

Draft

Model Request for Proposal [RFP]

for

Selection of Agency under Swadesh Darshan 2.0 Scheme for Development, Operations, Maintenance and Management of “Development of Adventure Tourism Hub at Tikkar Taal & Adventure Park



(Volume 1 of 2)

Date: 14.03.2026

HARYANA TOURISM CORPORATION

SCO 17-19, Sector 17-B, Chandigarh-160017-0172-2702955

Notice Inviting Bid

Dated: 14.03.2026

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List of Abbreviation

S. NO		Abbreviations
1	AF	Annual Fee
2	ASI	Archaeological Survey of India
3	BDD	Bid Due Date
4	BOQ	Bill of Quantity
5	CAs	Confirmation of Acceptance
6	CCTV	Closed Circuit Television
7	COD	Commercial Operation Date
9	CSR	Common Schedule of Rates
10	CZMA	Coastal Zone Management Act
11	DG	Diesel Generator
12	DMC	Destination Management Committee
13	DPR	Detailed Project Report
14	DSC	Digital Signature Certificate
15	EPC	Engineering, Procurement and Construction
16	FAQ	Frequently Asked Questions
17	FEED	Front End Experience and Engineering Design
18	GFC	Good for Construction
19	GOI	Government of India
20	IS Code	Indian Standard Code
21	IST	Indian Standard Time
22	KPI	Key Performance Indicator
23	LOA	Letter of Award

S. NO		Abbreviations
24	MICE	Meetings, Incentives, Conferences and Exhibitions.
25	MoEFCC	Ministry of Environment, Forest and Climate Change
26	MoT	Ministry of Tourism
27	NBC	National Building Code
28	O&M	Operations and Maintenance
29	PC	Project Cost
30	PDD	Process Definition Document or Post Disbursal Documents
31	PDMC	Project Development and Monitoring Consultants
32	HTC	Haryana Tourism Corporation
33	POA	Power of Attorney
34	PWD	Public Works Department
35	QR	Quick Response
36	RFP	Request for Proposal
37	SIA	State Implementing Agency
38	ST	Technical Score
39	TEDMA	Tourism Experience Development & Management Agency
40	UNESCO	United Nations Educational, Scientific and Cultural Organization
41	UT	Union Territory
42	WHO	World Health Organization

DISCLAIMER

The information contained in this Request for Proposals document (the “**RFP**”) or subsequently provided to Bidder(s), whether verbally or in documentary or any other form by or on behalf of Haryana Tourism Corporation Heritage & Tourism Promotion Board (the Authority) or any of its employees or advisors, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

This RFP is not an agreement and is neither an offer nor invitation by Haryana Tourism Corporation or to the prospective Bidders or any other person. The purpose of this RFP is to provide interested parties with information that may be useful to them in making their financial offers (Bids) pursuant to this RFP. This RFP includes statements, which reflect various assumptions and assessments arrived at by Haryana Tourism Corporation or in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require. This RFP may not be appropriate for all persons, and it is not possible for Haryana Tourism Corporation or, its employees or advisors to consider the investment objectives, financial situation and particular needs of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in the Bidding Documents, especially the DPR, may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources.

Information provided in this RFP to the Bidder(s) is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. Haryana Tourism Corporation the Authority or accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

Haryana Tourism Corporation or, its employees and advisors make no representation or warranty and shall have no liability to any person, including any Bidder or Bidder under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise, including the accuracy, adequacy, correctness, completeness or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way for participation in this Bid Stage.

Haryana Tourism Corporation the Authority or also accepts no liability of any nature whether resulting from negligence or otherwise, howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP.

Haryana Tourism Corporation the Authority or may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this RFP.

Haryana Tourism Corporation The issue of this RFP does not imply that The Authority or is bound to select a Bidder or to appoint the Selected Bidder or Agency, as the case may be, for the Project and Haryana Tourism Corporation The Authority or reserves the right to reject all or any of the Bidders or

Bids without assigning any reason whatsoever.

The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by Haryana Tourism Corporation the Authority or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and Haryana Tourism Corporation the Authority or ~~for~~.

1 INTRODUCTION

1.1 Background

- 1.1.1 Ministry of Tourism, Government of India has formulated Swadesh Darshan 2.0 Scheme (hereinafter referred as “**Scheme**”) to develop sustainable and responsible tourist destinations in the country by adopting the Destination Centric and Tourist Centric Approach. The Scheme is being implemented in the State of Haryana through its designated State Implementation Agency, Haryana Tourism Corporation as (hereinafter referred as “**Authority**”). The destination Panchkula (hereinafter referred as “**Destination**”) has been notified for developing as sustainable and responsible tourist destination. A Destination Management Committee (hereinafter referred as “**DMC**”) has also been constituted for the Destination under District Collector for coordinating, facilitating, and providing guidance for development of the destination. A professional agency Assystem India Limited (Formerly known as L&T Infrastructure Engineering Ltd.) & PricewaterhouseCoopers Private Ltd. (PWC) (hereinafter referred as “**Consultant**”) has been engaged as Project Design and Management Consultant for providing end to end support to SIA and DMC for implementation of the Scheme. A Master Plan for the destination has been prepared as part of the Scheme by the PDMC.

Name of the Project	Appointment of Agency for Development, Operations, Maintenance, and Management of Development of Adventure Tourism Hub at Tikkar Taal and Adventure Park
Name of the Authority	Executive Engineer, Haryana Tourism Corporation, SCO 17-19 Sector 17-B, Chandigarh
Location	Tikkar Taal , Haryana
Total Land Area	14.42 Acres (8.82 Tikkar Taal + 5.6 Acre Adventure Park)
Value of Work	Rs <u>2151.82 Lakh exclusive of GST</u>
Contract period	1 year (construction period)+5 years (operation & Maintenance and management from the date of issue of construction completion certificate)
Address for requesting clarifications is:	Executive Engineer, Haryana Tourism Corporation, SCO 17-19 Sector 17-B, Chandigarh Email: ee2009htc@gmail.com

- 1.1.2 The project **Development of Adventure Tourism Hub at Adventure Park, Morni** (hereinafter referred as “**Project**”) has been identified as one of the interventions in the Master Plan to enhance the tourist experience. The Authority is engaged in development of the project and as part of this endeavour, The Authority has decided to undertake development, operation/ maintenance and

management of the said **Project** and has, therefore, decided to carry out the bidding process for selection of Agency (hereinafter referred as “**Agency**”), a private entity as the bidder to whom the Project may be awarded. Brief particulars of the Project are as follows:

- 1.1.3 The Authority shall receive Bids pursuant to this RFP in accordance with the terms set forth in this RFP and other documents to be provided by the Authority pursuant to this RFP as modified, altered, amended and clarified from time to time by the Authority (collectively the “**Bidding Documents**”), and all Bids shall be prepared and submitted in accordance with such terms on or before the date specified in **Clause 1.4** for submission of Bids (the “**Bid Due Date**”).

1.2 Validity of the Proposal

The Bids shall be valid for a period of not less than 120 (one hundred and twenty) days from the Bid Due Date. The validity of Bids may be extended by mutual consent of the respective Bidders and the Authority.

1.3 Brief description of Bidding Process

- 1.3.1 The Authority has adopted a two-stage bidding process (collectively referred to as the “**Bidding Process**”) for selection of the Bidder for award of the Project. In the first stage, a technical evaluation will be carried out for bidders meeting minimum eligibility requirements. In the second stage, a financial evaluation will be carried out for Technically qualified bidders. The Bidders would be required to furnish all the information specified in this RFP.
- 1.3.2 Bidders are invited to examine the Project in greater detail, and to carry out, at their cost, such studies as may be required for submitting their respective Bids for award of the Project including implementation thereof.
- 1.3.3 The Bidder who satisfies the evaluation criteria in Section 2 and Section 4 shall be the selected Bidder. The remaining Bidders shall be kept in reserve and may, in accordance with the process specified in the RFP, be invited to match the Bid submitted by the Responsive Bidder in case such Responsive Bidder withdraws or is not selected for any reason. In the event that none of the other Bidders match the Bid of the Responsive Bidder, the Authority may, in its discretion, invite fresh Bids from the remaining Bidders or annul the Bidding Process, as the case may be.

1.4 Schedule of Bidding Process

- 1.4.1 The Authority shall endeavour to adhere to the following schedule:

1.	Issuance of Bidding Documents	14.03.2026; 5.00 PM
3.	Pre-Bid Conference	Already Held
5.	Bid Due Date (BDD)	30.03.2026 ;10:00 AM
6.	Opening of Technical Bids	30.03.2026; 11:00 AM
7.	Announcement of qualified Bidders	As per schedule
8.	Opening of Financial Bid	As per schedule

9.	Letter of Award (LOA)	As per schedule
10.	Signing of Contract Agreement	As per schedule

1.5 Pre-Bid Conference

1.5.1 Any queries or request for additional information concerning this RFP shall be submitted in writing by e-mail so as to reach the officer designated in Clause 2.13.4 by the specified date. The Authority shall endeavour to respond to the queries within the period specified therein. The email communication shall clearly bear the following subject title:

“Queries/Request for Additional Information: RFP for Appointment of Agency for development, operations, maintenance and management of “Development of Adventure Tourism Hub at Tikkar Taal & Adventure Park”.

1.5.2 Pre-Bid Conference(s) of the Bidders shall be convened at the designated date, time and place. A maximum of three representatives of each Bidder shall be allowed to participate on production of authority letter from the Bidder.

1.5.3 During Pre-Bid Conference(s), the Bidders will be free to seek clarifications and make suggestions for consideration of the Authority (only written/email queries in pre-bid will be entertained, no verbal queries will be responded). The Authority shall endeavour to provide clarifications and such further information as it may, in its sole discretion, consider appropriate for facilitating a fair, transparent and competitive Bidding Process.

1.5.4 The time and venue of the Pre-Bid Conference shall be intimate.

2 INSTRUCTIONS TO BIDDERS

A. GENERAL

2.1 General Terms of Bidding

- 2.1.1 No Bidder shall submit more than one Bid for the Project. A Bidder bidding individually or as a member of a Consortium shall not be entitled to submit another bid either individually or as a member of any Consortium, as the case may be.
- 2.1.2 Notwithstanding anything to the contrary contained in this RFP, the detailed terms specified in the draft Contract Agreement shall have overriding effect; provided, however, that any conditions or obligations imposed on the Bidder hereunder shall continue to have effect in addition to its obligations under the Contract Agreement.
- 2.1.3** The Bidder shall deposit a **Bid Security of Rs. 43,00,000/- (Rupees Forty Three Lakh Only)** in accordance with the provisions of this RFP. The Bidder has to deposit Bid Security amount specified for the Project/Work(s) as per Clause no. 2.1.4 and shall be paid online through Net Banking/NEFT/RTGS at portal <https://etenders.hry.nic.in/>
- 2.1.4 The validity period of the Bank Guarantee shall not be less than 120 (one hundred and twenty) days from the Bid Due Date, inclusive of a claim period of 60 (sixty) days and may be extended as may be mutually agreed between the Authority and the Bidder. Where a demand draft is provided, its validity shall not be less than 80 (eighty) days from the Bid Due Date, for the purposes of encashment by the Authority. The Bid shall be summarily rejected if it is not accompanied by the Bid Security. The Bid Security shall be refundable no later than 120 (One Hundred Twenty) days from the Bid Due Date except in the case of the Selected Bidder whose Bid Security shall be returned after 07 days of submission of PBG.
- 2.1.5 The Bidder should submit a Power of Attorney as per the format at Appendix-III, authorising the signatory of the Bid to commit the Bidder.
- 2.1.6 In case the Bidder is a Consortium, the Members thereof should furnish a Power of Attorney in favour of the Lead Member in the format at Appendix-IV.
- 2.1.7 Any condition or qualification or any other stipulation contained in the Bid shall render the Bid liable to rejection as a non-responsive Bid.
- 2.1.8 The Bid and all communications in relation to or concerning the Bidding Documents and the Bid shall be in English language.
- 2.1.9 The documents including this RFP and all attached documents, provided by the Authority are and shall remain or become the property of the Authority and are transmitted to the Bidders solely for the purpose of preparation and the submission of a Bid in accordance herewith. Bidders are to treat all information as strictly confidential and shall not use it for any purpose other than for preparation and submission of their Bid. The provisions of this Clause 2.1.11 shall also apply mutatis mutandis to Bids and all other documents submitted by the Bidders, and the Authority will not return to the Bidders any Bid, document or any information provided along therewith.
- 2.1.10 A Bidder including any Consortium Member should, in the last 3 (three) years, have neither failed to perform on any contract, as evidenced by imposition of a penalty by an arbitral or judicial authority or a judicial pronouncement or arbitration award against the Bidder, Consortium Member, as the case may be, nor has been expelled from any project or contract by any public entity nor have

had any contract terminated/blacklisted any public entity for breach by such Bidder, Consortium Member.

- 2.1.11 The Bidders should attach clearly marked and referenced continuation sheets in the event that the space provided in the prescribed forms in the Annexes is insufficient. Alternatively, Bidders may format the prescribed forms making due provision for incorporation of the requested information;
- 2.1.12 Information supplied by a Bidder (or other constituent Member if the Bidder is a Consortium) must apply to the Bidder, Member or Associate named in the Bid and not, unless specifically requested, to other associated companies or firms. Invitation to submit Bids will be issued only to Bidders whose identity and/ or constitution is identical to that at pre-qualification;
- 2.1.13 Notwithstanding anything to the contrary contained herein, in the event that the Bid Due Date falls within 3 (three) months of the closing of the latest financial year of a Bidder, it shall ignore such financial year for the purposes of its Bid and furnish all its information and certification with reference to the 5 (five) years or 1 (one) year, as the case may be, preceding its latest financial year. For the avoidance of doubt, financial year shall, for the purposes of a Bid hereunder, mean the accounting year followed by the Bidder in the course of its normal business.
- 2.1.14 Authority would place sole reliance on the certification provided by the Bidder in this regard in its letter comprising the Technical Bid.
- 2.1.15 This RFP is not transferable.
- 2.1.16 Any award of Contract pursuant to this RFP shall be subject to the terms of Bidding Documents.

2.2 Eligibility of Bidders

- 2.2.1 For determining the eligibility of Bidders for submission of Bids hereunder, the following shall apply:
- 2.2.1.1 The Bidder may be **a single entity or a group of entities (the “Consortium”)**, coming together to implement the Project. However, no Bidder applying individually or as a member of a Consortium, as the case may be, can be member of another Bidder. The term Bidder used herein would apply to both a single entity and a Consortium.
- 2.2.1.2 Bidder shall not have a conflict of interest (the “Conflict of Interest”) that affects the Bidding Process. Any Bidder found to have a Conflict of Interest shall be disqualified. In the event of disqualification, the Authority shall be entitled to forfeit and appropriate the Bid Security or Performance Security, as the case may be, as mutually agreed genuine pre- estimated loss and damage likely to be suffered and incurred by the Authority and not by way of penalty for, inter alia, the time, cost and effort of the Authority, including consideration of such Bidder’s proposal (the “Damages”), without prejudice to any other right or remedy that may be available to the Authority under the Bidding Documents and/ or the Contract Agreement or otherwise. Without limiting the generality of the above, a Bidder shall be deemed to have a Conflict of Interest affecting the Bidding Process, if:

- (i) the Bidder, its Member or Associate (or any constituent thereof) and any other Bidder, its Member or any Associate thereof (or any constituent thereof) have common controlling shareholders or other ownership interest; provided that this disqualification shall not apply in cases where the direct or indirect shareholding of a Bidder, its Member or an Associate thereof (or any shareholder thereof having a shareholding of more than 5% (five per cent) of the paid up and subscribed share capital of such Bidder, Member or Associate, as the case may be) in the other Bidder, its Member or Associate, is less than 5% (five per cent) of the subscribed and paid up equity share capital thereof; provided further that this disqualification shall not apply to any ownership by a bank, insurance company, pension fund or a public financial institution referred to in sub-section (72) of section 2 of the Companies Act, 2013. For the purposes of this Clause 2.2.1.2, indirect shareholding held through one or more intermediate persons shall be computed as follows:
- (ii) (aa) where any intermediary is controlled by a person through management control or otherwise, the entire shareholding held by such controlled intermediary in any other person (the "Subject Person") shall be taken into account for computing the shareholding of such controlling person in the Subject Person; and
- (iii) (bb) subject always to sub-clause (aa) above, where a person does not exercise control over an intermediary, which has shareholding in the Subject Person, the computation of indirect shareholding of such person in the Subject Person shall be undertaken on a proportionate basis; provided, however, that no such shareholding shall be reckoned under this sub-clause (bb) if the shareholding of such person in the intermediary is less than 26% of the subscribed and paid up equity shareholding of such intermediary; or
- (iv) a constituent of such Bidder is also a constituent of another Bidder; or
- (v) such Bidder, its Member or any Associate thereof receives or has received any direct or indirect subsidy, grant, Contractual loan or subordinated debt from any other Bidder, its Member or Associate, or has provided any such subsidy, grant, Contractual loan or subordinated debt to any other Bidder, its Member or any Associate thereof; or
- (vi) such Bidder has the same legal representative for purposes of this Bid as any other Bidder; or
- (vii) such Bidder, or any Associate thereof, has a relationship with another Bidder, or any Associate thereof, directly or through common third party/ parties, that puts either or both of them in a position to have access to each other's information about, or to influence the Bid of either or each other; or
- (viii) such Bidder or any Associate thereof has participated as a consultant to the Authority in the preparation of any documents, design or technical specifications of the Project.

Explanation:

In case a Bidder is a Consortium, then the term Bidder as used in this Clause 2.2.1.2, shall include each Member of such Consortium.

For purposes of this RFP, Associate means, in relation to the Bidder/ Consortium Member, a person who controls, is controlled by, or is under the common control with such Bidder/ Consortium Member (the "Associate"). 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 by operation of law.

2.2.1.3 A Bidder shall be liable for disqualification and forfeiture of Bid Security if any legal, financial or

technical adviser of the Authority in relation to the Project is engaged by the Bidder, its Members or any Associate thereof, as the case may be, in any manner for matters related to or incidental to such Project during the Bidding Process or subsequent to the (i) issue of the LOA or (ii) execution of the Contract Agreement. In the event any such adviser is engaged by the Selected Bidder or Agency, as the case may be, after issue of the LOA or execution of the Contract Agreement for matters related or incidental to the Project, then notwithstanding anything to the contrary contained herein or in the LOA or the Contract Agreement and without prejudice to any other right or remedy of the Authority, including the forfeiture and appropriation of the Bid Security or Performance Security, as the case may be, which the Authority may have thereunder or otherwise, the LOA or the Contract Agreement, as the case may be, shall be liable to be terminated without the Authority being liable in any manner whatsoever to the Selected Bidder or Agency for the same. For the avoidance of doubt, this disqualification shall not apply where such adviser was engaged by the Bidder, its Member or Associate in the past but its assignment expired or was terminated prior to the Bid Due Date. Nor will this disqualification apply where such adviser is engaged after a period of 3 (three) years from the date of commercial operation of the Project.

2.2.1.4 The Bidder shall enclose with its Bid, to be submitted as per the format at Appendix - I, complete with its Annexes, including the following:

- i. **Certificate(s) from statutory auditors of the Bidder or its Associates specifying the Net Worth of the Bidder**, as at the close of the preceding financial year, and also specifying that the methodology adopted for calculating such Net Worth conforms to the provisions of this Clause. For the purposes of this RFP, net worth (the “**Net Worth**”) shall mean the sum of subscribed and paid-up equity and reserves from which shall be deducted the sum of revaluation reserves, miscellaneous expenditure not written off and reserves not available for distribution to equity shareholders.

2.2.2 The Bidder should submit a Power of Attorney as per the format at Appendix-III authorising the signatory of the Bid to commit the Bidder. In the case of a Consortium, the Members should submit a Power of Attorney in favour of the Lead Member as per format at Appendix- IV

2.2.3 In case the Bidder is a Consortium, it shall, comply with the following requirements:

- (i) Number of members in a consortium shall not exceed 3 (three),
- (ii) Subject to the provisions of sub-clause (a) above, the Bid should contain the information required for each member of the Consortium.
- (iii) Members of the Consortium shall nominate one member as the lead member (the “**Lead Member**”). The nomination(s) shall be supported by a Power of Attorney, as per the format at Appendix-III, signed by all the other members of the Consortium.
- (iv) the Bid should include a brief description of the roles and responsibilities of individual members, particularly with reference to financial, technical and O&M obligations;
- (v) An individual Bidder cannot at the same time be member of a Consortium applying for pre-qualification. Further, a member of a particular Bidder Consortium cannot be member of any other Bidder Consortium applying for pre-qualification;
- (vi) Members of the Consortium shall enter into a binding Joint Bidding Agreement, substantially in the form specified at Appendix-V (the “**Jt. Bidding Agreement**”), for the purpose of

making the Bid and submitting a Bid in the event of being short-listed. The Jt.Bidding Agreement, to be submitted along with the Bid, shall, inter alia:

- a) Enter into the Contract Agreement and subsequently perform all the obligations of the Agency in terms of the Contract Agreement, in case the Contract to undertake the Project is awarded to the Consortium;
 - b) Clearly outline the proposed roles and responsibilities, if any, of each member;
 - c) Commit the minimum equity stake to be held by each member;
 - d) Include a statement to the effect that all members of the Consortium shall be liable jointly and severally for all obligations of the Agency in relation to the Project until the Financial Close of the Project is achieved in accordance with the Contract Agreement; and
- (vii) Except as provided under this RFP and the Bidding Documents, there shall not be any amendment to the Jt. Bidding Agreement without the prior written consent of the Authority.
- (viii) The Bidders are allowed to use the credentials of the parent/holding company shall be considered, provided it holds more than 95% equity stake in the bidding entity as on the date of bid submission.

2.3 Change in Ownership

- 2.3.1 By submitting the Bid, the Bidder acknowledges and agrees to obligations as may be contained in the Contract Agreement, and a breach hereof shall, notwithstanding anything to the contrary contained in the Contract Agreement, be deemed to be a breach of the Contract Agreement and dealt with as such thereunder.
- 2.3.2 By submitting the Bid, the Bidder shall also be deemed to have acknowledged and agreed that in the event of a change in control of a Consortium Member or an Associate whose Technical Capacity and/ or Financial Capacity was taken into consideration for the purposes of short- listing and pre-qualification under and in accordance with the RFP, the Bidder shall be deemed to have knowledge of the same and shall be required to inform the Authority forthwith along with all relevant particulars about the same and the Authority may, in its sole discretion, disqualify the Bidder or withdraw the LOA from the Selected Bidder, as the case may be. In the event such change in control occurs after signing of the Contract Agreement but prior to Financial Close of the Project, it would, notwithstanding anything to the contrary contained in the Contract Agreement, be deemed to be a breach of the Contract Agreement, and the same shall be liable to be terminated without the Authority being liable in any manner whatsoever to the Agency. In such an event, notwithstanding anything to the contrary contained in the Contract Agreement, the Authority shall be entitled to forfeit and appropriate the Bid Security or Performance Security, as the case may be, as Damages, without prejudice to any other right or remedy that may be available to the Authority under the Bidding Documents and/ or the Contract Agreement or otherwise.

2.4 Number of Bids and costs thereof

- 2.4.1 No Bidder shall submit more than one Bid for the Project. A Bidder applying individually or as a member of a Consortium shall not be entitled to submit another Bid either individually or as a member of any Consortium, as the case may be.
- 2.4.2 The Bidders shall be responsible for all of the costs associated with the preparation of their Bids and

their participation in the Bidding Process. The Authority will not be responsible or in any way liable for such costs, regardless of the conduct or outcome of the Bidding Process.

2.5 Site visit and verification of information

Bidders are encouraged to submit their respective Bids after visiting the Project site and ascertaining for themselves the site conditions, location, surroundings, climate, availability of power, water and other utilities for construction, access to site, handling and storage of materials, weather data, applicable laws and regulations, and any other matter considered relevant by them.

2.6 Acknowledgement by Bidder

2.6.1 It shall be deemed that by submitting a Bid, the Bidder has:

- (i) Made a complete and careful examination of the Bidding Documents;
- (ii) Received all relevant information requested from the Authority;
- (iii) Accepted the risk of inadequacy, error or mistake in the information provided in the Bidding Documents or furnished by or on behalf of the Authority relating to any of the matters referred to in Clause 2.5 above;
- (iv) Satisfied itself about all matters, things and information including matters referred to in Clause 2.5 hereinabove necessary and required for submitting an informed Bid, execution of the Project in accordance with the Bidding Documents and performance of all of its obligations thereunder;
- (v) Acknowledged and agreed that inadequacy, lack of completeness or incorrectness of information provided in the Bidding Documents or ignorance of any of the matters referred to in Clause 2.5 hereinabove shall not be a basis for any claim for compensation, damages, extension of time for performance of its obligations, loss of profits etc. from the Authority, or a ground for termination of the Contract Agreement by the Agency;
- (vi) Acknowledged that it does not have a Conflict of Interest; and
- (vii) Agreed to be bound by the undertakings provided by it under and in terms hereof.

2.6.2 The Authority shall not be liable for any omission, mistake or error in respect of any of the above or on account of any matter or thing arising out of or concerning or relating to RFP, the Bidding Documents or the Bidding Process, including any error or mistake therein or in any information or data given by the Authority.

2.7 Right to accept or reject any or all Bids

2.7.1 Notwithstanding anything contained in this RFP, the Authority reserves the right to accept or reject any Bid and to annul the Bidding Process and reject all Applications/ Bids, at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons therefore. In the event that the Authority rejects or annuls all the Bids, it may, in its discretion, invite all eligible Bidders to submit fresh Bids hereunder.

2.7.2 The Authority reserves the right to reject any Bid if:

- i. At any time, a material misrepresentation is made or uncovered, or
- ii. The Bidder does not provide, within the time specified by the Authority, the supplemental information sought by the Authority for evaluation of the Bid.

- 2.7.3 If the Bidder is a Consortium, then the entire Consortium may be disqualified/ rejected. If such disqualification/ rejection occurs after the Bids have been opened and the Least Bidder gets disqualified/ rejected, then the Authority reserves the right to:
- i. Invite the remaining Bidders to match the Least Bidder/ submit their Bids in accordance with the RFP; or
 - ii. Take any such measure as may be deemed fit in the sole discretion of the Authority, including annulment of the Bidding Process.
- 2.7.4 In case it is found during the evaluation or at any time before signing of the Contract Agreement or after its execution and during the period of subsistence thereof, including the Contract thereby granted by the Authority, that one or more of the pre-qualification conditions have not been met by the Bidder, or the Bidder has made material misrepresentation or has given any materially incorrect or false information, the Bidder shall be disqualified forthwith if not yet appointed as the Agency either by issue of the LOA or entering into of the Contract Agreement, and if the Bidder has already been issued the LOA or has entered into the Contract Agreement, as the case may be, the same shall, notwithstanding anything to the contrary contained therein or in this RFP, be liable to be terminated, by a communication in writing by the Authority to the Bidder, without the Authority being liable in any manner whatsoever to the Bidder and without prejudice to any other right or remedy which the Authority may have under this RFP, the Bidding Documents, the Contract Agreement or under applicable law.
- 2.7.5 The Authority reserves the right to verify all statements, information and documents submitted by the Bidder in response to the RFP. Any such verification or lack of such verification by the Authority shall not relieve the Bidder of its obligations or liabilities hereunder nor will it affect any rights of the Authority thereunder.
- 2.7.6 The Authority may, in its sole discretion and on grounds of reciprocity, disqualify a Bidder, if any or all of its constituents are entities incorporated in a country where an entity incorporated in India does not have similar rights of bidding for contracts contemplated hereunder.

B. DOCUMENTS

2.8 Contents of the RFP

- 1.9.1 This RFP comprise of two volumes as listed below and will additionally include any addendum/Amendment/corrigendum issued from time to time.

Request for Proposal Volume 1: Bid Document

Section 1. Introduction

Section 2. Instructions to Bidders

Section 3. Criteria for Evaluation

Section 4. Fraud and Corrupt Practices

Section 5. Scope of Work

Section 6. Miscellaneous

Appendices

- I. Letter Comprising the Technical Bid
- II. Letter Comprising the Financial Bid
- III. Format for Power of Attorney for signing of Bid
- IV. Format for Power of Attorney for Lead Member of Consortium
- V. Format for Joint Bidding Agreement for JV/ Consortium
- VI. Format for Bid Security (Bank Guarantee)
- VII. Clearances

Volume 2: Contract Agreement

The Contract Agreement and the Detailed Project Report provided by the Authority as part of the Bidding Documents shall be deemed to be part of this RFP.

2.9 Clarifications

- 1.10.1 The Authority shall endeavour to respond to the questions raised or clarifications sought by the Bidders. However, the Authority reserves the right not to respond to any question or provide any clarification, in its sole discretion, and nothing in this Clause shall be taken or read as compelling or requiring the Authority to respond to any question or to provide any clarification.
- 1.10.2 The Authority may also on its own motion, if deemed necessary, issue interpretations and clarifications to all Bidders. All clarifications and interpretations issued by the Authority shall be deemed to be part of the Bidding Documents. Verbal clarifications and information given by Authority or its employees or representatives shall not in any way or manner be binding on the Authority.

2.10 Amendment of RFP

- 1.11.1 At any time prior to the Bid Due Date, the Authority may, for any reason, whether at its own initiative or in response to clarifications requested by a Bidder, modify the RFP by the issuance of

Addenda.

1.11.2 Any Addendum to the RFP shall be uploaded online on <https://etenders.hry.nic.in/>

1.11.3 In order to afford the Bidders a reasonable time for taking an Addendum into account, or for any other reason, the Authority may, in its sole discretion, extend the Bid Due Date.

C. PREPARATION AND SUBMISSION OF BID

2.11 Language

1.11.1 The Bid and all related correspondence and documents in relation to the Bidding Process shall be in English language. Supporting documents and printed literature furnished by the Bidder with the Bid may be in any other language provided that they are accompanied by translations of all the pertinent passages in the English language, duly authenticated and certified by the Bidder. Supporting materials, which are not translated into English, may not be considered. For the purpose of interpretation and evaluation of the Bid, the English language translation shall prevail.

2.12 Format and Signing of Bid

1.12.1 The Bidder shall provide all the information sought under this RFP. The Authority will evaluate only those Bids that are received online in the required formats and complete in all respects and Bid Security, proof of online payment of cost of bid document, POA and Joint Bidding Agreement etc. as specified in Clause 2.13.2 of the RFP are received in hard copies.

1.12.2 The Bid shall be typed and signed by the authorised signatory of the Bidder who shall also initial each page. All the alterations, omissions, additions or any other amendments made to the Bid shall be initialled by the person(s) signing the Bid.

1.12.3 If every page of bid is not notarised and signed by duly authorised representative, the bid will be up rightly rejected.

2.13 Documents comprising Technical and Financial Bid

2.13.1 The Bidder shall submit the Technical Bid & Financial Bid online through e-procurement portal <https://etenders.hry.nic.in/> and also submit the hard copies before the due date comprising of the following documents along with supporting

Technical Bid

- (a) Appendix-I (Letter comprising the Technical Bid) including Annexure I to VI and supporting certificates/documents;
- (b) Power of Attorney for signing the BID as per the format at Appendix-III;
- (c) if applicable, Power of Attorney for Lead Member of Consortium as per the format at Appendix-IV;
- (d) if applicable, Joint Bidding Agreement for Consortium as per the format at Appendix-V
- (e) copy of Memorandum and Articles of Association, if the Applicant is a body corporate, and if a partnership then a copy of its partnership deed;
- (f) Copies of Bidder's duly audited balance sheet and profit and loss statement for preceding 3 years.
- (g) Proof of payment of BID Security of **Rs. 43,00,000/- (Rupees Forty Three Lakhs Only)** in the through Net Banking/NEFT/RTGS/BG at portal <https://etenders.hry.nic.in/>.
- (h) Proof of payment of Rs. **15,000/-** plus 18% GST towards cost of Bid document.
- (i) Proof of payment of tender processing fee of Rs.**20,000/- (Rupees Twenty Thousand only)** plus 18% GST;

- (j) An undertaking from the person having PoA referred to in Sub. Clause-(b) above that they agree and abide by the Bid documents uploaded by the Authority and amendments uploaded, if any.
- (k) A notarized affidavit on a stamp paper of appropriate value to the effect that they have not been blacklisted or their business dealings with the Govt Ministries / Departments have not been banned.

Financial Bid

- (a) Appendix-II (Letter comprising the Financial Bid)

2.13.2 The Bidder shall submit the following documents online:

- (i) Original Power of Attorney (PoA) for signing the Bid as per format at Appendix-III;
- (ii) if applicable, Original Power of Attorney for Lead Member of Consortium as per the format at Appendix-IV;
- (iii) if applicable, Original Joint Bidding Agreement for Consortium as per the format at Appendix-V
- (iv) Bid Security of Rs. 43,00,000/- (Fourty Three Lakhs Only) through Net Banking/NEFT/RTGS/BG at portal <https://etenders.hry.nic.in/>.
- (v) Copy of Proof of Payment of online payment of Cost of Tender Document of Rs. 20000.00/ (Rupees Twenty Thousand only) plus 18% GST.

2.13.3 Bids submitted by fax, telex, telegram or e-mail shall not be entertained and shall be summarily rejected.

2.14 Bid Due Date

2.14.1 Bids should be submitted online through e-procurement portal <https://etenders.hry.nic.in/> on or before 17:00hrs IST on 17.02.2026

2.14.2 The Authority may, in its sole discretion, extend the Bid Due Date by issuing an Addendum in accordance with Clause 2.10.2 uniformly for all Bidders.

2.14.3 Bids received by the Authority after the specified time on the Bid Due Date shall not be eligible for consideration and shall be summarily rejected.

2.15 Late Bids

E-procurement portal <https://etenders.hry.nic.in/> shall not allow submission of any Bid after the prescribed date and time at Clause 1.4.1. Physical receipt of documents listed at Clause 2.13.2 of the RFP after the prescribed date and time at Clause 1.4.1 shall not be considered and the bid shall be summarily rejected.

2.16 Procedure for e-tendering

2.16.1 Accessing/ Purchasing of Bid documents

1. It is mandatory for all the Bidders to have class-III Digital Signature Certificate (DSC) (in the name of Authorized Signatory / Firm or Organization / Owner of the Firm or organization) from any of the licensed Certifying Agency (Bidders can see the list of licensed CAs from the link www.cca.gov.in) to participate in e-tendering of the Authority.

DSC should be in the name of the authorized signatory as authorized in Appendix IV of this RFP. It should be in corporate capacity (that is in Bidder capacity / in case of Consortium in

the Lead Member capacity, as applicable). The Bidder shall submit a document in support of the class III DSC.

The Authorized Signatory holding Power of Attorney shall only be the Digital Signatory. In case Authorized Signatory holding Power of Attorney and Digital Signatory are not the same, the BID shall be considered non-responsive.

2. To participate in the bidding, it is mandatory for the Bidders to get registered their firm / Consortium with e-procurement portal of the Authority <https://etenders.hry.nic.in/> to have user ID & password which has to be obtained by submitting an annual registration charge of Rs. 500/- (Rupees Five hundred Only) plus 18% GST to the e-tendering service provider i.e. Tenders Haryana Government e-Procurement System through their e-payment gateway. Validity of online registration is for one year only. Following may kindly be noted:
 - i. Registration with e-procurement portal of the Authority should be valid at least up to the date of submission of Bid.
 - ii. Bids can be submitted only during the validity of registration.
3. If the firm / Consortium is already registered with e-tendering service provider of the Authority, and validity of registration is not expired the firm / Consortium is not required a fresh registration.
4. The complete Bid document can be viewed / downloaded by the Bidder from e- procurement portal of the Authority Haryana Tourism Corporation from [14.03.2026] to [28.03.2026] up to [17:00] Hrs. IST).
5. To participate in e- bidding, Bidders have to pay Rs 15000 /- (Rupees Fifteen Thousand only) as non-refundable fee for e-procurement service to e-tendering service provider i.e. Haryana Tourism Corporation against tender processing fee through online payment only.

2.17 Modifications/ Substitution/ Withdrawal of Bids

The Bidder may modify, substitute or withdraw its e-Bid prior to the Bid Due Date. No Bid can be modified, substituted or withdrawn by the Bidder on or after the Bid Due Date & Time. Before withdrawal of a Bid, it may specifically be noted that after withdrawal of a Bid for anyreason, Bidder cannot re-submit e-Bid again.

2.18 Correspondence with the Bidder

Save and except as provided in this RFP, the Authority shall not entertain any correspondence with any Bidder in relation to acceptance or rejection of any Bid.

D. EVALUATION PROCESS

2.19 Opening and Evaluation of Bids

- 1.18.1 The Authority shall open the Technical Bids on the Bid Due Date, at the time specified in Clause 1.4.1
- 1.18.2 The Authority will subsequently examine and evaluate Bids in accordance with the provisions set out in Section 4.
- 1.18.3 To facilitate evaluation of Bids, the Authority may, at its sole discretion, seek clarifications in writing from any Bidder regarding its Bid.
- 1.18.4 Bidders are advised that selection of Bidders will be entirely at the discretion of the Authority. Bidders will be deemed to have understood and agreed that no explanation or justification on any aspect of the Bidding Process or selection will be given.
- 1.18.5 Any information contained in the Bid shall not in any way be construed as binding on the Authority, its agents, successors or assigns, but shall be binding against the Bidder if the Project is subsequently awarded to it on the basis of such information.
- 1.18.6 The Authority reserves the right not to proceed with the Bidding Process at any time without notice or liability and to reject any or all Bid(s) without assigning any reasons.
- 1.18.7 If any information furnished by the Bidder is found to be incomplete, or contained in formats other than those specified herein, the Authority may, in its sole discretion, exclude the relevant project from computation of the Experience Score of the Bidder.

2.20 Confidentiality

- 1.19.1 Information relating to the examination, clarification, evaluation, and recommendation of the Bidders shall not be disclosed to any person who is not officially concerned with the process or is not a retained professional advisor advising the Authority in relation to, or matters arising out of, or concerning the Bidding Process. The Authority will treat all information, submitted as part of Bid, in confidence and will require all those who have access to such material to treat the same in confidence. The Authority may not divulge any such information unless it is directed to do so by any statutory entity that has the power under law to require its disclosure or is to enforce or assert any right or privilege of the statutory entity and/ or the Authority or as may be required by law or in connection with any legal process.

2.21 Examination Regarding Proposal Being Responsive to the Requirements

- 2.21.1 Prior to evaluation of Proposals, the Authority will determine whether each Proposal is responsive to the requirements of the RFP. The Authority may, in its sole discretion, reject any Proposal that is not responsive hereunder. A Proposal shall be considered responsive only if:
- (i) Technical Bid is received online as per the format at Appendix-I (Annexure I to VI);
 - (ii) Documents listed at Clause 2.13.2 are received physically;
 - (iii) Technical Bid is accompanied by the Bid Security as specified in Clause 2.13.1 and 2.13.2;
 - (iv) Technical Bid is accompanied by the Power of Attorney as specified in Clause 2.2.1 and in case of Consortium, the Power of Attorney for Lead Member of Consortium as specified in Clauses

2.2.3

- (v) Technical Bid contain all the information (complete in all respects);
- (vi) it contains information in formats same as those specified in this RFP;
- (vii) Technical Bid does not contain any condition or qualification;
- (viii) it contains certificates from its statutory auditors in the formats specified at Appendix- I of the RFP for each Eligible Project;
- (ix) it contains an attested copy of the receipt of the Authority towards the cost of the RFP process as specified in Clause 1.3;
- (x) it is accompanied by the Jt. Bidding Agreement (for Consortium), specific to the Project, as stipulated in Clause 2.2.3(vi);
- (xi) Technical Bid contains proof of online payment of Rs.15,000/- (Rupees Fifteen Thousand only) plus 18% GST towards cost of Bid document

2.21.2 Right to Reject Non-Responsive Proposal

The Authority reserves the right to reject any Bid which is non-responsive and no request for alteration, modification, substitution or withdrawal shall be entertained by the Authority in respect of such Bid. Provided, however, that the Authority may, in its discretion, allow the Bidder to rectify any infirmities or omissions if the same do not constitute a material modification of the Bid.

2.22 Technical Evaluation

After the evaluation of Technical Bids, the Authority would announce a list of qualified Bidders who will be eligible for opening of their Financial Bids. The Authority will not entertain any query or clarification from Bidders who fail to pre-qualify.

2.23 Financial Evaluation

After the technical evaluation, the Authority shall prepare a list of technically qualified Applicants as per methodology laid out in Clause 4.6 for opening of their Financial Proposals. A date, time and venue will be notified to all Applicants for announcing the result of evaluation and opening of Financial Proposals. Before opening of the Financial Proposals, the list of technically qualified Applicants along with their Technical Score will be read out for each State/UT. The opening of Financial Proposals for each State/UT shall be done in presence of respective representatives of Technically Qualified Applicants who choose to be present. The Authority will not entertain any query or clarification from Applicants who fail to qualify at any stage of the Selection Process.

2.24 Proprietary Data

- 2.24.1 All documents and other information supplied by the Authority or submitted by a Bidder to the Authority shall remain or become the property of the Authority. Bidders are to treat all information as strictly confidential and shall not use it for any purpose other than for preparation and submission of their Bid. The Authority will not return any Bid, or any information provided along therewith.

2.25 Rejection of Bids

2.25.1 Notwithstanding anything contained in this RFP, the Authority reserves the right to reject any Bid and to annul the Bidding Process and reject all Bids at any time without any liability or any obligation for such acceptance, rejection or annulment, and without assigning any reasons therefor. In the event that the Authority rejects or annuls all the Bids, it may, in its discretion, invite all eligible Bidders to submit fresh Bids hereunder.

2.25.2 The Authority reserves the right not to proceed with the Bidding Process at any time, without notice or liability, and to reject any Bid without assigning any reasons.

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3 BID SECURITY

3.1 Bid Security

- 3.1.1. The Bidder shall pay online as part of its Bid, a Bid Security referred to in Clauses 2.1.4 and 2.1.5 hereinabove through Net Banking/NEFT/RTGS/BG at portal <https://etenders.hry.nic.in/>
- 3.1.2. The Bidder has to deposit Bid Security amount specified for the Project/Work(s) as per Clause no. 2.1.4 and shall be paid online through Net Banking/NEFT/RTGS/BG at portal <https://etenders.hry.nic.in/> .The Authority shall not be liable to pay any interest on the Bid Security deposit so made and the same shall be interest free.
- 3.1.3. Any Bid not accompanied by the Bid Security shall be summarily rejected by the Authority as non-responsive.
- 3.1.4. Save and except as provided in Clauses 2.1.4 and 2.1.5 above, the Bid Security of unsuccessful Bidders will be returned by the Authority, without any interest, as promptly as possible on acceptance of the Bid of the Selected Bidder or when the Bidding process is cancelled by the Authority, and in any case within 120 (One Hundred and Twenty) days from the Bid Due Date. Where Bid Security has been paid by demand draft, the refund thereof shall be in the form of an account payee demand draft in favour of the unsuccessful Bidder(s). Bidders may by specific instructions in writing to the Authority give the name and address of the person in whose favour the said demand draft shall be drawn by the Authority for refund, failing which it shall be drawn in the name of the Bidder and shall be mailed to the address given on the Bid.
- 3.1.5. The Selected Bidder's Bid Security will be returned, without any interest, upon the Agency signing the Contract Agreement and furnishing the Performance Security in accordance with the provisions thereof..
- 3.1.6. The Authority shall be entitled to forfeit and appropriate the Bid Security as Damages inter alia in any of the events specified in Clause 3.1.7 herein below. The Bidder, by submitting its Bid pursuant to this RFP, shall be deemed to have acknowledged and confirmed that the Authority will suffer loss and damage on account of withdrawal of its Bid or for any other default by the Bidder during the period of Bid validity as specified in this RFP. No relaxation of any kind on Bid Security shall be given to any Bidder.
- 3.1.7. The Bid Security shall be forfeited as Damages without prejudice to any other right or remedy that may be available to the Authority under the Bidding Documents and/ or under the Contract Agreement, or otherwise, if
- (i) a Bidder submits a non-responsive Bid;
 - (ii) a Bidder engages in a corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice as specified in Section 5 of this RFP;
 - (iii) a Bidder withdraws its Bid during the period of Bid validity as specified in this RFP and as extended by mutual consent of the respective Bidder(s) and the Authority;
 - (iv) the Selected Bidder fails within the specified time limit –
 - a) to sign and return the duplicate copy of LOA; or
 - b) to sign the Contract Agreement; or

- c) to furnish the Performance Security within the period prescribed therefor in the Contract Agreement.

the Selected Bidder, having signed the Contract Agreement, commits any breach thereof prior to furnishing the Performance Security.

4 CRITERIA FOR EVALUATION

4.1 Eligible Projects

4.1.1 The following categories of experience would qualify as eligible project (the “**Eligible Projects**”):

(v) **Category1: Development of project/experience in tourism having similar** sector of experience

1 (one) project similar sector (as defined below) of value not less than 60% of the estimated cost of work

or

2 (two) projects similar sector each of value not less than 40% of the estimated cost of work

or

3 (three) projects similar sector each of value not less than 30% of the estimated cost of work.

For the purpose of determining eligibility, Similar Work shall mean executed/substantially completed projects (For substantially completed, CA certificate of substantially completed along with work order shall be considered as proof of document) involving the development, upgradation, or enhancement of public spaces, parks, recreational areas, executed for any Central Government Department, State Government Department, or Public Sector Undertaking (PSU) during the last five (5) years. “Substantially completed works” shall refer to those works which are at least 70% completed as on the date of bid submission, based on the gross value of work executed up to that date, duly certified by the client. Substantially completed works means those works which are at least 70% completed as on the date of submission (i.e., gross value of work done upto the last date of submission is 70% or more of the original contract price or enhanced contract price as the case may be) and continuing satisfactorily.

Work Order along with Completion Certificate or substantial completion certificate issued by an officer not less than Executive Engineer shall be attached as proof of documents.

In Case the bidder's past experience was executed as part of a Joint Venture (JV), the bidder shall be given full weightage for such work experience.

4.2 Minimum Eligibility:

4.2.1 To be eligible for technical evaluation, a Bidder shall fulfil the following conditions of minimum eligibility:

Technical Capacity: For demonstrating technical capacity and experience (the “Technical Capacity”), the Bidder shall, over the past 10 (ten) financial years preceding the Bid Due Date, have:

Sn	Eligibility Conditions
1	The Applicant shall have, over the last 10 (ten) years preceding the PDD,undertaken a minimum of 1 (one) eligible project as specified in Clause 4.1.

a. **Financial Capacity:**

The Bidder shall have a minimum Net Worth (the “Financial Capacity”) of Rs. 6,00,00,000/- (Rupees Six Crore Only) (credit lines/letter of credit/solvency certificates from Banks etc. shall be

equivalent of the estimated cash flow for three months in peak construction). The certificate issued by any nationalised Banks/Scheduled commercial Banks shall be uploaded and it should be as on bid closing date

4.2.1 The entity claiming experience shall, during the last 10 (ten) financial years preceding the Application Due Date, have (i) paid for development of the project (excluding the cost of land), and/or (ii) collected and appropriated the revenues from users.

In case of Consortium, the Consortium should jointly meet the Minimum Eligibility Requirement as per Clause 4.2.1 above

4.3 Evaluation of Bids

Only those Bidders who meet the minimum eligibility criteria specified in Clauses 4.2 shall qualify for technical evaluation as per Clause 4.4. Bids of firms/ consortia who do not meet these criteria shall be rejected.

The Bidder's competence and capability is proposed to be established by Technical Capacity and Financial Capacity.

4.4 Technical Evaluation

4.4.1 The Technical Proposal will be evaluated based on the following parameters:

Sr. No.	Technical Scoring Criteria	Marking Pattern	Maximum Score (Total- 100 marks)
Experience in Eligible Assignment			
1.	The Bidder (Sole entity or all the members collectively) should have successfully completed/ Substantially completed at-least 1 project of value of minimum 60 % of estimated Project value during last 5 Financial Years.	• 100% of EPC≤ 150% of EPC - 5 Marks • 150% of EPC≤ 200% of EPC- 07 Marks • Above 200% of EPC - 10 Marks	10 Marks
	OR		
	The Bidder (Sole entity or all the members collectively) should have successfully completed/ Substantially completed at-least 2 projects of value of minimum 40 % of estimated Project Value during last 5 Financial Years.		
	OR		
	The Bidder (Sole entity or all the members collectively) should have successfully completed/ Substantially completed at-least 3 projects of value of minimum 30 % of estimated Project Value during last 5 Financial Years.		

Sr. No.	Technical Scoring Criteria	Marking Pattern	Maximum Score (Total- 100 marks)
2	The Bidder (Sole entity or Lead Bidder of JV/consortium) shall be required to demonstrate and fulfil average annual turnover of at least 100% of the Estimated Bid Value during the last 3 (three) financial years till 2024-25.	• 100% of EPC $\leq$ Turnover $\leq$ • 150% of EPC - 5 Marks • 150% of EPC $<$ Turnover $\leq$ 200% of EPC- 07 Marks • Above 200% of EPC - 10 Marks	10 Marks
3	Net worth of (Sole entity or any one members of JV/consortium) in FY 2024-25 shall be positive to ensure the bidders capability. "CA Certificate certifying the Net worth shall be attached"	• 50% of EPC $\leq$ Net Worth $\leq$ 75% of EPC - 5 Marks • 75% of EPC $<$ Net Worth $\leq$ 100% of EPC - 10 Marks • Above 100% of EPC- 15 Marks	15 Marks
4	Solvency Certificate (Sole entity or of Lead member in case of JV)	• 50% of EPC $<$ Solvency$<$ • 75% of EPC: 05 Marks • 75% of EPC $<$ Solvency$<$ 100% of EPC: 10 Marks • Above 100% of EPC: 15 Marks	15 Marks
5	Bidder (Sole entity or any one member of JV/consortium) shall submit the quality certificates:	Quality accreditations and Certifications ISO 9001: 02 Marks ISO 27001: 03 Mark CMMi Level ML 3 or above: 05 Marks The Bidder (Sole entity or any one member of JV/consortium) shall submit the certificates which were issued at least 3 months prior to bid publishing date. Note: All the certificates should have been verified on International Accreditation Forum (IAF) otherwise they will not be considered except CMMi Certificate	10 Marks
6	The Bidders' (Sole entity or in case of JV, all the consortium members) are required to prepare a concept report and submit it along with the technical Bid with designs and make a presentation before the Technical Evaluation Committee on the drawing, design, visual & sound effects including technical specification, brand of materials, appeal, aesthetic etc. to be used	a. Understanding of the scope of work and requirements: 10 Marks b. Approach & Methodology: 05 Marks c. Presentation of previous executed work: 05 Marks Concept & Design including Walkthrough: 20 Marks	40 Marks
	Total		100 Marks

4.5 Shortlisting of Technically Qualified Bidder

Only those Applicants whose Technical Proposals get a score of 75 (seventy five) marks or more out of 100 (one hundred) shall be declared as **technically qualified** for financial evaluation in the second stage.

4.6 Financial Evaluation and Selection of Bidder

- 4.6.1 Bidders shall quote the Project Cost (the “Project Cost”) payable by the Authority to the Bidder and the Annual Fee (the “Annual Fee”) offered by a Bidder to the Authority for award of the Contract. For financial evaluation, the Project Cost and Annual Fee indicated in the Financial Proposal as per Appendix-II, will be considered.
- 4.6.2 The Bidder who offers the **Least Bid Value** (Project Cost - Total Annual Fee), shall ordinarily be the Selected Bidder. The Annual Fee comprising the Bid shall be offered.
- 4.6.3 The **Project Cost** shall be paid by the Authority to the Agency during Phase I of the Contract Period as per the Scope of Work and payment milestones specified in Clause 6.3.
- 4.6.4 The **Annual Fee** payable by the Agency to the Authority during Phase II of the contract period, shall be due and payable within 15 (fifteen) days of the commencement of an Accounting Year. Provided that the Annual Fee for the first Accounting Year shall be paid within 15 (fifteen) days of occurrence of the COD.
- 4.6.5 The shortlisted bidders as per Clause 3.5, who quotes the **Least Bid Value** as per clause 3.6, shall ordinarily be declared as the selected Bidder (the “**Selected Bidder**”). In the event that the Authority rejects or annuls all the Bids, it may, in its discretion, invite all eligible Bidders to submit fresh Bids hereunder. For the purpose of evaluating the financial proposal, the Bid Value shall be computed as follows:
- Bid Value = PC – (5xAF)**
- PC: Project Cost
- AF: Annual Fee
- 4.6.6 After selection, a Letter of Award (the “LOA”) shall be issued, in duplicate, by the Authority to the Selected Bidder and the Selected Bidder shall, within 7 (seven) days of the receipt of the LOA, sign and return the duplicate copy of the LOA in acknowledgement thereof. In the event the duplicate copy of the LOA duly signed by the Selected Bidder is not received by the stipulated date, the Authority may, unless it consents to extension of time for submission thereof, appropriate the Bid Security of such Bidder as Damages on account of failure of the Selected Bidder to acknowledge the LOA, and the next eligible Bidder may be considered.
- 4.6.7 After acknowledgement of the LOA as aforesaid by the Selected Bidder, it shall cause the Agency to execute the Contract Agreement within the period prescribed in Clause 1.4. The Selected Bidder shall not be entitled to seek any deviation, modification or amendment in the Contract Agreement.

The following orders/documents shall apply to this tender and shall form part of the tender document

- 4.6.8 Order no. 14/26/2023-5FA dated 05/06/2025. Subject Negotiation policy mandatory part of DNIT irrespective of source of funding of the procurement issued by Additional Chief

Secretary to Government of Haryana, Finance Department.(enclosed)

4.6.9 Order no. 14/29/2023-6FA dated 26/05/2023.Subject Amendment in negotiation policy in respect of Procurement of Goods/ Stores (Fixed Purchase & Rate Contracts), Turnkey and Services. issued by Additional Chief Secretary to Government of Haryana, Finance Department.(enclosed)

4.6.10 In case of any ambiguity the decision of MD Haryana Tourism Corporation shall be final.

5 FRAUD AND CORRUPT PRACTICES

- The Bidders and their respective officers, employees, agents and advisers shall observe the highest standard of ethics during the Bidding Process and subsequent to the issue of the LOA and during the subsistence of the Contract Agreement. Notwithstanding anything to the contrary contained herein, or in the LOA or the Contract Agreement, the Authority may reject a Bid, withdraw the LOA, or terminate the Contract Agreement, as the case may be, without being liable in any manner whatsoever to the Bidder or Agency, as the case may be, if it determines that the Bidder or Agency, as the case may be, has, directly or indirectly or through an agent, engaged in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice in the Bidding Process. In such an event, the Authority shall be entitled to forfeit and appropriate the Bid Security or Performance Security, as the case may be, as Damages, without prejudice to any other right or remedy that may be available to the Authority under the Bidding Documents and/ or the Contract Agreement, or otherwise.
- Without prejudice to the rights of the Authority under Clause 5.1 hereinabove and the rights and remedies which the Authority may have under the LOA or the Contract Agreement, or otherwise if a Bidder or Agency, as the case may be, is found by the Authority to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice during the Bidding Process, or after the issue of the LOA or the execution of the Contract Agreement, such Bidder or Agency shall not be eligible to participate in any tender or RFP issued by the Authority during a period of 2 (two) years from the date such Bidder or Agency, as the case may be, is found by the Authority to have directly or indirectly or through an agent, engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practices, as the case may be.
- For the purposes of this Clause 5, the following terms shall have the meaning hereinafter respectively assigned to them:
 - a) **“corrupt practice”** means (i) the offering, giving, receiving, or soliciting, directly or indirectly, of anything of value to influence the actions of any person connected with the Bidding Process (for avoidance of doubt, offering of employment to or employing or engaging in any manner whatsoever, directly or indirectly, any official of the Authority who is or has been associated in any manner, directly or indirectly, with the Bidding Process or the LOA or has dealt with matters concerning the Contract Agreement or arising therefrom, before or after the execution thereof, at any time prior to the expiry of one year from the date such official resigns or retires from or otherwise ceases to be in the service of the Authority, shall be deemed to constitute influencing the actions of a person connected with the Bidding Process); or (ii) save and except as permitted under the Clause 2.2.1.4 of this RFP, engaging in any manner whatsoever, whether during the Bidding Process or after the issue of the LOA or after the execution of the Contract Agreement, as the case may be, any person in respect of any matter relating to the Project or the LOA or the Contract Agreement, who at any time has been or is a legal, financial or technical adviser of the Authority in relation to any matter concerning the Project;
 - b) **“Fraudulent practice”** means a misrepresentation or omission of facts or suppression of facts or disclosure of incomplete facts, in order to influence the Bidding Process;
 - c) **“Coercive practice”** means impairing or harming, or threatening to impair or harm, directly or indirectly, any person or property to influence any person’s participation or action in the Bidding Process;
 - d) **“Undesirable practice”** means (i) establishing contact with any person connected with or employed or engaged by the Authority with the objective of canvassing, lobbying or in any manner influencing or attempting to influence the Bidding Process; or (ii) having a Conflict of Interest; and
 - e) **“Restrictive practice”** means forming a cartel or arriving at any understanding or arrangement among Bidders with the objective of restricting or manipulating a full and fair competition in the Bidding Process.

6 SCOPE OF WORK

6.1 Background

The State of Haryana has assigned Haryana Tourism Corporation as the State Implementing Agency (Authority) for developing Development of Adventure Tourism Hub at Tikkar Taal & Adventure Park, Panchkula, under the Swadesh Darshan 2.0 Scheme. The tourist experience would include major 2 components

1. Tikkar Taal
2. Adventure Park

The projects at Tikkar Taal and Adventure Park are proposed to be executed on Engineering, Procurement and Construction (EPC) basis to ensure integrated responsibility for design, construction, installation, testing and commissioning under a single contract. The scope involves renovation of existing tourism infrastructure, construction of new visitor amenities and development of adventure tourism facilities, in accordance with approved DPRs and eco-tourism guidelines.

Considering the complexity of works, interface between civil, structural, MEP and adventure installations, and the need for adherence to safety, quality and time schedules, execution through EPC mode has been adopted. The EPC approach shall facilitate better coordination, assured performance, defined accountability and timely completion of the projects.

The selected EPC Contractor shall be responsible for end-to-end delivery of the project, including design, statutory approvals, procurement, construction, testing, commissioning and handover of fully functional facilities, in compliance with applicable codes, standards and tender provisions.

The Authority intends to elevate Adventure Park by appointment of Tourism Experience Development and Management Agency (the 'Agency') for Front End Experience and Engineering Design (FEEED) based EPC contract followed by performance-based Operation, Maintenance and Management (including Experience Management, Marketing and Branding, Skilled Human Resourcing and Capacity Building, and Digital Interventions for end to end servicing of Tourist Touch points)of the proposed Tourist Experience.

6.2 Features

- (i) **Original Proposal** – The scope, description of work, specifications, approved conceptual drawings for architectural and engineering planning of the Project are provided by the Authority as part of the DPR. The Agency shall use the base conceptual design to design and develop the facility to ensure best delivery of tourist experience through this project in line with the desired intent of the project experience.
- (ii) **Modification to the Proposal:** The Agency will be allowed to propose modification to the conceptual layout without any major reduction in the total built up area of components such as buildings, driveways, landscape areas, parking areas etc. The modification with intent to enable operational efficiency, upward revision in specifications with better options, alignment with market requirements, enhancement of tourist experience, enabling equal or better service standards would be considered for approval by the Authority.

-
- (iii) **The revenue generation** shall be from the ticketing, rentals, events, parking, adventure activities, immersive gallery, proceeds of sale of food items, retails and items such as advertisement, brand sponsorship, etc. The sale costs and other tariffs shall be determined by the agency as driven by market forces, wherever not specified. For essential services upper ceiling for the sale cost and other user charges shall be as prescribed by the Authority.
- (iv) **The total contract period** is for 6 years including maximum of 1 years period for construction.
- [For Projects with complexity or destinations where the construction period maybe limited due to natural conditions; the timeline to be suitably modified such that major components of the experience is operational within 1 year while remaining development work continues parallelly]
- (v) **Contract Renewal:** The Authority may consider renewal of the contract on the same terms and conditions for additional period of **5 years** based on satisfactory performance during the initial contract period of the agency.
- (vi) **First right of refusal:** For avoidance of doubt, it is further clarified that the Agency shall have the first right of refusal to accept or refuse another term of 5 years contract on conclusion of the first contract period.
- (vii) **Commercial Advertising:** The Agency may undertake or cause to be undertaken commercial advertising or display on the project in conformity with Applicable Laws overall project aesthetics and the provisions of this Agreement.
- (viii) **Transfer of Project** to the Authority at the end of Contract period.
- (ix) **Delivery of Tourist Experience:** The Agency after completion of construction shall operate, maintain, and manage the tourist experience.

6.3 Project Location and Context

Location and Site Map

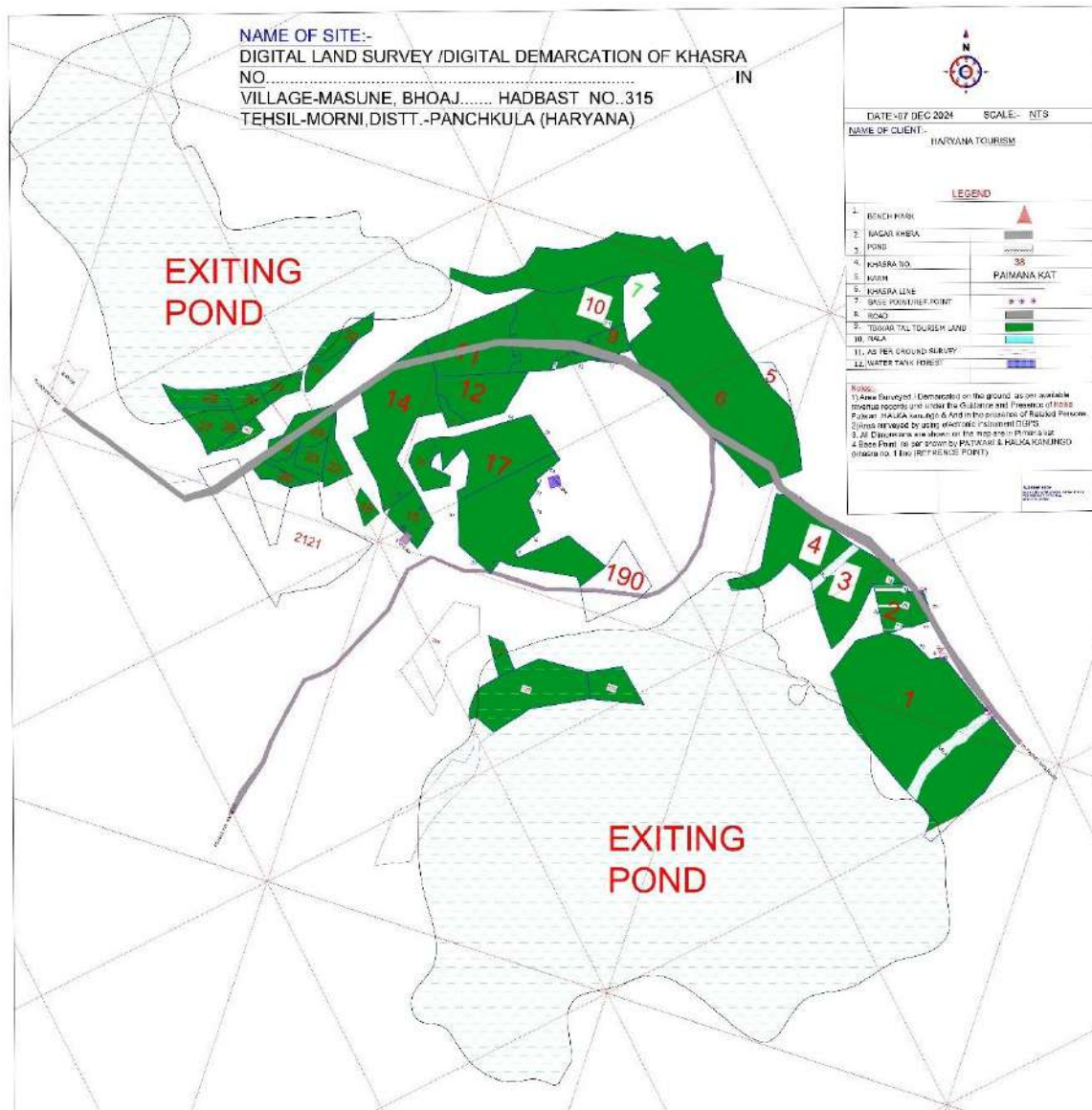


Figure 1: Site Plan Adventure Park



The EPC Contractor shall be responsible for carrying out the following works for the Site Boundary of the Adventure Park:

Site Boundary Identification & Verification

- The Contractor shall verify the site limits as per the land demarcation plan provided by the Authority.
- Any discrepancy in site limits shall be reported to the Authority prior to commencement of works.

Demarcation of Boundary

- The entire perimeter of the project site shall be physically demarcated as per the approved layout plan.
- Survey markers/pillars shall be installed at all turning points and intermediate points as required.

Boundary Fencing Works

The Contractor shall provide and install chain-link fencing along the entire demarcated boundary, which includes:

- RCC/steel posts at approved spacing.
- GI chain-link mesh of approved gauge and height.
- Base concreting for posts as per structural design.
- Anti-rust and protective coatings where required.
- Gates, access control points, and lockable entry arrangements at designated locations.

Drawings & Approvals

- The Contractor shall prepare detailed boundary demarcation drawings, fencing layout drawings, and structural details for approval.
- All works shall conform to the relevant BIS codes and Authority's technical specifications.

Completion Requirements

- The fencing shall form a continuous, secure, and clearly visible boundary around the entire project site.
- The EPC Contractor shall maintain the fencing till completion and handover.

General Description

The project envisages the integrated development of Tikkar Taal and the Adventure Park as a unified tourism and recreation destination, to be executed on Engineering, Procurement and Construction (EPC) basis. The scope broadly includes upgradation and renovation of existing infrastructure, construction of new visitor facilities, development of adventure and experiential attractions, strengthening of utilities, and comprehensive site development, while adhering to eco-tourism principles and applicable safety standards.

At **Tikkar Taal**, the project involves development of organized parking facilities, construction of visitor amenities such as ticketing kiosks, food kiosks and toilet blocks, and extensive renovation of residential, restaurant and service buildings. The works also include structural repairs, waterproofing, roofing replacement with acoustic insulation, interior and exterior finishes, and integration of modern electrical, plumbing, HVAC and fire-safety systems. Additional interventions include construction of support structures near the camping area, enhancement of the viewing deck with a Glass Walk, and channelization of natural watercourses along with embankment protection works to ensure long-term site stability and safety.

The **Adventure Park** component focuses on renovation and expansion of adventure and recreational infrastructure, including parking areas, entrance gates, reception facilities, themed attractions such as the Haunted House and Maze, and visitor utilities. New developments include a 100' tall viewing tower, Swiss tents, mobile toilets, soak pits, souvenir and retail facilities, and an Open Air Theatre. The project further includes installation of adventure and experiential activities such as zip lines, artificial wall climbing and rope courses, supported by robust safety systems, lighting, signage, IT and surveillance infrastructure. Comprehensive site grading, pathways, landscaping and illumination form an integral part of the development.

The project also aims to provide safe, inclusive and well-managed visitor environments through improved circulation, crowd management infrastructure and clearly defined activity zones. Emphasis is placed on enhancing visitor experience, extending dwell time, and creating a strong sense of place through quality design, engaging attractions and adequate amenities. In addition, provisions for

marketing and promotion of the Adventure Park and nearby attractions are included to strengthen the destination's visibility and tourism potential.

The selected EPC Contractor shall be responsible for end-to-end delivery, including design, statutory approvals, construction, supply and installation, testing, commissioning and handover of fully functional facilities, in compliance with applicable codes, standards and tender provisions.



Figure 6-1 Reception Block Adventure Park

Challenges Identified:

Arrival & Traffic Management

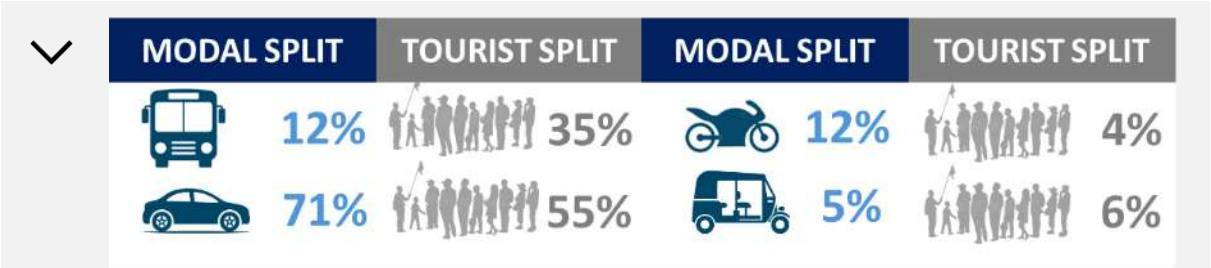


Figure 6-2 Existing modal split¹

Analysing the existing modal split it is seen that the tourists majorly arrive using Private cars, taxis, and buses.

Currently Parking is available for 20 cars, However, this is inadequate during the peak days when around 2.5 times the capacity of tourist influx is observed. On normal days it is observed that only 50% of the parking is utilised. Exacerbating issues of congestion and disorganization caused by tourists moving. This movement majorly happens along the road and cause pedestrian and vehicular conflict at the entrance to the area. The existing Traffic movement is shown in Figure 6-3.

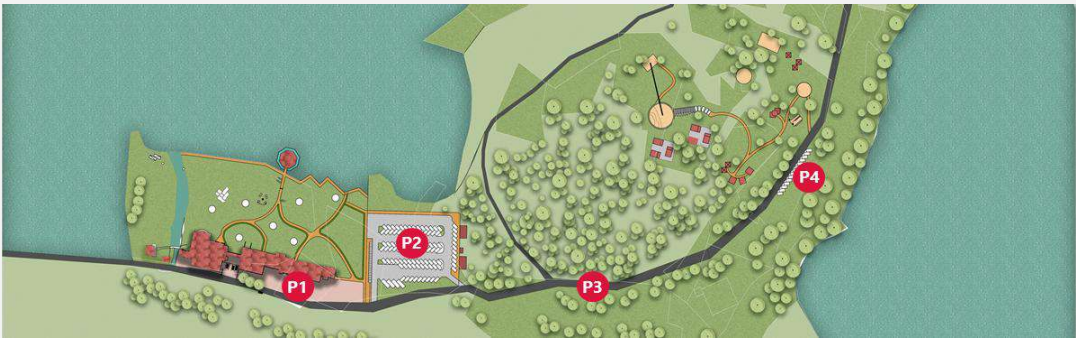


Figure 6-3 Existing Traffic Movement Plan

¹ Based on Parking data from the existing concessionaire and count of vehicles at the private parking plots



Figure 6-4 Existing Parking



Figure 6-5 Plot for Parking

Additionally, there is a lack of sense of arrival at the Entrance and needs proper segregation of pedestrian and vehicular traffic.



Figure 6-6 Existing Entrance area



Based on the modal split it is understood that there is a need to improve the connectivity to Tikkar Taal. It is recommended to deploy e-buses in phases and is recommended to be taken up by the Tourism department under convergence with other central/state schemes. May explore procuring buses and provide a complete Hill Tourism package experience incorporating the nearby attractions to the tourists from Panchkula. Integrating private tour operators on the website and should collaborate to curate package experiences. These buses may be themed as part of Hill tourism marketing and can be a creative and immersive way to attract visitors.



Figure 6-7 Representative image for themed buses for Morni Hills Tourism Experience

Image Source: Internet

Further, has to engage with private taxi operators to sensitize, provide parking incentives/monthly passes and encourage them to park at the Govt. Parking and ensure complete utilisation. Also, Pick-up and Drop-off is proposed at the Parking area itself and designated areas are provided. A rationalisation is proposed for the Parking area.



Figure 6-8 Proposed traffic management plan

Further, the creation of an impressive entrance gate followed by vibrant murals, and engaging installations. These additions not only serve to guide visitors effectively but also create a sense of anticipation and grandeur as they approach Tikkar Taal.

On-Site Registration & Holding Area

✓ No such facility is available on ground.



Figure 6-6 Entrance area lacks any registration/holding area

^ Registration is proposed for the visitor to designate seating zones to all tourists, will also offer attractive packages coupled with travel, experiential activities, food, and seating. The registration will be available online and offline.

To cater to the offline registration, at the arrival area, an Information/Registration counter is proposed. Equipped with knowledgeable staff and modern facilities, the counter will provide various diverse options for registration and provide them with a designated zone for seating at the visitor gallery. Informative multilingual signages further enhance accessibility.

- Pedestrian movement is allowed through the building and the counters are arranged on both sides. There will be clear pathway in between and space for queuing on both the sides.
- Designed for universal accessibility and designed to seamlessly blend with the existing buildings with protruded trimmings.



Figure 6-7 Artistic image of proposed Information/Registration Centre

Visitor Flow & Management



- The visitor flow and management are presently managed by the Tourism Haryana area.
- Lack of adequate crowd management measures and tourist amenities poses significant challenges for the tourists.
- There is online reservation through HTC website which does not provide any seat allotment online. But due to lack of information and signage this gets overlooked. There are significant challenges especially for the aged, specially-abled and children.



- The interventions proposed at the Tikkar Taal area are focused on streamlining the tourist flow, ease entry to the area and diversify the offerings to the tourists to ensure an overall safe and comfortable experience.
- At the Entry, segregated vehicular and pedestrian pathway is provided. From the Entrance and Parking area, the tourists are properly guided by signages to the Entrance. The tourists with online booking can proceed to the immersive gallery, offerings at Tikkar Taal and the Adventure Park. Offline registration is facilitated through the online registration/information centre, QR codes and digital kiosks.



• **Figure 6-9 Proposed parking and vending and activities**

- For the Security Check the tourist will move towards the Queuing area provided both Infront.

Interpretation & Sensitization



• **Interpretation at Tikkar Taal and Adventure Park**

Interpretation, in the context of tourism, refers to the process of providing information and storytelling about a place's natural, cultural, and historical significance. At Adventure Park, interpretation will be implemented through:

Ecological Interpretation: This involves educating visitors about the local flora and fauna of the region, such as the species of birds, aquatic life, and plant species surrounding Morni Hills. Guided nature walks, informative signboards, and even digital apps could enhance the experience, allowing visitors to learn about the ecosystem.

Environmental Education: Programs that explain the importance of preserving natural areas like Tikkar Taal, highlighting water conservation, biodiversity, and sustainable tourism, can offer visitors an educational experience that connects them to the environment.

• **Sensitization at Adventure Park:**

Sensitization refers to raising awareness and fostering a sense of responsibility among visitors and the local community about the importance of maintaining the ecological and cultural integrity of the site. For Adventure Park, sensitization would be focused on:

Environmental Sensitization: Promoting sustainable practices, such as waste management, minimizing plastic usage, and respecting the natural environment. Visitors could be encouraged to not disturb wildlife, follow designated paths, and dispose of waste responsibly.

Cultural Sensitization: Ensuring that visitors are aware of the local traditions and customs to avoid unintentional disrespect. This could include promoting respect for local rituals, festivals, and practices. Engaging local communities as cultural ambassadors could help bridge the gap between tourists and locals.

Promoting Responsible Tourism: Sensitizing tourists about the impact of over-tourism on local communities and resources. Providing guidelines on ethical behavior, respecting privacy, and supporting local businesses can help preserve the uniqueness of Tikkar Taal.

Inclusive Sensitization: Involving local communities in the process of interpretation and sensitization, ensuring they have ownership of the project. This empowers them to become stewards of their heritage, fostering a sense of pride and responsibility.

- Way to Implement Interpretation & Sensitization at Tikkar Taal and Adventure Park

Guided Tours & Local Narratives: Offering tours led by trained local guides who can share insights into the ecology, culture, and history of the area in an engaging and informative manner. This can also include storytelling traditions that connect visitors to the local narrative.

Workshops & Interactive Sessions: Organizing workshops for both visitors and locals to discuss the importance of conservation, the preservation of traditions, and the environmental challenges faced by the region.

Public Engagement Campaigns: Using signage, posters, and social media campaigns to raise awareness about responsible behavior, conservation, and the cultural significance.

Collaboration with Local Communities: Ensuring that the local communities play an active role in both interpreting their own heritage and in sensitizing visitors to the unique characteristics of Morni Hills.

By fostering interpretation and sensitization at Adventure Park, the place can maintain its natural beauty and cultural heritage while promoting sustainable tourism and responsible visitor engagement

Public Convenience



At the Tikkar Taal and Adventure Park area there is lack of adequate drinking water and toilet facilities. There is an existing toilet block at Tikkar Taal. These toilets require refurbishment and lacks maintenance due to which tourists experience discomfort and inconvenience.

Tikkar Taal- Existing Condition of Toilet Block at Tikkar Taal



Figure 6-10 Condition of existing toilet block



Toilets: The location of existing toilet blocks requires refurbishment and is to be maintained in par with the standards.

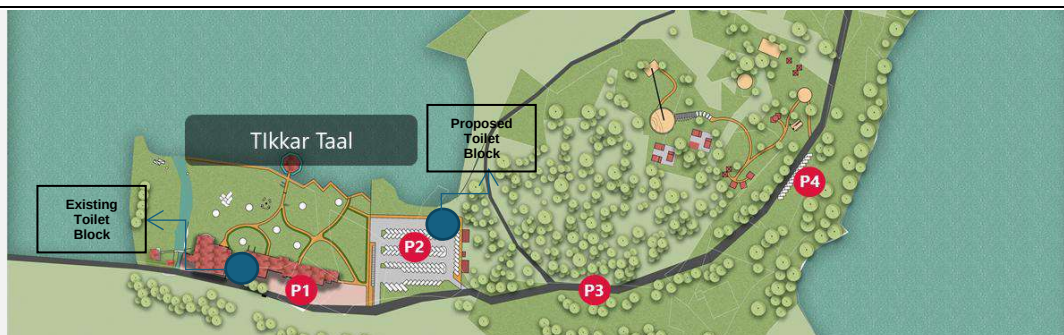


Figure 6-11 existing toilet facilities and proposed toilet block

A new toilet block proposed near to the Parking Area for male and female. The minimum dimensions and details are included as per the accessibility norms.

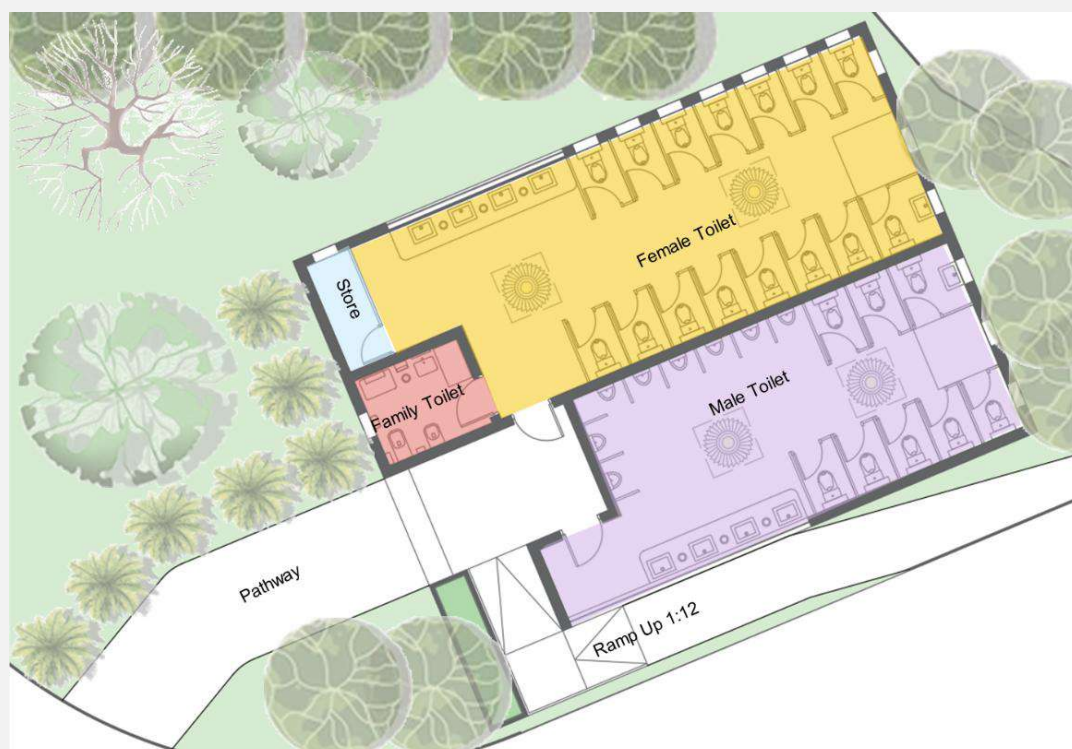


Figure 6-12 Plan of Proposed Toilet Block

Drinking water Fountains: The integration of drinking water fountains and vending areas with the shaded pathway ensures that the tourists have easy access to drinking water and refreshments.

Seating: The deteriorated seating is proposed to be replaced with Blow moulded plastic chairs are known for their lightweight yet sturdy quality. These chairs are all weatherproof and UV resistant which makes them an ideal choice for outdoor seating.

Hawkers & Vending Zones





Souvenir, Food & Beverage & Other Retail



The souvenir shops sell Phulkari, Haryana Jutis, magnets/photographs themed on the Panchkula, Morni Hills, etc.



Boating Deck



Fun Zone for Children



Restaurant



Retail kiosks at the Tikkar Taal

Figure 6-13 Offerings at Tikkar Taal and Adventure Park



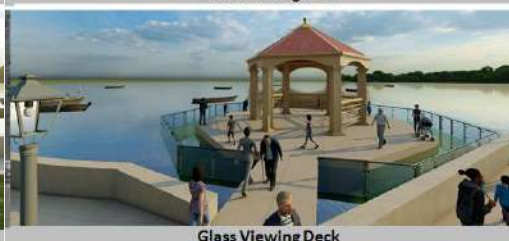
Boating Deck



Glass Viewing Deck



Boating Deck



Glass Viewing Deck

Refurbishment of Restaurant:



Figure 6-14 Representative images for refurbishment of restaurant

Image Source: Internet References
 Adventure Activity Area

It is proposed to develop Adventure Park and is included under the development obligations to be funded. The indicative list of activities include:



Artificial Wall Climbing

High/Low Rope course and Adventure activities



Viewing Deck and Small Zip Line



Paint Ball

Figure 6-15 Proposed Activities at Adventure Zone



Image Source: Artistic images and Internet References
 Adventure seekers can test their skills and agility on obstacle courses inspired by real-life challenges. Photo booths should be provided which will allow visitors to capture memorable moments in military attire.

Cleanliness (Entire Premises)



The site is adequately maintained in terms of solid waste management but requires improvement. The plastic waste is littered on the site by the tourists. The collected waste is sorted out in open at the Tikkar Taal area at one corner and causes visual discomfort. Wet waste gets disposed here and the dry waste gets picked by kabadiwalaas. The restrooms are not being maintained and cleaned frequently

creating discomfort and inconvenience among tourists. The concerns about the unhygienic environment have been highlighted by the tourism officials because of inadequate drinking water, and toilet facilities.



Figure 6-16 Littering at site and lack of cleanliness in toilets



Segregated dustbins are proposed at regular intervals and ensure that the rules and regulations regarding waste disposal be displayed at major points and enforce the same through sensitisation, constant monitoring and imposing fines for non-compliance. With segregated waste collection the segregation in open is to be avoided, and the limited sorting can be done after properly covering the area to ensure the same is not visible to the tourists. The existing toilets are proposed for refurbishment and the cleaning is to be carried out frequently with adequate manpower is to be employed. Additionally, the provision of drinking water and toilet ensures the comfort and well-being of visitors, mitigating concerns about hygiene and sanitation.

Security Arrangement (Entire Premises)



The security arrangements at Tikkar Taal and Adventure Park, like in many recreational areas, are designed to ensure the safety and well-being of visitors. While specific details about the park's security measures might not be publicly available, here are some typical features that are likely to be implemented:

1. **Surveillance and Monitoring:** Security cameras are commonly placed at key locations throughout the park to monitor activities and maintain safety.
2. **Security Personnel:** There is usually no security guards stationed at entrances, key areas, and throughout the park which may help in crowd management, provide assistance during emergencies, and ensure that safety protocols are followed.
3. **Entry and Exit Checks:** Visitors are typically not required to go through security checks at the entrances.
4. **Fire Safety:** Fire extinguishers placed around the park but are outdated presently.
5. **Signage and Instructions:** Clear signage with safety guidelines is placed throughout the park. This ensures visitors are informed about the rules and what to do in case of an emergency.
6. **Parking and Traffic Management:** To ensure smooth movement of vehicles and pedestrian safety, tourism management often manage parking lots and traffic flow in the vicinity of the park.



Proposed intervention - Crowd Management & Surveillance System at Tikkar Taal:

The proposed interventions are aimed at enhancing the safety and security of tourists through a reliable surveillance system for monitoring and ensuring a safe environment. These include:

- Supply, Design Installation of a baggage scanning system.
- Supply, Design, Installation of a Public Announcement System for emergency notifications and guidance
- Supply, Design, Installation of CCTV Surveillance System across key locations within the tourist place.
- Manpower Deployment for operation support.

CCTV Surveillance System

A Closed-Circuit Television (CCTV) Surveillance system for tourist spots is a specialized security infrastructure designed to monitor and ensure the safety and security of tourists and visitors in popular tourist destinations. It involves the installation of a network of cameras and related components strategically positioned to provide comprehensive surveillance coverage of the tourist area.

Minimum Technical Specification of CCTV:

- Poles for Camera Installation

Table 6-1 Minimum Specifications of CCTV

Parameter	Minimum Specifications
Pole type	Hot Dip Galvanized Octagonal pole. The pole should be made as per IS and shall be coated with Hot Dip Galvanizing as per IS: 4759, IS:2629, IS: 2633. Fabrication in accordance with IS-2713 (1980)
Height	6-8 Meters (or higher), as-per-requirements for different types of cameras & Site conditions. Height of pole will be finalized during the feasibility study.
Pole Diameter	Min 70 mm Top diameter x 135 mm Bottom diameter x 4 mm thickness with suitable size of Base Plate (bidder to choose larger diameter for higher height)
Cantilevers	Cantilever arm length of minimum 1.5 meter
RCC Foundation	Casting of Civil Foundation with foundation bolts, to ensure vibration free erection (basic aim is to ensure that video feed quality is not impacted due to winds in different climatic conditions).
Cabling	All wiring must be hidden, through tubes/pipes. No wires shall be visible from outside.
Earthing	Separate Earthing as per IS standard provided for each mounting structure and lighting arrester
General	SI is required to submit the detailed design of the pole with complete foundation approved by Government approved structural engineer. The actual design of pole and foundation will be based on structure stability report issued by Government approved structural engineer.

CCTV system Specification:

- High quality imaging with 8 MP resolution
- Angle Adjustment - Pan: 0° to 355°, tilt: 0° to 90°, rotate: 0° to 360°
- Supplement Light Yes
- Environment Noise Filtering Yes
- Audio Type Mono sound
- Deep Learning Functions
- Startup And Operating Conditions - -30 °C to 60 °C (-22 °F to 140 °F). Humidity 95% or less (non-condensing)
- Protection IP67
- 32 ch NVR (32-ch, Minimum capacity 8 TB),
- 24-slot High-performance Storage
- Cables- Should be supplied with necessary cables for connection.

- Decline in Tourist Footfall: Reduced attraction offerings, including. Poor maintenance leading to diminished visitor experiences.
- Insufficient Tourism Infrastructure: Lack of adequate public amenities, proper signages, and guided experiences. Poorly maintained facilities such as toilets and parking.
- Disorganized Visitor Spaces: Inefficient layout of eateries, and play areas. Low visual and thematic coherence.
- Non-functional Water Features: Neglected fountains and water channels reducing site ambiance.
- Environmental and Aesthetic Concerns: Poor waste management, uncleanliness, and lack of landscaping elements.
- Terrain and Topography Constraints: The natural slopes, uneven landform, and varying gradients pose challenges for safe placement of adventure structures, circulation paths, and service infrastructure.
- Environmental Sensitivity: The area is surrounded by forested zones and ecological habitats, requiring careful planning to minimize disturbance to flora, fauna, and natural drainage patterns.
- Limited Existing Infrastructure: Inadequate utilities such as electricity, water supply, waste management, and internal access pathways present challenges for supporting a high-volume adventure facility.

6.3.1 Connectivity of Adventure Park: Project Site –

Location and Connectivity



Figure 6-17 Location of Adventure Park

1. **Air Connectivity:** The nearest airport to Morni Hills, offering domestic and limited international connectivity. From the airport, visitors can hire taxis or use ride-hailing services to reach Tikkar Taal.
2. **Rail Connectivity:**
 - Chandigarh Railway Station (40 km): Well-connected to major cities, including Delhi, Amritsar, and Mumbai. Post arrival, visitors can use taxis, buses, or hired vehicles to reach Morni Hills.
 - Ambala Cantt Railway Station (65 km): Another major railway hub providing access to Tikkar Taal via road.
3. **Road Connectivity: From**
 - Chandigarh (45 km): Easily accessible via NH5 and State Highway 1 through Panchkula. Approximate travel time: 1.5 hours.
 - From Panchkula (35 km): Scenic routes via the Morni Hills Road, passing through forested areas and small villages.
 - From Delhi (260 km): Connected via NH44, followed by State Highway routes through Ambala and Panchkula. Approximate travel time: 5–6 hours by car.
4. **Public Transportation/IPT:** Public transportation options are limited. Several transportation options are available, including buses Haryana Roadways and private operators provide bus services to Panchkula and Morni Hills. Local taxis or auto-rickshaws are available from Panchkula to Tikkar Taal.

6.4 Scope of Work

The scope of work shall include survey, investigations, detailed design, engineering, statutory approvals, procurement, construction, renovation, supply, installation, testing, commissioning and handover of all works described herein, complete in all respects and in accordance with applicable codes, standards, eco-tourism guidelines and directions of the Engineer-in-Charge.

A. TIKKAR TAAL – DETAILED SCOPE OF WORK

1. Parking Area Development & Solar Infrastructure

- Design and development of organized parking areas using paver block flooring, including excavation, sub-base preparation, compaction, drainage layers, edge restraints and markings.
- Design, supply, installation, testing and commissioning of solar panel systems for parking-area lighting and utility loads, including mounting structures, inverters, cabling and safety devices.
- External lighting, signage, entry/exit control and integration with site circulation.

2. Construction of Visitor Facilities

- Construction of Ticketing Kiosk, Food Kiosk and Toilet Block in RCC framed structure including:
 - Architectural finishes
 - Plumbing, sanitary and drainage systems
 - Electrical, lighting and power distribution
 - Ventilation and fire-safety provisions
 - External development and site integration

3. Residential Block Renovation

Ground Floor

- Renovation of four (04) residential rooms (Room Nos. 105, 106, 107 & 108), including:
 - Dismantling of damaged finishes
 - Civil repairs and surface preparation
 - Flooring, wall and ceiling finishes
 - Electrical wiring, lighting and power points
 - Plumbing, sanitary fittings and fixtures
 - Design, supply and installation of furniture.
- Comprehensive waterproofing of the entire residential complex.
- Dismantling and relaying of roofing with corrugated sheets and acoustic insulation.
- Renovation of corridors including roofing, granite flooring and planters.

Basement Floor

- Renovation of hall, dormitory and toilet block, including:
 - Structural repairs/strengthening (if required)
 - Waterproofing of ceilings and walls
 - Interior finishes
 - Electrical, plumbing and sanitary installations

4. Renovation of Restaurant Block

- Renovation of the complete restaurant complex comprising:
 - Reception area
 - Restaurant seating area
 - Kitchen and kitchen stores
 - Bar area
 - Drivers' dormitory
 - Toilets
 - Furniture for Restaurant and Reception Area
- Design, supply and installation of **modular kitchen**, including:
 - HVAC and exhaust systems
 - Plumbing and drainage
 - Electrical systems
 - Fire detection and fire-fighting systems
- Relaying of roofing with acoustic insulation, provision of false ceiling and architectural finishes.
- Integration of all MEP, fire and safety systems.

5. New Structures near Camping Area

- Design and construction of the following structures in RCC / suitable structural systems:
 - Staff dormitory block
 - Diesel Generator (DG) shed
 - LT panel room
 - Toilet block
 - Two (02) gazebos near boating area
 - Security kiosk
- Complete finishes, electrical, plumbing, drainage and external development for all structures.

6. Glass Walk & Viewing Deck

- Extension and renovation of existing viewing deck including structural design and construction.
- Design and installation of **Glass Walk**, including:
 - Laminated and tempered safety glass
 - Structural steel framework
 - Handrails, edge protection and fall-arrest systems
- Structural stability checks, load testing and safety certification.

7. Channelization & Embankment Protection

- Channelization of seasonal nalla/rivulet.
- Construction of rubble masonry retaining walls for embankment protection.
- Raising and strengthening of breast wall along Tikkar Taal lake periphery with coping and granite finish.
- Drainage, erosion control and slope protection works.

8. Waterproofing, Painting & Finishes

- Comprehensive waterproofing of all roofs, basements, wet areas and terraces.
- Internal and external painting of all buildings using approved weather-resistant systems.

9. Site Development & Landscaping

- Pathways, street furniture, signage and lighting.
- Soft and hard landscaping, plantation and ecological restoration works.

B. ADVENTURE PARK – DETAILED SCOPE OF WORK

1. Parking, Access & Security Infrastructure

- Development and renovation of two (02) parking areas with paver blocks, drainage and markings.
- Renovation of entrance gate and reception block.
- Chain link fencing (1.8 m height) around the campus including gates and access control.
- Internal cobblestone/paver pathways and site grading.

2. Renovation of Existing Attractions

- Renovation of **Reception Block, Haunted House, Maze and Toilet Block**, including:
 - Dismantling of old interiors
 - Civil repairs and flooring
 - Upgraded lighting, electrical and thematic elements
- Construction of enclosed shed extension to Haunted House for immersive themed experience.
- Renovation of existing viewing decks.

3. New Buildings & Visitor Facilities

- Construction of **100-feet tall viewing tower** in structural steel with:
 - Multiple landing platforms
 - Roofed top deck
 - Panoramic lift
 - Integration of zip-line from intermediate platform
- Development of **Swiss tents (10 Nos.)** with attached washrooms and plug-in services.
- Provision of mobile/portable toilets with bathing facilities and soak pits.
- Construction of food kiosks, souvenir and retail shops.
- Construction of RCC toilet blocks as per approved drawings.

4. Adventure & Experiential Activities

- Design, supply, installation, testing and commissioning of:
 - Zip line
 - Artificial wall climbing
 - Rope courses
- Provision of all safety equipment, anchoring systems, harnesses and fall-arrest mechanisms.
- Mandatory third-party inspection and safety certification.

5. Public Spaces & Landscaping

- Development of **Open Air Theatre** with seating, stage and backdrop.
- Softscape and hardscape landscaping, shaded seating and rest zones.
- Site lighting, illumination and signage.

6. Utilities, IT & Surveillance

- Electrical systems, lighting, power distribution and backup.
- Water supply, wastewater and stormwater systems as per CPHEEO & NBC.
- CCTV surveillance, IT and communication systems.

C. GENERAL & COMMON SCOPE (APPLICABLE TO BOTH COMPONENTS)

- Detailed design, drawings and engineering approvals
- Statutory approvals and NOCs
- Quality control, safety management and environmental compliance
- Testing, commissioning and trial runs
- Submission of as-built drawings and manuals
- Training of client staff and final handover

End Responsibility

The EPC Contractor shall deliver **fully functional, safe and operational facilities**, complete in all respects, within the approved scope, cost and timelines

(i) Minimum Development Obligation

The bidder will take full responsibility to design and develop the project as per norms and guidelines provided by the Ministry of Tourism, Government of India (GoI), Haryana Government Building byelaws and NHAI guidelines. The bidder would be given the option to enhance the plan and design the facilities conforming to the applicable building byelaws and regulations/norms/standards for respective project components including arranging approval from the competent authority.

Project components to be developed by the Agency, which will be funded by the Authority as enlisted below. Please refer to Volume 2 of RFP-Schedule B for the proposed layout plan and detailed description.

Sr. No.	Activities	Particulars	Quantity	Built-up Area (sqm)
. TIKKAR TAAL				
A	Along NH3			
	Signages and Lighting along approach Road	Signages and street lighting indicating diirections to the complex as indicated in the drawing on Tourism Department Land		
B	Approach & Entry Zone			
1	Signages	Directional & Tourism Signages along approach road	6	–
2	Entrance Plaza	Entrance Gate	2	–
		Ticketing Kiosk (RCC)	1	20
		Security Kiosk	1	15
		Landscaping & selfie points		–
C	Parking & Circulation			
3	Parking Area	Paver block parking with markings	1	2000
		Solar panels for lighting & utilities		–
4	Pathways	Cobble stone & paver block pathways		5000
D	Residential & Hospitality Renovation			
5	Residential Rooms	Renovation of Rooms 105–108	4	224
6	Basement Area	Hall, Dormitory & Toilet renovation		109
7	Restaurant Block	Reception, Restaurant, Kitchen, Bar, Toilets, Stores	1	620
E	New Structures (Camping Zone)			
8	Dormitory	Staff Dormitory Block	1	35
9	Gazebos	Gazebos near lake/boating area	2	56
10	Utility Structures	DG Shed, LT Panel Room, Diesel & Firewood Shed		112
F	Viewing Infrastructure			
11	Viewing Deck	Renovation of Viewing Deck	1	269
12	Glass Walk	Glass walk with steel structure & safety railings	1	173
G	Public Conveniences			
13	Toilet Block	RCC Toilet Block	1	100

H	Site Development & Utilities			
14	Landscaping	Softscape, lawns, plantation		
15	Drainage & Nalla Works	Retaining walls, toe walls, embankment protection		
16	Utilities	Water supply, STP, Electrical, ELV, Firefighting, Solar		
B. ADVENTURE PARK – SCOPE MATRIX				
A	Entry & Parking			
1	Parking	New & renovated parking areas	2	1100
2	Entrance Gate	Main Entry Gate with signage	1	–
B	Renovation of Existing Attractions			
3	Reception Block	Interior renovation & interpretation centre	1	60
4	Haunted House	Renovation + themed interiors	1	150
		Extension Shed (Eco-compliant)	1	93
5	Maze	Renovation with lighting & signage	1	210
6	Machaan	Structural & ladder renovation	1	10
7	Toilet Block	Renovation of existing toilets	1	20
C	New Structures			
8	Viewing Tower	100 ft tall steel viewing tower with lift	1	180
9	Swiss Tents	Swiss tents with attached washrooms	10	500
10	Food Kiosk	Eco-compliant food kiosk	1	24
11	Portable Toilets	Plug-in mobile toilets (M/F)		–
D	Adventure & Experiential Activities			
12	Zip Line	Zip line from viewing tower	1	
13	Artificial Wall Climbing	Artificial climbing wall		60
14	Rope Courses	Low & high rope course activities		600
E	Public Realm & Landscaping			
15	Open Air Theatre	Seating for 250 persons with stage	1	457
16	Pathways	Cobble stone internal circulation		–
17	Landscaping	Softscape, seating, street furniture		–
F	Safety, IT & Utilities			
18	Fencing	Chain-link fencing (1.8 m ht)		–
19	Lighting	Area lighting & feature illumination		–
20	IT & Surveillance	CCTV, PA system, control room		–
21	Utilities	Electrical, water supply, wastewater, soak pits		

Minimum development obligations to be funded by the Agency:

No.	Activities	Particulars	Quantity	Built-up Area (sqm)
1.	Marketing & Promotion		-	-
2.	Safety & Security			
3.	Waste Management			
4.	Feedback & Complaint redressal			

(ii) Design & Drawing

Prior to commencement of development works, the contractor shall submit to the Authority detailed design, construction methodology, quality assurance procedures, and the procurement plan, engineering, and construction time schedule for completion of the Project in accordance with the Project Completion Schedule

- a. Prepare and submit Good for Construction (GFC) project drawings in conformity with the Scope of the Project, the technical Specifications and Standards, Applicable Laws and Good Industry Practice in such sequence as is consistent with the Project Completion Schedule.
- b. All drawings prepared by the Agency for the execution of the temporary or permanent works, are subject to prior approval by the Authority before their use.
- c. Any deviation/ modification required for the drawing as per site condition, Agency must submit the drawing and get the approval from the Authority before executing the work.
- d. Submit all shop drawings and vendor specific details based on schematic drawings provided at tender stages.
- e. Within 90 (ninety) days of the Project COD, the Agency shall furnish to the Authority a complete set of as-built Drawings, in 2 (two) hard copies and its editable digital format or in such other medium as may be acceptable to the Authority.

(iii) Construction and Development of the Project

- a. Implementation of the Project, undertaking the development, engineering, procurement, and construction of the project as specified in the project completion schedule and in conformity with the specifications and standards set forth by the Authority.
- b. Undertake the Mandatory Development Obligations
- c. In the event that the Agency fails to achieve any Project Milestone within 30 (thirty) days from the date set forth for such Project Milestone, unless such failure has occurred due to Force Majeure or for reasons solely and directly attributable to the Authority, it shall pay Damages to the Authority in a sum calculated at the rate of 1% (one per cent) of the amount of Performance Security for delay of each day until such Project Milestone is achieved up to a maximum of 5% (Five per cent) of the amount of Performance Security
- d. If the Development Works pertaining to the Mandatory Development Obligation is not completed within 30 (thirty) days from the Scheduled Completion 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.

(iv) Monthly Progress Reports

- a. During the Construction Period, the Agency shall, within [7 (seven)] days after the close of each month, furnish to the Authority a monthly report on progress of the Development Works

(v) Billing and Closure of Development Works

- a. The payment against the development of the project works shall be as per Payment Milestones defined under Scope of Work Clause 6.7.
- b. Agency shall request the authority to issue a Certificate of Completion of the Works

(vi) Other Requirements

- a. Arrange for and procure, all infrastructure facilities and utilities for the construction, and development of the Project, including procuring connection for and supply of electricity, water, gas, and other utilities as may be necessary or required for the Project. The Agency shall obtain all Applicable Permits and comply with the conditions thereunder for the procurement and use of such infrastructure facilities and utilities. Safety n any other aspects compliances will be solely the responsibility of the bidder / agency.
- b. Employing technical personnel (of number and qualifications) as per the requirement to be evaluated and employed by the agency and as may be stipulated by the Authority from time to time during the execution of the work.
- c. Prior to commencing the works, effect and maintain insurances (cover from the first working day after the Start Date to the end of Defects Liability Period)
- d. Commence execution of the Works on the Start Date and shall carry out the Works in accordance with the program submitted by the Contractor, as updated with the approval of the Client, and complete them by the Completion Date.
- e. The BOQ shall contain items for the construction, installation, testing, and commissioning work to be done by the Agency.
- f. Undertake required survey and site assessment.
- g. Preparation of Execution Drawings
- h. Construction & Procurement

6.4.2 Phase II: Operations, Maintenance and Management of the Project (Funded by the Agency)**3.16.1.1.1 Operations and Management for Adventure Park**

- a. Finance, Procure, provide, install, operate, and maintain all equipment, furniture and/or fixtures within the Project Site of Adventure Park(including, but not limited to, furniture, furnishings and items related to O&M such as kitchen equipment, or luggage scanner, etc.), which may be required for implementation of Scope of Work of the Operator including elements not funded by the authority but essential for successful operation and management of the facility.
- b. Promptly commence operations upon the Project Site, including the Project Facilities and Services.
- c. Make efforts to maximize tourists handled to achieve optimal utilization of the Project Facilities and Services.
- d. Ensure that the Project Facilities and Services shall adhere to the Operations and Maintenance Standards, Performance Standards and Safety Standards and there is safe, smooth, and uninterrupted flow of traffic normal operating conditions.
- e. Make available all necessary financial, technical, technological, managerial, and other resources for operation, maintenance, repair and replacement of the Project Facilities and Services in a timely manner.
- f. Ensure maintenance of proper and accurate record/data/accounts relating to operations of the Project Facilities and Services and the revenue earned therefrom.
- g. Obtain, maintain, and comply with Applicable Permits and comply with the Applicable Laws

including those relating but not limited to safety, health, environment, and labour.

- h. Implement standard operating procedures for all departments.
- i. Undertake such commercial activities as are permitted and in the manner contemplated under the O&M Agreement, Applicable Laws, and Applicable Permits, on Commercial Built-up Areas either itself or allot and grant the sub-license to any third party.
- j. Collect user charges from ticketing sales, as well as from licensees of Commercial Built-up Area in the form of license fee, revenue share, security deposit, utility charges and any other form of service charges, parking revenue, advertisement rights, events, and commercial activities, etc.
- k. Finance, provide additional services / facilities if any to enhance the tourist experience or generate additional revenues with the prior approval of the Authority.
- l. This ticket will be taken by the Bidder.

3.16.1.1.2 Repair & Maintenance Requirement

- a. The agency shall, in consultation with the Authority, evolve a repair and maintenance manual for the regular and preventive maintenance of the Project in conformity with the Specifications and Standards, Maintenance Requirements, Safety Requirements and Good Industry Practice
- b. The maintenance and performance standards as given in Clause 6.8 of this section cover only some of the minimum requirements for operation for reference purpose. The Agency shall operate, maintain, and manage the proposed Project and allied facilities strictly conforming to the relevant Bureau of Indian Standards, the best industry practices. Whether the requirements are explicitly stated or not in the RFP documents, the Bidders must note the Client envisages and expects a high quality and standard facility in all respects from the Preferred Bidder, as the binding contractual obligation.
- c. Repair as necessary and maintain the Project Facilities and Services or any part thereof in accordance with the Scope of Work
- d. Maintain a good environment, conducive to all tourism and leisure facilities. Identify potential problems early within the context of the planned maintenance system so that corrective action may be planned and completed in a timely manner.
- e. Perform maintenance on a routine and periodic basis.
- f. Establish a maintenance list for planned operation and maintenance. Follow an orderly program so that maximum operational efficiency is attained.
- g. Remove promptly from the site all surplus construction machinery and materials, waste materials (including hazardous materials and waste-water), rubbish, debris (including, without limitation, accident debris) and keep the Project in a clean, tidy and orderly condition, and in conformity with Applicable Laws, Applicable Permits and Good Industry Practice.

3.16.1.1.3 Safety & Security

- a. Make adequate security arrangements on the project premises.
- b. Employ qualified and skilled personnel required to operate the Project Facilities and Services

3.16.1.1.4 Waste Management (Solid waste collection, segregation & disposal)

- a. It will be the responsibility of bidder to collect solid waste and dispose the non-recyclable part in the designated site as instructed by the Authority.
- b. Systematic and periodic waste collection: Collection & disposal of all garbage on regular basis at least once in a day
- c. Maintain hygiene in the premises by routine garbage collection & disposal by safe & secured manner.
- d. Segregation of wastes: The waste collected in the common area shall be segregated & collected in different colour bags for organic & inorganic waste and disposed as per Authority instructions / waste management rules.
- e. Trash Receptacles - Clearly label bins for different types of waste (recyclables, general waste, etc.), Informative signs about the importance of cleanliness and responsible waste disposal, Regular Cleaning Crew, Surveillance and Monitoring, composting machine, Encouraging the use of eco-friendly products by vendors and visitors (biodegradable plates, cups, etc.)

3.16.1.1.5 Employment of Personnel

- a. The Operator shall employ qualified and skilled personnel required to operate the Project Facilities and Services. The terms of employment may be as deemed fit by the Operator and the Operator shall comply with all Applicable Laws and bear all costs in this regard. Without prejudice to the generality of this provision, all requisite approvals for employment of personnel of foreign origin or nationality shall be obtained by the Operator prior to engaging such personnel, however, it must be noted that the failure to obtain such approval shall not amount to a Force Majeure Event.
- b. All employees shall always remain the Operator's responsibility.
- c. Further, the agency shall comply with the requirements of employing the existing personnel/ labour. All labour law compliances shall be that of the Operator alone.
- d. The Operator shall ensure that the manpower engaged by it in the performance of its obligations under this Agreement are at all times properly trained for their respective functions and qualifications.
- e. At no point in time, the services at the Operational Built-up Areas at the Project Site shall suffer for lack of staff.

3.16.1.1.6 Marketing & Promotion

- a. Make efforts to increase the number of international and domestic tourists.
- b. Develop an annual marketing plan – targeting domestic & international cruise operators and tourists.
- c. Fund, develop and regularly maintain a comprehensive web portal / website for the project with ticket booking, details of facilities, event schedule, layout plan, tourist amenities, customer support, customer feedback / rating, FAQs etc.
- d. Publish articles / promotional advertisements in local and national print media for publicizing the

project.

- e. Promote the facility across various social media platforms.
- f. Tie-up with tour operators, travel agents etc. to ensure more itineraries are planned with the project as one of the access points.
- g. Regularly publish advertisements at transit points and major tourism points to attract tourists.
- h. Marketing and Promotion – Make efforts to increase the number of international and domestic tourists.

Vii Feedback & Complaint Redressal

- a. Provide for a customer feedback mechanism through a QR code-based system.
- b. Analyse feedbacks and assess trends and issues for improving tourist experience.

Viii Other Requirements

- a. The Operator shall make/ensure payments to the Authority, if applicable.

6.5 Estimated Project Cost

6.6 Proposed Timeline

- (i) **Phase I** (Design & Development Period) - Maximum 12 months
- (ii) **Phase II (Operations, Maintenance and Management Period for Adventure Park) - Minimum 60 months**

6.7 Payment Milestones

The Agency shall be made payments sequentially in order defined as per milestones mentioned (Detail refer in Schedule-N of Volume-II).

6.8 Development Specifications and Standards

The following specifications and standards cover the minimum requirements for the proposed experience. The agency shall, establish resources, procure and construct the proposed tourism experience and allied facilities strictly conforming to the relevant code/s of Bureau of Indian Standards and the best industry practices.

Whether the requirements are explicitly stated or not in this document, the agency must note that the Authority envisages a world-class facility in all respects and expects a truly international quality and standards from the Preferred Bidder, as the binding contractual obligation.

(For Detail Specifications and standard- Refer Schedule- B & C of Volume-II)

Site Development related specifications

The agency should maintain and operate auxiliary site infrastructure including landscaping, internal road network, rainwater, storm water and parking areas within the site.

Signages

The Agency shall provide signages so as to facilitate necessary information to the visitors regarding amenities and their location. The signage would be provided separately.

- i. Information Signs,

- ii. Directional Signs
- iii. Dos and Don'ts
- iv. Facility Signs
- v. Other Signs.

Parking Area

- i. The agency shall be responsible for operations and management of the facility.
- ii. All parking spaces shall be paved to withstand vehicle loads and forces due to frequent acceleration and deceleration of vehicles. Parking bays/ lots shall have proper cross slopes and drainage. They shall be marked with paint as per Indian Standards to demarcate parking and circulation space.

Commercial spaces/ area permitted under the Project

The Agency may also develop commercial space as approved under the project i.e. souvenirshop, retail showrooms, business area, etc. All relevant rules and regulations shall be followed by the Agency for developing commercial spaces/ area. Parking provisions catering to the needs of the Commercial space/ area, as per Local Bye Laws shall be made.

Support Facilities and Amenities

The Agency shall provide all the necessary support facilities and amenities conforming to the development controls and meeting the relevant Indian and international standards.

Fire Fighting Facilities

The Agency shall provide all the required firefighting equipment and facilities including fire exits, fireproof doors, etc. conforming to the relevant standards and the applicable rules and regulations.

Facilities for Physically Challenged Persons

The Agency shall provide all the necessary facilities to the entry/ exit, seating and movement of physically challenged persons including wheelchairs, ramps, specially designed seats, toilets, etc.

6.9 Maintenance & Performance Standards

The Agency shall procure that at all times during the Operation Period, the Project conforms to the maintenance requirements set forth in Section 4.6 and the maintenance and performance standards as per the Clause 6.9.4 (**the “Maintenance & Performance Requirements”**).

Maintenance Manual

The Agency 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 in conformity with the Specifications and Standards, Maintenance Requirements, Safety Requirements and Good Industry Practice, and shall provide 5 (five) copies thereof to the Authority. The Maintenance Manual shall be revised and updated once every 3 (three) years.

Without prejudice to the provision of this clause, 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 their overall condition conforms to Good Industry Practice.

Maintenance Programme

No later than 45 (forty-five) days prior to the beginning of each Accounting Year during the Operation Period, as the case may be, the Agency shall provide to the Authority, 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 the inspection of all elements of the Project;
- e. Intervals at which the Agency 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.

Within 15 (fifteen) days of receipt of the Maintenance Programme, the Authority shall review the same and convey its comments to the Agency with particular reference to its conformity with the Maintenance Requirements, Maintenance Manual and Safety Requirements.

The Agency may modify the Maintenance Programme as may be reasonable in the circumstances, and the procedure specified in this Clauses 6.10.1 and 6.10.2 shall apply mutatis mutandis to such modifications.

6.9.3 De-commissioning due to Emergency

If, in the reasonable opinion of the Agency, there exists an Emergency which warrants decommissioning and closure of the whole or any part of the Project/Project facilities, the Agency shall be entitled to decommission and close the whole or any part of the Project for so long as such Emergency and the consequences thereof warrant; provided that such decommissioning and particulars thereof shall be notified by the Agency to the Authority without any delay, and the Agency shall diligently carry out and abide by any reasonable directions that the Authority may give for dealing with such Emergency.

The Agency shall re-commission the Project/Project facilities or the affected part thereof as quickly as practicable after the circumstances leading to its decommissioning and closure have ceased to exist or have so abated as to enable the Agency to re-commission the Project and shall notify the Authority of the same without any delay.

Any decommissioning or closure of any part of the Project and the re-commissioning thereof shall, as soon as practicable, be brought to the notice of affected persons by means of public announcements/notice.

6.9.4 Maintenance Standard

During the period of operation, the Agency shall maintain all the facilities in accordance with

performance standards and maintenance requirements, as mentioned below:

- i. Perform maintenance on a routine and periodic basis.
- ii. Provide functional facilities that:
 - Meet the experience requirements;
 - Have an environmentally acceptable atmosphere for users of the facility;
 - Ensure the safety of the visitors; and,
- iii. Maintain a good environment in the site conducive to all tourism and leisure facilities. Identify potential problems early within the context of the planned maintenance system so that corrective action may be planned and completed in a timely manner.
- iv. Establish a maintenance list for planned operation and maintenance. Follow an orderly program so that maximum operational efficiency is attained.

The Agency shall remove promptly from the Project Site all surplus construction machinery and materials, waste materials (including hazardous materials and wastewater), rubbish, debris (including, without limitation, accident debris) and keep the Project in a clean, tidy and orderly condition, and in conformity with Applicable Laws, Applicable Permits and Good Industry Practice.

6.9.5 Maintenance Works

The Agency shall perform routine and periodic maintenance activities for the project infrastructure viz, civil, mechanical and electrical works and equipment, furniture for meeting the specified performance standards as per the table below:

Description	Required Level	Facility/ Equipment
Power supply, Electrical Installations, Electrical Equipment.	Standby power arrangements shall be made for all necessary amenities. No loose, open, un-insulated wiring in any of the areas. Switch Boards, Electric Meters should be enclosed in the boxes and accessible to only authorized persons.	Standby power supply by DG sets shall be ready to be operated and should be available on a 24 x 7 (hours) basis.
Natural and Mechanical Ventilation and Illumination	Shall meet the required illumination level as specified in the IS Code and NBC. Shall meet the required ventilation level as specified in the IS Code and NBC.	Any disruption to mechanical ventilation, if provided, shall be rectified within 24 hours. Arrangements for natural ventilation like skylights ventilators, shafts etc. shall be cleaned once every week.

Maintenance of Circulation Areas. Maintenance shall include the entire housekeeping activities requiring routine and periodic maintenance. Annual maintenance shall be done for accessories like fans, lighting arrangements etc. in these areas.

6.9.6 Performance Standards Intent

- i. The performance levels define the level at which the proposed facilities are to be maintained and the proposed facilities are to be maintained and the operation and maintenance of the facilities and the site environment.
- ii. The obligations of the Agency in respect of Maintenance requirements shall include:
- iii. Maintaining Site environment to cause minimum disturbance to the environment,
- iv. Ensure that the facilities are operational and rectification of the defects and deficiencies within the minimum time,
- v. Ensure that the fixed parameters provided in this RFP are abided by at any time during the Concession Period.
- vi. Notwithstanding anything contrary to specified in this schedule, if the nature and extent of any defect justify more time for its repair or rectification as compared to the time specified herein, the Agency shall be entitled to additional time in conformity with good industry practice. However, the Agency shall get prior approval from the Client or authorized Representative, for such additional requirements of the time.
- vii. Notwithstanding anything to the contrary contained in this schedule, if any defect, deficiency or deterioration in the project poses danger to the life and property of the users thereof, the Agency shall promptly take all reasonable measures for eliminating or minimizing such danger.

6.9.7 Routine Maintenance Performance Standards

Sn.	Serviceability Indicator	Required Maintenance Level	Permissible Time Limit for repairs/rectifications
A	Experience		
1	Power supply, Electrical installations, Electrical equipment shall be functional	-	Any disruption in powersupply shall be rectifiedwithin six hours. Standby power supply by DG sets shall be ready to be operated and should be available 24x7 (hrs) basis
2	Boundary Wall shall bewithout any Damage/ Breach	-	Any damage/ breach to the boundary wall shallbe rectified within three (3) days after their detection
3	There shall be no standing water on the pavement surface, no waterlogging in the centre	-	Immediate measures to be taken and waterlogging should be cleared within four hours
B	Allied facilities for all		

Sn.	Serviceability Indicator	Required Maintenance Level	Permissible Time Limit for repairs/rectifications
5	All Toilets, urinals bathrooms shall be cleanand functional	A minimum of 95% toilets and urinals shall be functional at any given point of time	Toilets, urinals bathrooms shall be demarked with suitable signboards. These shouldbe kept clean and hygienic and cleaning shall be done at least twice daily.
6	All drinking water chambers shall be cleanand functional	A minimum of 95% drinking water chambers shall be functional at any given point of time	These shall be cleaned daily, Water supply shallbe on 24x7 (hrs) basis. Drinking water quality inall the seasons shall be as per WHO standards.
7	Dustbins, spittoons etc. shall be clean and Functional	A minimum of 95% Dustbins, spittoons shall be functional at any given point of time	The dustbin shall be emptied after every six hours or earlier if it is full or if creates a foul smell in the neighbourhood.
8	All information Signage and Display Boards shall be visible, legible and functional	Maximum 2% number of damaged signage and boards atany given point of time	These shall be cleanedonce a week. Damaged signage and boards shall be replaced, repaired within seven days of their detection
9	Seating Arrangements shall not be damaged	Maximum 5% number of damaged seats at any given point of time	Any damaged seat shall be repaired and replaced within seven days of detection. These shall be cleaned daily and checked that they are firmly fixed/ grouted to the platform with the base.
10	Power supply, Electrical Installations, Electrical equipment shall be functional	-	Timely intervention with Temporary measures within 8 hours, permanent restoration within 7 days, depending on nature and intensity of work required as decided by the Client or its authorized representative.
11	Staircases shall be clean and functional	-	The staircase shall be cleaned at least twice a day. Damaged handrails, risers or treads shall be repaired within three days after detection.

Sn.	Serviceability Indicator	Required Maintenance Level	Permissible Time Limit for repairs/rectifications
12	Illumination (Lighting) shall be functional	To meet the required illumination level as per national standards	The ventilators, skylights, etc. serving as source of natural ventilation and other luminaries for artificial lighting shall be cleaned once in seven days to maintain the illumination level
C	Buildings		
13	Defects in Electricity gadgets like bulbs/ lampshades/ wiring/ etc.	-	Temporary measures within 4 hours, permanent restoration within 7 days,
14	Defects in all other utilities like water supply/ tap/tap connections/ pipe/ sewerage and drainage pipes/ tanks & overflow/ glasses/ windowpanes/ all other building furniture	-	Timely intervention with Temporary measures within 8 hours, permanent restoration within 7 days, depending on the nature and intensity of work required.
E	Telecom system/networking		
15	Telecommunication and Networking System shall be functional	-	Temporary measures within 8 hours, permanent restoration within 3 days
F	Fire Fighting Equipment		
16	Fire Fighting Equipment shall be functional	-	Any damage to firefighting equipment installed in the facilities and in public spaces shall be rectified within 2 days of detection. Fire extinguishers shall be replaced before the end of its expiry date. The water tank meant for firefighting purpose shall remain flooded with water to its capacity at all the times
G	Water tank		

Sn.	Serviceability Indicator	Required Maintenance Level	Permissible Time Limit for repairs/rectifications
17	Water tank shall be clean and functional	-	Water tank shall be cleaned and disinfected every month (by the usage of approved chemicals) to ensure that no inorganic sedimentation takes place.

6.9.8 Periodic Maintenance Performance Standards

To maintain the quality and operational standards of high quality, the periodic maintenance/renewal activities are proposed for the project in the table below:

Sn.	Periodic Renewal Activities	Time Limit for renewal
1	Repainting of furniture signages delineators, markings etc.	Minimum once in a year
2	Repainting of Buildings and all other structures	Minimum once in three year
3	Repainting of carpentry work like joinery, doors, windows, ventilators, wooden furniture etc. in the offices, cabins, booths etc.	Minimum once in three year
4	Resurfacing of Pavement	Routine repairs every year and premix carpet every fourth year. In case the pavement is of Rigid type, no periodic renewal would be required except cleaning & filling of joints
5	Mechanical Equipment	Minimum once in a year as per manufacturer's installation, operational and maintenance instruction manual
6	Electrical Equipment	Minimum once in a year as per manufacturer's installation, operational and maintenance instruction manual

6.9.9 Key Performance Indicators for Operations & Management

Sn.	Parameters	Performance Indicators
1	Experience	To remain operational during the permitted hours.
2	Kitchen & FoodCourt	To remain operational during the permitted hours.
3	Registration Office, Administration	To remain operational during the permitted hours.
4	Information System Displays	To remain operational during the permitted hours.
5	Toilets	To remain operational 24 hours a day throughout the year.

Sn.	Parameters	Performance Indicators
6	Water Supply	To remain operational 24 hours a day throughout the year.
7	Parking Area	To remain operational 24 hours a day throughout the year.
8	Electricity Supply	To remain operational 24 hours a day throughout the year.
9	Telecommunication and Networking System	To remain operational 24 hours a day throughout the year.
10	Standby Diesel Generators Sets	Standby diesel generators set to supply power to the Project facilities must be available 24 hours a day, throughout the year in case of disruption or breakdown in power supply
11	Maintenance Office	This shall remain open for 16 hours a day and throughout the year
12	Security	To remain functional 24 hours a day throughout the year Appropriate fencing of the Site with lighting and security shall be provided to ensure that there will be no encroachment on the Site

Note: The above norms for maintenance and performance are only indicative. The authority may direct the Agency from time to time during the contract period to take appropriate measures to improve maintenance and performance activities as may be deemed necessary by it. The agency on receiving such specific directions shall take action without loss of time to comply with the directions of the Authority.

6.9.10 Monitoring of Operation and Maintenance

During Operation Period, the Agency shall, no later than 7 (seven) days after the close of each month, furnish to the Authority a monthly report stating in reasonable detail the condition of the Project including its compliance or otherwise with the Maintenance Requirements, Maintenance Manual, Maintenance Program and Safety Requirements, and shall promptly give such other relevant information as may be required by the Independent Engineer or the Authority. In particular, such report shall separately identify and state in reasonable detail the defects and deficiencies that require rectification.

During Operation Period, the Agency shall, no later than 10 (ten) days after the close of each month, furnish to the Authority and the Independent Engineer a monthly management report which shall be a summary of:

- Key performance indicators achieved in the month, along with an analysis of reasons for failures, if any, and proposals to remedy the same;
- Key operational hurdles and deliverables expected in the succeeding month along with strategies for addressing the same and for otherwise improving the Project's operational

performance; and

6.9.11 Inspection

The Authority shall inspect the project 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 Agency within 7 (seven) days of such inspection.

6.9.12 Remedial measures

The Agency shall repair or rectify the defects or deficiencies, if any, set forth in the O&M Inspection Report or in the test results requested by the Independent Engineer and furnish a report in respect thereof to 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 Agency shall submit progress reports of the repair works once every week until such works are completed in conformity with this Agreement.

In the event that remedial measures are not completed by the Agency in conformity with the provisions of this Agreement, the Authority shall be entitled to recover Damages from the Agency under and in accordance with the provisions of Contract Agreement.

6.9.13 Reports of unusual occurrence

The Agency shall, prior to the close of each day, send to the Authority and the Independent Engineer, by facsimile or e-mail, a report stating accidents and unusual occurrences on the Project relating to the safety and security of the Users. A weekly and monthly summary of such reports shall also be sent within 3 (three) days of the closing of each week and month, as the case may be. For the purposes of this Clause, accidents and unusual occurrences on the Project shall include:

- a. death or injury to any person;
- b. damaged or dislodged fixed equipment.
- c. any damage or obstruction on the Project, which results in slow down of the services being provided by the Agency.
- d. disablement of any equipment during operation.
- e. smoke or fire.
- f. flooding of the Project Site; and
- g. such other relevant information as may be required by the Authority.

6.10 Team Structure

Key Professional Staff /Consultant and qualification required are as follows: [Define required minimum workforce requirement in the table below]

Sn.	Positions	Minimum Qualification	Years of Experience
A	Project Manager cum Tourism Expert	MBA / PGDBM/Master s in Tourism/Urban Planning/Architecture/Civil Engineer	10
B	Project Development Team		
	Architect /Landscape Architect	B. Arch/ M.Arch/ Architect /Landscape Architect	5
	Craftsman	Domain Experts with experience in stonework	5
	Graduate Engineer	Electrical Engineer	3
C	Maintenance Team		
D	Operations and Management Team		

E	Quality & Assurance		
	Graduate Engineer	Quality Control Engineer	3
F	Others		

7 MISCELLANEOUS

- 7.1. The Bidding Process shall be governed by, and construed in accordance with, the laws of India and the Courts in the State in which the Authority has its headquarters shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the Bidding Process.

The Authority, in its sole discretion and without incurring any obligation or liability, reserves the right, at any time, to;

- a. suspend and/ or cancel the Bidding Process and/ or amend and/ or supplement the Bidding Process or modify the dates or other terms and conditions relating thereto.
 - b. consult with any Bidder in order to receive clarification or further information.
 - c. qualify or not to qualify any Bidder and/ or to consult with any Bidder in order to receive clarification or further information.
 - d. retain any information and/ or evidence submitted to the Authority by, on behalf of, and/ or in relation to any Bidder; and/ or
 - e. independently verify, disqualify, reject and/ or accept any and all submissions or other information and/ or evidence submitted by or on behalf of any Bidder.
- 7.2. It shall be deemed that by submitting the Bid, the Bidder agrees and releases the Authority, its employees, agents and advisers, irrevocably, unconditionally, fully and finally from any and all liability for claims, losses, damages, costs, expenses or liabilities in any way related to or arising from the exercise of any rights and/ or performance of any obligations hereunder, pursuant hereto and/ or in connection with the Bidding Process and waives, to the fullest extent permitted by applicable laws, any and all rights and/ or claims it may have in this respect, whether actual or contingent, whether present or in future.
- 7.3. The Contract Agreement and RFP are to be taken as mutually explanatory and, unless otherwise expressly provided elsewhere in this RFP, in the event of any conflict between them the priority shall be in the following order:
- a. the Contract Agreement;
 - b. the RFP
 - c. i.e. the Contract Agreement at (a) above shall prevail over the RFP at (b) above.

8 FORMS OF BID (APPENDICES)

Appendix-I: Technical Bid for Pre-qualification

Letter Comprising the Technical Bid for Pre-qualification.

(Refer Clause 2.14.2)

Dated:

To,

Executive Engineer,
Haryana Tourism Corporation
Haryana

Sub: Technical Bid for pre-qualification for Development of Adventure Tourism Hub at Adventure Park, Morni Haryana

Dear Sir,

1. With reference to your RFP document dated-----, I/we, having examined the RFP document and understood its contents, hereby submit my/our Bid for the aforesaid project. The Bid is unconditional and unqualified.
2. I/We acknowledge that the Authority will be relying on the information provided in the Bid and the documents accompanying the Bid for selection of the Bidder for the aforesaid project, and we certify that all information provided in the Bid and in Annexes I to V is true and correct; nothing has been omitted which renders such information misleading; and all documents accompanying such Bid are true copies of their respective originals.
3. This statement is made for the express purpose of qualifying as a Bidder for the development, construction, operation, maintenance and management of the aforesaid Project.
4. I/ We shall make available to the Authority any additional information it may find necessary or require supplementing or authenticate the Bid.
5. I/ We acknowledge the right of the Authority to reject our Bid without assigning any reason or otherwise and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.
6. I/ We certify that in the last three years, we/ any of the Consortium Members or our/ their Associates have neither failed to perform on any contract, as evidenced by imposition of a penalty by an arbitral or judicial authority or a judicial pronouncement or arbitration award, nor been expelled from any project or contract by any public authority nor have had any contract terminated by any public authority for breach on our part.
7. I/ We declare that:
 - a. I/ We have examined and have no reservations to the Bidding documents, including any Addendum issued by the Authority;
 - b. I/ We do not have any conflict of interest in accordance with Clauses 2.2.1 of the RFP document.
 - c. I/We have not directly or indirectly or through an agent engaged or indulged in any corrupt

practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as defined in Clause 5.2 of the RFP document, in respect of any tender or request for proposal issued by or any agreement entered into with the Authority or any other public sector enterprise or any government, Central or State; and

- d. I/ We hereby certify that we have taken steps to ensure that in conformity with the provisions of Section 5 of the RFP document, no person acting for us or on our behalf has engaged or will engage in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.
8. I/ We understand that you may cancel the Bidding Process at any time and that you are neither bound to accept any Bid that you may receive nor to invite the Bidders to Bid for the Project, without incurring any liability to the Bidders, in accordance with Clause 2.8 and 2.25 of the RFP documents.
9. I/ We believe that we/ our Consortium/ proposed Consortium satisfy(ies) the Net Worth criteria and meet(s) all the requirements as specified in the RFP document and am/ are qualified to submit a Bid.
10. I/ We declare that we/ any Member of the Consortium, or our/ its Associates are not a Member of a/ any other Consortium submitting a Bid for the Project.
11. I/ We certify that in regard to matters other than security and integrity of the country, we/ any Member of the Consortium or any of our/ their Associates have not been convicted by a court or indicted or adverse orders passed by a regulatory authority which could cast a doubt on our ability to undertake the Project or which relates to a grave offence that outrages the moral sense of the community.
12. I/ We further certify that in regard to matters relating to security and integrity of the country, we/ any Member of the Consortium or any of our/ their Associates have not been charge-sheeted / blacklisted/ barred by any agency of the Government or convicted by a court.
13. I/ We further certify that no investigation by a regulatory authority is pending either against us/ any Member of the Consortium or against our/ their Associates or against our CEO or any of our directors/ managers/ employees².
14. I/ We undertake that in case due to any change in facts or circumstances during the Bidding Process, we are attracted by the provisions of disqualification in terms of the provisions of this RFP, we shall intimate the Authority of the same immediately.
15. I/We acknowledge and agree that in the event of a change in control of a Member whose Financial Capacity was taken into consideration for the purposes of qualification under and in accordance with the RFP, I/we shall inform the Authority forthwith along with all relevant particulars and the Authority may, in its sole discretion, disqualify our Consortium or

² In case the Bidder is unable to provide certification regarding any pending investigation as specified in paragraph 13, it may precede the paragraph by the words viz. "Except as specified in Schedule hereto". The exceptions to the certification or any disclosures relating thereto may be clearly stated in a Schedule to be attached to the Bid. The Authority will consider the contents of such Schedule and determine whether or not the exceptions/disclosures are material to the suitability of the Bidder for award hereunder.

withdraw the Letter of Award, as the case may be. I/we further acknowledge and agree that in the event such change in control occurs after signing of the Contract Agreement but prior to commencement of the Appointed Date under the Contract Agreement , it would, notwithstanding anything to the contrary contained in the Agreement, be deemed a breach thereof, and the Contract Agreement shall, at the sole discretion of the Authority, be liable to be terminated under and in accordance with Clause 2.4.2 of the RFP without the Authority being liable to us in any manner whatsoever.

16. I/ We hereby irrevocably waive any right or remedy which we may have at any stage at law or howsoever otherwise arising to challenge or question any decision taken by the Authority in connection with the selection of Bidders, selection of the Bidder, or in connection with the selection/ Bidding Process itself, in respect of the above mentioned Project and the terms and implementation thereof.
17. In the event of my/ our being declared as the Selected Bidder, I/we agree to enter into a Contract Agreement in accordance with the draft that has been provided to me/us prior to the Bid Due Date. We agree not to seek any changes in the aforesaid draft and agree to abide by the same.
18. I/ We have studied all the Bidding Documents carefully and also surveyed the project site. We understand that except to the extent as expressly set forth in the Contract Agreement, we shall have no claim, right or title arising out of any documents or information provided to us by the Authority or in respect of any matter arising out of or relating to the Bidding Process including the award of Project.
19. The Statement of Legal Capacity as per format provided at Annex-V in Appendix-I of the RFP document, and duly signed, is enclosed. The power of attorney for signing of Bid and the power of attorney for Lead Member of consortium, as per format provided at Appendix III and IV respectively of the RFP, are also enclosed.
20. I/ We understand that the selected Bidder shall either be an existing Company incorporated under the Indian Companies Act, 1956/2013, or shall incorporate as such prior to execution of the Contract Agreement.
21. I/ We hereby confirm that we shall comply with the O&M requirements specified in Clause 2.2.3 and Clause 6.4.2.
22. I/ We agree and undertake to abide by all the terms and conditions of the RFP document.
23. I/ We certify that in terms of the RFP, my/our Net Worth is Rs. [.....] (Rupees)
 Experience Score is..... (in figures)..... (in words).
24. I/ We offer a Bid Security of Rs [.....] (Rupees only) to the Authority in accordance with the RFP Document. The Bid Security in the form of a {Demand Draft/ Bank Guarantee} has been submitted.

25. I/ We agree and understand that the Bid is subject to the provisions of the Bidding Documents. In no case, I/we shall have any claim or right of whatsoever nature if the Project is not awarded to me/us or our Bid is not opened or rejected.
26. We agree and undertake to be jointly and severally liable for all the obligations of the Agency under the Contract Agreement till occurrence of Financial Close in accordance with the Contract Agreement.
27. I/ We shall keep this offer valid for 120 (one hundred and twenty) days from the Bid Due Date specified in the RFP.

In witness thereof, I/ we submit this Bid under and in accordance with the terms of the RFP document.

Yours faithfully,

Date: (Signature, name and designation of the Authorized Signatory)

Place: Name and seal of the Bidder/ Lead Member

Appendix-I**Annex-I: Particulars of the Bidder****General Information**

a.	Name:	
b.	Country of incorporation:	
c.	Address of the corporate headquarters and its branch office(s), if any, in India:	
d.	Date of incorporation and/ or commencement of business:	

(i) Brief description of the Company including details of its main lines of business and proposed role and responsibilities in this Project:

(ii) Particulars of individual(s) who will serve as the point of contact/ communication for the Bidder:

a.	Name:	
b.	Designation:	
c.	Company:	
d.	Address:	
e.	Telephone:	
f.	E-Mail:	

(iii) Particulars of the Authorised Signatory of the Bidder:

a.	Name:	
b.	Designation:	
c.	Address:	
d.	Phone Number:	
e.	Fax Number:	

(iv) In case of a Consortium:

- (i) The information above (1-4) should be provided for all the Members of the Consortium.
- (ii) A copy of the Joint Bidding Agreement, as envisaged in Clause 2.2.6(g) should be attached to the Bid.
- (iii) Information regarding the role of each Member should be provided as per table below:

Sn.	Name of Member	Role ^{\$}	Percentage of equity in the Consortium ^{\$\$}
1			
2			
3			
4			

^{\$}The role of each Member, as may be determined by the Bidder, should be indicated in accordance with Clause 2.2.6 (d) and instruction 4 at Annex-IV.

^{\$\$}The percentage of equity should be in accordance with Clause 2.2.6 (a), (c) and (g).

6. The following information shall also be provided for the Bidder, including each Member of the Consortium:

Name of Bidder/ member of Consortium:

Sn.	Criteria	Yes	No
1.	Has the Bidder/ constituent of the Consortium been barred by the Central/ State Government, or any entity controlled by it, from participating in any project (PPP or otherwise)?		
2.	If the answer to 1 is yes, does the bar subsist as on the date of Bid?		
3.	Has the Bidder/ constituent of the Consortium paid liquidated damages of more than 5% of the contract value in a contract due to delay or has been penalized due to any other reason in relation to execution of a contract, in the last three years?		

7. A statement by the Bidder and each of the Members of its Consortium (where applicable) or any of their Associates disclosing material non-performance or contractual non-compliance in past projects, contractual disputes and litigation/ arbitration in the recent past is given below (Attach extra sheets, if necessary).

Appendix-I**Annex-II: Technical Capacity of the Bidder***(Refer to Clauses 2.3.2 and 4.2.1a of the RFP)*

Sn.	Name of Project	Member Code	Project Cost (Capex)	Ongoing (Y/N)	Start of Operations (Mention Year)	Total Builtup Area (in Sqft)					
A	Category 1										
1											
2											
3											
4											
5											
B	Category 2										
1											
2											
3											
4											
5											

NOTE:

- Provide details of only those projects that have been undertaken by the Bidder under its own name and/ or by an Associate specified in Clause 2.2.9 and/ or by a project company eligible under Clause 3.2.3. In case the Bid Due Date falls within 3(three) months of the close of the latest financial year, refer to Clause 2.2.12.
- In case credit is claimed for an Associate, necessary evidence to establish the relationship of the Bidder with such Associate, in terms of Clause 2.2.9, shall be provided.
- Member Code shall indicate NA for Not Applicable in case of a single entity Bidder. For other Members, the following abbreviations are suggested viz. LM means Lead Member, OM means Other Member. In case of consortium, projects for Lead Members to be showcased first followed by others.
- ^{¶¶}Refer Annex-IV of this Appendix-I. Add more rows if necessary.
- ^{\$} Refer Clause 3.2.1.

Appendix-I**Annex-III: Financial Capacity of the Bidder***(Refer to Clauses 2.3.2 and 4.2.1b of the RFP)***(In Rs. Crore\$)**

Bidder type ^{\$\$}	Member Code [£]	Net Cash Accruals					Net Worth ^{££}
		Year 1	Year 2	Year 3	Year 4	Year 5	Year1
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Single entity Bidder							
Consortium Member 1							
Consortium Member 2							
Consortium Member 3							
Consortium Member 4							
TOTAL							

Name & address of Bidder's Bankers:

- ^{\$} For conversion of other currencies into rupees, see notes below Annex-II of Appendix-I.
- ^{\$\$}A Bidder consisting of a single entity should fill in details as per the row titled Single entity Bidder and ignore the rows titled Consortium Members. In case of a Consortium, row titled Single entity Bidder may be ignored.
- [£]For Member Code, see instruction 4 at Annex-IV of this Appendix-I.

- ^{££}The Bidder should provide details of its own Financial Capacity or of an Associate specified in Clause 2.2.9.

Instructions:

1. The Bidder/ its constituent Consortium Members shall attach copies of the balance sheets, financial statements and Annual Reports for 5 (five) years preceding the Bid Due Date. The financial statements shall:
 - a. reflect the financial situation of the Bidder or Consortium Members and its/ their Associates where the Bidder is relying on its Associate's financials;
 - b. be audited by a statutory auditor;
 - c. be complete, including all notes to the financial statements; and
 - d. Correspond to accounting periods already completed and audited (no statements for partial periods shall be requested or accepted).
2. In case the annual accounts for the latest financial year are not audited and therefore the Bidder cannot make it available, the Bidder shall give an undertaking to this effect and the statutory auditor shall certify the same. In such a case, the Bidder shall provide the Audited Annual Reports for 3 (three) years preceding the year for which the Audited Annual Report is not being provided.
3. Net Cash Accruals shall mean Profit After Tax + Depreciation.
4. Net Worth shall mean (Subscribed and Paid-up Equity + Reserves) less (Revaluation reserves + miscellaneous expenditure not written off + reserves not available for distribution to equity shareholders³).
5. Year 1 will be the latest completed financial year, preceding the bidding. Year 2 shall be the year immediately preceding Year 1 and so on. In case the Bid Due Date falls within 3 (three) months of the close of the latest financial year, refer to Clause 2.2.12.
6. In the case of a Consortium, a copy of the Jt. Bidding Agreement shall be submitted in accordance with Clause 2.2.6 (g) of the RFP document.
7. The Bidder shall provide an Auditor's Certificate specifying the Net Worth of the Bidder and also specifying the methodology adopted for calculating such Net Worth in accordance with Clause 2.2.4 of the RFP document.

³ To further explain, Net worth is aggregate value of the paid-up share capital and all reserves created out of the profits and securities, premium account, after deducting the aggregate value of the accumulated losses, deferred expenditure and miscellaneous expenditure not written off, as per the audited balance sheet, but does not include reserves created out of revaluation of assets, write-back of depreciation and amalgamation

Appendix-I**Annex-IV: Details of Eligible Projects***(Refer to Clauses 4.1 of the RFP)***Project Code:****Member Code:**

Item (1)	Refer Instructions below (2)	Particulars of the Project (3)
Title & nature of the project		
Category	5	
Number of Rooms (if applicable)	6	
Location and address of the Project	7	
Date of commencement of Project	8	
Equity shareholding (with period during which equity was held)	9	

1	Name of the Bidder	
2	Name of the Project	
3	Project Category	
4	Name of the Location	
5	Whether credit is being taken for the Eligible Experience of an Associate (Yes/ No)	
6	Name of the Client & Address	
7	Name and Telephone Number of Client's Representative	
8	Value of the Project Completed with Certificate of evidence (In Rs. Crores)	

9	Approximate Value of the Contract (In Rs Crores)	
10	Duration of the Assignment (Contract Period)	
11	Date of Commencement of Project (month/ year)	
12	Project Description	
13	Description of the activities performed by the bidder	

It is certified that the aforesaid information is true and correct to the best of my knowledge and belief.

[Authorised Signatory]

Instructions:

1. Bidders are expected to provide information in respect of each Eligible Project in this Annex. Information provided in this section is intended to serve as a back-up for information provided in the Bid. Bidders should also refer to the Instructions below.
2. A separate sheet should be filled for each Eligible Project.
3. Member Code shall indicate NA for Not Applicable in case of a single entity Bidder. For other Members, the following abbreviations are suggested viz. LM means Lead Member and OM means Other Member. In case the Eligible Project relates to an Associate of the Bidder or its Member, write "Associate" along with Member Code.
4. Refer to Clause 4.4.1 of the RFP for category number.
5. The date of commissioning of the project should be indicated for all Eligible Projects.
6. For all Eligible Projects, the equity shareholding of the Bidder, in the company owning the Eligible Project, held continuously during the period for which Eligible Experience is claimed, needs to be given (Refer Clause 4.1.1). In case the project is owned/ operated, maintained and managed by the Bidder Company, please indicate accordingly (Refer Clause 3.2.3).
7. Certificate from the Bidder's statutory auditor⁴ or its respective entity issuing the star categorization certificate must be furnished as per formats below for each Eligible Project. In jurisdictions that do not have statutory auditors, the auditors who audit the annual accounts of the Bidder/ Member/Associate may provide the requisite certification.
8. In the event that credit is being taken for the Eligible Experience of an Associate, as defined in Clause 2.2.3, the Bidder should also provide a certificate in the format below:

⁴ In case duly certified audited annual financial statements containing the requisite details are provided, a separate certification by statutory auditors would not be necessary.

Certificate from the Statutory Auditor/ Company Secretary regarding Associate^{\$}

Based on the authenticated record of the Company, this is to certify that more than 50% (fifty per cent) of the subscribed and paid up voting equity of(name of the Bidder/

Consortium Member/ Associate) is held, directly or indirectly[£], by(name of Associate/ Bidder/ Consortium Member). By virtue of the aforesaid share-holding, the latter exercises control over the former, who is an Associate in terms of Clause 2.2.3 of the RFP.

A brief description of the said equity held, directly or indirectly, is given below:

{Describe the share-holding of the Bidder/ Consortium Member and the Associate. In the event the Associate is under common control with the Bidder/ Consortium Member, the relationship may be suitably described and similarly certified herein.}

Name of the audit firm:

(Signature, name and designation of Date:

Seal of the audit firm:

the authorised signatory).

^{\$}In the event that the Bidder/ Consortium Member exercises control over an Associate by operation of law, this certificate may be suitably modified and copies of the relevant law may be enclosed and referred to.

[£]In the case of indirect share-holding, the intervening companies in the chain of ownership should also be Associates i.e., the share-holding in each such company should be more than 50% in order to establish that the chain of “control” is not broken.

9. It may be noted that in the absence of any detail in the above certificates, the information would be considered inadequate and could lead to exclusion of the relevant project in computation of Experience Score⁵.

⁵ Refer Clause 3.2.6 of the RFP.

Appendix-I

Annex-V: Statement of Legal Capacity

(To be forwarded on the letterhead of the Bidder/ Lead Member of Consortium)

Ref. Date:

To,

The Chief Executive Officer

Haryana Tourism Corporation

Haryana

Dear Sir/Madam,

We hereby confirm that we/ our members in the Consortium (constitution of which has been described in the Bid) satisfy the terms and conditions laid out in the RFP document. We have agreed that (insert member's name) will act as the Lead Member of our consortium⁶. We have agreed that (insert individual's name) will act as our representative/ will act as the representative of the consortium on its behalf\$ and has been duly authorized to submit the RFP. Further, the authorised signatory is vested with requisite powers to furnish such letter and authenticate the same.

Thanking you,

Yours faithfully,

(Signature, name and designation of the authorised signatory)

For and on behalf of.....

⁶ Please strike out whichever is not applicable.

Appendix-I**Annex-VI: Proposed Design & Implementation Plan**

The applicant shall submit the proposed design and plan covering the following aspects:

- a. **Conceptual clarity and understanding of context in which the Authority operates in general and Swadesh Darshan scheme objectives.**
- b. **Business Operations Plan:**
General operational details explaining roles and responsibilities, timelines and the scope of work to successfully operate the experience.
- c. **Design & Aesthetics:**
Ensure the design is aesthetical and functional and in line with the Authority's vision incorporating aspects of vernacular design, local materials, measures for safety and universal accessibility.
- d. **Project Timeline:**
Describe how the bidder proposes meet the construction timelines
- e. **Proposed Service Standards & KPI:**
Describe proposed service levels and KPI for sustainable Operations and Management of the project.
- f. **Proposed Maintenance Plan:**
Plan for Daily / Weekly / Monthly/ Yearly with well incorporated system for monitoring the performance and grievance redressal mechanism
- g. **Proposed Team Strength:**
Describe the proposed team and organization of personnel explaining how different areas of expertise needed for this project have been fully covered by its proposal.

Appendix-II: Financial Bid for selection of Bidder**Letter comprising the Bid***(Refer Clauses 2.1.4 and 2.14)*

Dated: _____

To

Executive engineer,

Haryana Tourism Corporation

Sub: Financial Bid for the **Development of Adventure Tourism Hub at Tikkar Taal and Adventure Park**

Dear Sir,

1. With reference to your RFP document dated, I/we, having examined the Bidding Documents and understood their contents, hereby submit my/our Bid for the aforesaid Project. The Bid is unconditional and unqualified.
2. I/ We acknowledge that the Authority will be relying on the information provided in the Bid and the documents accompanying the Bid for selection of the Agency for the aforesaid Project, and we certify that all information provided therein is true and correct; nothing has been omitted which renders such information misleading; and all documents accompanying the Bid are true copies of their respective originals.
3. This statement is made for the express purpose of our selection as Agency for the development, construction, operations, maintenance and management of the aforesaid Project.
4. I/ We shall make available to the Authority any additional information it may find necessary or require to supplement or authenticate the Bid.
5. I/ We acknowledge the right of the Authority to reject our Bid without assigning any reason or otherwise and hereby waive, to the fullest extent permitted by applicable law, our right to challenge the same on any account whatsoever.
6. I/ We certify that in the last three years, we/ any of the Consortium Members^E or our/ their Associates have neither failed to perform on any contract, as evidenced by imposition of a penalty by an arbitral or judicial authority or a judicial pronouncement or arbitration award, nor been expelled from any project or contract by any public authority nor have had any contract terminated by any public authority for breach on our part.
7. I/ We declare that:
 - a. I/ We have examined and have no reservations to the Bidding Documents, including any Addendum issued by the Authority; and
 - b. I/ We do not have any conflict of interest in accordance with Clause **2.2.1** of the RFP document; and

-
- c. I/ We have not directly or indirectly or through an agent engaged or indulged in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice, as defined in Clause 5.3 of the RFP document, in respect of any tender or request for proposals issued by or any agreement entered into with the Authority or any other public sector enterprise or any government, Central or State; and
 - d. I/ We hereby certify that we have taken steps to ensure that in conformity with the provisions of Section 5 of the RFP, no person acting for us or on our behalf has engaged or will engage in any corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice; and
 - e. the undertakings given by us along with the Bid in response to the RFP for the Project were true and correct as on the date of making the Bid and are also true and correct as on the Bid Due Date and I/we shall continue to abide by them.
 8. I/ We understand that you may cancel the Bidding Process at any time and that you are neither bound to accept any Bid that you may receive nor to invite the Bidders to Bid for the Project, without incurring any liability to the Bidders, in accordance with **Clauses 2.8 and 2.25** of the RFP document.
 9. I/ We believe that we/ our Consortium satisfy(s) the Net Worth criteria and meet(s) the requirements as specified in the RFP document.
 10. I/ We declare that we/ any Member of the Consortium, or our/ its Associates are not a Member of a/ any other Consortium submitting a Bid for the Project.
 11. I/ We certify that in regard to matters other than security and integrity of the country, we/ any Member of the Consortium or any of our/ their Associates have not been convicted by a Court of Law or indicted or adverse orders passed by a regulatory authority which could cast a doubt on our ability to undertake the Project or which relates to a grave offence that outrages the moral sense of the community.
 12. I/ We further certify that in regard to matters relating to security and integrity of the country, we/ any Member of the Consortium or any of our/ their Associates have not been charge-sheeted by any agency of the Government or convicted by a Court of Law.
 13. I/ We further certify that no investigation by a regulatory authority is pending either against us or against our Associates or against our CEO or any of our directors/ managers/ employees.⁶
 14. I/ We undertake that in case due to any change in facts or circumstances during the Bidding Process, we are attracted by the provisions of disqualification in terms of the guidelines referred to above, we shall intimate the Authority of the same immediately.
 15. I/ We acknowledge and undertake that our Consortium was pre-qualified and short-listed on the basis of Technical Capacity and Financial Capacity of those of its Members who shall, for a period
 16. of 2 (two) years from the date of commercial operation of the Project, hold equity share capital not less than: (i) 26% (twenty six per cent) of the subscribed and paid-up equity of the Agency; and (ii) 5% (five per cent) of the Total Project Cost specified in the Contract
-

Agreement. We further agree and acknowledge that the aforesaid obligation shall be in addition to the obligations contained in the Contract Agreement in respect of Change in Ownership.

17.

18. In witness thereof, I/we submit this Bid under and in accordance with the terms of the RFP document.

⁶ In case the Bidder is unable to provide certification regarding any pending investigation as specified in paragraph 13, it may precede the paragraph by the words viz. "Except as specified in Schedule hereto". The exceptions to the certification or any disclosures relating thereto may be clearly stated in a Schedule to be attached to the Application. The Authority will consider the contents of such Schedule and determine whether or not the exceptions/disclosures are material to the suitability of the Bidder for award hereunder.

19. I/ We acknowledge and agree that in the event of a change in control of an Associate whose Technical Capacity and/ or Financial Capacity was taken into consideration for the purposes of short-listing and pre-qualification under and in accordance with the RFP, I/We shall inform the Authority forthwith along with all relevant particulars and the Authority may, in its sole discretion, disqualify our Consortium or withdraw the Letter of Award, as the case may be. I/We further acknowledge and agree that in the event such change in control occurs after signing of the Contract Agreement but prior to Financial Close of the Project, it would, notwithstanding anything to the contrary contained in the Agreement, be deemed a breach thereof, and the Contract Agreement shall be liable to be terminated without the Authority being liable to us in any manner whatsoever.

20. I/ We understand that the Selected Bidder shall either be an existing Company incorporated under the Indian Companies Act, 1956/ 2013, or shall incorporate as such prior to execution of the Contract Agreement.

21. I/ We hereby irrevocably waive any right or remedy which we may have at any stage at law or howsoever otherwise arising to challenge or question any decision taken by the Authority in connection with the selection of the Bidder, or in connection with the Bidding Process itself, in respect of the above mentioned Project and the terms and implementation thereof.

22. In the event of my/ our being declared as the Selected Bidder, I/we agree to enter into a Contract Agreement in accordance with the draft that has been provided to me/us prior to the Bid Due Date. We agree not to seek any changes in the aforesaid draft and agree to abide by the same.

23. I/ We have studied all the Bidding Documents carefully and also surveyed the site identified for the Project. We understand that except to the extent as expressly set forth in the Contract Agreement, we shall have no claim, right or title arising out of any documents or information provided to us by the Authority or in respect of any matter arising out of or relating to the Bidding Process including the award of Contract.

24. I/ We offer a Bid Security of Rs..... (Rupees only) to the Authority in accordance with the RFP Document.

25. The Bid Security in the form of a Demand Draft/ Bank Guarantee (strike out whichever is not applicable) is attached.

26. The documents accompanying the Bid, as specified in **Clause 2.14.3** of the RFP, have been submitted in a separate envelope and marked as "Enclosures of the Bid".

27. I/ We agree and understand that the Bid is subject to the provisions of the Bidding Documents. In no case, I/we shall have any claim or right of whatsoever nature if the Project / Contract is not awarded to me/us or our Bid is not opened or rejected.
28. The (i) Project Cost and (ii) Annual Fee has been quoted by me/us after taking into consideration all the terms and conditions stated in the RFP, draft Contract Agreement, our own estimates of costs and Revenue and after a careful assessment of the site and all the conditions that may affect the project cost and implementation of the Project.
29. I/ We agree and undertake to abide by all the terms and conditions of the RFP document.
30. {We, the Consortium Members agree and undertake to be jointly and severally liable for all the obligations of the Agency under the Contract Agreement till occurrence of Financial Close in accordance with the Contract Agreement.}
31. I/ We shall keep this offer valid for 120 (one hundred and twenty) days from the Bid Due Date specified in the RFP.
32. I/ We hereby submit the following Bid for undertaking the aforesaid Project in accordance with the Bidding Documents and the Contract Agreement:

**30. We quote a Project Cost of Rs. _____ (in words) for undertaking the
1.6 the project.**

**31. We offer a Annual Fee of (_____) to the Authority from the date of COD of the
Project, which shall be increased @ 10% every year as specified in the draft
Contract Agreement.**

In witness thereof, I/we submit this Bid under and in accordance with the terms of the RFP document.

Yours faithfully,

Date: _____ (Signature, name and designation of the Authorised signatory)

Place: _____ Name and seal of Bidder/Lead Member

Appendix-III: Power of Attorney for signing of Bid⁷(Refer Clause 2.2.5)

Know all men by these presents, We..... (name of the firm and address of the registered office) do hereby irrevocably constitute, nominate, appoint and authorise Mr/ Ms (name), ... son/daughter/wife of and presently residing at....., who is presently employed with us/ the Lead Member of our Consortium and holding the position of....., as our true and lawful attorney (hereinafter referred to as the "Attorney") to do in our name and on our behalf, all such acts, deeds and things as are necessary or required in connection with or incidental to submission of our application for pre-qualification and submission of our bid for the.....Project proposed or being developed by the(the "Authority") including but not limited to signing and submission of all applications, bids and other documents and writings, participate in Pre-Bids and other conferences and providing information/ responses to the Authority, representing us in all matters before the Authority, signing and execution of all contracts including the Contract Agreement and undertakings consequent to acceptance of our bid, and generally dealing with the Authority in all matters in connection with or relating to or arising out of our bid for the said Project and/ or upon award thereof to us and/or till the entering into of the Contract Agreement with the Authority.

AND we hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us.

IN WITNESS WHEREOF WE,....., THE ABOVE NAMED PRINCIPAL HAVE EXECUTED THIS POWER OF ATTORNEY ON THIS DAY OF 2.....

For

(Signature, name, designation and address)

Witnesses:

1.

(Notarised)

2.

Accepted

.....(Signature)

(Name, Title and Address of the Attorney)

Notes: The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law and the charter documents of the

executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.

Appendix-IV: Power of Attorney for Lead Member of Consortium⁸

(Refer **Clause 2.2.5**)

Whereas the (“the Authority”) has invited applications from interested parties for the Project(the “Project”).

Whereas,.....and
(collectively the “Consortium”) being Members of the Consortium are interested in bidding for the Project in accordance with the terms and conditions of the Request for Proposal (RFP) and other connected documents in respect of the Project, and

Whereas, it is necessary for the Members of the Consortium to designate one of them as the Lead Member with all necessary power and authority to do for and on behalf of the Consortium, all acts, deeds and things as may be necessary in connection with the Consortium’s bid for the Project and its execution.

NOW THEREFORE KNOW ALL MEN BY THESE PRESENTS

We,.....having our registered office at.....,M/s.
.....having our registered office at.....,M/s.
.....having our registered office at.....,and
.....having our registered office at.....,(hereinafter collectively referred to as the “Principals”) do hereby irrevocably designate, nominate, constitute, appoint and authorise M/S.....having its registered office at ,being one of the Members of the Consortium, as the Lead Member and true and lawful attorney of the Consortium (hereinafter referred to as the “Attorney”). We hereby irrevocably authorise the Attorney (with power to sub-delegate) to conduct all business for and on behalf of the Consortium and any one of us during the bidding process and, in the event the Consortium is awarded the Contract/contract, during the execution of the Project and in this regard, to do on our behalf and on behalf of the Consortium, all or any of such acts, deeds or things as are necessary or required or incidental to the pre-qualification of the Consortium and submission of its bid for the Project, including but not limited to signing and submission of all applications, bids and other documents and writings, accept the Letter of Award, participate in bidders’ and other conferences, respond to queries, submit information/ documents, sign and execute contracts and undertakings consequent to acceptance of the bid of the Consortium and generally to represent the Consortium in all its dealings with the Authority, and/ or any other Government Agency or any person, in all matters in connection with or relating to or arising out of the Consortium’s bid for the Project and/ or upon award thereof till the Contract Agreement is entered into with the Authority.

AND hereby agree to ratify and confirm and do hereby ratify and confirm all acts, deeds and things done or caused to be done by our said Attorney pursuant to and in exercise of the powers conferred by

⁸ To be submitted in original.

this Power of Attorney and that all acts, deeds and things done by our said Attorney in exercise of the powers hereby conferred shall and shall always be deemed to have been done by us/ Consortium.

IN WITNESS WHEREOF WE THE PRINCIPALS ABOVE NAMED HAVE EXECUTED THIS
POWER OF ATTORNEY ON THIS DAY OF 2.....

For

(Signature)

.....

(Name & Title)

For

(Signature)

.....

(Name & Title)

For

(Signature)

.....

(Name & Title)

Witnesses:

1.

2.

.....

(Executants)

(To be executed by all the Members of the Consortium)

Notes:

- *The mode of execution of the Power of Attorney should be in accordance with the procedure,if any, laid down by the applicable law and the charter documents of the executant(s) and*

when it is so required, the same should be under common seal affixed in accordance with the required procedure.

- *Also, wherever required, the Bidder should submit for verification the extract of the charter documents and documents such as a board or shareholders' resolution/ power of attorney in favour of the person executing this Power of Attorney for the delegation of power hereunder on behalf of the Bidder.*
- *For a Power of Attorney executed and issued overseas, the document will also have to be legalised by the Indian Embassy and notarised in the jurisdiction where the Power of Attorney is being issued. However, the Power of Attorney provided by Bidders from countries that have signed the Hague Legislation Convention 1961 are not required to be legalised by the Indian Embassy if it carries a conforming Apostille certificate.*

(a) Appendix-V: Joint Bidding Agreement

(Refer **Clause 2.2.6 (g)**)

(To be executed on Stamp paper of appropriate value)

THIS JOINT BIDDING AGREEMENT is entered into on this the day of 20...

(b) AMONGST

1.Limited, a company incorporated under the Companies Act, 1956/2013 and having its registered office at.....(hereinafter referred to as the “**First Part**” which expression shall, unless repugnant to the context include its successors and permitted assigns)

(c) AND

2.Limited, a company incorporated under the Companies Act, 1956/2013 and having its registered office at (hereinafter referred to as the “**Second Part**” which expression shall, unless repugnant to the context include its successors and permitted assigns)

(d) AND

3. {..... Limited, a company incorporated under the Companies Act, 1956/2013 and having its registered office at (hereinafter referred to as the “**Third Part**” which expression shall, unless repugnant to the context include its successors and permitted assigns)}

(e) AND

4. {..... Limited, a company incorporated under the Companies Act, 1956/2013 and having its registered office at (hereinafter referred to as the “**Fourth Part**” which expression shall, unless repugnant to the context include its successors and permitted assigns)}^{\$}

The above mentioned parties of the FIRST, SECOND, {THIRD and FOURTH} PART are collectively referred to as the “**Parties**” and each is individually referred to as a “**Party**”

(f) **WHEREAS,**

(A) <Name of SIA> under the aegis of **Haryana** represented by its **Haryana Tourism Corporation** and having its principal offices at (hereinafter referred to as the “Authority” which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and assigns) has invited applications (the Bids”) by its Request for Proposal No. dated (the “RFP”) for pre-qualification and short-listing of bidders for development, operation, maintenance and management of the Project (the “Project”).

(B) The Parties are interested in jointly bidding for the Project as members of a Consortium and in accordance with the terms and conditions of the RFP document and other bid documents in respect of the Project, and

(C) It is a necessary condition under the RFP document that the members of the Consortium shall enter into a Joint Bidding Agreement and furnish a copy thereof with the Bid.

(g) **NOW IT IS HEREBY AGREED as follows:**

1. Definitions and Interpretations

In this Agreement, the capitalized terms shall, unless the context otherwise requires, have the meaning ascribed thereto under the RFP.

2. Consortium

2.1 The Parties do hereby irrevocably constitute a consortium (the “**Consortium**”) for the purposes of jointly participating in the Bidding Process for the Project.

2.2 The Parties hereby undertake to participate in the Bidding Process only through this Consortium and not individually and/ or through any other consortium constituted for this Project, either directly or indirectly or through any of their Associates.

4. Role of the Parties

The Parties hereby undertake to perform the roles and responsibilities as described below:

- (a) **Party of the First Part shall be the Lead member of the Consortium and shall have the power of attorney from all Parties for conducting all business for and on behalf of the Consortium during the Bidding Process and until the Appointed Date under the Contract Agreement when all the obligations of the bidder shall become effective;**
- (b) **Party of the Second Part shall be_____;**

5. Joint and Several Liability

The Parties do hereby undertake to be jointly and severally responsible for all obligations and liabilities relating to the Project and in accordance with the terms of the RFP, RFP and the Contract Agreement, till such time as the Financial Close for the Project is achieved under and in accordance with the Contract Agreement.

6. Representation of the Parties

Each Party represents to the other Parties as of the date of this Agreement that:

- (a) Such Party is duly organized, validly existing and in good standing under the laws of its incorporation and has all requisite power and authority to enter into this Agreement;
- (b) The execution, delivery and performance by such Party of this Agreement has been authorized by all necessary and appropriate corporate or governmental action and a copy of the extract of the charter documents and board resolution/ power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Consortium Member is annexed to this Agreement, and will not, to the best of its knowledge:
 - (i) require any consent or approval not already obtained;
 - (ii) violate any Applicable Law presently in effect and having applicability to it;
 - (iii) violate the memorandum and articles of association, by-laws or other applicable organizational documents thereof;
 - (iv) violate any clearance, permit, Contract, grant, license or other governmental authorization, approval, judgment, order or decree or any mortgage agreement, indenture or any other instrument to which such Party is a party or by which such Party or any of its properties or assets are bound or that is otherwise applicable to such Party; or
 - (v) create or impose any liens, mortgages, pledges, claims, security interests, charges or encumbrances or obligations to create a lien, charge, pledge,

security interest, encumbrances or mortgage in or on the property of such Party, except for encumbrances that would not, individually or in the aggregate, have a material adverse effect on the financial condition or prospects or business of such Party so as to prevent such Party from fulfilling its obligations under this Agreement;

- (c) this Agreement is the legal and binding obligation of such Party, enforceable in accordance with its terms against it; and
- (d) there is no litigation pending or, to the best of such Party's knowledge, threatened to which it or any of its Associates is a party that presently affects or which would have a material adverse effect on the financial condition or prospects or business of such Party in the fulfillment of its obligations under this Agreement.

7. Termination

This Agreement shall be effective from the date hereof and shall continue in full force and effect until the Financial Close of the Project is achieved under and in accordance with the Contract Agreement, in case the Project is awarded to the Consortium. However, in case the Consortium is either not pre-qualified for the Project or does not get selected for award of the Project, the Agreement will stand terminated in case the Bidder is not pre-qualified or upon return of the Bid Security by the Authority to the Bidder, as the case may be.

8. Miscellaneous

8.1 This Joint Bidding Agreement shall be governed by laws of India.

8.2 The Parties acknowledge and accept that this Agreement shall not be amended by the Parties without the prior written consent of the Authority.

IN WITNESS WHEREOF THE PARTIES ABOVE NAMED HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

SIGNED, SEALED AND DELIVERED

SIGNED, SEALED AND DELIVERED

For and on behalf of

LEAD MEMBER by:

SECOND PART

(Signature)

(Signature)

(Name)

(Name)

(Designation)

(Designation)

(Address)

(Address)

SIGNED, SEALED AND DELIVERED

For and on behalf of

THIRD PART

(Signature)

(Name)

(Designation)

(Address)

SIGNED, SEALED AND DELIVERED

For and on behalf of

FOURTH PART

(Signature)

(Name)

(Designation)

(Address)

In the presence of:

1.

2.

(h) Notes:

1. The mode of the execution of the Joint Bidding Agreement should be in accordance with the procedure, if any, laid down by the Applicable Law and the charter documents of the executant(s) and when it is so required, the same should be under common seal affixed in accordance with the required procedure.
2. Each Joint Bidding Agreement should attach a copy of the extract of the charter documents and documents such as resolution / power of attorney in favour of the person executing this Agreement for the delegation of power and authority to execute this Agreement on behalf of the Consortium Member.
3. For a Joint Bidding Agreement executed and issued overseas, the document shall be legalized by the Indian Embassy and notarized in the jurisdiction where the Power of Attorney has been executed.

Appendix VI

Bank Guarantee for Bid Security

(Refer Clauses 2.1.5 and 2.27)

B.G. No.

Dated: _____

1. In consideration of you, ..., having its office at..... (hereinafter referred to as the “Authority”, which expression shall unless it be repugnant to the subject or context thereof include its, successors and assigns) having agreed to receive the Bid of (a company registered under the Companies Act, 1956/ 2013) and having its registered office at (and acting on behalf of its Consortium) (hereinafter referred to as the “Bidder” which expression shall unless it be repugnant to the subject or context thereof include its/their executors, administrators, successors an assigns), for the Project on DBFOT basis (hereinafter referred to as “the Project”) pursuant to the RFP Document dated issued in respect of the Project and other related documents including without limitation the draft Contract agreement (hereinafter collectively referred to as “Bidding Documents”), we (Name of the Bank) having our registered office at and one of its branches at (hereinafter referred to as the “Bank”), at the request of the Bidder, do hereby in terms of Clause 2.1.5 read with Clause 2.1.6 of the RFP Document, irrevocably, unconditionally and without reservation guarantee the due and faithful fulfilment and compliance of the terms and conditions of the Bidding Documents (including the RFP Document) by the said Bidder and unconditionally and irrevocably undertake to pay forthwith to the Authority an amount of Rs. (Rupees only) (hereinafter referred to as the “Guarantee”) as our primary obligation without any demur, reservation, recourse, contest or protest and without reference to the Bidder if the Bidder shall fail to fulfil or comply with all or any of the terms and conditions contained in the said Bidding Documents.
2. Any such written demand made by the Authority stating that the Bidder is in default of the due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents shall be final, conclusive and binding on the Bank.
3. We, the Bank, do hereby unconditionally undertake to pay the amounts due and payable under this Guarantee without any demur, reservation, recourse, contest or protest and without any reference to the Bidder or any other person and irrespective of whether the claim of the Authority is disputed by the Bidder or not, merely on the first demand from the Authority stating that the amount claimed is due to the Authority by reason of failure of the Bidder to fulfil and comply with the terms and conditions contained in the Bidding Documents including failure of the said Bidder to keep its Bid open during the Bid validity period as set forth in the said Bidding Documents for any reason whatsoever. Any such demand made on the Bank shall be conclusive as regards amount due and payable by the Bank under this Guarantee. However, our liability under this Guarantee shall be restricted to an amount not exceeding Rs. (Rupees.....only).
4. This Guarantee shall be irrevocable and remain in full force for a period of 180 (one hundred and eighty) days from the Bid Due Date inclusive of a claim period of 60 (sixty) days or for such

- extended period as may be mutually agreed between the Authority and the Bidder, and agreed to by the Bank, and shall continue to be enforceable till all amounts under this Guarantee have been paid.
5. We, the Bank, further agree that the Authority shall be the sole judge to decide as to whether the Bidder is in default of due and faithful fulfilment and compliance with the terms and conditions contained in the Bidding Documents including, inter alia, the failure of the Bidder to keep its Bid open during the Bid validity period set forth in the said Bidding Documents, and the decision of the Authority that the Bidder is in default as aforesaid shall be final and binding on us, notwithstanding any differences between the Authority and the Bidder or any dispute pending before any Court, Tribunal, Arbitrator or any other authority.
 6. The Guarantee shall not be affected by any change in the constitution or winding up of the Bidder or the Bank or any absorption, merger or amalgamation of the Bidder or the Bank with any other person.
 7. In order to give full effect to this Guarantee, the Authority shall be entitled to treat the Bank as the principal debtor. The Authority shall have the fullest liberty without affecting in any way the liability of the Bank under this Guarantee from time to time to vary any of the terms and conditions contained in the said Bidding Documents or to extend time for submission of the Bids or the Bid validity period or the period for conveying acceptance of Letter of Award by the Bidder or the period for fulfilment and compliance with all or any of the terms and conditions contained in the said Bidding Documents by the said Bidder or to postpone for any time and from time to time any of the powers exercisable by it against the said Bidder and either to enforce or forbear from enforcing any of the terms and conditions contained in the said Bidding Documents or the securities available to the Authority, and the Bank shall not be released from its liability 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 said Bidder or any other forbearance, act or omission on the part of the Authority or any indulgence by the Authority to the said Bidder or by any change in the constitution of the Authority or its absorption, merger or amalgamation with any other person or any other matter or thing whatsoever which under the law relating to sureties would but for this provision have the effect of releasing the Bank from its such liability.
 8. Any notice by way of request, demand or otherwise hereunder shall be sufficiently given or made if addressed to the Bank and sent by courier or by registered mail to the Bank at the address set forth herein.
 9. We undertake to make the payment on receipt of your notice of claim on us addressed to [name of Bank along with branch address] and delivered at our above branch which shall be deemed to have been duly authorised to receive the said notice of claim.
 10. It shall not be necessary for the Authority to proceed against the said Bidder before proceeding against the Bank and the guarantee herein contained shall be enforceable against the Bank, notwithstanding any other security which the Authority may have obtained from the said Bidder or any other person and which shall, at the time when proceedings are taken against the Bank hereunder, be outstanding or unrealised.
 11. We, the Bank, further undertake not to revoke this Guarantee during its currency except with the

previous express consent of the Authority in writing.

12. The Bank declares that it has power to issue this Guarantee and discharge the obligations contemplated herein, the undersigned is duly authorised and has full power to execute this Guarantee for and on behalf of the Bank.

13. For the avoidance of doubt, the Bank's liability under this Guarantee shall be restricted to Rs..... crore (Rupees.....crore only). The Bank shall be liable to pay the said amount or any part thereof only if the Authority serves a written claim on the Bank in accordance with paragraph 9 hereof, on or before [.....(indicate date falling 180 days after the Bid Due Date)].

Signed and Delivered by..... Bank

By the hand of Mr./Ms, its.....and authorised official.

(Signature of the Authorised Signatory)

(Official Seal)

Note: Though for this bid not applicable, it is enclosed for any exigency.

Appendix-VII**CLEARANCES**

- a. **Other Clearances:** The following list of Applicable Permits for construction, operation and maintenance of the Tourism Experience is indicative only. The actual Applicable permits will be contingent upon the nature of construction and operation envisaged by the Agency.

The estimated timeframe for obtaining following approvals is 30 days, subject to the Agency submitting its applications complete in all respect in a timely manner. The Authority will provide reasonable support and assistance to the Agency in procuring Applicable Permits required from any Government Instrumentality for implementation and operation of the Project.

[To be customised as per project applicability]

Sn.	Clearance / Permit	When required?	Relevant Department	Timeline
1	Transfer of land lease to Legal Entity – Lease Registry	Before Construction	Registrar / Sub-Registrar	30 days
2	Development Permit	Before Land Development	State	30 days (as per State/UT Building Bye-Laws)
3	Building Permit	Before erection of building	Town and Country Planning	30 days (as per State/ UT Building Bye-Laws)
4	Development Certificate	After Land development but before building construction	State	30 days (as per State/ UT Building Bye-Laws)
5	Occupancy Certificate	After Building Construction but before occupation	State	15 days (as per State/ UT Building Bye-Laws)
7	Provisional NOC	Before Construction	State Pollution Control Board	1 week after receiving the project drawings
6	Consent to Establish	Before Construction	State Pollution Control Board	1 week after receiving the project drawings

Sn.	Clearance / Permit	When required?	Relevant Department	Timeline
7	Consent to Operate	After Building Construction but before operation	State Pollution Control Board concerned departments like PWD & Revenue Department	15 days
8	Panchayat NOC	Before Construction	Village Panchayat	15 days
9	Food License & Hygiene Clearance	Before Operation	Department of Health, State/UT; Food Safety & Standards Authority of India (FSSAI)	15 days
10	Fire Clearance	Before operation	Fire Department/Police Department, State/ UT	15 days
11				

Request for Proposal

For
**Selection of Tourist Experience Development and
Management Agency under Swadesh Darshan 2.0
Scheme**



(Volume 2 of 2)

Date: 17.01.2026

**Ministry of Tourism
Government of India**

FORM OF AGREEMENT

Agreement for

For selection of Agency for development under Swadesh Darshan 2.0 Scheme

Development of Adventure Tourism Hub at Tikkar Taal and Adventure Park

14.03.2026

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DISCLAIMER

The information contained in this Request for Proposals document (the “**RFP**”) or subsequently provided to Bidder(s), whether verbally or in documentary or any other form by or on behalf of the Authority or any of its employees or advisors, is provided to Bidder(s) on the terms and conditions set out in this RFP and such other terms and conditions subject to which such information is provided.

This RFP is not an agreement and is neither an offer nor invitation by the Authority to the prospective Bidders or any other person. The purpose of this RFP is to provide interested parties with information that may be useful to them in making their financial offers (Bids) pursuant to this RFP. This RFP includes statements, which reflect various assumptions and assessments arrived at by the Authority in relation to the Project. Such assumptions, assessments and statements do not purport to contain all the information that each Bidder may require. This RFP may not be appropriate for all persons, and it is not possible for the Authority, its employees or advisors to consider the investment objectives, financial situation and particular needs of each party who reads or uses this RFP. The assumptions, assessments, statements and information contained in the Bidding Documents, especially the DPR, may not be complete, accurate, adequate or correct. Each Bidder should, therefore, conduct its own investigations and analysis and should check the accuracy, adequacy, correctness, reliability and completeness of the assumptions, assessments, statements and information contained in this RFP and obtain independent advice from appropriate sources.

Information provided in this RFP to the Bidder(s) is on a wide range of matters, some of which may depend upon interpretation of law. The information given is not intended to be an exhaustive account of statutory requirements and should not be regarded as a complete or authoritative statement of law. The Authority accepts no responsibility for the accuracy or otherwise for any interpretation or opinion on law expressed herein.

The Authority, its employees and advisors make no representation or warranty and shall have no liability to any person, including any Bidder or Bidder under any law, statute, rules or regulations or tort, principles of restitution or unjust enrichment or otherwise for any loss, damages, cost or expense which may arise from or be incurred or suffered on account of anything contained in this RFP or otherwise, including the accuracy, adequacy, correctness, completeness or reliability of the RFP and any assessment, assumption, statement or information contained therein or deemed to form part of this RFP or arising in any way for participation in this Bid Stage.

The Authority also accepts no liability of any nature whether resulting from negligence or otherwise howsoever caused arising from reliance of any Bidder upon the statements contained in this RFP.

The Authority may in its absolute discretion, but without being under any obligation to do so, update, amend or supplement the information, assessment or assumptions contained in this RFP.

The issue of this RFP does not imply that the Authority is bound to select a Bidder or to appoint the Selected Bidder or Agency, as the case may be, for the Project and the Authority reserves the right to reject all or any of the Bidders or Bids without assigning any reason whatsoever.

The Bidder shall bear all its costs associated with or relating to the preparation and submission of its Bid including but not limited to preparation, copying, postage, delivery fees, expenses associated with any demonstrations or presentations which may be required by the Authority or any other costs incurred in connection with or relating to its Bid. All such costs and expenses will remain with the Bidder and the Authority shall not be liable in any manner whatsoever for the same or for any other costs or other expenses incurred by a Bidder in preparation or submission of the Bid, regardless of the conduct or outcome of the Bidding Process.

1 Introduction

1.1 Background

- 1.1.1 Ministry of Tourism, Government of India has formulated Swadesh Darshan 2.0 Scheme (hereinafter referred as “**Scheme**”) to develop sustainable and responsible tourist destinations in the country by adopting the Destination Centric and Tourist Centric Approach. The Scheme is being implemented in the State of **Haryana** through its designated State Implementation Agency Haryana Tourism Corporation as (hereinafter referred as “**Authority**”). The destination **Panchkula** (hereinafter referred as “**Destination**”) has been notified for developing as sustainable and responsible tourist destination. A Destination Management Committee (hereinafter referred as “**DMC**”) has also been constituted for the Destination under District Collector for coordinating, facilitating, and providing guidance for development of the destination. A professional agency **Assystem India Limited (Formerly known as L&T Infrastructure Engineering Ltd.) & PricewaterhouseCoopers Private Ltd. (PWC)** (hereinafter referred as “**Consultant**”) has been engaged as Project Development and Management Consultant for providing end to end support to SIA and DMC for implementation of the Scheme. A Master Plan for the destination has been prepared as part of the Scheme by the PDMC.
- 1.1.2 The project **Development of Adventure Tourism Hub at Adventure Park** (hereinafter referred as “**Project**”) has been identified as one of the interventions in the Master Plan to enhance the tourist experience. The Authority is engaged in development of the project and as part of this endeavour, the Authority has decided to undertake development, operation/ maintenance and management of the said **Project** and has, therefore, decided to carry out the bidding process for selection of Agency (hereinafter referred as “**Agency**”), a private entity as the bidder to whom the Project may be awarded. Brief particulars of the Project are as follows:

Name of the Project	Appointment of Agency for Development of Development of Adventure Tourism Hub at Adventure Park
Location	Adventure Park, Morni Hills
Total Land Area	~14.42 Acres
Estimated Project Cost	Rs. <u>21.51 crores exclusive of GST</u>

Contract period

Commencing from Appointed Date

- : Maximum 12 Months for Experience in Development inclusive monsoon

DRAFT CONTRACT AGREEMENT

PART I. PRELIMINARY**CONTRACT AGREEMENT**

This **CONTRACT AGREEMENT** (“**Agreement**”) is entered into on this 20 at .

BETWEEN

1. **Haryana tourism corporation** with its principal office at SCO 17-19, Madhya Marg, Bank Square, 17B, Sector 17 Chandigarh (hereinafter referred to as the “**Authority**” which expression shall, unless repugnant to the context or meaning thereof, include its administrators, successors and permitted assigns) of One Part;

AND

2. **LIMITED**, a company incorporated under the provisions of the Companies Act, 2013 with its registered office at , India (hereinafter referred to as the “**Selected Agency**” which expression shall, unless repugnant to the context or meaning thereof, include its successors and permitted assigns and substitutes) of the Other Part.

The Authority and the Selected Agency shall collectively be referred to as “**Parties**” and individually as a “**Party**”.

WHEREAS:

- (A) Ministry of Tourism, Government of India has formulated Swadesh Darshan 2.0 Scheme (hereinafter referred as “**Scheme**”) to develop sustainable and responsible tourist destinations in the country by adopting the Destination Centric and Tourist Centric Approach. The Scheme is being implemented in the State of Haryana through its designated State Implementation Agency Haryana Tourism Corporation as (hereinafter referred as “**Authority**”). The destination Panchkula (hereinafter referred as “**Destination**”) has been notified for developing as sustainable and responsible tourist destination.
- (B) A Destination Management Committee (hereinafter referred as “**DMC**”) has also been constituted for the Destination under District Collector for coordinating, facilitating and providing guidance for development of the destination.
- (C) A professional agency **Assystem India Limited (Formerly known as L&T Infrastructure Engineering Ltd.) & PricewaterhouseCoopers Private Ltd. (PWC)** (hereinafter referred as “**Consultant**”) has been engaged as Project Design and Management Consultant for providing end to end support to SIA and DMC for implementation of the Scheme. A Master Plan for the destination has been prepared as part of the Scheme by the PDMC. The project Development of Adventure Tourism Hub at Adventure Park, Morni Hills (hereinafter referred as “**Project**”) has been

identified as one of the interventions in the Master Plan to enhance the tourist experience.

- (D) The Authority for development of the project has decided to undertake development, operations, maintenance and management of the said Project and has, therefore, decided to carry out the bidding process for selection of Tourism Experience Development and Management Agency (hereinafter referred as “**Agency**”), a private entity as the bidder to whom the Project may be awarded.
- (E) The Authority had accordingly invited proposals under its [Request for Proposal No. _____]¹ dated [●] (the “**Request for Proposal**” or “**RFP**”) for selection of bidders for undertaking the Project. The selected Bidder/consortium comprising and (collectively, the “**Consortium**”) with as its lead member (the “**Lead Member**”) was one of the bidders who had submitted its bid for the Project (the “**Bid**”).
- (F) Following the evaluation of the bids submitted by the bidders, including that of the Selected Bidder, the Authority had accepted the Bid. Subsequently, the Authority had issued the letter of award no. [●] dated [●] (the “**Letter of Award**” or “**LOA**”) to the Selected Bidder.
- (G) The Authority, through its [letter dated _____]², had agreed to the request of the Selected Bidder, and accordingly intends to enter into this Agreement with the Selected Agency for execution of the Project, subject to and on the terms and conditions set forth hereinafter.

NOW, THEREFORE, in consideration of the promises and mutual covenants herein contained, the adequacy of which is hereby acknowledged and confirmed, the terms and conditions of this Agreement are set out below.

¹ To be inserted upon issuance of the RFP.

ARTICLE 1: DEFINITIONS AND INTERPRETATION

1.1 DEFINITIONS

The words and expressions beginning with capital letters and defined in this Agreement (including those in Article 43) 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, except where the context otherwise requires:

- (a) references to any legislation or any provision thereof shall include amendment or re-enactment or consolidation of such legislation or any provision thereof so far as such amendment or re-enactment or consolidation applies or is capable of applying to any transaction entered into hereunder;
- (b) references to laws 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 in the territory of India and as from time to time may be amended, modified, supplemented, extended 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, headings or sub-headings in this Agreement are only for convenience of reference 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 activities 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, up-gradation and other activities incidental thereto, and **“develop”** shall be construed accordingly;
- (h) any reference to any period of time shall mean a reference to such time according to

Indian Standard Time;

- (i) any reference to “**hour**” shall mean a period of 60 (sixty) minutes commencing either on the hour or on the half hour of the clock, which by way of illustration means 5.00 (five), 6.00 (six), 7.00 (seven) and so on being hours on the hour of the clock and 5.30 (five thirty), 6.30 (six thirty), 7.30 (seven thirty) and so on being hours on the half hour of the clock;
- (j) any reference to day shall mean a reference to a calendar day;
- (k) references to a “**business day**” shall be construed as a reference to a day (other than a Sunday or a statutory holiday as declared by the State or Centre) on which Banks are generally open for business;
- (l) any reference to month shall mean a reference to a calendar month as per the Gregorian calendar;
- (m) 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;
- (n) any reference to any period commencing 'from' a specific date or date and 'till' or 'until' a specific 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;
- (o) the words importing singular shall include plural and vice versa;
- (p) references to any gender shall include the other and the neutral gender;
- (q) “**lakh**” means a hundred thousand (100,000) and “**crore**” means ten million (10,000,000);
- (r) “**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;
- (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 Article 1.2.1 (s) 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 shall be valid and effective only if it is in writing under the hand of a duly authorised representative of such Party in this behalf and not otherwise;
- (u) the Schedules and Recitals to this Agreement form an integral part of this Agreement

and shall be in full force and effect as though they were expressly set out in the body of this Agreement;

- (v) references to Recitals, Articles, Sub-Articles, provisos or Schedules in this Agreement shall, except where the context otherwise requires, mean references to Recitals, Articles, Sub-Articles, provisos and Schedules of or to this Agreement; reference to an Annexure shall, subject to anything to the contrary specified therein, be construed as a reference to an Annexure to the Schedule in which such reference occurs; and reference to a paragraph shall, subject to anything to the contrary specified therein, be construed as a reference to a paragraph of the Schedule or Annexure, as the case may be, in which such reference appears;
- (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 agreed genuine pre-estimate of loss and damages likely to be suffered and incurred by the Party entitled to receive the same and are not by way of penalty (the “**Damages**”); and
- (x) time shall be of the essence in the performance of the Parties’ respective obligations. If any time period specified herein is extended, such extended time shall also be of the essence.

1.2.2 Unless expressly provided otherwise in this Agreement, any documentation required to be provided or furnished by the Selected Agency to the Authority shall be provided free of cost and in 3 (three) copies, and if the Authority is required to return any such documentation with their comments and/or approval, they shall be entitled to retain 2 (two) copies thereof.

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

1.2.4 Any word or expression used in this Agreement shall, unless otherwise defined or construed in this Agreement, bear its ordinary English meaning and, for these purposes, 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 DOCUMENTS:

- (a) The documents referred to in this Agreement and forming part thereof are to be taken as mutually explanatory of one another. If there is an ambiguity or discrepancy in the documents, the Authority shall issue any necessary clarification or instruction to the Selected Agency, and the priority of the documents shall be as follows:

- i. The Agreement and letter of award and letter of intent.
 - ii. The written Clarifications of the pre-bid meeting.
 - iii. The bid submitted by the Selected Agency.
 - iv. RFP Document issued by the Authority.
- (b) Subject to the provisions of Article 1.4 (a), in case of ambiguities or discrepancies within this Agreement, the following shall apply:
 - (i) between two or more Articles of this Agreement, the provisions of a specific Article relevant to the issue under consideration shall prevail over those in other Articles;
 - (ii) between the Articles of this Agreement and the Schedules, the Articles shall prevail;
 - (iii) between any two Schedules, the Schedule more relevant to the issue under consideration shall prevail;
 - (iv) between the written description on the Drawings and the Specifications and Standards, the latter shall prevail;
 - (v) between the dimension scaled from the Drawing and its specific written dimension, the latter shall prevail; and
 - (vi) Between any value written in numerals and that in words, the latter shall prevail.

PART II. THE CONTRACT

ARTICLE 2: SCOPE OF THE PROJECT

2.1. The scope of the project during the contract period shall mean and include the following (the “Scope of the Project”):

- (a) to **design, develop** the Project on the Project Site set forth in **Schedule A**, in accordance with the provisions of this Agreement;
- (b) to develop the Project as specified in **Schedule B**, in conformity with the **Specifications and Standards** set forth in **Schedule C**;
- (b) to operate, maintain and manage the Project in accordance with the provisions of this Agreement, including the Key Performance Indicators as specified in Article 21.
- (c) to **provide Ancillary Facilities** in accordance with the provisions of this Agreement
- (d) to **transfer the Project to the Authority upon Termination** in accordance with the provisions of this Agreement; and
- (e) to **perform and fulfil all other obligations of the Selected Agency** 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 Selected Agency under this Agreement.

2.2. The Selected Agency shall be entitled to develop additional facilities, within the Project Site for providing additional tourist facilities and experience, in accordance with Applicable Laws. The Selected Agency shall be responsible for the maintenance, up keep and security of any such Facilities developed by the Selected Agency. The Selected Agency shall ensure that all activities are managed and undertaken in accordance with Applicable Laws and Applicable Permits.

ARTICLE 3: GRANT OF CONTRACT

- 3.1.1. Subject to and in accordance with the provisions of this agreement, applicable laws and applicable permits, the authority, awards to the selected agency the contract set forth herein including exclusive right, license and authority to construct, operate and maintain the project and provide hospitality services (the “Contract”), for the contract period, and the selected agency hereby accepts the contract and agrees to implement the project subject to and in accordance with the terms and conditions set forth in this agreement.
- 3.1.2. Subject to and in accordance with the provisions of this agreement, the CONTRACT hereby granted shall oblige or entitle (as the case may be) the selected agency to:
- (a) the Right of Way, access and leave and license rights to use the Project Site for the purpose of developing the Project, to the extent conferred by the provisions of this Agreement;
 - (b) design, develop and construct the Project during the Construction Period;
 - (c) achieve Project COD in accordance with the provisions of Article 15.1 and subsequently, manage, operate and maintain the Project Infrastructure throughout the Contract Period;
 - (d) provide Services and Tourist Experience in accordance with the standards and terms set out in this Agreement, Applicable Laws, Applicable Permits and Good Industry Practice;
 - (e) demand, collect and appropriate Revenue from the Users for the Tourist Experience in accordance with this Agreement;
 - (f) pay Annual Fee to the Authority in accordance with the provisions of Article 24;
 - (g) perform and fulfil all the obligations of the Selected Agency under and in accordance with this Agreement;
 - (h) bear and pay all costs, expenses and charges in connection with or incidental to the performance of the obligations of the Selected Agency under this Agreement;
 - (i) appoint Contractors, sub-contractors, agents, advisors and consultants to carry out its obligations under this Agreement in accordance with its terms;
 - (j) upon Termination of the Contract Period transfer the Project to the Authority in accordance with the terms of this Agreement;
 - (k) neither assign, transfer or sub-let or create any lien or Encumbrance on this Agreement, or the Contract hereby granted or on the whole or any part of the Project Site, nor sell, transfer, exchange, lease or part possession thereof;
 - (l) set all standards and frame and apply all internal policies, guidelines and procedures as may be appropriate for safety, security, development,

management, operation or maintenance of the Project and the Project Site, subject only to the terms of this Agreement and in accordance with Applicable Permits, Applicable Laws and Good Industry Practice;

- (l) exercise such other rights as the Authority may determine as being necessary for the purposes incidental and necessary to implement, manage, operate and maintain the Project; and
- (m) do all things incidental or related thereto or which the Selected Agency considers desirable and appropriate to be carried out in connection therewith during the Contract Period.

3.1.3. Subject to and in accordance with the provisions of this agreement, applicable laws and applicable permits, this agreement shall, from the appointed date, entitle the selected agency to undertake designing, construction, development, operation and maintenance and management of the additional facilities as provided in **Schedule B** and that may be approved and/or notified, in writing, by the authority from time to time during the CONTRACT period as part of the project (the “**ancillary facilities**”). Provided, however, that the selected agency shall not, in any event, commence the operation and/or use of the ancillary facilities prior to the project COD.

3.2. CONTRACT PERIOD

- (a) **Contract Period:** Subject to early termination of this Agreement in accordance with its terms, the term of this Agreement is 6 years from the Appointed Date (the “**Contract Period**”) including a maximum of 1 year period for construction.

[For Projects with complexity or destinations where the construction period maybe limited due to natural conditions; the timeline to be suitably modified such that major components of the experience is operational within 1 year while remaining development work continues parallel]

- (b) The Authority may consider extension of the contract period for additional period of 1 (One) year on the same terms and conditions, based on satisfactory performance during the initial contract period of the agency.
- (c) **The Authority shall, at any time prior to the date of expiry of the Contract Period,** have the right to grant extension with respect to the Project for a period which it may determine its sole discretion, after the expiry of the Contract Period, through competitive bidding. The Authority further agrees that the *Agency* shall have the right to participate in such competitive bidding and make its offer in accordance with the terms thereof and shall have the first right of refusal to accept or refuse another term contract on conclusion of the first contract period.

ARTICLE 4: CONDITIONS PRECEDENT

4.1. CONDITIONS PRECEDENT

4.1.1. Save and except as expressly provided in articles 4, 7, 8, 9, 10, 11, 16, 26, 29, 35, 36, 38, 41, 42, 43 and any related schedules 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 condition's precedent specified in this article 4.1 (the "**conditions precedent**"). Provided, however, that a party may grant waiver from satisfaction of any condition precedent by the other party in accordance with the provisions of articles 4.1.2 or 4.1.3, as the case may be, and to the extent of such waiver, that condition precedent shall be deemed to be fulfilled for the purposes of this article 4.1.1.

4.1.2. The selected agency may, upon providing the performance security to the authority in accordance with article 9 and at any time after 15 (fifteen) days from the execution date 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 article 4.1.2 within a period of 90 (ninety) days of receipt of the notice, or such longer period not exceeding 120 (one hundred and twenty) days as may be specified therein, and the conditions precedent required to be satisfied by the authority shall be deemed to have been fulfilled when the authority shall have:

- (a) procured for the Selected Agency the Right of Way to the Project Site in accordance with Article 10; and
- (b) procured all Applicable Permits as provided in **Schedule E** including permits in relation to environmental protection and conservation.

Provided, that upon request in writing by the Authority, the Selected Agency may, in its discretion, waive the Conditions Precedent set forth in this Article 4.1.2.

4.1.3. the conditions precedent required to be satisfied by the selected agency within a period of 90 (ninety) days from the execution date shall be deemed to have been fulfilled when the selected agency shall have:

- (a) provided the Performance Security to the Authority pursuant to Article 9;
- (b) executed and procured execution of the Escrow Account Agreement and opened and operationalized the Escrow Account in accordance with Article 26;
- (c) execute and procure execution of the Substitution Agreement;
- (d) procured all Applicable Permits specified in **Schedule E** unconditionally or if subject to conditions, then all such conditions required to be fulfilled under such Applicable Permits, have been fulfilled as on date the Selected Agency claims satisfaction of all the Conditions Precedent under this Agreement;
- (e) 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-Article (l), {(m)} and (n) of Article 7.1;

- (f) delivered to the Authority a legal opinion from the legal counsel of the Selected Agency with respect to the authority of the Selected Agency to enter into this Agreement and the enforceability of the provisions thereof;
- (g) delivered to the Authority the copies (certified as true copies by an authorised officer of the Selected Agency) of the constitutional documents of the Selected Agency;
- (h) executed the Financing Agreements and delivered to the Authority [3 (three)] true copies thereof, duly attested by a director of the Selected Agency;
- (i) delivered to the Authority 3 (three) true copies of the Financial Package and the Financial Model, duly attested by a director of the Selected Agency, along with copies of the Financial Model in an editable version either in MS Excel version or any substitute thereof, which is acceptable to the Senior Lenders;
- (j) delivered to the Authority copies (certified as true copies by a director of the Selected Agency) of all resolutions adopted by the board of directors of the Selected Agency authorising the execution, delivery and performance by the Selected Agency of the Agreement; and
- (k) provided proof of its shareholding pattern, evidenced by certificates from the authorised signatory of the Selected Agency.

Provided that upon request in writing by the Selected Agency, the Authority may, in its discretion, waive any of the Conditions Precedent set forth in this Article 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.

4.1.6. The selected agency shall, upon satisfaction or waiver, as the case may be, of all the conditions precedent, notify the authority of the occurrence of the appointed date.

4.2. DAMAGES FOR DELAY BY THE AUTHORITY

In the event that: (i) the Authority does not procure fulfillment or waiver of the Condition Precedent set forth in Article 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 Selected Agency or due to Force Majeure Event, the Authority shall pay Damages to the Selected Agency

of an amount calculated at the rate of 0.1% (zero point one per cent) of the Performance Security for each day's delay until the fulfillment of such Conditions Precedent, subject to a maximum amount equal to the Bid Security.

4.3.DAMAGES FOR DELAY BY THE SELECTED AGENCY

In the event that: (i) the Selected Agency does not procure fulfillment or waiver of any or all of the Conditions Precedent set forth in Article 4.1.3 within the period specified in that Article; and (ii) the delay has not occurred as a result of breach of this Agreement by the Authority or due to Force Majeure Event, the Selected Agency shall pay Damages to the Authority of an amount calculated at the rate of [1% Percent (One per cent)] of the Performance Security for each day's delay until the fulfillment or waiver of such Conditions Precedent, up to the maximum amount equal to the Bid Security and upon reaching such maximum amount, the Authority may, in its sole discretion and subject to the provisions of Article 9.2, terminate the Agreement. Provided that in the event of delay by the Authority in procuring fulfillment of the Conditions Precedent specified in Article 4.1.2, no Damages shall be due and payable by the Selected Agency under this Article 4.3 until the date on which the Authority shall have procured fulfillment of the Conditions Precedent specified in Article 4.1.2.

4.4.COMMENCEMENT OF THE CONTRACT PERIOD

The date on which Financial Close is achieved and all the Conditions Precedent specified in Article 4.1, are satisfied or waived, as the case may be, shall be the Appointed Date which shall be the date of the commencement of the Contract Period. For avoidance of doubt, the Parties agree that the Selected Agency may, upon occurrence of the Appointed Date hereunder, by notice convey the particulars thereof to the Authority, and shall thereupon be entitled to commence development of the Project in accordance with the terms of this Agreement.

4.5.TERMINATION UPON DELAY

Without prejudice to the provisions of Articles 4.2 and 4.3, and subject to the provisions of Article 9.2, the Parties expressly agree that in the event the Appointed Date does not occur, for any reason whatsoever, within a period of 180 (one hundred and eighty) days from the Execution Date or the extended period provided in accordance with this Agreement, then all rights, privileges, claims and entitlements of the Selected Agency under or arising out of this Agreement shall be deemed to have been waived by, and to have ceased with the concurrence of the Selected Agency and the Agreement may be terminated by the non-defaulting Party. Provided, however, that in the event the delay in occurrence of the Appointed Date is for reasons attributable to the Selected Agency, the Performance Security or the Bid Security, as the case may be, of the Selected Agency shall be encashed and appropriated by the Authority as Damages thereof.

ARTICLE 5: OBLIGATIONS OF THE SELECTED AGENCY

5.1. GENERAL OBLIGATIONS OF THE SELECTED AGENCY

- (a) Subject to and on the terms and conditions of this Agreement, the Selected Agency shall implement the Project, procure for and undertake the development, engineering, procurement, equipping, operation, maintenance and management of the Project and observe, fulfil, comply with and perform all its obligations set out in this Agreement or arising hereunder. The Authority however shall fund the minimum development obligation as per the terms and conditions of this agreement.
- (b) The Selected Agency shall arrange for and procure, at its own cost and risk, all allied infrastructure facilities and utilities for the construction, development, operation and maintenance of the Project, including procuring connection for and supply of electricity, water, gas and other utilities as may be necessary or required for the operation of the Project. The Selected Agency shall obtain all Applicable Permits and comply with the conditions thereunder for the procurement and use of such infrastructure facilities and utilities.
- (c) During the Contract Period, the Selected Agency shall obtain from the relevant Government Instrumentalities, the Applicable Permits (other than the Applicable Permits required to be obtained by the Authority under Article 4.1.2) and keep in force and comply with the conditions of all Applicable Permits for the development, operation and maintenance of the Project and upon Termination, the transfer of the Project to the Authority.
- (d) The Selected Agency shall comply with all Applicable Laws and conditions of all Applicable Permits (including keeping them valid and in force as required) while performing its obligations under this Agreement. Further, the Selected Agency shall ensure and procure that its Contractors, if any, comply with all Applicable Permits and Applicable Laws during their performance of any of the Selected Agency's obligations under this Agreement.
- (e) Subject to the provisions of Articles 5.1(a) and (b), the Selected Agency shall and shall procure that its Contractors, if any, shall discharge its obligations in accordance with Good Industry Practice and as a reasonable and prudent person.
- (f) The Selected Agency shall pay the Annual Fee to the Authority in accordance with Article 24.
- (g) The Selected Agency shall, at its own cost and expense, in addition to and not in derogation of its obligations elsewhere set out in this Agreement:
 - (i) procure, as required, the appropriate proprietary rights, licences, agreements and permissions for materials, methods, processes and systems used or incorporated into the Project;
 - (ii) perform and fulfil its obligations under the Financing Agreements;

- (iv) 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;
- (v) not do or omit to do any act, deed or thing which may in any manner violates any provision of this Agreement;
- (vi) ensure that the Users are treated with due courtesy and consideration and provided with ready access to services and information;
- (vii) ensure employment of the local population during the Contract Period in accordance with Article 5.13;
- (viii) procure registration from the Department of Tourism, Authority;
- (ix) always act in a manner consistent with the provisions of this Agreement and not cause or fail to do any act, deed or thing, whether intentionally or otherwise, which may in any manner violate any of the provisions of this Agreement or Applicable Laws and Applicable Permits;
- (x) procure that all equipment and facilities comprising the Project are developed, operated and maintained in accordance with the Specifications and Standards, Maintenance Requirements, Safety Requirements and Good Industry Practice;
- (xi) support, cooperate with and facilitate the Authority in the implementation and operation of the Project in accordance with the provisions of this Agreement;
- (xii) transfer the Project Assets to the Authority upon Termination in accordance with the provisions of this Agreement;

5.2. OBLIGATIONS RELATING TO PROJECT AGREEMENTS

- 5.2.1. It is expressly agreed that the selected agency 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 any other agreement shall excuse the selected agency from its obligations or liability hereunder.
- 5.2.2. Before finalisation, the selected agency shall submit to the authority the drafts of all project agreements and the operation and maintenance contract (if any) 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 and observations, if any, to the selected agency. Selected agency shall appropriately consider all such comments/ observations. Within 7 (seven) days of execution of any project agreement or amendment thereto, the selected agency shall submit to the authority a true copy thereof, duly attested by a director of the selected agency, for its record. For avoidance of doubt, it is agreed that the review and comments/ observations by the authority on any project agreement or failure or omission of the authority to review and/ or comment hereunder shall not be construed

or deemed as acceptance of any such agreement or document by the authority. No review and/or observation of the authority and/or its failure to review and/or convey its observations on any document shall relieve the selected agency of its obligations and/or liabilities under this Agreement in any manner whatsoever nor shall the authority be liable for the same in any manner whatsoever.

- 5.2.3. The selected agency 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 selected agency shall not enforce such replacement or amendment nor permit enforcement thereof against the authority. For avoidance of doubt, the authority acknowledges and agrees that it shall not unreasonably withhold its consent for restructuring or rescheduling of the debt of the selected agency.
- 5.2.4. Notwithstanding anything to the contrary contained in this agreement, the selected agency shall not sub-lease, sub-license, assign or in any manner create an encumbrance on any of the project assets as the case may be, without prior written approval of the authority, which approval the authority may, in its discretion, deny if such sub-lease, sub-license, assignment or encumbrance has or may have a material adverse effect on the rights and obligations of the authority under this agreement or applicable laws.
- 5.2.5. The selected agency 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 selected agency 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 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 selected agency expressly agrees to include the covenant in all its project agreements and undertakes that it shall, in respect of each of the project agreements, 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, where such counter party(ies) shall acknowledge and accept the covenant and undertake to be bound by the same and not to seek any relief or remedy whatsoever from the authority in the event of termination or suspension.
- 5.2.6. notwithstanding anything to the contrary contained in this agreement, the selected agency agrees and acknowledges that selection or replacement of the contractor and execution of the project agreement 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 selected agency

and undertake that it shall not give effect to any such selection or contract without prior approval of the authority. For 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 selected agency or its contractors from any liability or obligation under this agreement.

5.3. OBLIGATIONS RELATING TO CHANGE IN OWNERSHIP

- (a) The Selected Agency shall not undertake or permit any Change in Ownership except with the prior written approval of the Authority.
- (b) Notwithstanding anything to the contrary contained in this Agreement, the Selected Agency agrees and acknowledges that during the Contract Period:
 - (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 25% (twenty-five per cent) or more of the total Equity of the Selected Agency; or
 - (ii) acquisition of any control directly or indirectly of the Board of Directors of the Selected Agency 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 regard being final, conclusive and binding on the Selected Agency, and undertakes that it shall not give effect to any such acquisition of equity or control of the Board of Directors of the Selected Agency without such prior approval of the Authority. For 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 endeavor 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 Selected Agency from any liability or obligation under this Agreement.

For the purposes of this Article 5.3(b):

- (i) 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, 2011 or any statutory re-enactment thereof as in force as on the date of acquisition of Equity, or the control of the board of directors, as the case may be, of the Selected Agency;

- (ii) 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 the shares of the Selected Agency; and
- (iii) power to appoint, whether by contract or by virtue of control or acquisition of shares of any company holding directly or through one or more companies, whether situated in India or abroad, the Equity of the Selected Agency, not less than half of the directors on the Board of Directors of the Selected Agency or of any company, directly or indirectly whether situate in India or abroad, having ultimate control of not less than 25% (twenty five one per cent) of the Equity of the Selected Agency, shall constitute acquisition of control, directly or indirectly, of the board of directors of the Selected Agency.

5.4. OBLIGATIONS RELATING TO MANAGEMENT OF THE SELECTED AGENCY

The Selected Agency shall not, without the prior written approval of the Authority, undertake or cause to be undertaken, any action for all or any of the following or any matter incidental or consequential thereto:

- (a) to alter or add to the provisions of the memorandum of association;
- (b) to alter or add to the articles of association;
- (c) to change the name of the Selected Agency;
- (d) to reduce the share capital;
- (e) to commence any new lines of business;
- (f) to consent to a director or his or her relative or partner or firm or private company holding an office or place of profit, except that of managing director, manager, banker, or trustee for debenture-holders of the Selected Agency;
- (g) to make inter-corporate-loans and investments or guarantee or security (except where such security or payment is to be made to the Authority) to be given, if the aggregate amount thereof, exceeds the limit of 30% (thirty per cent) of the Selected Agency's paid-up share capital;
- (h) to apply for corporate insolvency proceedings under the Insolvency and Bankruptcy Code, 2016;
- (i) for various other matters pertaining to the winding up of the Selected Agency; and
- (j) any other matter which is required by the Companies Act to be passed by a special resolution of the shareholders of the Selected Agency.

5.5. OBLIGATIONS RELATING TO EMPLOYMENT OF TRAINED PERSONNEL

The Selected Agency shall ensure that the personnel engaged by it or by its

Contractors in the performance of its obligations under this Agreement are duly qualified and at all times properly trained with adequate and state-of-the-art training for their respective functions.

5.6. OBLIGATIONS RELATING TO AESTHETICS & QUALITY OF THE PROJECT

The Selected Agency shall maintain a high standard in the appearance and aesthetic quality of the Project and achieve integration of the Project with the character of the surrounding landscape through both appropriate design and sensitive management of all visible elements. The Selected Agency shall engage professional architects of repute for ensuring that the design of the Project meets the aforesaid aesthetic standards.

5.7. BRANDING OF PROJECT

The Selected Agency may, in its discretion, name or brand the Project or any part thereof in accordance with the Applicable Laws and Applicable Permits.

5.8. FACILITIES FOR PHYSICALLY CHALLENGED AND ELDERLY PERSONS

The Selected Agency shall, in conformity with the guidelines issued from time to time by the Ministry of Social Justice and Empowerment, GOI or a substitute thereof and any policy issued by the concerned State Government, procure a barrier free environment for the physically or visually challenged and for elderly persons using the Project.

5.9. EHS STANDARDS AND L&FS STANDARDS

5.9.1 The Selected Agency shall at all times and throughout the Contract Period (designing, development, construction and maintenance) comply with Applicable Laws including the relevant Environmental, Health and Safety (the “EHS”) rules and regulations and life and fire safety Standards (the “L&FS Standards”).

5.9.2 The Selected Agency shall prepare and comply with the performance standards, including an environmental and sustainability plan stating how the Selected Agency intends to manage and mitigate risks in relation to EHS. Such performance standards shall take into consideration the principles set out in:

- (a) National EHS regulations (<http://www.moef.nic.in/> and others);
- (b) Real Estate (Regulation and Development) Act, 2016;
- (c) National Building Code of India published by BIS (<http://www.bis.org.in/>) and other statutory BIS standards applicable to projects of similar nature; and
- (d) L&FS Standards.

5.10. OBLIGATIONS RELATING TO TAXES

The Selected Agency shall pay, at all times during the subsistence of this Agreement, all Taxes, fees, levies, duties, cesses and all other statutory charges payable in respect of the Project and Project Infrastructure. Provided, however, that all

payments made by the Selected Agency with respect to GST levied on or in respect of any services provided by the Selected Agency to the Authority for and in respect of the Project and the Project Infrastructure shall be paid by the Authority upon receipt of particulars thereof.

5.11. OBLIGATIONS RELATING TO EXPERIENCE

- (a) The Selected Agency shall at all times operate the experience in accordance with the Applicable Laws, Applicable Permits, Good Industry Practice and the provisions of this Agreement.
- (b) The Selected Agency shall use the Licensed Premises only for the development; operation and maintenance of the Project and Project Infrastructure and any use thereof in violation of Applicable Laws or this Agreement shall constitute a Selected Agency's Event of Default.
- (c) The Selected Agency shall complete the construction of the Project to achieve Project COD in accordance with the provisions of Article 15.
- (d) The Selected Agency shall employ trained personnel for providing Hospitality Services.

5.12. OBLIGATIONS RELATING TO INFORMATION

- 5.12.1. Without prejudice to the provisions of applicable laws, applicable permits and this agreement, upon receiving a notice from the authority for any information that it may reasonably require or that it considers may be necessary to enable it to perform any of its functions, the selected agency shall provide such information to the authority forthwith and in the manner and form required by the authority.
- 5.12.2. After receiving a notice from the authority for reasoned comments on the accuracy and text of any information relating to the selected agency's activities under or pursuant to this agreement which the authority proposes to publish, the selected agency shall provide such comments to the authority in the manner and form required by the authority.

5.13. OBLIGATIONS RELATING TO EMPLOYMENT OF LOCALS

The Selected Agency shall make necessary efforts to employ locals to the extent possible by providing necessary skill training.

5.14. OBLIGATIONS RELATING TO OTHER CHARGES

The Selected Agency shall make timely payments for all utility services in respect of the Project Site, including water, sewage, electricity, telecommunication, internet and cable charges etc.

ARTICLE 6: OBLIGATIONS OF THE AUTHORITY

6.1. GENERAL OBLIGATIONS OF THE AUTHORITY

- (a) The Authority shall, at its own cost and expense, undertake, comply with and perform all its obligations set out in this Agreement.
- (b) Subject to and in accordance with the provisions of this Agreement and Applicable Laws, the Authority agrees to provide support to the Selected Agency and undertakes to observe, comply with and perform the following:
 - (i) Upon written request from the Selected Agency, and subject to the Selected Agency complying with Applicable Laws, provide reasonable support and assistance to the Selected Agency in procuring Applicable Permits required from any Government Instrumentality for implementation and operation of the Project, subject to the Selected Agency submitting its applications complete in all respect in a timely manner. The Authority agrees and undertakes that it shall not unreasonably delay or withhold provision of any such reasonable support or assistance to the Selected Agency;
 - (ii) upon written request from the Selected Agency, provide reasonable assistance to the Selected Agency in obtaining access to all necessary infrastructure facilities and utilities, including water and electricity at rates and on terms no less favourable to the Selected Agency than those generally available to commercial customers receiving substantially equivalent services;
 - (iii) transfer the Project Site on leave and license basis free from Encumbrance to the Selected Agency from the Government Instrumentality and ensure that no barriers are erected or placed on or about the Project Site and/or Project and Project Infrastructure by any Government Instrumentality or persons claiming through or under any Government Instrumentality, except for reasons of Safety Requirements, Emergency, national security, or law and order;
 - (iv) not do or omit to do any act, deed or thing which may in any manner violate the provisions of this Agreement;
 - (v) support, cooperate with and facilitate the Selected Agency in the implementation and operation of the Project in accordance with the provisions of this Agreement;
 - (vi) upon written request from the Selected Agency, execute the Substitution Agreement; and
 - (vii) upon written request from the Selected Agency and subject to the provisions of Article 5.5, provide reasonable assistance to the Selected Agency at the Selected Agency's cost and expense and any expatriate personnel of the Selected Agency or its Contractors to obtain applicable visas and work permits for the purposes of discharge by the Selected Agency or its Contractors their obligations under this Agreement and the Project Agreements. No such assistance or lack thereof by the

Authority shall absolve the Selected Agency of its obligations under this Agreement or amount to Force Majeure under this Agreement.

Notwithstanding anything in this Article, the Authority shall not be required to provide any financial support or financial assistance to the Selected Agency.

ARTICLE 7: REPRESENTATIONS, WARRANTIES AND UNDERTAKINGS**7.1. REPRESENTATIONS, WARRANTIES AND UNDERTAKINGS OF THE SELECTED AGENCY**

The Selected Agency represents warrants and undertakes to the Authority that:

- (a) it is duly organised and validly existing under the laws of India, and hereby expressly and irrevocably waives any immunity in any jurisdiction in respect of this Agreement or matters arising thereunder including any obligation, liability or responsibility hereunder;
- (b) it has full power and authority to execute and perform its obligations under this Agreement and to carry out the transactions contemplated hereby;
- (c) it has taken all necessary corporate and other actions under Applicable Laws to authorise the execution and delivery of this Agreement and to validly exercise its rights and perform its obligations under this Agreement;
- (d) it has the financial standing and capacity to undertake the Project in accordance with the terms of this Agreement;
- (e) this Agreement constitutes its legal, valid and binding obligation, enforceable against it in accordance with the terms hereof, and its obligations under this Agreement shall be legally valid, binding and enforceable obligations against it in accordance with the terms hereof;
- (f) 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 hereunder;
- (g) the information furnished in the Bid and as updated on or before the Execution Date is true and accurate in all respects as on the Execution Date;
- (h) the execution, delivery and performance of this Agreement shall 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 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;
- (i) 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, Government Instrumentality 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 obligations under this Agreement;
- (j) 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;

- (k) it has complied with Applicable Laws in all material respects and has not been subject to any fines, penalties, injunctive relief or any other civil or criminal liabilities which in the aggregate have or may have a Material Adverse Effect on its ability to perform its obligations under this Agreement;
- (l) it shall at no time undertake or permit any Change in Ownership except in accordance with the provisions of Article 5.3; and that the [Selected Bidder or Consortium Members], together with {it's or their} Associates, hold not less than [51% (fifty one per cent)] 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 purpose of pre-qualification and short- listing in response to the Request for Proposal shall, during [2 (two)] years commencing from Project COD, hold less than 26% (twenty six per cent) of such Equity which shall also be no less than 5% (five per cent) of the Total Project Cost;
- (m) the {Selected Bidder/Consortium Members} and {its/their} 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;
- (n) the {Selected Bidder/Consortium Members} is duly organised and validly existing under the laws of the jurisdiction of its incorporation, and has requested the Authority to enter into this Agreement with the Selected Agency pursuant to the Letter of Award, and has agreed to and unconditionally accepted the terms and conditions set forth in this Agreement;
- (o) all its rights and interests in the Project 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;
- (p) no representation or warranty given by it contained herein or in any other document furnished by it to the Authority, including the Bid or to any Government Instrumentality in relation to Applicable Permits contains or shall contain any untrue or misleading statement of material fact or omits or shall omit to state a material fact necessary to make such representation or warranty not misleading;
- (q) no sums, in cash or kind, have been paid or shall be paid, by it or on its behalf, to any

person by way of fees, commission or otherwise for securing the Contract or entering into this Agreement or for influencing or attempting to influence any officer or employee of the Authority in connection therewith;

- (r) all information provided by the (Selected Bidder/ Consortium Member) in response to the Request for Proposal or otherwise, is to the best of its knowledge and belief, true and accurate in all material respects;
- (s) agree that the execution, delivery and performance by it of this Agreement and all other agreements, contracts, documents and writings relating to this Agreement constitute private and commercial acts and not public or government acts;
- (t) consents generally in respect of the enforcement of any judgment against it in any proceedings in any jurisdiction to the giving of any relief or the issue of any process in connection with such proceedings; and
- (u) further representations as may be added depending on the specific circumstances of the Selected Agency.

7.2. REPRESENTATIONS, WARRANTIES AND COVENANTS OF THE AUTHORITY

The Authority represents, warrants and covenants to the Selected Agency 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;
- (b) it has taken all necessary actions under 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) 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; and
- (f) it has good, legal and valid right and title to the Project Site and has the power and authority to handover the Project Site to the Selected Agency for the development of the Project in accordance with the provisions of this Agreement.

7.3. DISCLOSURE

- (a) 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 it. 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 adversely affect or waive any right, remedy or obligation of a Party under this Agreement.

- (b) Neither the Authority nor any of its agents or employees shall be liable to the Selected Agency in contract, tort, including negligence or breach of statutory duty, statute or otherwise as a result of:
 - (i) Any inaccuracy, omission, unfitness for any purpose or inadequacy of any kind whatsoever in the data disclosed by the Authority to the Selected Agency in relation to the Project; and/or
 - (ii) Any failure to make available to the Selected Agency any materials, documents, drawings, plans or other information relating to the Project.

ARTICLE 8: DISCLAIMER

- (a) The Selected Agency acknowledges that prior to the execution of this Agreement, the Selected Agency has, after a complete and careful examination, made an independent evaluation of the Request for Proposals, Scope of the Project, Specifications and Standards, Project Site, existing structures, local conditions, physical qualities of ground, subsoil and geology, availability of Users 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. The Authority makes no representation whatsoever, express, implicit or otherwise, regarding the accuracy, adequacy, correctness, reliability or completeness of any assessment, assumption, statement or information provided by it and the Selected Agency confirms that it shall have no claim whatsoever against the Authority in this regard.
- (b) The Selected Agency acknowledges and hereby accepts the risk of inadequacy, mistake or error in or relating to any of the matters set forth in 0(a) above and hereby acknowledges and agrees that the Authority shall not be liable for the same in any manner whatsoever to the Selected Agency, Associates or any person claiming through or under any of them.
- (c) The Parties agree that any mistake or error in or relating to any of the matters set forth in 0 (a) above shall not vitiate this Agreement or render it voidable.
- (d) In the event that either Party becomes aware of any mistake or error relating to any of the matters set forth in 0(a) above, that Party shall immediately notify the other Party, specifying the mistake or error; provided, however, that a failure on part of the Authority to give any notice pursuant to this 0(d) shall not prejudice the disclaimer of the Authority contained in 0(a) and shall not in any manner shift to the Authority any risks assumed by the Selected Agency pursuant to this Agreement.
- (e) Except as otherwise provided in this Agreement, all risks relating to the Project shall be borne by the Selected Agency and the Authority shall not be liable in any manner for such risks or the consequences thereof.

Part III DEVELOPMENT AND OPERATION

ARTICLE 9: PERFORMANCE SECURITY

9.1. PERFORMANCE SECURITY

- (a) The Selected Agency shall, for the performance of its obligations hereunder during the Construction Period, provide to the Authority within 21 (Twenty One) days of LOA valid up to DLP / O&M period, an irrevocable and unconditional guarantee from a Bank in the form set forth in Schedule-B (the “**Performance Security**”) for an amount equal to 5% (Five per cent) of the Contract Price. The Selected Agency shall maintain and keep in force the Performance Security for the entire duration of the Performance Security Period in accordance with this Article 9. Until such time the Performance Security is provided by the Selected Agency 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 Selected Agency.
- (b) Notwithstanding anything to the contrary contained in this Agreement, in the event that the Performance Security is not provided by the Selected Agency within the above specified period, the Authority shall have the right to encash the Bid Security and appropriate the proceeds thereof as Damages, and thereupon all rights, privileges, claims and entitlements of the Selected Agency under or arising out of this Agreement shall be deemed to have been waived by, and to have ceased with the concurrence of the Selected Agency and Authority will have right to terminate the Agreement.

9.2 APPROPRIATION OF PERFORMANCE SECURITY

Upon occurrence of a Selected Agency Default or failure to meet any Condition Precedent or failure to make any payment which becomes due and payable to the Authority under and in accordance with this Agreement, the Authority shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to encash and appropriate the amounts due and payable as liquidated damages from the Performance Security as Damages for such Selected Agency Default or failure to meet any Condition Precedent or failure to pay such amounts which are due and payable by the Selected Agency to the Authority under and in accordance with the provisions of this Agreement. Upon such encashment and appropriation of the Performance Security, the Selected Agency shall, within [15 (fifteen)] days thereof, replenish, in case of partial appropriation, the Performance Security to its original level, and in case of appropriation of the entire Performance Security provide a fresh Performance Security, as the case may be, failing which the Authority shall be entitled to terminate this Agreement in accordance with Article 32. Upon such replenishment or furnishing of a fresh Performance Security, as the case may be, the Selected Agency shall be entitled to an additional Cure Period of 120 (one hundred and twenty) days for remedying the Selected Agency Default or for satisfying any Condition Precedent, and in the event of the Selected Agency not curing its default or meeting such Condition

Precedent 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 32.

9.3 RELEASE OF PERFORMANCE SECURITY

The Performance Security shall remain in force and effect for a period of 1 (One) year from the Project COD (the “**Performance Security Period**”); provided, however, that the Performance Security shall not be released if the Selected Agency is in breach of this Agreement. Upon request made by the Selected Agency for release of the Performance Security along with the particulars which establish satisfaction of the requirements specified in this Article 9.3 and subject to the creation of Deemed Performance Security in accordance with Article 9.4, the Authority shall release the Performance Security forthwith.

9.4 DEEMED PERFORMANCE SECURITY

The Parties expressly agree that at least 15 (fifteen) days prior to release of the Performance Security in accordance with the provisions of Article 9.3, a substitute Performance Security for the same amount shall be deemed to be created under this Article 9.4, as if it is a Performance Security under Article 9.1 for and in respect of the entire remaining Contract Period (the “**Deemed Performance Security**”). The Deemed Performance Security shall be unconditional and irrevocable, and shall, notwithstanding anything to the contrary contained in Article 26, constitute the first and exclusive charge on an equivalent balance in the Escrow Account and the payments accrued or payments due and payable subsequently, as the case may be, to the Selected Agency under this Agreement and over which the Authority shall have the first and exclusive charge, including to the exclusion of the Senior Lenders, and shall be entitled to appropriate any amount therefrom as if it is an appropriation from the Deemed Performance Security under Article 9.5. For avoidance of doubt, the Parties agree that no amounts shall be earmarked, frozen or withheld in the Escrow Account for securing payment of any potential Damages that may fall due at a subsequent date, and only the amounts which shall have become due and payable by the Selected Agency to the Authority under and in accordance with the provisions of this Agreement shall be liable to appropriation hereunder.

9.5 APPROPRIATION OF DEEMED PERFORMANCE SECURITY

Upon any amounts becoming due and payable by the Selected Agency to the Authority under and in accordance with the terms of this Agreement, the Authority shall, without prejudice to its other rights and remedies hereunder or in law, be entitled to appropriate the amounts due and payable. For avoidance of doubt, the Parties expressly agree that upon the Deemed Performance Security being appropriated, in whole or in part, it shall be deemed to be replenished to the extent of such appropriation.

9.6 REFERENCES TO PERFORMANCE SECURITY

References to the Performance Security occurring in this Agreement for and in respect of any period prior to the delivery of the Performance Security by the Selected Agency to the Authority, or in respect of any period subsequent to the expiry or release thereof, as the case may be, shall be construed solely for the purposes of calculating the amount of Damages payable by the Selected Agency and/or any amounts due and payable by the Selected Agency to the Authority under and in accordance with the provisions of this Agreement, and the amount so determined shall be appropriated from the Bid Security or Deemed Performance Security, as the case may be.

ARTICLE 10. RIGHT OF WAY

10.1 THE PROJECT SITE

The site of the Project and the Project Infrastructure shall comprise the land as described in Schedule A, and in respect of which the Right of Way shall be provided and granted by the Authority to the Selected Agency on a leave and licensee basis under and in accordance with this Agreement (the “**Project Site**”).

10.2 LICENSE, ACCESS TO THE PROJECT SITE

- 10.2.1 The Authority hereby grants access to the Project Site to the Selected Agency for carrying out surveys, investigations and soil tests of the Project Site that the Selected Agency may deem necessary prior to the Appointed Date, it being expressly agreed and understood that the Authority shall have no liability whatsoever in respect of the survey, investigations and tests carried out or work undertaken by the Selected Agency on or about the Project Site pursuant hereto in the event of Termination or otherwise.
- 10.2.2 In consideration of the Contract Fee, this Agreement and the covenants and warranties on the part of the Selected Agency herein contained, the Authority, in accordance with the terms and conditions set forth herein, hereby grants to the Selected Agency, commencing from the Appointed Date, leave and license rights in respect of all the land comprising the Project Site which is described in Schedule A. The Project Site shall be handed-over to the Selected Agency and provided on an 'as is where is' basis, free of any Encumbrances, to develop, operate and maintain the Project, together with all and singular rights, liberties, privileges, easements and appurtenances whatsoever to the Project Site, hereditaments or premises or any part thereof belonging to or in any way appurtenant thereto or enjoyed therewith, for the duration of the Contract Period and, for the purposes permitted under this Agreement, and for no other purpose whatsoever.
- 10.2.3 The license, access, Right of Way and all other rights to the Project Site granted under this Agreement by the Authority to the Selected Agency shall always be subject to existing rights of way.
- 10.2.4 It is expressly agreed that the Selected Agency's rights to the Project Site shall terminate automatically and forthwith, without the need for any action to be taken by the Authority, upon the Termination of this Agreement for any reason whatsoever. For avoidance of doubt, the Parties expressly agree that notwithstanding any temporary or permanent structures erected on the Project Site by the Selected Agency or its Contractors, the rights of the Selected Agency in respect of the Project Site shall automatically terminate, without any further act of the Parties, upon Termination of this Agreement.
- 10.2.5 The Selected Agency hereby irrevocably appoints the Authority (or its nominee) to be its true and lawful attorney, to execute and sign in the name of the Selected

Agency a transfer or surrender of the rights granted hereunder at any time after the Contract Period has expired or has been Terminated in terms hereof, whichever is earlier, a sufficient proof of which shall be the declaration of any duly authorised officer of the Authority, and the Selected Agency consents to it being registered for this purpose.

- 10.2.6 It is expressly agreed that trees on the Project Site are the property of the Authority except that the Selected Agency shall be entitled to exercise usufructuary rights thereon during the Contract Period.

10.3 PROCUREMENT OF THE PROJECT SITE

- 10.3.1 Pursuant to the notice specified in Article 4.1.2, the Authority Representative and the Selected Agency shall, on a mutually agreed date and time but in any event no later than [10 (ten)] days prior to the Appointed Date, inspect the Project Site and prepare a memorandum containing an inventory of the Project Site including the vacant land, buildings, structures, road works, trees and any other immovable property on or attached to the Project Site, free from any Encumbrance. Such memorandum shall have appended thereto an appendix (the “**Appendix**”) specifying in reasonable detail those parts of the Project Site to which vacant access and Right of Way has not been granted to the Selected Agency. Signing of the memorandum, in 2 (two) counterparts (each of which shall constitute an original), by the authorised representatives of the Parties shall, subject to the provisions of Article 10.2.1, be deemed to constitute a valid Right of Way to the Selected Agency for free and unrestricted use and development of the Project Site which is vacant and free from any Encumbrance during the Contract Period under and in accordance with the provisions of this Agreement and for no other purpose whatsoever. For avoidance of doubt, it is agreed that rights, including the Right of Way with respect to the parts of the Project Site as set forth in the Appendix shall be deemed to have been granted to the Selected Agency upon vacant access thereto being provided by the Authority to the Selected Agency.
- 10.3.2 In case of any dispute between the Selected Agency and the Authority in relation to the survey of the Project Site and the Appendix, the decision of the Authority shall prevail and shall be binding on the Selected Agency.
- 10.3.3 Without prejudice to the provisions of Article 10.3.1, 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 [10% (ten per cent)] of the total area of the Project Site required and necessary for the Project and Project Infrastructure]. For avoidance of doubt, the Authority acknowledges and agrees that the Appendix shall not include any land which may prevent the development of the Project and Project Infrastructure.
- 10.3.4 On and after signing the memorandum referred to in Article 10.3.1, and until the Transfer Date, the Selected Agency shall maintain a round-the-clock vigil over the

Project 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 Selected Agency shall report such encroachment or occupation forthwith to the Authority and undertake its removal at its own cost and expense.

10.3.5 Upon receiving Right of Way to and in respect of any land included in the Appendix, the Selected Agency shall complete the Development Works in accordance with the Project Completion Schedule set forth in Schedule G.

10.3.6 The Authority shall procure any additional land that may be required for the Project or for work specified in Change of Scope Order issued under Article 16, in accordance with the provisions of this Agreement, and upon procurement thereof, such land shall form part of the Project Site; provided that no land to be acquired by the Authority hereunder shall be deemed to be included in the Appendix referred to in this Article 10.3 and dealt with accordingly. For avoidance of doubt, the Parties agree that any land required for the Project, in addition to the land included in Schedule A, shall be acquired at the sole discretion of the Authority and the Selected Agency shall have no right to claim in the event the Authority declines any such acquisition in whole or in part.

10.4 PROJECT SITE TO BE FREE FROM ENCUMBRANCES

The Project Site shall be made available to the Selected Agency pursuant hereto free from all Encumbrances and occupations and without the Selected Agency 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 Project Site for the duration of the Contract Period, except insofar as otherwise expressly provided in this Agreement. For avoidance of doubt, it is agreed that existing rights of way, easements, privileges, liberties and appurtenances to the Project Site shall not be deemed to be Encumbrances. It is further agreed that the Selected Agency accepts and undertakes to bear any and all risks arising out of the inadequacy or physical condition of the Project Site.

10.5 PROTECTION OF PROJECT SITE FROM ENCROACHMENTS

During the Contract Period, the Selected Agency shall protect the Project 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 Selected Agency to place or create any Encumbrance or security interest over all or any part of the Project Site or the Project Assets, or on any rights of the Selected Agency therein or under this Agreement, save and except as otherwise expressly set forth in this Agreement.

10.6 SPECIAL OR TEMPORARY RIGHT OF WAY

The Selected Agency shall bear all costs and charges for any special or temporary Right of Way required by it in connection with access to the Project Site. The Selected

Agency shall obtain at its own cost such facilities on or outside the Project Site as may be required by it for the purposes of the Project and the Project Infrastructure and the performance of its obligations under this Agreement.

10.7 ACCESS TO THE AUTHORITY

The Right of Way and right to the Project Site granted to the Selected Agency hereunder shall always be subject to the right of access of the Authority, its representatives or authorized personnel, the Authority and their employees and agents for inspection, viewing and exercise of their rights and performance of their obligations under this Agreement.

10.8 DEVELOPMENT OF PROJECT SITE

The Selected Agency may landscape and develop the Project Site and regulate the use thereof in accordance with the Good Industry Practice and in conformity with the provisions of this Agreement.

10.9 PERMITTED USE

- 10.9.1. The Selected Agency shall use or cause to be used any or all part of the Project Site for operating, managing and maintaining the Project and Project Infrastructure as approved for the applicable tourism experience by the Authority and in accordance with Applicable Laws and Applicable Permits. Any use of the Project Site in violation thereof shall constitute a Selected Agency Default under this Agreement.

ARTICLE 11: UTILITIES AND ASSOCIATED ROADS**11.1 EXISTING UTILITIES AND ROADS**

Notwithstanding anything to the contrary contained herein, the Selected Agency shall ensure that the Government Instrumentalities owning the existing roads, Right of Way or utilities, on, under or above the Project Site are enabled by it to keep such utilities in continuous satisfactory use, if necessary, by providing suitable temporary or permanent diversions with the authority of the relevant Government Instrumentality. Further, the Authority shall, upon written request from the Selected Agency, initiate and undertake at the Selected Agency's cost, legal proceedings for acquisition of any Right of Way necessary for such diversion.

11.2 SHIFTING OF OBSTRUCTING UTILITIES

The Selected Agency shall, subject to Applicable Laws, provisions of Applicable Permits and with the 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 Project Site, if and only if such utility causes or shall cause a Material Adverse Effect on the construction, operation or maintenance of the Project and/or the Project Infrastructure. The cost of such shifting shall be borne by the Selected Agency, and in the event of any delay in shifting thereof, the Selected Agency 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.

11.3 FELLING OF TREES

The Authority shall assist the Selected Agency in procuring the Applicable Permits for felling of trees to be identified by the Selected Agency for this purpose if and only if such trees cause a Material Adverse Effect on the construction, operation or maintenance of the Project and the Project Infrastructure. In the event of any delay in felling thereof for reasons beyond the control of the Selected Agency, it shall in the sole discretion of the Authority, 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 avoidance of doubt, the costs and expense in respect of felling of trees shall be borne by the Selected Agency and any revenues thereof shall be paid to the Authority.

ARTICLE 12: DEVELOPMENT OF TOURIST EXPERIENCE AND PROJECT INFRASTRUCTURE

12.1 OBLIGATIONS RELATING TO DEVELOPMENT WORKS

17.4.1 Prior to the commencement of Development Works, the Selected Agency shall along with the Drawings:

- (a) submit to the Authority its detailed design, 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 G & Schedule N;
- (b) appoint its representative duly authorised to deal with the Authority in respect of all matters under or arising out of or relating to this Agreement; and
- (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 this Agreement, Applicable Laws and Applicable Permits.

17.4.1 The Selected Agency shall inform the Authority for any structural change to the Project Site or demolition of any part of the Project Site prior to undertaking such structural change or demolition.

17.4.1 The Selected Agency acknowledges and agrees that any or all Development Works which are in any manner attached to the floors, walls or ceiling, including any linoleum or other floor coverings of similar character that may be cemented or otherwise adhesively affixed to the floor, and any heating, ventilating or air-conditioning equipment, the removal of which may cause any damage to the Project Site, shall remain upon the Project Site, and shall be transferred to the Authority upon Termination, without any cost to the Authority; provided, however, that the Authority may, by written notice to the Selected Agency, require the removal of such alteration or addition, in which case the Selected Agency shall repair, at its own cost and expense, any and all damages to the Project Site resulting from such removal. For the avoidance of doubt, the Parties agree that the Selected Agency shall at all times be entitled to remove any fixtures and furniture installed by it on the Project Site.³

12.2 DRAWINGS

In respect of the Selected Agency's obligations relating to the Drawings of the Project and Project Infrastructure, the following shall apply:

- (a) the Selected Agency shall prepare and submit, with reasonable promptness and in such sequence as is consistent with the Project Completion Schedule, the copies of all Drawings to the Authority for review. Such Drawings shall be prepared for a

³ In the event the land is vacant, these Articles 12.1.2. and 12.1.3 shall be omitted.

Project taking into account the capacities envisaged under the Minimum Development Obligations;

- (b) by submitting the Drawings for review to the Authority, the Selected Agency shall be deemed to have represented that it has determined and verified that the design and engineering are in conformity with the Scope of the Project, the Specifications and Standards, Applicable Laws and Good Industry Practice;
- (c) within 15 (fifteen) days of the receipt of the Drawings, the Authority shall review the same and convey its observations to the Selected Agency with particular reference to their conformity or otherwise with the scope of Project and the Specifications and Standards. The Selected Agency shall not be obliged to await the observations of the Authority on the Drawings submitted pursuant hereto beyond the specified period and may begin or continue Development Works at its own discretion and risk;
- (d) if the aforesaid observations of the Authority indicate that the Drawings are not in conformity with the Scope of Project and the Specifications and Standards, such Drawings shall be revised by the Selected Agency and resubmitted to the Authority for review within 7 (seven) days. The Authority shall give its observations, if any, within 7 (seven) days of receipt of the revised Drawings;
- (e) no review or observation of the Authority and/or its failure to review or convey its observations on any Drawings shall relieve the Selected Agency of its obligations and liabilities under this Agreement in any manner nor shall the Authority or the Authority be liable for the same in any manner;
- (f) without prejudice to the foregoing provisions of this Article 12.2, the Selected Agency shall submit to the Authority for review and comments, its Drawings relating to the location and layout of the Project, Project Infrastructure and general arrangement drawings thereof 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 Article 12.2 shall apply mutatis mutandis to the review and comments thereunder;
- (g) within 90 (ninety) days of the Project COD, the Selected Agency shall furnish to the Authority a complete set of as-built Drawings, in 2 (two) hard copies and its editable digital format or in such other medium as may be acceptable to the Authority, reflecting the Project and the Project Infrastructure, as actually designed, engineered and constructed, including an as-built survey illustrating the layout of the Project and Project Infrastructure and setback lines, if any, of the buildings and structures forming part of the Project. It is clarified that the Selected Agency shall submit the Drawings in accordance with Schedule D.

12.3 CONSTRUCTION AND DEVELOPMENT OF PROJECT

17.4.1 On or after the Appointed Date, the Selected Agency shall undertake development

of the Project on the Project Site as specified in Schedule B, and in conformity with the Specifications and Standards set forth in Schedule C (the “**Minimum Development Obligations**”). The Selected Agency shall undertake the Minimum Development Obligations, where the Development Works shall commence from the Appointed Date and shall be completed in accordance with the Project Completion Schedule as set forth in Schedule G.

- 17.4.1 The Selected Agency shall develop and construct the Project in accordance with the Project Completion Schedule set forth in Schedule G. In the event that the Selected Agency fails to achieve any Project Milestone within 30 (thirty) days from the date set forth for such Project Milestone in Schedule G, unless such failure has occurred due to Force Majeure or for reasons solely and directly attributable to the Authority, it shall pay Damages to the Authority in a sum calculated at the rate of 0.2% (zero point two per cent) of the amount of Performance Security for delay of each day until such Project Milestone is achieved up to a maximum of 20% (twenty per cent) of the amount of Performance Security; provided that if any or all Project Milestones or the Scheduled Completion Date are extended in accordance with the provisions of this Agreement, the dates set forth in Schedule G shall be deemed to be modified accordingly and the provisions of this Agreement shall apply as if Schedule G has been amended as above; provided further that in the event Project COD is achieved on or before the Scheduled Completion Date, the Damages paid under this Article 12.3.2 shall be refunded by the Authority to the Selected Agency, but without any interest thereon. For avoidance of doubt, it is agreed that recovery of Damages under this Article 12.3.2 shall be without prejudice to the rights of the Authority under this Agreement, or otherwise including the right of Termination thereof.
- 17.4.1 In the event that the Development Works pertaining to the Minimum Development Obligations is not completed within 180 (one hundred and eighty) days from the Scheduled Completion 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. Without prejudice to the Authority's rights under this Agreement and/or any other right that it may have under Applicable Law or equity, the Authority may in its sole discretion choose not to Terminate this Agreement after the said period of 180 (one hundred and eighty) days and allow for a weekly extension beyond such period of 180 (one hundred and eighty) days; provided that the Selected Agency agrees and pays in advance, the Damages calculated in accordance with Article 12.3.2 above, for each day of such extension. To the extent that the Authority has agreed to allow for an extension and the Selected Agency has paid the Damages in advance as stated above, the Authority shall not terminate this Agreement in accordance with the provisions of this Article 12.3.3. Notwithstanding the foregoing, the Parties agree that this Article shall not prejudice, in any manner whatsoever, the Authority's right of Termination under any other provision of this Agreement.

12.4 TESTS

17.4.1 No later than 30 (thirty) days prior to the likely completion of the Development Works, the Selected Agency shall notify the Authority of its intent to subject the Project and Project Infrastructure to Tests. The date and time of each of the Tests shall be determined by the Authority in consultation with the Selected Agency, and notified to the Authority who may designate its representative to witness the Tests. The Selected Agency shall provide such assistance as the Authority may reasonably require for conducting the Tests. In the event of the Selected Agency and the Authority failing to mutually agree on the dates for conducting the Tests, the Selected Agency shall fix the dates, but not less than [10 (ten)] days' notice to the Authority.

17.4.1 All Tests shall be conducted in accordance with Schedule H at the cost and expense of the Selected Agency. The Authority shall observe, monitor and review the results of the Tests to determine compliance of the Project and Project Infrastructure with the Specifications and Standards and if it is reasonably anticipated or determined by the Authority during the course of any Test that the performance of the Project and/or Project Infrastructure 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 Selected Agency to remedy and rectify the defects or deficiencies. Upon completion of each Test, the Authority shall provide to the Selected Agency and the Authority, copies of all Test data including detailed Test results. For avoidance of doubt, it is expressly agreed that the Authority may require the Selected Agency to carry out or cause to be carried out additional Tests, in accordance with Good Industry Practice, for determining the compliance of the Project and Project Infrastructure with the Specifications and Standards.

12.5 SAFETY CERTIFICATION PRIOR TO PROJECT COD

The Selected Agency shall, not later than [15 (fifteen)] days prior to the likely Project COD, notify the Authority and the Authority of the compliance or Safety Requirements and invite them to observe any or all the Tests that may be specified by the Authority in accordance with Applicable Laws, Applicable Permits and Good Industry Practice to determine that the Project and Project Infrastructure is safe for entering into commercial service, and the costs of such Tests shall be shared equally between the Selected Agency and the Authority; provided that in case of failure in any Test requiring repetition thereof, the cost of such second or subsequent Test shall be borne entirely by the Selected Agency.

ARTICLE 13. MONITORING OF DEVELOPMENT WORKS

13.1 MONTHLY PROGRESS REPORTS

During the Construction Period, the Selected Agency shall, within [7 (seven)] days after the close of each month, furnish to the Authority and the Authority a monthly report on progress of the Development Works and shall promptly give such other relevant information as may be required by the Authority and/or Authority. The provisions of this Article 13 shall apply *mutatis mutandis* to the Development Works undertaken for the Minimum Development Obligations and the Optional Development Obligation.

13.2 INSPECTION

During the construction of Development Works, the Authority shall inspect the Project and Project Infrastructure, at least once in 3 (three) months 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 Specifications and Standards. It shall send a copy of the Inspection Report to the Authority and the Selected Agency within [7 (seven)] days of such inspection and upon receipt thereof, the Selected Agency shall rectify and remedy the defects or deficiencies, if any, stated in the Inspection Report. Notwithstanding the foregoing, such inspection or submission of Inspection Report by the Authority shall not relieve or absolve the Selected Agency of its obligations and liabilities hereunder in any manner whatsoever.

13.3 TESTS

- 13.3.1 Contractor has to develop / establish laboratory at site with his own cost for the testing of the materials and day to day activity of the development works.

For determining that the development works conform to the agreement and specifications and standards, the Authority shall require the selected agency 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 Authority from time to time in accordance with good industry practice for quality assurance. the size of sample for such tests shall, to the extent possible not exceed [10% (ten per cent)] of the quantity and/or number of tests that the owner or builder of such works would normally undertake in accordance with good industry practice. the selected agency shall, with due diligence, carry out or cause to be carried out all the tests in accordance with the instructions of the Authority and furnish the results thereof to the Authority. One half of the costs incurred on such tests, and to the extent certified by the Authority as reasonable, shall be reimbursed by the authority to the selected agency. Provided however, that the Authority may, instead of carrying out the tests specified hereunder, at its option decide to witness, or participate in, any of the tests to be undertaken by the selected agency for its own quality assurance in accordance with

good industry practice, and in such an event, the selected agency shall cooperate with, and provide the necessary assistance to, the Authority for discharging its functions hereunder. For 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 selected agency.

- 13.3.2 in the event that results of any tests conducted under this article 13.3 establish any defects or deficiencies in the development works, the selected agency shall carry out remedial measures and furnish a report to the Authority in this regard. the Authority shall require the selected agency to carry out or cause to be carried out tests to determine that such remedial measures have brought the development works into compliance with specifications and standards, and the procedure under article 13.3 shall be repeated until such development works conform to the specifications and standards. for avoidance of doubt, it is agreed that the tests pursuant to this article 13.3 shall be undertaken in addition to and independent of the tests carried out by the selected agency for its own quality assurance in accordance with applicable laws, applicable permits and good industry practice. it is also agreed that a copy of the results of such test shall be sent by the selected agency to the Authority forthwith.

13.4 DELAYS DURING CONSTRUCTION

Without prejudice to the provisions of Article 12.1, if the rate of progress of Development Works is such that the Minimum Development Obligation is not likely to be completed within the time period stipulated, the Selected Agency shall inform the Authority and the Authority at fortnight intervals, in reasonable detail about the steps it proposes to take to expedite progress and the period within which it shall achieve the Project COD.

ARTICLE 14. COMPLETION CERTIFICATE

14.1 PROVISIONAL CERTIFICATE

If the Project is complete and the Selected Agency certifies in writing that the Tests are successful and all the facilities required for rendering Hospitality Services, can be safely and reliably placed in commercial operation, even though certain works or things forming part thereof which do not affect the use and safety of the Project, or any part of the Project, for their intended purpose, are outstanding and are to be completed (the “**Punch List**”), the Authority may, at the request of the Selected Agency, issue a provisional completion certificate, specifying the details of the Punch List which the Selected Agency shall be required to complete before issuance of a Completion Certificate (the “**Provisional Certificate**”). Upon issuance of such Provisional Certificate the Selected Agency shall be entitled to demand and collect the Revenue for rendering such Hospitality Services in accordance with this Agreement.

14.2 COMPLETION CERTIFICATE

- 14.2.1 List of all punch list items appended to the provisional certificate, if any, shall be completed by the selected agency within [180 (one hundred and eighty)] days of the date of issue of such provisional certificate. When selected agency considers it has achieved completion of punch list, it must request the Authority for issuance of the completion certificate.
- 14.2.2 Within 30 (thirty) days after receiving the request and upon being satisfied by the documents provided by the Selected Agency, the Authority shall inspect the Project for Punch List items and either:
- (a) issue to the Selected Agency and the Authority a certificate substantially in the form set forth in Schedule I (the “**Completion Certificate**”), if the Punch List items as provided under the Provisional Certificate have been completed; or
 - (b) issue a written notice to Selected Agency listing the Punch List items remaining to be completed along with the timelines to complete them.
- 14.2.3 In the event the Selected Agency fails to complete the Punch List items within the timeline mentioned in this Article, then the Authority without prejudice to any of its rights under this Agreement including Termination thereof, may waive of completion of such Punch List items. Authority’s decision in this regard shall be at its discretion and shall be final and binding.

14.3 DEEMED COMPLETION CERTIFICATE

In the event that upon successful determination by the Authority of the successful completion of all Tests in accordance with Article 12.4 above, the Authority fails to issue the Completion Certificate to the Authority and the Selected Agency within

the time specified in Article 14.2, at the end of such period, such Completion Certificate shall be deemed to have been issued to the Authority and the Selected Agency in accordance with the provisions of this Article 14.2 (the “**Deemed Completion Certificate**”).

14.4 RESCHEDULING OF TESTS

If the Authority certifies to the Authority and the Selected Agency that it is unable to certify the completion of the facilities required for rendering Hospitality Services or issue the Completion Certificate, as the case may be, because of events or circumstances on account of which the Tests could not be held or had to be suspended, the Selected Agency at its own cost and expense, shall be entitled to re-schedule the Tests and hold the same as soon as reasonably practicable. The provisions of this Article 14.2 shall apply *mutatis mutandis* to such re-scheduled Tests.

ARTICLE 15: ENTRY INTO COMMERCIAL SERVICE

15.1 COMMERCIAL OPERATION DATE

The Minimum Development Obligations shall be deemed to be complete when the Project have been completed and Completion Certificate or the Deemed Completion Certificate, as the case may be, in respect of the Project, is issued under the provisions of Article 14, and accordingly the commercial operation date, shall be the date on which such Completion Certificate or the Deemed Completion Certificate, as the case may be, is issued (the “**Project COD**”). The Minimum Development Obligations shall enter into commercial service on Project COD whereupon the Selected Agency shall be entitled to provide Hospitality Services and charge Revenue from the Users, subject to compliance with Applicable Laws, Applicable Permits, Good Industry Practice and provisions of this Agreement.

ARTICLE 16. CHANGE OF SCOPE

16.1 CHANGE OF SCOPE

- (a) 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 (the “**Change of Scope**”). Provided that, the Authority shall be entitled to require the Selected Agency to undertake any Change of Scope only during the Construction Period. Any such Change of Scope shall be made in accordance with the provisions of this Article 16 and the costs thereof shall be expended by the Selected Agency and reimbursed to it by the Authority in accordance with Article 16.3.
- (b) If the Selected Agency determines at any time that a Change of Scope is necessary for providing safer and improved Hospitality Services, 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 Clause or inform the Selected Agency in writing of its reasons for not accepting such Change of Scope.
- (c) Any works or services which are provided under and in accordance with this Clause 16.1 shall form part of the Project and Project Infrastructure and the provisions of this Agreement shall apply *mutatis mutandis* to such works or services.

16.2 PROCEDURE FOR CHANGE OF SCOPE

- 16.2.1 In the event of the Authority determining that a Change of Scope is necessary, it shall issue to the Selected Agency a notice specifying in reasonable detail the works and services contemplated thereunder (the “**Change of Scope Notice**”).
- 16.2.2 Upon receipt of a Change of Scope Notice, the Selected Agency shall, with due diligence, provide to the Authority such information as is necessary, together with preliminary Documents 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;
 - (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, any impact on the operations or the cost of operation of the Project and Project Infrastructure, along with the proposed premium or discount on such rates; provided that the cost incurred by the Selected

Agency in providing such information shall be reimbursed by the Authority to the extent such cost is certified by the Authority as reasonable; and

- (c) It's likely impact on the Gross Revenue and profitability of the Project.
- (d) Any change in the scope that is, increase or decrease in the scope of this work, shall be regulated as per schedule S-II (variation schedule), Section 9 in so far as the payments/recoveries are concerned. All other conditions of contract shall remain unchanged.
- (e) If rate is not available in schedule S-II, the Contractor shall provide the Authority with a quotation (with breakdown of unit rates) for carrying out the Variation / Change in scope when requested to do so by the Authority. The Authority shall assess the quotation, which shall be given within seven days of the request or within any longer period stated by the Engineer and before the Variation is ordered.
- (f) If the Contractor's quotation is unreasonable, the Authority may order the Variation and make a change to the Contract Price which shall be based on Authority's own forecast of the effects of the Variation on the Contractor's costs.
- (g) If the Authority decides that the urgency of varying the work would prevent a quotation being given and considered without delaying the work, no quotation shall be given and the Variation shall be treated as a Compensation Event.
- (h) The Contractor shall not be entitled to additional payment for costs which could have been avoided by giving early warning.

16.2.3 Upon receipt of information set forth in Article 16.2.2, if the Authority decides to proceed with the Change of Scope, it shall convey its preferred option to the Selected Agency, and the Parties shall, with assistance, thereupon of the Authority, 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 Selected Agency to proceed with the performance thereof. In the event that the Parties are unable to agree, the Authority may, by issuing a Change of Scope Order, require the Selected Agency to proceed with the performance thereof pending resolution of the Dispute.

16.2.4 The provisions of this Agreement, insofar as they relate to Development Works and Tests, shall apply *mutatis mutandis* to the works undertaken by the Selected Agency under this Article 16.

16.3 PAYMENT FOR CHANGE OF SCOPE

Within [7 (seven)] days of issuing a Change of Scope Order, the Authority shall make a payment to the Selected Agency, 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 Documents 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 Selected Agency such amounts as are certified by the Authority, 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 in Article 39.

16.4 RESTRICTIONS ON CERTAIN WORKS

16.4.1 Notwithstanding anything to the contrary contained in this Article 16, the Authority shall not require the Selected Agency to undertake any works or services if such works or services are likely to delay the Project COD; 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 the Project and issuing the Completion Certificate or Deemed Completion Certificate.

16.4.2 Notwithstanding anything to the contrary contained in this Article 16, the Selected Agency 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 [10% (ten per cent)] of the estimated market value of the buildings comprising the Project and the Project Infrastructure 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 such market value at any time during the Contract Period.

16.5 FINANCING BY THE SELECTED AGENCY

Notwithstanding anything to the contrary contained in this Article 16, the Parties may, subject to this Article 16.5 agree on determining the Change of Scope which may be financed entirely by the Selected Agency, if such arrangement enables the Selected Agency to provide the financing and undertake its recovery in accordance with the provisions of this Agreement.

ARTICLE 17: OPERATION AND MAINTENANCE**17.10&M OBLIGATIONS OF THE SELECTED AGENCY**

17.1.1 During the operation period, the selected agency shall operate and maintain the Project and the project infrastructure in accordance with this agreement either by itself, and/or through an O&M contractor who is the consortium partner and if required, modify, repair or otherwise make improvements to the Project and the project infrastructure 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 selected agency hereunder shall include:

- (a) ensuring safe, hygienic and efficient Services and maintaining a high standard of cleanliness and hygiene in the Project;
- (b) undertaking operation and maintenance of the Project in an efficient, coordinated and economical manner, in compliance with the Specification and Standards;
- (c) undertaking operation and maintenance of the Project Infrastructure in accordance with the Specification and Standards, operation and maintenance manual provided by the OEMs and the terms of this Agreement to ensure that the Selected Agency is able to optimally use the Project Infrastructure during the Operation Period such that the Project is self-sustained;
- (d) carrying out periodic preventive maintenance of the Project and Project Infrastructure;
- (e) undertaking routine maintenance including prompt repairs of all elements and components of the Project and Project Infrastructure so as to ensure compliance with the Maintenance Requirements and the Specification and Standards;
- (f) undertaking major maintenance, replacement of components and parts, repairs to structures, and repairs and development of associated facilities, including the Project Infrastructure;
- (g) providing round the clock security at the Project Site and preventing with the assistance of the concerned law enforcement agencies, any encroachments on or authorised entry on the Project Site;
- (h) protection of environment and provision of equipment and materials therefor in accordance with the Applicable Laws, Applicable Permits, terms of this Agreement and Good Industry Practice;
- (i) operation and maintenance of all communication, control and administrative systems necessary for the efficient operation of the Project and Project Infrastructure and for providing Hospitality Services in conformity with the Good Industry Practice;
- (j) maintaining a public relations unit to interface with and attend to suggestions

from the Users, Government Instrumentality, media and other agencies;

- (k) complying with the Safety Requirements; and
- (l) operation and maintenance of all Project Assets diligently and efficiently and in accordance with Applicable Laws, Applicable Permits, Good Industry Practice and provisions of this Agreement.

17.1.2 The Selected Agency shall remove promptly from the Project Site all surplus construction machinery and materials, waste materials (including hazardous materials and wastewater), rubbish and other debris (including, without limitation, accident debris) and keep the Project and Project Infrastructure in a clean, tidy and orderly condition, and in conformity with Applicable Laws, Applicable Permits, Good Industry Practice and the provisions of this Agreement.

17.1.3 The Selected Agency shall maintain, in conformity with Good Industry Practice and Applicable Laws and Applicable Permits, all stretches of approach roads, or other structures situated on the Project Site.

17.1.4 If the Selected Agency fails to comply with any directions issued by the Authority or any Government Instrumentality acting under any Applicable Laws, as the case may be, and is liable to pay a penalty under the provisions of Applicable Laws, such penalty shall be borne solely by the Selected Agency, and shall not be claimed from the Authority. For avoidance of doubt, payment of any penalty under the provisions of Applicable Laws shall be in addition to and independent of the Damages payable under this Agreement. In the event the Authority is required to pay any penalty to the Government Instrumentality under any Applicable Laws then the Authority shall be entitled to be indemnified by the Selected Agency under Article 37.

17.2 MAINTENANCE REQUIREMENTS

The Selected Agency shall procure that at all times during the Operation Period, the Project and the Project Infrastructure are maintained in accordance with the provisions of this Agreement, Applicable Laws, Applicable Permits and Good Industry Practice (the “**Maintenance Requirements**”), as more specifically set out in Schedule J.

17.3 SAFETY, BREAKDOWNS AND ACCIDENTS

17.3.1 The Selected Agency shall ensure safe conditions at the Project Site for the Users and Authority, and in the event of unsafe conditions, damage, breakdowns and accidents, it shall follow the relevant operating procedures in conformity with the provisions of this Agreement, Applicable Laws, Applicable Permits and Good Industry Practice. In the event of occurrence of any damage, breakdowns and/or accidents, the Selected Agency shall undertake removal of obstruction and debris without delay.

17.3.2 Selected Agency's responsibility for rescue operations in the Project and Project

Infrastructure shall include safe evacuation of all Users, visitors and staff from the affected area as an initial response to any particular incident requiring evacuation and shall also include prompt and safe removal of dangerous spills, leakages, debris or any other obstruction, which may endanger or interrupt the Hospitality Services.

17.4 AUTHORITY'S RIGHT TO TAKE REMEDIAL MEASURES

17.4.1 In the event the Selected Agency does not maintain, repair and/or rectify any defects and deficiencies in the Project and/or the Project Infrastructure or any part thereof in conformity with the Maintenance Requirements and fails to commence remedial works within [15 (fifteen)] days of receipt of the O&M Inspection Report or notice in this behalf from the Authority or the Authority, as the case may be, the Authority, 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 Selected Agency, and to recover its cost from Selected Agency. In addition to recovery of the aforesaid cost, a sum equal to [20% (twenty per cent)] of such cost shall be paid by the Selected Agency to the Authority as Damages. For avoidance of doubt, the rights of the Authority under this Article 17.4 shall be without prejudice to its rights and remedies under Article 17.3.]

17.5 OVERRIDING POWERS OF THE AUTHORITY

17.5.1 If in the opinion of the Authority, the Selected Agency is in material breach of its obligations under this Agreement and in particular, the Maintenance Requirements, and such breach is causing or is likely to cause material hardship or danger to any person or property, the Authority may, without prejudice to any of its rights under this Agreement including Termination thereof, by notice require the Selected Agency to take reasonable measures immediately for removing such hardship or danger as the case may be.

17.5.2 In the event the Selected Agency, upon notice under Article 17.5.1, fails to rectify or remove any hardship or danger within a reasonable period, the Authority may take over the performance of any or all the obligations of the Selected Agency to the extent deemed necessary by it for 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 in the circumstances which caused the exercise of such overriding power by the Authority; 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 Selected Agency in accordance with the provisions of Article 17 along with the Damages specified therein.

17.6 RESTORATION OF LOSS OR DAMAGE TO THE PROJECT AND PROJECT INFRASTRUCTURE

Save and except as otherwise expressly provided in this Agreement, in the event that the Project and/or Project Infrastructure or any part thereof suffers any loss or damage during the Contract Period from any cause whatsoever, the Selected Agency shall, at its cost and expense, rectify and remedy such loss or damage forthwith so that the Project and Project Infrastructure conforms to the provisions of this Agreement.

17.7 MODIFICATIONS TO THE PROJECT AND PROJECT INFRASTRUCTURE

The Selected Agency shall not carry out any material modifications to the Project and the Project Infrastructure, save and except where such modifications are necessary for the Project and the Project infrastructure to operate in conformity with the Specifications and Standards, Maintenance Requirements, Good Industry Practice and Applicable Laws; provided that the Selected Agency shall notify the Authority 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 which the Authority may make within [15 (fifteen)] days of receiving Selected Agency's proposal. For avoidance of doubt if the modification has a Material Adverse Effect on the safety thereof or the safety of Users and other persons, the same shall be subjected to tests and certification specified in Article 13.3. For avoidance of doubt all modifications hereunder shall comply with the safety requirements, Specifications and Standards, Applicable Laws, Applicable Permits, terms of this Agreement and Good Industry Practice.

17.8 EXCUSE FROM PERFORMANCE OF OBLIGATIONS

The Selected Agency shall not be considered in breach of its obligations under this Agreement if any part of the Project is not available to Users, or the Project Infrastructure is not available for the use of the Project on account of any of the following for the duration thereof:

- (a) a Force Majeure Event;
- (b) measures taken to ensure the safe use of the Project and Project Infrastructure, except when unsafe conditions occurred because of failure of the Selected Agency 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 or Project Infrastructure.

Provided, that any such event and particulars thereof shall be notified by the Selected Agency to the Authority and the Authority without any delay.

Notwithstanding the above, the Selected Agency shall keep all unaffected parts of

the Projects open to Users provided that Hospitality Services can be provided safely.

Article 18 SAFETY REQUIREMENTS

18.1 SAFETY REQUIREMENTS

The Selected Agency shall comply with the provisions of this Agreement, Applicable Laws, Applicable Permits and Good Industry Practice for securing the safety of the Project, Project Infrastructure, safety of the Users and other persons present in the premises. In particular, the Selected Agency shall develop, implement and administer a surveillance and safety program for providing a safe environment on or about the Project and the Project Infrastructure and shall comply with the safety requirement set forth in Schedule K (the “**Safety Requirements**”).

18.2 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 Selected Agency.

Article 19 MONITORING OF OPERATION AND MAINTENANCE**19.1 ANNUAL STATUS REPORTS**

During Operation Period, the Selected Agency shall, no later than [7 (seven)] days after the close of every Accounting Year, furnish to the Authority and the Authority an annual report, in a mutually agreed format, stating in reasonable detail the condition of the Project and Project Infrastructure, including its compliance or otherwise with the Maintenance Requirements and the Safety Requirements, and shall promptly give such other relevant information as may be required by the Authority. In particular, such report shall separately identify and state in reasonable detail the defects and deficiencies that require rectification.

19.2 INSPECTION

The Authority shall inspect the Project and the Project Infrastructure at least once a year. 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 and Safety Requirements and send a copy thereof to the Authority and the Selected Agency within [7 (seven)] days of such inspection.

19.3 TESTS

For determining that the Project and the Project Infrastructure conforms to the Maintenance Requirements, the Authority shall require the Selected Agency to carry out, or cause to be carried out, tests specified by it in accordance with Good Industry Practice. The Selected Agency shall, with due diligence, carry out or cause to be carried out all such tests in accordance with the instructions of the Authority and furnish the results of such tests forthwith to the Authority. One half of the cost incurred on such tests, and to the extent certified by the Authority as reasonable, shall be reimbursed by the Authority to the Selected Agency.

19.4 REMEDIAL MEASURES

19.4.1 The Selected Agency 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 Article 19.3 and furnish a report in respect thereof to the Authority and the Authority within [15 (fifteen)] days of receiving the O&M Inspection Report; provided that where the remedying of such defects or deficiencies is likely to take more than [15 (fifteen)] days, the Selected Agency shall submit progress reports of the repair works once every week until such works are completed in conformity with this Agreement.

19.4.2 The Authority shall require the Selected Agency to carry out or cause to be carried out tests, at its own cost, to determine that such remedial measures have brought the Project and Project Infrastructure into compliance with the Maintenance Requirements and the procedure set forth in this Article 19.4.2 shall be repeated until the Project and the Project Infrastructure conforms to the Maintenance

Requirements.

Article 20 SAFETY AND SECURITY

20.1 SECURITY OBLIGATIONS OF THE SELECTED AGENCY

- 20.1.1 The Selected Agency shall provide and maintain perimeter fencing or other suitable protection around the Project and the Project Infrastructure and shall be responsible for the security arrangements for the Project in order to maintain safe and orderly conduct of its business and the security thereof.
- 20.1.2 The Selected Agency shall install and operate a closed circuit television system to monitor the Project and such other parts of the Project as may be necessary and expedient for safe operations of the Project in accordance with Good Industry Practice.
- 20.1.3 The Selected Agency shall engage and depute trained personnel for maintaining the security and safety of Users inside the Project Site in accordance with Good Industry Practice.
- 20.1.4 The Selected Agency shall not be entitled to any compensation for disruption of its operations or loss or damage resulting from the Authority's actions or the actions of any organization authorised by the Authority other than those resulting from wilful or grossly negligent acts and omissions of the Authority. The Authority agrees that it shall cause the relevant organization to take such actions as reasonably deemed necessary by them for the security of the Project, without unduly disrupting the operations of the Project or interfering with the exercise of rights or fulfilment of obligations by the Selected Agency under this Agreement. The Selected Agency agrees that it shall extend its full support and cooperation to the Authority and to the other organization authorised by the Government in discharge of their obligations for and in respect to the security of the Project and the Project Infrastructure.
- 20.1.5 The Selected Agency shall abide by and implement any instructions of the Authority and the Authority for enhancing the security within and around the Project and Project Infrastructure. The Selected Agency shall not be entitled to any compensation for disruption of its operations or loss or damage resulting from the implementation of any instruction of the Authority or the Authority.

Article 21 KEY PERFORMANCE INDICATORS**21.1 QUALITY OF TOURIST SERVICES**

- (a) The Selected Agency shall procure that all Users in the Project receive quality services in accordance with the provisions of this Agreement and Good Industry Practices.
- (b) The Selected Agency shall procure and ensure that all personnel engaged in the provision of Services, are suitably qualified and receive sufficient training and instructions in accordance with Good Industry Practice and standards of their relevant professional body, if any, for execution of their duties, which shall at a minimum, be compliant with the performance standards set out at Schedule C. The Selected Agency shall regularly supervise and monitor the performance of the personnel to ensure that they comply with this Agreement, Applicable Laws and Good Industry Practice.
- (c) The Selected Agency shall address to any complaints received by the Users in a prompt and effective manner and take all reasonable efforts to accommodate the requests of the Users.

21.2 Additional Services

Notwithstanding anything to the contrary contained herein, the Selected Agency shall be entitled to undertake any services which become permissible by any Change in Law. In the event that the Selected Agency intends to undertake any such services, it shall obtain all necessary applicable permits in accordance with such Change in Law and comply with such Change in Law throughout the Contract Period.

Further, the Selected Agency while seeking permission from the Authority of its proposal to undertake Additional Services, shall also submit projected additional year on year Revenue from the Additional Services. The projected additional year on year Revenue shall be duly examined and certified by the Authority.

After completion of Additional Services, the Selected Agency shall pay 10% (ten percent) of the actual additional Revenue on yearly basis. The additional Revenue shall be deemed to be part of the Annual Fee for each year of the Contract Period starting from operationalization of the Additional Services.

Article 22 INDEPENDENT EXPERTS

Article Deleted

Part IV FINANCIAL COVENANTS

Article 23 FINANCIAL CLOSE

Article Deleted

Article 24 PROJECT COST AND ANNUAL FEE**24.1 PAYMENT AGAINST PROJECT COST**

24.1.1 The payment against the Project Cost a sum of Rs. [●], shall be disbursed to the agency in accordance with the provisions of this Clause 24.1.

The Employer / Authority shall make payments to the Contractor for the Works on the basis of the lump sum price accepted by the Employer / Authority in consideration of the obligations specified in this Agreement for an amount of Rs.....(Rupees) (the “Contract Price”), which shall be subject to adjustments in accordance with the provisions of this Agreement. For the avoidance of doubt, the Parties expressly agree that the Contract Price shall not include the cost of Maintenance. The Parties further agree that save and except as provided in this Agreement, the Contract Price shall be valid and effective until the issue of the Completion Certificate for Construction works

24.1.2 Subject to the conditions specified in this Clause 24.1, the payment shall be credited to the escrow account in accordance with the escrow agreement and shall be applied by the agency for meeting the total project cost.

24.1.3 the project cost shall be disbursed in accordance with provisions of Clause 24.8

24.1.4 in the event of occurrence of an agency default, disbursement of payment against the Project Cost shall be suspended till such agency default has been cured by the agency.

24.1.5 The Contract Price includes all applicable taxes (excluding GST) and Duties, royalty and fees, etc. as applicable in accordance with the laws and regulations in force as on the Base Date under this Agreement. Nothing in this Agreement shall relieve the Contractor from its responsibility to pay any tax including any tax that may be levied in India on profits made by it in respect of this Agreement.

GST (Goods and Services Tax) would be payable at the applicable rates as may be in force from time to time.

24.1.6 Procedure for Royalty payments, in case the same is not paid directly by the Contractor.

- a. A copy of the agreement shall be forwarded to the Revenue officer with the intimation that the royalty for minor mineral/excavation involved in the work such as murrum, sand, metal, rubble etc. will be deducted from each IPC of the Contractor will be remitted by Employer / Authority directly with them, if the same is not paid directly by the Contractor to Revenue authorities.
- b. For working out the amount of royalty to be recovered, a consumption statement of minor minerals such as metal, rubble, sand etc. shall be prepared by the Contractor for the items where minor minerals are used for the work. No bulk-age shall be considered while arriving quantities and the amount of royalty for

each minor mineral shall be worked out as per prevailing rate. However, the amount so recovered shall be certified by the Revenue Authorities before the finalization of the bill to implement exact recovery.

- c. As regards items such as cement concrete pipe, ready-mix concrete, precast concrete material, premix asphalt brought from the plant, all types of tiles etc., consumption of minor minerals need not be worked out and royalty for the same shall not be recovered and paid to Revenue Department.
- d. If the Contractor submits that he has already paid the royalty to Revenue Department even in such cases the royalty charges shall have to be recovered from the bills of the Contractor and shall be kept in deposit for confirmation from Revenue Authority. The amount in the deposit shall be released only after getting confirmation from the Revenue Authorities. In such cases, Employer / Authority's Engineer shall forward the receipts of payment of Royalty charges produced by the Contractor to the Revenue Authorities and obtain their confirmation. Till such time, the Royalty charges shall be recovered and kept in deposit.

24.1.7 The Contract Price shall not be adjusted for any change in costs stated in Clause 24.1.1 above, except as stated in Clause 24.1.2.

24.1.8 The Contract Price shall not be adjusted to take account of any Force Majeure unless otherwise provided for in this Agreement.

24.1.9 Unless otherwise stated in this Agreement, the Contract Price covers all the Contractor's obligations for the Works under this Agreement and all things necessary for the Construction and the remedying of any Defects in the Project Works.

24.1.10 All payments under this Agreement shall be made in Indian Rupees

24.2 ANNUAL FEE

24.2.1 In consideration of the cost of the Contract, the Selected Agency shall during the Contract Period, pay to the Authority by way of **Annual Fee a sum of Rs. [●] per annum** in the manner laid down in Article 24.3.1, increased at 10% (ten percent) year on year basis.

24.2.2 In the event the Selected Agency undertakes Future Expansion in accordance with Article 12.6.1 and Additional Services in accordance with Article 21.3, then the Selected Agency shall be liable to pay to the Authority, 10% (ten) percent of the actual Revenue from such Future Expansion and Additional Services, as the case may be ("**Additional Annual Fee**")

24.2.3 The selected agency shall maintain a separate record for monthly revenue from such activities. The record will detail tariff and other details of the revenue generation and shall be audited and certified by the statutory auditor of the selected agency. The revenue generation from such activities and corresponding

records shall be reviewed by the Authority on quarterly basis.

24.3 PAYMENT OF ANNUAL FEE

24.3.1 The annual fee and the additional annual fee (if any) to be paid by the selected agency shall be due and payable within [15 (fifteen)] days of the commencement of the accounting year. Provided that the annual fee for the first accounting year shall be paid within [15 (fifteen)] days of the occurrence of the cod

24.3.2 the selected agency shall, with each payment of the annual fee and additional annual fee submit: (a) a certificate that the amounts paid are correct and in accordance with the provisions of the agreements; (b) details in respect of taxes/duties payable/reimbursable in accordance with the provisions of this agreement; (c) details in respect of other damages payable in accordance with the provisions of this agreement; and (d) net amount payable under the provisions of this agreement and (e) details of the revenue in the relevant year generated from the date of commissioning of the Future Expansion.

24.4 DELAYED PAYMENTS

All amounts due and payable by the Selected Agency under the provisions of this Agreement shall be paid on or before the time period stipulated in Article 24.2. In the event of delay beyond such period the Selected Agency shall pay interest for the period of delay, calculated at the rate specified in Article 42.4.

24.5 DISPUTED AMOUNTS

24.5.1 The Authority shall, within [10 (ten)] days of receiving the Contract Fee, notify the Selected Agency of the disputed amounts along with details thereof (the “**Disputed Amounts**”). Within [7 (seven)] days of receiving such notice, the Selected Agency shall present any information or evidence as may be reasonably required for determining that such Disputed Amounts are not payable. The Authority may, if necessary, meet a representative of the Selected Agency for resolving the dispute and in the event that the dispute is not resolved the Dispute Resolution Procedure in accordance with Article 39 shall apply.

24.5.2 If any amount is payable by either Party upon determination of a dispute regarding any Disputed Amount such amount shall be deemed to be payable on the date when it first became due and interest for the period of delay shall be due and payable at the rate specified in Article 24.5.

24.6 SET-OFF

24.6.1 Except as provided in Article 25, the Selected Agency shall not be entitled to retain or set-off any amount due to the Authority by it, but the Authority may retain or set-off any amount owed to it by the Selected Agency under this Agreement which has fallen due and payable against any amount due to the Selected Agency under this Agreement.

24.6.2 If the payment or deduction of any amount pursuant to Article 24 is disputed, then any undisputed element of that amount shall be paid, and the disputed element shall be dealt with in accordance with the Dispute Resolution Procedure in Article 39.

24.7 Procedure for Estimating the Payment for the Works

24.7.1 The Employer / Authority shall make interim payments to the Contractor as certified by the Employer / Authority's Engineer on completion of a stage, in a length, number or area as specified and valued in accordance with the proportion of the Contract Price assigned to each item and its stage in Schedule-N.

24.7.2 The Contractor shall base its claim for interim payment for the stages completed till the end of the month for which the payment is claimed, valued in accordance with Clause 24.7.1, supported with necessary particulars and documents in accordance with this Agreement.

24.7.3 Any reduction in the Contract Price arising out of Change of Scope or the Works withdrawn shall not affect the amounts payable for the items or stage payments thereof which are not affected by such Change of Scope or withdrawal. For the avoidance of doubt and by way of illustration, the Parties agree that if the amount assigned to Bridges has reduced from Rs.100 crore to Rs. 80 crores owing to a Change of Scope or withdrawal of work, the reduction in payment shall be restricted to relevant payments for Bridges only and the payment due in respect of all other stage payments under the item Bridges shall not be affected in any manner. The Parties further agree that the adjustments arising out of the aforesaid modifications shall be carried out in a manner that the impact of such modifications is restricted to the said Change of Scope or withdrawal, as the case may be, and does not alter the payments due for and in respect of items or stage payments which do not form part of such Change of Scope or withdrawal.

24.8 Stage Payment Statement for Works

24.8.1 The Contractor shall submit a statement (the "Stage Payment Statement"), in 3 copies, by the 7th (seventh) day of the month to the Employer / Authority's Engineer in the form set forth in Schedule-J, showing the amount calculated in accordance with Clause 24.7 to which the Contractor considers himself entitled for completed stage(s) of the Works. The Stage Payment Statement shall be accompanied with the progress reports and any other supporting documents. The Contractor shall not submit any claim for payment of incomplete stages of work.

24.9 Stage Payment for Works

24.9.1 Upon receipt of the Stage Payment Statement referred to in Clause 24.8, the Employer / Authority's Engineer shall determine and shall deliver to the Employer / Authority and the Contractor an Interim Payment Certificate (IPC) certifying the amount due and payable to the Contractor, after adjusting the payments

already released, if any to the Contractor. The Employer / Authority shall pay the Contractor the approved/certified sum against the said IPC.

24.9.2 In cases where there is a difference of opinion as to the value of any stage, the Employer / Authority's Engineer's view shall prevail, and interim payments shall be made to the Contractor on this basis; provided that the foregoing shall be without prejudice to the Contractor's right to raise a Dispute.

24.9.3 The Employer / Authority's Engineer may, for reasons to be recorded, withhold from payment:

- a) the estimated value of work or obligation that the Contractor has failed to perform in accordance with this Agreement and the Employer / Authority's Engineer had notified the Contractor; and
- b) the estimated cost of rectification of work done is not in accordance with this Agreement.

24.9.4 Payment by the Employer / Authority shall not be deemed to indicate the Employer / Authority's acceptance, approval, consent or satisfaction with the work done.

Article 25 TARIFF**25.1 TARIFF STRUCTURE**

25.1.1 The revenue generation shall be from the rentals, tickets, events, parking, proceeds of sale of food items, retails and items such as advertisement, brand sponsorship, accommodations, camping, amenities etc. The Selected Agency may determine the tariff structure for services in such manner as it deems fit; provided however, that such tariffs shall not be combined with any facility or service that is not directly connected with the Project.

25.1.2 For essential services, the upper ceiling for the sale cost and other tariff shall be as prescribed by the Authority [Authority to provide table of Maximum Tariff Rates for essential service]

Sn	Service	Upper Ceiling for the Tariff (<i>in INR</i>)

25.1.2 The Selected Agency may also recover rent or fee for use of commercial or other spaces of every description and kind, provided by the Selected Agency.

25.2 SERVICE CHARGES

The Selected Agency may levy and recover an additional service charge for and in respect of any facility or service as it may deem fit.

25.3 TAXES AND DUTIES

All Taxes, duties, levies, cess, fees and duties shall be paid by the Selected Agency.

Article 26 ESCROW ACCOUNT

26.1 ESCROW ACCOUNT

26.1.1 The Agency and Authority shall, on or before the Effective Date, enter into an escrow agreement with the Escrow Bank, substantially in the form set forth in Schedule L (the “**Escrow Agreement**”) for the establishment and maintenance of Escrow Accounts as may be specified in the Escrow Agreement. The Parties expressly agree that the Escrow Accounts shall be established and maintained {an Escrow Bank selected by the Authority at its sole discretion.}

26.1.2 The nature and scope of the Escrow Account are fully described in the agreement Escrow Agreement.

26.2 DEPOSITS INTO ESCROW ACCOUNT

26.2.1 The Selected Agency and the Authority, as the case may be shall deposit or cause to be deposited the following inflows and receipts into the Escrow Account:

- (a) Project Cost by the Authority;
- (b) all Fees and any other revenues, from or in respect of the Tourist Experience, including the proceeds of any rentals, deposits, capital receipts or insurance claims, in the Revenue Account;
- (c) any funds received by the Agency from its lenders or shareholders, in any manner or form, other than funds for meeting the Total Project Cost, in the Revenue Account;
- (d) At least 120% (One Hundred and Twenty percent) of the Annual Fee payable to the Authority, from the annual revenue from the Project, for the Accounting Year, at least 15 (fifteen) days prior to the date the Annual Fee is due and payable to the Authority. In case the annual revenue from the Project is less than 120% of the Contract Fee, then the Selected Agency shall make good the balance amount to reach the 120% of the Annual Fee from its own sources;
- (e) Additional Annual Fee payable (if any) to the Authority for the Accounting Year at least 15 (fifteen) days prior to the date the Additional Annual Fee is due and payable to the Authority.
- (f) Termination Payments, as and when due and payable in accordance with this Agreement, in the Revenue Account; and
- (g) Any other amounts required to be paid by the Authority to the Agency not specifically provided for in the Escrow Agreement, in the Revenue Account.

26.3 WITHDRAWALS DURING CONTRACT PERIOD

26.3.1 The Selected Agency shall, at the time of opening the Escrow Account, give irrevocable instructions, by way of an Escrow Account Agreement, to the Escrow

Bank instructing, inter alia, that deposits in the Escrow Account shall be appropriated in the following order every year, or at shorter intervals as necessary, and if not due in a year then appropriated proportionately in such year and retained in the Escrow Account and paid out therefrom in the year when due:

- (a) Annual Fee and Additional Annual Fee due and payable to the Authority;
- (b) all payments and Damages certified by the Authority as due and payable to it by the Selected Agency; and
- (c) Balance, if any, in accordance with the instructions of the Selected Agency.

26.3.2 The Selected Agency shall not in any manner modify the order of payment specified in Article 26.3.1, except with the prior written approval of the Authority.

26.3.3 The Selected Agency may open any other account at its discretion for making such payments as provided in Article 26.3.1 save and except Annual Fee due and payable to the Authority which must be appropriated from the Escrow Account.

26.4 WITHDRAWALS UPON TERMINATION

26.4.1 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 Selected Agency for and in respect of the Project;
- (b) Outstanding Annual Fee and Additional Contract Fee;
- (c) all payments due and payable under this Agreement and/or Damages certified by the Authority as due and payable to it by the Selected Agency; and
- (d) Balance, if any, in accordance with the instructions of the Selected Agency.

26.4.2 The provisions of this Article and the instructions contained in the Escrow Account Agreement shall remain in full force and effect until the obligations set forth in Article 26.4.1 have been discharged.

Article 27 INSURANCE

27.1 INSURANCE DURING CONTRACT PERIOD

27.1.1 The Selected Agency 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 Selected Agency 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 Selected Agency during the Contract Period. The Selected Agency shall procure that in each insurance policy, the Authority shall be a co-insured. For avoidance of doubt, the level of insurance to be maintained by the Selected Agency 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.

27.2 INSURANCE COVER

27.2.1 Without prejudice to the provisions contained in Article 27.1, the Selected Agency shall, during the Operation Period, procure and maintain Insurance Cover including but not limited to the following:

- (a) Loss, damage or destruction of the Project Assets, including assets handed over by the Authority to the Selected Agency, at replacement value;
- (b) comprehensive third-party liability insurance including injury to or death of personnel of the Authority or others who may enter the Project and Project Infrastructure;
- (c) the Selected Agency's general liability arising out of the Contract;
- (d) liability to third parties for goods or property damage;
- (e) workmen's compensation insurance; and
- (f) any other insurance that may be necessary to protect the Selected Agency and its employees, including all Force Majeure Events that are insurable at commercially reasonable premiums and not otherwise covered in items (a) to (d) above.

27.3 NOTICE TO THE AUTHORITY

No later than [45 (forty-five)] days prior to commencement of the Construction Period or the Operation Period, as the case may be, the Selected Agency 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 27. Within [30 (thirty)] days of receipt of such notice, the Authority may require the Selected Agency 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 in Article 39 shall apply.

27.4 EVIDENCE OF INSURANCE COVER

All insurances obtained by the Selected Agency in accordance with this Article 27 shall be maintained with insurers on terms consistent with Good Industry Practice. Within [15 (fifteen)] days of obtaining any insurance cover, the Selected Agency shall furnish to the Authority, notarized 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 Selected Agency to the Authority.

27.5 REMEDY FOR FAILURE TO INSURE

If the Selected Agency fails to effect and keep in force all insurances which it is required to obtain 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 Selected Agency, 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 Selected Agency.

27.6 WAIVER OF SUBROGATION

All insurance policies in respect of the insurance obtained by the Selected Agency pursuant to this Article 27 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 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.

27.7 SELECTED AGENCY'S WAIVER

The Selected Agency 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 Selected Agency 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 Selected Agency 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.

27.8 APPLICATION OF INSURANCE PROCEEDS

The proceeds from all insurance claims, except life and injury, shall be paid to the Selected Agency and it shall notwithstanding anything to the contrary contained in this Agreement, apply such proceeds towards payment of Damages and balance remaining, if any, shall be applied for any necessary repair, reconstruction, reinstatement, replacement, improvement in the Project and Project Infrastructure, in accordance with the provisions contained in this behalf in the Financing Agreements.

27.9 COMPLIANCE WITH CONDITIONS OF INSURANCE POLICIES

The Selected Agency expressly acknowledges and undertakes to fully indemnify the Authority from and against all losses and claims arising from the Selected Agency's failure to comply with conditions imposed by the insurance policies affected in accordance with this Agreement.

Article 28 ACCOUNTS AND AUDIT

28.1 AUDITED ACCOUNTS

- 28.1.1 The Selected Agency shall maintain books of accounts recording all its receipts (including the Revenues from room charges, restaurants, sale of food and provision of Associated Services, and all incomes derived or collected by it from or on account of the Project and/or its use), income, expenditure, payments, assets and liabilities, in accordance with this Agreement, Applicable Laws, Applicable Permits and Good Industry Practice. The Selected Agency 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 Revenue records of the Selected Agency 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 only 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.
- 28.1.2 The Selected Agency 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
- 28.1.3 On or before the [31st (thirty-first)] day of May each year, the Selected Agency shall provide to the Authority, for the preceding Accounting Year, a statement duly audited by its Statutory Auditors giving summarised information on Revenues and such other information as the Authority may reasonably require.

28.2 APPOINTMENT OF AUDITORS

- 28.2.1 The Selected Agency shall appoint and have during the subsistence of this Agreement as its Statutory Auditors, a firm having at least five practicing Chartered Accountants on its rolls. All fees and expenses of the Statutory Auditors shall be borne by the Selected Agency.
- 28.2.2 The Selected Agency 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 in accordance with the Article 28.2.1.
- 28.2.3 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 any time, another firm of Chartered Accountants (the “**Additional Auditors**”) 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.

28.3 CERTIFICATION OF CLAIMS BY STATUTORY AUDITORS

Any claim or document provided by the Selected Agency 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. For avoidance of doubt, such certification shall not be required for exchange of information in the normal course of business.

28.4 SET-OFF

In the event any amount is due and payable by the Authority to the Selected Agency, it may set-off any sums payable to it by the Selected Agency and pay the balance remaining. Any exercise by the Authority of its rights under this Article 28.4 shall be without prejudice to any other rights or remedies available to it under this Agreement or otherwise.

Part V FORCE MAJEURE AND TERMINATION

Article 29 FORCE MAJEURE

29.1 FORCE MAJEURE

As used in this Agreement, the expression “**Force Majeure**” or “**Force Majeure Event**” shall, save and except as expressly provided otherwise, mean occurrence in India of any or all of Non-Political Event, Indirect Political Event and Political Event, as defined in Articles 29.2, 29.3 and 29.4 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: (a) is beyond the reasonable control of the Affected Party; and (b) the Affected Party could not have prevented or overcome by exercise of due diligence and following Good Industry Practice; and (c) has Material Adverse Effect on the Affected Party.

29.2 NON-POLITICAL EVENT

A Non-Political Event shall mean one or more of the following acts or events:

- (a) act of God, epidemic, extremely adverse weather conditions, lightning, earthquake, landslide, cyclone, flood, volcanic eruption, tsunami, chemical or radioactive contamination or ionisation radiation, fire or explosion (to the extent of contamination or radiation or fire or explosion originating from a source external to the Project and Project Infrastructure);
- (b) strikes or boycotts (other than those involving the Selected Agency, Contractors or their respective employees/representatives, or attributable to any act or omission of any of them) interrupting supplies and services to the Project and Project Infrastructure for a continuous period of [24 (twenty four)] hours and an aggregate period exceeding [7 (seven)] days in an Accounting Year, and not being an Indirect Political Event set forth in Article 29.3;
- (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 Selected Agency by or on behalf of such Contractor;
- (d) any delay or failure of an overseas Contractor to deliver any critical equipment required for the Project and Project Infrastructure and not available in India if such delay or failure is caused outside India by any event specified in Sub-Article (a) above and which does not result in any offsetting compensation being payable to the Selected Agency by or on behalf of such Contractor;
- (e) any judgement or order of any court of competent jurisdiction or statutory authority made against the Selected Agency in any proceedings for reasons other than (i) failure of the Selected Agency 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;

- (f) the discovery of geological conditions, toxic contamination or archaeological remains on the Project Site that could not reasonably have been expected to be discovered through an inspection of the Project Site; or
- (g) any event or circumstances of a nature analogous to any of the foregoing.

29.3 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;
- (b) any political or economic upheaval, disturbance, movement, struggle or similar occurrence which could not have been anticipated or foreseen by a prudent person and which causes the construction or operation of the Project to be financially unviable or otherwise not feasible;
- (c) 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;
- (d) any civil commotion, boycott or political agitation which prevents operation of the Project or Project Infrastructure by the Selected Agency for an aggregate period exceeding [7 (seven)] days in an Accounting Year;
- (e) failure of the Authority to permit the Selected Agency to continue the Development Works, with or without modifications, in the event of stoppage of such works after discovery of any geological or archaeological finds or for any other reason;
- (f) any failure or delay of a Contractor to the extent caused by an Indirect Political Event and which does not result in any offsetting compensation being payable to the Selected Agency by or on behalf of such Contractor;
- (g) any Indirect Political Event that causes a Non-Political Event; or
- (h) any event or circumstances of any nature analogous to any of the foregoing.

29.4 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 36 and its effect, in financial terms, exceeds the sum specified in Article 36.1;
- (b) compulsory acquisition in national interest or expropriation of any Project Assets or rights of the Selected Agency or of the Contractors;

- (c) unlawful or unauthorised or without jurisdiction revocation of, or refusal to renew or grant without valid cause, any clearance, license, permit, authorisation, no-objection certificate, consent, approval or exemption required by the Selected Agency 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 Selected Agency's or any Contractor's inability or failure to comply with any condition relating to grant, maintenance or renewal of such clearance, license, 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 Selected Agency by or on behalf of such Contractor; or
- (e) Any event or circumstance of a nature analogous to any of the foregoing.

29.5 DUTY TO REPORT FORCE MAJEURE EVENT

29.5.1 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 29 with evidence in support thereof;
- (b) the estimated duration and 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.

29.5.2 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 no 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 performance of its obligations under this Agreement.

29.5.3 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 under Article 29.5.1, and such other information as the other Party may reasonably request the Affected Party to provide.

29.6 EFFECT OF FORCE MAJEURE EVENT ON THE CONTRACT

29.6.1 Upon occurrence of any Force Majeure Event prior to the Appointed Date, the period set forth in Article 4.1 for fulfilment of the Conditions Precedent shall be extended by a period equal in length to the duration of the Force Majeure Event.

29.6.2 At any time after the Appointed Date, if any Force Majeure Event occurs:

- (a) before Project COD, the Contract 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; or
- (b) after Project COD, whereupon the Selected Agency is unable to provide the Project and Project Infrastructure services despite making best efforts or it is directed by the Authority or any Governmental Instrumentality to suspend the aforesaid services during the subsistence of such Force Majeure Event, the Contract Period shall be extended by a period equal in length to the period during which the Selected Agency was prevented from providing the aforesaid services on account thereof; provided that in the event of reduction in Project and Project Infrastructure services on account of partial suspension of services which cause the Gross Revenue to decline below [75% (seventy five per cent)] of the Average Daily Gross Revenue for the corresponding period over the preceding [2 (two) years], the Authority shall extend the Contract Period in proportion to the loss of such Gross Revenue due to Force Majeure. For the avoidance of doubt, loss of [25% (twenty five per cent)] in Gross Revenue for [4 (four)] days as compared to the Average Daily Gross Revenue for the corresponding period during the preceding [2 (two) years] shall entitle the Selected Agency to the extension of [1 (one)] day in the Contract Period.

29.7 ALLOCATION OF COSTS ARISING OUT OF FORCE MAJEURE

29.7.1 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.

29.7.2 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 and Project Infrastructure (the “**Force Majeure Costs**”) shall be allocated and paid as follows:

- (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 Selected Agency, 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 Selected Agency;

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 Selected Agency.

29.7.3 For avoidance of doubt, Force Majeure Costs may include interest payments on debt, O&M Expenses, any increase in the cost of Development Works on account of inflation and all other costs directly attributable to the Force Majeure Event, but shall not include loss of Revenues from room charges, restaurants and sale of food and all incomes derived or collected by it from or on account of the Project, Project Infrastructure and Associated Services, 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.

29.7.4 Save and except as expressly provided in this Article, 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.

29.8 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 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 the other Party to make a representation and may after the expiry of such [15 (fifteen)] day period, whether or not it is in receipt of such representation, in its sole discretion issue the Termination Notice.

29.9 TERMINATION PAYMENT FOR FORCE MAJEURE EVENT

29.9.1 If Termination is on account of a Non-Political Event, the Authority shall make a Termination Payment to the Selected Agency in an amount equal to [90% (ninety per cent)] of the Debt Due less Insurance Cover.

29.9.2 If Termination is on account of an Indirect Political Event, the Authority shall make a Termination Payment to the Selected Agency 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.

29.9.3 If Termination is on account of a Political Event, the Authority shall make a Termination Payment to the Selected Agency in an amount that would be payable under Article 32.3.2 as if it were an Authority Default.

29.10 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 in accordance with Article 39; 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.

29.11 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.

29.12 RELIEF FOR UNFORESEEN EVENTS

29.12.1 Upon occurrence of an unforeseen event, situation or similar circumstances not contemplated or referred to in this Agreement, and which could not have been foreseen by a prudent and diligent person (the “**Unforeseen Event**”), any Party may by notice inform the other Party of the occurrence of such Unforeseen Event with the particulars thereof and its effects on the costs, expense and Revenues of the Project. Within [15 (fifteen)] days of such notice, the Parties shall meet and make efforts in good faith to determine if such Unforeseen Event has occurred, and upon reaching agreement on occurrence thereof, deal with it in accordance with the provisions of this Article 29.12.

29.12.2 Upon determination of the occurrence of an Unforeseen Event, the Parties shall make a reference to a conciliation tribunal which shall comprise one member each to be nominated by both Parties from among persons who have been judges of a High Court and the conciliators so nominated shall choose a chairperson who

has been a Judge of the Supreme Court or Chief Justice of a High Court.

29.12.3 The conciliation tribunal referred to in Article 29.12.2 shall conduct its proceedings in accordance with the provisions of Article 39 as if it is an arbitration proceeding under that Article, save and except as provided in Article 29.12.

29.12.4 The conciliation tribunal referred to in this Article 29.12 shall conduct preliminary proceedings to satisfy itself that:

- (a) an Unforeseen Event has occurred;
- (b) the effects of such Unforeseen Event cannot be mitigated without a remedy or relief which is not contemplated in the Agreement; and
- (c) the Unforeseen Event or its effects have not been caused by any Party by any act or omission or its part,

And if the conciliation tribunal is satisfied that each of the conditions specified hereinabove is fulfilled, it shall issue an order to this effect and conduct further proceedings under this Article 29.12.

29.12.5 Upon completion of the conciliation proceedings referred to in this Article 29.12, the conciliation tribunal may by a reasoned order make recommendations which shall be:

- (a) based on a fair and transparent justification;
- (b) no greater in scope than is necessary for mitigating the effects of the Unforeseen Event; and
- (c) of no greater duration than is necessary for mitigating the effects of the Unforeseen Event; and
- (d) Quantified and restricted in terms of relief or remedy.

29.12.6 Within [15 (fifteen)] days of receiving the order referred to in Article 29.12.5, the Parties shall meet and make efforts in good faith to accept, in whole or in part, the relief or remedy recommended by the conciliation tribunal for mitigating the effects of the Unforeseen Event and to procure implementation of the Project in accordance with the provisions of this Agreement. In pursuance hereof, the Parties may enter into a Memorandum of Understanding (the “**MoU**”) setting forth the agreement reached hereunder, and the terms of such MoU shall have the force and effect as if they form part of the Agreement.

Article 30 COMPENSATION FOR BREACH OF AGREEMENT**30.1 COMPENSATION FOR DEFAULT BY THE SELECTED AGENCY**

Subject to the provisions of Article 30.4, in the event of the Selected Agency being in material breach or default 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 breach or default, within [30 (thirty)] days of receipt of the demand supported by necessary particulars thereof; provided that no compensation shall be payable under this Article 30.1 for any material breach or default in respect of which Damages are expressly specified and payable under this Agreement or for any consequential losses incurred by the Authority.

30.2 COMPENSATION FOR DEFAULT BY THE AUTHORITY

Subject to the provisions of Article 30.4, in the event of the Authority being in material breach or default of this Agreement at any time after the Appointed Date, it shall pay to the Selected Agency by way of compensation, all direct costs suffered or incurred by the Selected Agency as a consequence of such material breach or 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 material breach or default in respect of which Damages have been expressly specified in this Agreement. For 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 breach or default but shall not include loss on account of Revenues from room charges, restaurants and sale of food and all incomes derived or collected by it from or on account of the Project, Project Infrastructure and Associated Services, debt repayment obligations, or other consequential losses, 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.

30.3 EXTENSION OF CONTRACT PERIOD

Subject to the provisions of Article 30.4, in the event that a material breach or default of this Agreement set forth in Article 30.2 causes delay in achieving COD or leads to reduction in the realization of Gross Revenues, as the case may be, the Authority shall, in addition to payment of compensation under Article 30.2, extend the Contract Period, such extension being equal in duration to the period by which COD was delayed or Gross Revenue was reduced on account thereof, as the case may be; and in the event of reduction in Gross Revenue to decline below [75% (seventy five per cent)] of the Average Daily Gross Revenue for the corresponding period during the preceding [2 (two)] years, the Authority shall, in addition to payment of compensation hereunder, extend the Contract Period in proportion to the loss of Gross Revenue. For the avoidance of doubt, loss of [25% (twenty five per cent)] in realization of Gross Revenue for [4 (four)] days, as compared to the Average Daily Gross Revenue for the corresponding period during the preceding [2 (two)] years shall entitle the Selected Agency to extension of [1 (one)] day in the Contract Period.

30.4 COMPENSATION TO BE IN ADDITION

Compensation payable under this Article 30 shall be in addition to, and without prejudice to, the other rights and remedies of the Parties under this Agreement including Termination thereof.

30.5 MITIGATION OF COSTS AND DAMAGE

The non-defaulting Party shall make all reasonable efforts to mitigate or limit the costs and damage arising out of or as a result of breach of the Agreement by the other Party.

Article 31 SUSPENSION OF SELECTED AGENCY'S RIGHTS

31.1 SUSPENSION UPON SELECTED AGENCY DEFAULT

Upon occurrence of Selected Agency Default, the Authority shall be entitled, subject to Applicable Laws and without prejudice to its other rights and remedies under this Agreement including its right of Termination hereunder, to (a) suspend all rights of the Selected Agency under this Agreement including the Selected Agency's right to receive any Revenues from room charges, restaurants and sale of food and all other incomes received by it from or on account of the Project, Project Infrastructure and Associated Services pursuant hereto, and (b) exercise such rights itself and perform the obligations hereunder or authorized 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 Selected Agency 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 Selected Agency and the Lender's Representative, the Authority shall extend the aforesaid [180 (one hundred and eighty)] days by a further period not exceeding [90 (ninety)] days.

31.2 AUTHORITY TO ACT ON BEHALF OF SELECTED AGENCY

- 31.2.1 During the period of Suspension, the Authority shall, on behalf of the Selected Agency, collect all 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 O&M Expenses and for meeting the costs incurred by it for remedying and rectifying the cause of Suspension, and thereafter for defraying the expenses specified in Article 26.3.
- 31.2.2 During the period of Suspension hereunder, all rights and liabilities vested in the Selected Agency in accordance with the provisions of this Agreement shall continue to vest in the Selected Agency and all things done or actions taken, including expenditure incurred by the Authority for discharging the obligations of the Selected Agency under and in accordance with this Agreement and the Project Agreements, shall be deemed to have been done or take for and on behalf of the Selected Agency and the Selected Agency undertakes to indemnify the Authority for all costs incurred during such period. The Selected Agency hereby licenses and sub-licenses respectively, the Authority or any other person authorised by it to use during Suspension, all Intellectual Property belonging to or licensed to the Selected Agency with respect to the Project and the Project Infrastructure and their design, engineering, construction, operation and maintenance and which is used or created by the Selected Agency in performing its obligations under this Agreement.

31.3 REVOCATION OF SUSPENSION

- 31.3.1 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 Selected Agency under this Agreement. For avoidance of doubt, the Parties expressly agree that the Authority may, in its discretion, revoke the Suspension at any time, whether or not the cause of Suspension has been rectified or removed hereunder.

- 31.3.2 Upon the Selected Agency having cured the Selected Agency 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 Selected Agency under this Agreement.

31.4 SUBSTITUTION OF SELECTED AGENCY

At any time during the period of Suspension, the Lenders' Representative, on behalf of the Senior Lenders, shall be entitled to substitute the Selected Agency under an 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)] days from the date of Suspension, and any extension thereof under Article 31.1, for enabling the Lenders' Representative to exercise its rights of substitution on behalf of the Senior Lenders.

31.5 TERMINATION

- 31.5.1 At any time during the period of Suspension under this Article 31, the Selected Agency may by notice request the Authority to revoke the Suspension and issue a Termination Notice. Subject to the rights of the Lenders' Representative to undertake the substitution in accordance with the provisions of this Agreement and within the period specified in Article 31.4, the Authority shall, within [15 (fifteen)] days of receipt of such notice, terminate this Agreement under and in accordance with Article 32 as if it is a Selected Agency Default under Article 32.1.
- 31.5.2 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 Article 31.1, this 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 b/y the Authority upon occurrence of Selected Agency Default.

Article 32 TERMINATION

32.1 TERMINATION FOR SELECTED AGENCY DEFAULT

32.1.1 Subject to Applicable Laws and save as otherwise provided in this Agreement, in the event that any of the defaults specified below shall have occurred, and the Selected Agency fails to cure the default within a Cure Period of [60 (sixty)] days, the Selected Agency shall be deemed to be in default of the Agreement (the “**Selected Agency Default**”), unless the default has occurred as a result of any breach of this Agreement by the Authority or due to Force Majeure. The defaults referred to herein shall include the following:

- (a) The Performance Security has been encashed and appropriated in accordance with Article 9.2 and the Selected Agency fails to replenish or provide fresh Performance Security within a Cure Period of [15 (fifteen)] days;
- (b) subsequent to the replenishment or furnishing of fresh Performance Security in accordance with Article 9.2, or cure the Selected Agency Default, as the case may be, for which whole or part of the Performance Security was appropriated, within a Cure Period of [120 (one hundred and twenty)] days;
- (c) the Selected Agency does not achieve the latest outstanding Project Milestone due in accordance with the provisions of Schedule G and continues to be in default for [90 (ninety)] days;
- (d) the Selected Agency abandons or manifests intension to abandon the development or operation of the Project and the Project Infrastructure without the prior written consent of the Authority;
- (e) Project COD does not occur on or before the Scheduled Completion Date;
- (f) the Agency commits default(s) in any year commencing from COD, in conforming to the Key Performance Indicators as set forth in Article 21 and Schedule 14 or O&M obligations as set forth in Article 17, which results in the total Damages payable for such defaults exceed the amount of Deemed Performance Security;
- (g) the Selected Agency is in breach of the Maintenance Requirements or the Safety Requirements, as the case may be;
- (h) the Agency does not achieve the latest outstanding Project Milestone due in accordance with the provisions of Schedule 10 and continues to be in default for 365 (three hundred and sixty five) days;
- (i) the Punch List items have not been completed within the period set forth in Clause 14.4.1;
- (j) the Selected Agency has failed to make any payment to the Authority including the Annual Fee within the period specified in this Agreement;
- (k) a default under the Escrow Agreement has occurred and the Agency fails to cure

the default within a Cure Period of 15 (fifteen) days;

- (l) a breach of any of the Project Agreements by the Selected Agency has caused a Material Adverse Effect;
- (m) the Selected Agency creates any Encumbrance in breach of this Agreement;
- (n) the Selected Agency repudiates this Agreement or otherwise takes an action or evidences or conveys an intention not to be bound by the Agreement;
- (o) a Change in Ownership has occurred in breach of the provisions of Article 5.3;
- (p) there is a transfer, pursuant to law either of (i) the rights and/or obligations of the Selected Agency under any of the Project Agreements, or of (ii) all or part of the assets or undertaking of the Selected Agency, and such transfer causes a Material Adverse Effect;
- (q) an execution levied on any of the assets of the Selected Agency has caused a Material Adverse Effect;
- (r) the Selected Agency is adjudged bankrupt or insolvent, or if a trustee or receiver is appointed for the Selected Agency or for the whole or material part of its assets that has a material bearing on the Project;
- (s) the Selected Agency has been, or is in the process of being amalgamated or reconstituted in a manner that would cause, in the reasonable opinion of the Authority, a Material Adverse Effect: provided that, as part of such amalgamation or reconstruction, the entire property, assets and undertaking of the Selected Agency are transferred to the amalgamated or reconstructed entity and that the amalgamated or reconstructed entity has unconditionally assumed the obligations of the Selected Agency 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 Selected Agency as at the Appointed Date; and
 - (iii) each of the Project Agreements remain in full force and effect.
- (t) occurrence of any Insolvency Event;
- (u) any representation or warranty of the Selected Agency herein contained which is, as of the date hereof, found to be materially false, incorrect or misleading or the Selected Agency is at any time hereafter found to be in breach thereof;

- (v) the Selected Agency 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;
- (w) the Selected Agency has failed to fulfil any obligation, for which failure Termination has been specified in this Agreement;
- (x) the Selected Agency issues Termination Notice in violation of the provisions of this Agreement;
- (y) the Selected Agency commits a default in complying with any other provisions of this Agreement if such default causes or may cause a Material Adverse Effect on the Authority; or
- (z) the Selected Agency violates any of the terms and conditions of the Applicable Permits obtained by the Authority, as provided in Schedule E.

32.1.2 Without prejudice to any other rights or remedies which the Authority may have under this Agreement, upon occurrence of a Selected Agency Default, the Authority shall be entitled to terminate this Agreement by issuing a Termination Notice to the Selected Agency; provided that before issuing the Termination Notice, the Authority shall by a notice inform the Selected Agency of its intention to issue such Termination Notice and grant [15 (fifteen)] days to the Selected Agency 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 Article 32.3.3.

32.2 TERMINATION FOR AUTHORITY DEFAULT

32.2.1 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 Selected Agency 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 Selected Agency;
- (b) the Authority has failed to make any payment due to the Selected Agency, and the Selected Agency is unable to recover any unpaid amounts through the adjustment in the Annual Fee payable by it to the Authority;
- (c) the Authority fails to provide any land which is necessary and required for construction of any essential element or part of the Project and/or the Project Infrastructure; or

- (d) 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.

32.2.2 Without prejudice to any other right or remedy which the Selected Agency may have under this Agreement, upon occurrence of a Authority Default, the Selected Agency 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 Selected Agency 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.

32.3 TERMINATION PAYMENT

- a) Upon Termination on account of a Selected Agency Default during Execution and the Operations Period, If the Contract is terminated because of a fundamental breach of Contract by the Contractor, the Engineer shall issue a certificate for the value of the work done less advance payments received upto the date of the issue of the certificate, less other recoveries due in terms of the contract, less taxes due to be deducted at source as per applicable law and less 5% of the contract value towards compensation for the breach of contract. The total amount of liquidated damages and compensation for breach of contract shall, however, be limited to 7.5% of the contract value or the amount available with the Engineer (in the shape of retention money, performance security and due amount of work done if any), whichever is less. The requisite amount for which the Contractor may become liable shall be realized by encashing the performance security furnished by the Contractor and/ or from other amounts due to the Contractor in respect of this work.
- b) If the Contract is terminated at the Employer's convenience or because of a fundamental breach of Contract by the Employer, the Engineer shall issue a certificate for the value of the work done. This work value shall take into account the cost of balance material brought by the Contractor and available at site, the reasonable cost of removal of Equipment, repatriation of the Contractor's personnel employed solely on the Works, and the Contractor's costs of protecting and securing the works. The advance payment received upto to the date of the certificate, other recoveries due in terms of the contract and the taxes due to be deducted at source as per applicable law, shall be deducted from the work value.
- c) **No Compensation for Alteration in or Restriction in Works**

If at any time after the commencement of the work the Authority, for any reason whatsoever, does not require the whole Project/Work or part thereof to be carried out, the Authority shall give notice in writing of the fact to the Contractor , who

shall have no claim to any payment or compensation whatsoever on account of any profit or advantage, which he might have derived from the execution of the work in full, but which he did not derive in consequence of the full amount of work not having been carried out, neither shall he have any claim for compensation by reasons of any alteration having been made in the original specifications, drawings, designs and instructions, which shall involve any curtailment of the work originally contemplated.

For avoidance of doubt, the Selected Agency hereby acknowledges that no Termination Payment shall be due or payable on account of a Selected Agency Default occurring prior to the Project COD, save and except as provided in Article 32.3.3.

32.3.1 Upon Termination on account of an Authority Default, the Authority shall pay to the Selected Agency, by way of Termination Payment, an amount equal to:

- (i) Debt Due;
- (ii) [150% (one hundred and fifty per cent)] of the Adjusted Equity; and
- (iii) [115% (one hundred and fifteen per cent)] of the amount representing the Additional Termination Payment.

32.3.2 Upon Termination on account of the Selected Agency Default at any time prior to Project COD, no Termination Payment shall be due and payable for expenditure comprising the first [40% (forty per cent)] of the Total Project Cost and in the event of the expenditure exceeding such [40% (forty per cent)] and forming part of Debt Due, the provisions of Article 32.3.1 shall, to the extent applicable to Debt Due, apply in respect of the expenditure exceeding such [40% (forty per cent)]. For avoidance of doubt and by way of illustration, if the total expenditure incurred prior to the Transfer Date is [90% (ninety per cent)] of the Total Project Cost, the expenditure eligible for computation of Termination Payment hereunder shall be [50% (fifty per cent)] of the Total Project Cost and the Termination Payment due and payable in such event shall not exceed [45% (forty five per cent)] of the Total Project Cost. The Parties further agree that for the purposes of this Article 32.3.3 Total Project Cost shall mean the amount specified in Sub-Article (b) of the definition of Total Project Cost in Article 43.1. The Parties also agree that for determining the Termination Payment under this Article 32.3.3, the expenditure comprising the latest Project Milestone shall also be reckoned.

32.3.3 Termination Payment shall become due and payable to the Selected Agency within [90 (ninety)] days of a demand being made by the Selected Agency to the Authority with the necessary particulars, and in the event of any delay, the Authority shall pay interest at a rate equal to the existing Bank Rate of Lead Bank (Government Nationalized Bank) on the amount of Termination Payment remaining unpaid; provided that such delay shall not exceed [150 (one hundred fifty)] days. For

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.

32.3.4 Upon Termination on expiry of the Contract Period by efflux of time, no Termination Payment shall be due and payable to the Selected Agency. At the end of the Contract Period, all Project Assets shall be transferred to the Authority at free of cost.

32.3.5 The Selected Agency expressly agrees that Termination Payment under this Article 32 shall constitute a full and final settlement of all claims of the Selected Agency on account of Termination of this Agreement for any reason whatsoever and that the Selected Agency or any shareholder thereof shall not have any further right or claim under any law, treaty, convention, contract or otherwise.

32.4 CERTAIN LIMITATIONS ON TERMINATION PAYMENT

32.4.1 Termination Payment, due and payable under this Agreement shall be limited 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. For avoidance of doubt, it is agreed that within a period of [60 (sixty)] days from Project COD, the Selected Agency shall notify to the Authority, the Total Project Cost 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, the Equity and Debt Due shall be arrived at by adopting the proportion between debt and equity as specified in the Financing Agreements. The Parties also agree that, notwithstanding anything contained in this Agreement, for the purposes of computing Termination Payment, the Debt Due shall at no time exceed [50% (fifty per cent)] of the Total Project Cost.

32.4.2 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. Provided, however, that the provisions of this Article 32.4.2 shall not apply if the Selected Agency does not notify the particulars of any foreign currency loans within [60 (sixty)] days of the date of conversion of such foreign currency loans into Indian currency. Provided further that all borrowings in foreign currency shall be restricted to the financing of the Total Project Cost and any borrowings in excess thereof shall not qualify for computation of Termination Payment.

32.4.3 Additional Termination Payment due and payable in respect of Specified Assets, forming part of the Project or the Project Infrastructure, as the case may be, which are constructed, acquired or installed after the 5th (fifth) anniversary of Project COD, but no later than the 30th (thirtieth) anniversary of the Appointed Date, shall

be limited to the lowest of:

- (a) Adjusted Depreciated Value;
- (b) the replacement value thereof, as assessed by the Approved valuer, who shall be selected and appointed by the Authority, within [15 (fifteen)] days of Termination, for submitting his assessment within [30 (thirty)] days of his appointment hereunder; and
- (c) [40% (forty per cent)] of the sum of the Total Project Cost.

32.4.4 For the avoidance of doubt, it is clarified that any Termination Payment payable under this Agreement shall not include the Grant against the Project Cost.

32.5 OTHER RIGHTS AND OBLIGATIONS OF THE AUTHORITY

Upon Termination for any reason whatsoever, the Authority shall:

- (a) take possession and control of the Project and the Project Infrastructure forthwith;
- (b) take possession and control of all materials, stores, implements, construction plants and equipment on or about the Project and the Project Infrastructure;
- (c) be entitled to restrain the Selected Agency and any person claiming through or under the Selected Agency from entering the Project and the Project Infrastructure;
- (d) require the Selected Agency to comply with the Requirements for transfer of rights and interest set forth in Article 33.1; and
- (e) succeed upon election by the Authority, without the necessity of any further action by the Selected Agency, to the interests of the Selected Agency 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 Selected Agency. For avoidance of doubt, the Selected Agency 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 Selected Agency 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.

32.6 SURVIVAL OF RIGHTS

Notwithstanding anything to the contrary contained in this Agreement, but subject

to the provisions of Article 32.3.6, 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 Requirements for transfer of rights and interest, shall survive the Termination to the extent such survival is necessary for giving effect to such rights and obligations.

Article 33 TRANSFER OF RIGHTS AND INTEREST

33.1 REQUIREMENTS

33.1.1 Upon Termination, the Selected Agency shall comply with and conform to the following Transfer 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 and Project Infrastructure, free and clear of all Encumbrances, save and except to the extent set forth in the Substitution Agreement;
- (c) cure all Project Assets of all defects and deficiencies so that the Project 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 an as is where is basis after bringing them to a safe condition;
- (d) deliver and transfer relevant records, reports, Intellectual Property and other licenses pertaining to the Project 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, provided that in the event the Selected Agency has used the brand name and/or logo of the Selected Bidder/Consortium Members, if any, in relation to the Project or otherwise, the Selected Agency shall not be obliged to deliver and transfer such brand name and/or logo to the Authority. For the avoidance of doubt, the Selected Agency represents and warrants that the Intellectual Property delivered hereunder shall be adequate and complete for the design, engineering, construction, operation and maintenance of the Project and shall be assigned to the Authority free of any encumbrance;
- (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 Selected Agency in the Project and Project Infrastructure, including manufacturers' warranties in respect of any plant or equipment and 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 transfer and assignment of all rights, title and interest of the Selected Agency in the Project and Project Infrastructure, free from all Encumbrances, absolutely unto the Authority or to its nominee.

33.1.2 Subject to the exercise by the Authority of its rights under this Agreement or under any of the Project Agreements to perform or procure the performance by a third

party of any of the obligations of the Selected Agency, the Parties shall continue to perform their obligations under this Agreement, notwithstanding the giving of any Termination Notice, until the Termination of this Agreement becomes effective in accordance with its terms.

33.2 INSPECTION AND CURE

Not earlier than [90 (ninety)] days prior to Termination but not later than [15 (fifteen)] days prior to the effective date of such Termination, the Authority shall verify, after giving due notice to the Selected Agency specifying the time, date and venue of such verification and/or inspection, compliance by the Selected Agency with the Maintenance Requirements, and if required, cause appropriate tests to be carried out at the Selected Agency's cost for this purpose. Defaults, if any, in the Maintenance Requirements shall be cured by the Selected Agency at its cost and the provisions of Article 34 shall apply, *mutatis mutandis*, in relation to curing of defects or deficiencies under this Article 33.

33.3 COOPERATION AND ASSISTANCE ON TRANSFER OF PROJECT

- (a) 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 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 Project Site.
- (b) 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 Selected Agency shall further provide such reasonable advice and assistance as the Authority, its Selected Agency or agent may reasonably require for operation of the Project until the expiry of [6 (six) months] after the Transfer Date.
- (c) The Authority shall have the option to purchase or hire from the Selected Agency at a fair market value, determined by a reputed firm mutually agreed upon and appointed by the Parties, and free from any encumbrance all or any part of Project and Project Infrastructure but which does not form part of the assets specified in Article 33.1.1 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 in Article 39 shall apply.

33.4 VESTING CERTIFICATE

The transfer of all rights, title and interest in the Project shall be deemed to be

complete on the date when all of the Transfer Requirements have been fulfilled, and the Authority shall, without unreasonable delay, thereupon issue a certificate substantially in the form set forth in Schedule N (the “**Vesting Certificate**”), which shall have the effect of constituting evidence of transfer by the Selected Agency of all of its rights, title and interest in the Project and Project Infrastructure, and their vesting in the Authority pursuant hereto. It is expressly agreed that any defect or deficiency in the Transfer 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 and Project Infrastructure on the footing that all Transfer Requirements have been complied with by the Selected Agency.

33.5 COSTS

- (a) The Selected Agency shall bear and pay all costs incidental to transfer of all of the rights, title and interest of the Selected Agency in the Project in favour of the Authority upon Termination, save and except that all stamp duties payable on any deeds or Documents executed by the Selected Agency in connection with such transfer shall be borne by the Authority.
- (b) In the event of any dispute relating to matters covered by and under this Article, the Dispute Resolution Procedure in Article 39 shall apply.

Article 34 DEFECTS LIABILITY AFTER TERMINATION**34.1 LIABILITY FOR DEFECTS AFTER TERMINATION**

The Selected Agency shall be responsible for all defects and deficiencies in the Project and the Project Infrastructure 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 Authority in the Project and the Project Infrastructure during the aforesaid period. In the event that the Selected Agency 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 Selected Agency's risk and cost so as to make the Project and the Project Infrastructure conform to the Maintenance Requirements. All costs incurred by the Authority hereunder shall be reimbursed by the Selected Agency 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 funds retained in the Escrow Account under the provisions of Article

34.1 or from the Performance Guarantee provided thereunder. For the avoidance of doubt, the provisions of this Article 34 shall not apply if Termination occurs prior to Project COD.

34.2 RETENTION OF CONTRACT FEE

- 34.2.1 Notwithstanding anything to the contrary contained in this Agreement, but subject to the provisions of Article 34.2.3, a sum equal to the average of 1 (one) month's Annual Fee during the year immediately preceding the Transfer Date shall be retained in the Escrow Account for a period of [180 (one hundred and eighty)] days after Termination for meeting the liabilities, if any, arising out of or in connection with the provisions of Article 34.1.
- 34.2.2 Without prejudice to the provisions of Article 34.2.1, the Authority shall carry out an inspection of the Project and the Project Infrastructure at any time between [210 (two hundred and ten)] and [180 (one hundred and eighty)] days prior to the Termination and if it recommends that the status of the Project and Project Infrastructure is such that the sum larger than the amount stipulated in Article 34.2.1 should be retained in Escrow Account and for a period longer than the aforesaid [180 (one hundred and eighty)] days, the amount recommended by the Authority shall be retained in the Escrow Account for the period specified by it.
- 34.2.3 The Selected Agency may, for the performance of its obligations under this Article 34, provide to the Authority a guarantee from a Bank for a sum equivalent to the amount determined under Article 34.2.1 or Article 34.2.2. as the case may be, and for the period specified therein, substantially in the form set forth in Schedule F (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 Selected Agency's risk and cost in accordance with the provisions of this Article 34. Upon furnishing of the Performance Guarantee under this Article 34.2.3, the retention of funds in Escrow Account Agreement in terms of Article 34.2.1 or 34.2.2, as the case may be, shall be dispensed with.

Part VI OTHER PROVISIONS

Article 35 ASSIGNMENT AND CHARGES**35.1 RESTRICTIONS ON ASSIGNMENT AND CHARGES**

35.1.1 Subject to Articles 35.2 and 35.3, this Agreement shall not be assigned by the Selected Agency 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.

35.1.2 Subject to the provisions of Article 35.2, the Selected Agency 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 Selected Agency 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.

35.2 PERMITTED ASSIGNMENT AND CHARGES

35.2.1 The restraints set forth in Article 35.1 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 or liens or encumbrances required by any Applicable Law;
- (b) mortgages, pledges or hypothecation of goods or assets other than Project Assets and their related documents of title, arising or created in the ordinary course of business of the Project, and as security only for indebtedness to the Senior Lenders under the Financing Agreements and/or for working capital arrangements for the Project and Project Infrastructure; and
- (c) assignment of rights, interest and obligations of the Selected Agency 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.

35.2.2 The Selected Agency shall not, directly or indirectly, transfer, mortgage, pledge, assign, hypothecate, encumber, let or sub-let or part with the occupation of the Project or the Project Infrastructure or any part thereof and/or the benefits arising out of this Agreement or any part thereof in any manner whatsoever to any person, without the prior written consent of the Authority. The Selected Agency may permit or sub-let any third party to operate permissible activities in the Project and Project Infrastructure such as offices, retail areas, gymnasium, spa, restaurant, coffee shops, banquet halls, or any other facilities within the Project Site for a period that shall be coterminous with or, less than the Contract Period and upon expiry of the Contract Period or Termination of the Agreement, all such permissions granted to third parties to operate or maintain any facilities or amenities as aforesaid shall

automatically cease and terminate forthwith.

35.3 ASSIGNMENT BY THE AUTHORITY

35.4.1 Notwithstanding anything to the contrary contained in this Agreement, the Authority may, after giving [60 (sixty)] days' notice to the Selected Agency, assign and/or transfer 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.

35.3.2 Any assignment under this Article 35 shall be subject to the approvals and consents required therefore under Applicable Laws. Provided, however, that the grant of any consent or approval under Applicable Laws shall not oblige the Authority to grant its approval to such assignment, save and except as provided herein.

Article 36 CHANGE IN LAW

36.1 INCREASE IN COSTS

36.1.1 If as a result of Change in Law, the Selected Agency suffers an increase in costs or reduction in net after-tax return or other financial burden, the aggregate financial effect of which exceeds [Rs. 25 lakh (Rupees twenty-five lakh)] in any Accounting Year, the Selected Agency may so notify the Authority and propose amendments to this Agreement so as to place the Selected Agency 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 Selected Agency, 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 amendments to this Agreement or on any other mutually agreed arrangement:

36.1.2 Provided that if no agreement is reached within [90 (ninety)] days of the aforesaid notice, the Selected Agency may by notice require the Authority to pay an amount that would place the Selected Agency 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 Selected Agency, the same shall be settled in accordance with the Dispute Resolution Procedure in accordance with Article 39. For avoidance of doubt, it is agreed that this Article 36.1 shall be restricted to changes in law directly affecting the Selected Agency's costs of performing its obligations under this Agreement.

36.2 REDUCTION IN COSTS

36.2.1 If as a result of Change in Law, the Selected Agency benefits from a reduction in costs or increase in net after tax return or other financial gains, the aggregate financial effect of which exceeds [Rs. 25 lakh (Rupees twenty-five lakh)] in any Accounting Year, the Authority may so notify the Selected Agency and propose amendments to this Agreement so as to place the Selected Agency 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:

36.2.2 Provided that if no agreement is reached within [90 (ninety)] days of the aforesaid notice, the Authority may by notice require the Selected Agency to pay an amount that would place the Selected Agency 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 Selected Agency shall

pay the amount specified therein to the Authority; provided that if the Selected Agency shall dispute such claim of the Authority, the same shall be settled in accordance with the Dispute Resolution Procedure in accordance with Article 39. For the avoidance of doubt, it is agreed that this Article 36.2 shall be restricted to changes in law directly affecting the Selected Agency's costs of performing its obligations under this Agreement.

36.3 PROTECTION OF NPV

Pursuant to the provisions of Article 36.1 and 36.2 for the purposes of placing the Selected Agency 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. For the avoidance of doubt, the Parties expressly agree that for determination of NPV, the discount rate to be used shall be equal to the weighted average rate of interest at which the Selected Agency has raised the Debt Due under its Financing Agreements.

36.4 RESTRICTION ON CASH COMPENSATION

The Parties acknowledge and agree that the demand for cash compensation under this Article 36 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.

36.5 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 Selected Agency any sums on account of a Change in Law if the same are recoverable from the Users for and in respect of the services utilized by such Users.

Article 37 LIABILITY AND INDEMNITY

37.1 GENERAL INDEMNITY

37.1.1 The Selected Agency shall indemnify, defend, save and hold harmless the Authority and its officers, servants, agents, Government Instrumentalities and Authority owned and/or controlled entities or enterprises, (the “**Authority Indemnified Persons**”) against any and all suits, proceedings, actions, demands and claims from third parties for any loss, damage, cost and expense of whatever kind and nature, whether arising out of any breach by the Selected Agency 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 Selected Agency to the Authority or to any User or from any act and/or omission by the Selected Agency arising out of gross negligence, fraud or wilful misconduct resulting in any harm, loss, damage, bodily injury or sickness to a person or harm, loss or damage to any property, 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.

37.1.2 The Authority shall indemnify, defend, save and hold harmless the Selected Agency against any and all suits, proceedings, actions, demands and claims from third parties 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 Project 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 Selected Agency 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 Selected Agency, its subsidiaries, Affiliates, contractors, servants or agents, the same shall be the liability of the Selected Agency.

37.2 INDEMNITY BY THE SELECTED AGENCY

37.2.1 Without limiting the generality of Article 37.1 the Selected Agency 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 Selected Agency to comply with Applicable Laws and Applicable Permits;
- (b) payment of Taxes required to be made by the Selected Agency in respect of the income or other Taxes of the Contractors, suppliers and representatives; or
- (c) non-payment of amounts due as a result of materials or services furnished to the Selected Agency or any of its Contractors which are payable by the Selected Agency or any of its Contractors;
- (d) its omissions or acts of fraud, gross negligence and wilful misconduct;
- (e) any personal bodily injury or death of any person caused by, arising out of or in connection with its performance of this Agreement; or

- (f) loss of or physical damage to property of the Authority or any third party caused by, arising out of or in connection with the performance of this Agreement.

37.2.2 Without limiting the generality of the provisions of this Article 37, the Selected Agency 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 Selected Agency or by the Contractors in performing the Selected Agency's obligations or in any way incorporated in or related to the Project. If in any such suit, action, claim or proceedings, a temporary restraint order or preliminary injunction is granted, the Selected Agency 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 the Project Infrastructure, or any part thereof or comprised therein, is held to constitute an infringement and its use is permanently enjoined, the Selected Agency shall promptly make every reasonable effort to secure for the Authority a license, at no cost to the Authority, authorising continued use of the infringing work. If the Selected Agency is unable to secure such license within a reasonable time, the Selected Agency 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.

37.3 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 37 (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.

37.4 DEFENSE OF CLAIMS

37.4.1 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, 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.

37.4.2 If the Indemnifying Party has exercised its rights under Article 37.3, 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).

37.4.3 If the Indemnifying Party exercises its rights under Article 37.3, the Indemnified Party shall nevertheless have the right to employ its own counsel, and such counsel may participate in such 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;
- (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;
- (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-Articles (b) (c) or (d) of this Article 37.4 shall be applicable, the counsel for the Indemnified Party shall have the right to direct the defense 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.

37.5 NO CONSEQUENTIAL CLAIMS

Notwithstanding anything to the contrary contained in this Article 37, 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.

37.6 LIMITATION OF LIABILITY

37.6.1 Notwithstanding anything to the contrary in this Agreement, the liability of one Party towards the other Party for any damages or compensation of any nature whatsoever under

this Agreement, save and except where amounts exceeding the Total Project Cost are specifically prescribed in this Agreement as Termination Payment, shall not exceed the Total Project Cost. The limitation hereunder shall not apply to any or all liabilities in respect of third parties. The Parties agree that the Selected Agency's liability will be uncapped in case of any liabilities arising due to:

- (a) any amount payable as indemnity to the Authority due to its acts or omissions or fraud, gross negligence and wilful misconduct;
- (b) breach of any Applicable Laws or any Applicable Permits;
- (c) any claims or loss on account of Intellectual Property rights violation by the Selected Agency;
- (d) any personal bodily injury or death of any person caused by, arising out of or in connection with its performance of this Agreement; or
- (e) any loss of or physical damage to property of the Authority or any third party caused by, arising out of or in connection with the performance of this Agreement.

37.7 SURVIVAL ON TERMINATION

The provisions of this Article 37 shall survive Termination.

Article 38 RIGHTS TO THE SITE**38.1 RIGHTS TO THE PROJECT SITE**

For the purpose of this Agreement, the Selected Agency shall have rights to use the Project Site in accordance with this Agreement and to this end, it may regulate the entry and use of the Project by third parties in accordance with and subject to the provisions of this Agreement.

38.2 ACCESS RIGHTS OF THE AUTHORITY AND OTHERS

2.1.1 The Selected Agency shall allow free access to the Project Site at all times to the Authority Representatives and to the persons duly authorised by any Government Instrumentality to inspect the Project and the Project Infrastructure and to investigate any matter within their authority, and upon reasonable notice, the Selected Agency shall provide to such persons reasonable assistance necessary to carry out their respective duties and functions.

2.1.2 The Selected Agency shall, for the purpose of operation and maintenance of any utility or road specified in Article 11 allow free access to the Project Site at all times for the authorised persons and vehicles of the relevant Government Instrumentality.

38.3 PROPERTY TAXES

All property taxes with respect to the Project Site shall be payable by the Authority as owner of the Project Site; provided, however, that any such taxes payable by the Selected Agency under Applicable Laws for use of the Project Site including taxes relating to the buildings on constructed on the Project Site shall not be reimbursed or payable by the Authority. The Parties agree that stamp duties, if any, due and payable on the grant of [leave and license] comprising the Agreement shall be paid by the Selected Agency.

38.4 RESTRICTION ON SUB-LETTING

The Selected Agency shall not sub-lease, sub-license or sub-let the whole or any part of the Project 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 Selected Agency to appoint Contractors for the performance of its obligations hereunder including for development, operation and maintenance of all or any part of the Project and the Project Infrastructure.

Article 39 DISPUTE RESOLUTION

39.1 DISPUTE RESOLUTION

- (a) 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 Article 39.2.
- (b) 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.
- (c) If any dispute or differences of any kind what-so-ever arise between the Authority, its authorized representatives and the Contractor in connection with or arising out of this contract or the execution of work, these shall be resolved as under.
- (d) Whether before its commencement or during the progress of Project/Work or after the termination, abandonment or breach of the contract, the dispute shall in the first instance supported with complete documents and further documents, if any, required by him, be referred for settlement to the Engineer of the work and he shall, within a period of sixty (60) days after being requested in writing by the Contractor to do so, convey his decision to the Contractor. Such decision in respect of every matter so referred shall, subject to arbitration as hereinafter provided, be final and binding upon the Contractor. In case the work is already in process, the Contractor shall continue with the execution of the work as aforesaid with all due diligence, whether any of the parties requires arbitration as hereinafter provided or not.
- (e) If the Authority has conveyed his decision to the Contractor and no claim for arbitration has been filed by the Contractor within a period of sixty (60) days from the receipt of the letter communicating the decision, the said decision shall be final and binding upon the Contractor and will not be a subject matter of arbitration at all.
- (f) If the Authority fails to convey his decision within a period of sixty (60) days from the date on which the said request was made by the Contractor, he may refer the dispute for arbitration as hereinafter provided.
- (g) All disputes or differences in respect of which the decision is not final and conclusive shall, at the request of either party made in communication sent through registered A.D. post, be referred for arbitration as per following:
 - i. For original contract of the value up to Rs. 5.00 Crore, the disputes shall be referred to the sole arbitration of the Chief Engineer of the concerned circle

of Haryana Tourism Corporation, Engineering Branch acting as such at the time of reference unless debarred from acting as an Arbitrator by an order of the Haryana Government, in which event, the Employer shall appoint any other Superintending Engineer of the department to act as an arbitrator on receipt of a request from either party.

- ii. For original contract of the value more than Rs. 5.00 Crores and up to Rs. 15.00 Crore, the disputes shall be referred to the sole arbitration of any other Superintending Engineer of the department to be appointed by the Employer.
- iii. For original contracts of the value more than Rs. 15.00 Crores, the disputes shall be referred to the Arbitral Tribunal consisting of three (3) members. The composition of tribunal will be as under:
 - One official member, Chairman of the Tribunal, who shall be a serving Chief Engineer of PWD (B&R) other than the Chief Engineer incharge of the work. The appointment of the chairmanship of the Tribunal shall be done by the Employer;
 - One official member, not below the rank of Superintending Engineer (serving) of the Haryana PWD (B&R) to be appointed by the Employer and
 - One non-official member, who will be a technical expert, not below the rank of Superintending Engineer (serving/retired) of the Haryana PWD (B&R) selected by the Contractor from a panel of three (3) persons given to him by the Employer.
- (h) The Employer shall have the authority to change the arbitrator/any member of arbitral tribunal on an application by either the Contractor or the Authority requesting change of arbitrator giving reasons thereof, either before the start of the arbitration proceedings or during the course of such proceedings. The arbitration proceedings would stand suspended as soon as an application for change of Arbitrator/any member of Arbitral Tribunal is filed before the Employer and a notice thereof is given by the applicant to the Arbitrator. The Employer after hearing both the parties may pass a speaking order rejecting the application or accepting to change the arbitrator or simultaneously, appointing a technical officer as Arbitrator/any member of arbitral tribunal under the contract. The new Arbitrator/Arbitral Tribunal so appointed may enter upon the reference afresh or may continue the hearings from the point these were suspended before the previous Arbitrator/Arbitral Tribunal.
- (i) The reference to the Arbitrator/Arbitral Tribunal shall be made by the claimant party within one hundred twenty (120) days from the date of dispute of claim arises during the execution of work. If the claim pertains to rates or recoveries introduced in the final bill, the reference to the Arbitrator/Arbitral Tribunal shall be made within six calendar months from the date of payment of the final bill to

the Contractor or from the date a registered notice is sent to the Contractor to the effect that his final bill is ready by the Engineer (whose decision in this respect shall be final and binding) whichever is earlier.

- (j) It shall be an essential term of this contract that in order to avoid frivolous claims, the party invoking arbitration shall specify the disputes based upon facts and calculations stating the amount claimed under each claim and shall furnish a “deposit-at-call” for ten percent of the amount claimed, on a scheduled bank in the name of the Arbitrator/chairman of the Arbitral Tribunal, by his official designation who shall keep the amount in deposit till the announcement of the award. In the event of an award in favour of the claimant, the deposit shall be refunded to him in proportion to the amount awarded with respect to the amount claimed and the balance, if any, shall be forfeited and paid to the other party.
- (k) The provisions of the Arbitration and Reconciliation Act, 1996 or any other statutory law there under or modification thereof and for the time being in force shall apply to the arbitration proceedings under this clause.
- (l) The Arbitrator/Arbitral Tribunal shall give a reasoned award for each claim/counter claim.
- (m) The independent claims of the party other than one seeking arbitration as also the counter claims of any party shall be entertained by the arbitrator.
- (n) The venue of arbitration shall be such place or places in Haryana or Chandigarh as may be fixed by the arbitrator in his sole discretion. The work under the contract shall continue during the arbitration proceedings.
- (o) The stamp fee due on the award shall be payable by the party as desired by the Arbitrator/Arbitral Tribunal and in the event of such party’s default, the stamp fee shall be recoverable from another sum due to such party under this or any other contract.
- (p) Neither party shall be entitled to bring a claim for arbitration, if it is not filed as per the time period already specified or within six months of the following: -
 - i. of the date of completion of the work as certified by the Engineer or
 - ii. of the date of abandonment of the work or breach of contract under any of its clauses, or
 - iii. of its non-commencement or non-resumption of work within 10 days of written notice for commencement or resumption as applicable, or
 - iv. of the cancellation, termination or withdrawal of the work from the Contractor in whole or in part and/or revision for closure of the contract, or
 - v. of receiving an intimation from the Engineer that the final payment due or to be recovered from the Contractor had been determined, for the purpose of payment/adjustment whichever is the latest. If the matter is not referred to

arbitration within the period prescribed above, all the rights and claims of either party under the contract shall be deemed to have been forfeited and absolutely barred by the time for arbitration and even for civil litigation.

- (q) No question relating to this contract shall be brought before any civil court without first invoking and completing the arbitration proceedings, if the issue is covered by the scope of arbitration under the contract. The pending arbitration proceedings shall not disentitle the Authority to terminate the contract and to make alternate arrangement for completion of the works.
- (r) Arbitrator/Arbitral Tribunal shall be deemed to have entered into the reference on the day, notice is issued to the parties fixing the first date of hearing. The Arbitrator/Arbitral Tribunal may, from time to time, with the consent of the parties enlarge the initial time for making and publishing the award. However, the Arbitrator/Arbitral Tribunal shall make all out efforts to decide each claim within a period of 6 months from the date of initiation.
- (s) The expiry to the contractual time limit, whether originally fixed or extended, shall not invalidate the provisions of this clause.

Article 40 DISCLOSURE**40.1 DISCLOSURE OF SPECIFIED DOCUMENTS**

The Selected Agency shall make available for inspection by any person, copies of this Contract Agreement (hereinafter collectively referred to as the “**Specified Documents**”), free of charge, during normal business hours on all working days at the Selected Agency's registered office and the Project. The Selected Agency shall prominently display at the Project and Project Infrastructure, public notices stating the availability of the Specified Documents for such inspection and shall provide copies of the same to any person upon payment of copying charges on a no profit no loss basis.

40.2 DISCLOSURE OF DOCUMENTS RELATING TO SAFETY

The Selected Agency shall make available for inspection by any person copies of all Documents and data relating to safety of the Project and Project Infrastructure, free of charge, during normal business hours on all working days, at the Selected Agency's registered office. The Selected Agency shall make copies of the same available to any person upon payment of copying charges on a no profit no loss basis.

40.3 WITHHOLDING DISCLOSURE OF PROTECTED DOCUMENTS

Notwithstanding the provisions of Articles 40.1 and 40.2, the Authority shall be entitled to direct the Selected Agency, from time to time, to withhold the disclosure of Protected Documents (as defined herein below) to any person in pursuance of the aforesaid Articles.

Explanation:

The expression Protected Documents shall mean such of the Specified Documents or documents referred to in Articles 40.1 and 40.2, or portions thereof, the disclosure of which the Authority is entitled to withhold under the provisions of the Right to Information Act, 2005.

Article 41 REDRESSAL OF PUBLIC GRIEVANCES

41.1 COMPLAINTS REGISTER

- (a) The Selected Agency shall maintain a public relations office at the Project where it shall keep a register (the “**Complaint Register**”) open to public access at all times for recording of complaints by any person (the “**Complainant**”) in compliance with the minimum standards set out in Article 21.1. Information relating to the availability of and access to the Complaint Register shall be prominently displayed by the Selected Agency at the Project and its website so as to bring it to the attention of all Users.
- (b) The Complaint Register shall have appropriate columns including the complaint number, date, name and address of the Complainant, substance of the complaint and the action taken by the Selected Agency. Immediately after a complaint is registered, the Selected Agency shall give a receipt to the Complainant stating the date and complaint number.
- (c) Without prejudice to the provisions of Article 41.1 (a) and (b), the Authority may, in consultation with the Selected Agency, specify the procedure for making complaints in electronic form and for responses thereto.

41.2 REDRESSAL OF COMPLAINTS

- (a) The Selected Agency shall inspect the Complaint Register every day and take prompt and reasonable action for redressal of each complaint. The action taken shall be briefly noted in the Complaint Register and a reply stating the particulars thereof shall be sent by the Selected Agency to the Complainant under a certificate of posting.
- (b) Within [7 (seven)] days of the close of each month, the Selected Agency shall send to the Authority and to the Authority a true photocopy each of all the pages of the Complaint Register on which any entry has been recorded during the course of such month, and upon perusal thereof, the Authority may, in its discretion, advise the Selected Agency to take such further action as the Authority may deem appropriate for a fair and just redressal of any grievance. The Selected Agency shall consider such advice and inform the Authority of its decision thereon, and if the Authority is of the opinion that the Complainant is entitled to further relief, it may refer the matter to the competent forum for its disposal under the Consumer Protection Act, 1986, and advise the Complainant to pursue the complaint at his own risk and cost.

Article 42 MISCELLANEOUS**42.1 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 Chandigarh shall have exclusive jurisdiction over matters arising out of or relating to this Agreement.

42.2 WAIVER OF IMMUNITY

Each Party 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 Party 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).

42.3 DEPRECIATION AND INTEREST

- (a) For the purposes of depreciation under the Applicable Laws, the property representing the capital investment made by the Selected Agency in the Project Assets shall be deemed to be acquired and owned by the Selected Agency. For the avoidance of doubt, the Authority shall not in any manner be liable in respect of any claims for depreciation (based on written down value method) to be made by the Selected Agency under the Applicable Laws.
- (b) 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 rates.

42.4 DELAYED PAYMENTS

The Parties hereto agree that payments due from one Party to the other Party under the provisions of this Agreement shall be made within the period set forth therein, and if no such period is specified, within [30 (thirty)] 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 the existing Bank Rate and recovery thereof shall be without prejudice to the rights of the Parties under this Agreement including Termination thereof.

42.5 WAIVER

- (a) 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:
 - (i) 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;
 - (ii) shall not be effective unless it is in writing and executed by a duly authorised representative of the Party; and
 - (iii) shall not affect the validity or enforceability of this Agreement in any manner.
- (b) 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 the other Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

42.6 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 Authority of any Project Agreement, Document or Drawing submitted by the Selected Agency nor any observation or inspection of the construction, operation or maintenance of the Project nor the failure to review, approve, comment, observe or inspect hereunder shall relieve or absolve the Selected Agency 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 Selected Agency by reason of any review, comment, approval, observation or inspection referred to in Sub-Article (a) above.

42.7 EXCLUSION OF IMPLIED WARRANTIES

This Agreement expressly excludes any warranty, condition or other undertaking implied by 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.

42.8 SURVIVAL

Termination shall:

- (a) not relieve the Selected Agency 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.

All obligations surviving Termination shall only survive for a period of [3 (three) years] following the date of such Termination.

42.9 ENTIRE AGREEMENT

This Agreement and the Schedules together constitute 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 Selected Agency arising from the RFP shall be deemed to form part of this Agreement and treated as such.

42.9.1 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 shall 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 in Article 39 or otherwise.

42.9.2 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.

42.9.3 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.

42.9.4 SUCCESSORS AND ASSIGNS

This Agreement shall be binding upon and inure to the benefit of the Parties and their respective successors and permitted assigns.

42.9.5 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:

- (a) in the case of the Selected Agency, 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 Selected Agency may from time to time designate by notice to the Authority; provided that notices or other communications to be given to an address outside the city specified in Sub-Article (b) below 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 Selected Agency may from time to time designate by notice to the Authority.

{Name:

Designation:

Address:

Fax No:

Email :}

- (b) in the case of the Authority, be given by facsimile or e-mail and by letter delivered by hand at the address given below and be addressed to the person named below 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 Selected Agency; provided that if the Selected Agency does not have an office in the same city as the Authority, it may send such notice by facsimile or e-mail and by registered acknowledgement due, air mail or by courier.

{Name:

Designation:

Address:

Fax No:

Email :}; 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.

42.9.6 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.

42.9.7 CONFIDENTIALITY

- (a) Each Party shall keep the Confidential Information confidential and shall not disclose the same to any other person without the prior written consent of the other Party.
- (b) Sub-Article (a) shall not apply in the following circumstances:
 - (i) any disclosure required by Applicable Laws or in respect of information already in the public domain;
 - (ii) any disclosure required by any applicable stock exchange listing rule; and
 - (iii) Disclosure to under a Financing Agreement, to the extent required for the purposes of raising funds or maintaining compliance with credit arrangements.
- (c) Either Party shall have the right to disclose Confidential Information pursuant to this Agreement or otherwise to the extent required to its personnel and consultants, including technical and legal consultants. Such personnel and/or consultants shall agree and undertake to keep such information disclosed as confidential.
- (d) In the event a disclosure is required by Applicable Law, upon reasonable request by the non-disclosing Party, the disclosing Party shall use all reasonable efforts and co-operate with other Party's efforts to obtain confidential treatment of material so disclosed.
- (e) Each Party shall utilise the same degree of care to preserve and protect the other Party's Confidential Information from disclosure that they use to protect their own Confidential Information, which shall not be less than reasonable care.
- (f) Confidential Information disclosed shall be and remain the property of the disclosing Party. The obligations of the Parties to protect Confidential Information shall survive [3 (three) years] from Termination.

42.9.8 STAMP DUTY

Any stamp duty, registration charges or other fees, Taxes or charges of any kind whatsoever pertaining to the execution of this Agreement shall be borne by the Selected Agency.

42.9.9 COUNTERPARTS

This Agreement may be executed in two counterparts, each of which, when executed and delivered, shall constitute an original of this Agreement.

Article 43 DEFINITIONS

43.1 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**” shall mean 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;

“**Additional Auditors**” shall have the meaning set forth in Article 28.2.3;

“**Additional Contract Fee**” shall have the meaning set forth in Article 24.1;

“**Additional Termination Payment**” shall mean the amount payable upon Termination in respect of Specified Assets, if any, as limited by the provisions of Article 32.4.3;

“**Adjusted Depreciated Value**” shall mean the amount arrived at after adjusting the depreciated book value of an asset (as stated in the books of account of the Selected Agency, save and except, in the case of buildings and permanent structures where the depreciated book value shall be determined by applying an annual depreciation rate of [3% (three per cent)] based on the written down value method) to reflect the variation occurring in the WPI between the date of purchase thereof and the Transfer Date;

“**Adjusted Equity**” shall mean 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:

- (a) on or before Project COD of the Project and Project Infrastructure, 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 Effective Date and the Reference Date;
- (b) from Project COD and until the 3rd (third) anniversary thereof, an amount equal to the Adjusted Equity as on Project 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 Project COD to the extent of variation in WPI occurring between Project COD and the Reference Date; and
- (c) any time after the 3rd (third) anniversary of Project COD, the Adjusted Equity hereunder shall be a sum equal to the Base Adjusted Equity, reduced by [0.15% (zero point one five per cent)]⁴ thereof at the commencement of each month following the 3rd (third) anniversary of Project COD and the amount so arrived at shall be revised to

⁴ This number has been arrived at upon dividing 100 by the number of months comprising the Concession Period. For example, the figure for a 60 year Concession Period shall be $100/654.54 = 0.15277$ rounded off to two decimal points i.e. 0.15.

the extent of variation in WPI occurring between Project COD and the Reference Date; and the aforesaid shall apply, *mutatis mutandis*, to the Equity funded in Indian Rupees and expended for Optional Development Obligation. 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 Contract Period is extended, but the revision on account of WPI shall continue to be made;

“**Affected Party**” shall have the meaning set forth in Article 29.1;

“**Agreement**” shall mean this Agreement, its Recitals and the Schedules hereto and any amendments thereto made in accordance with the provisions contained in this Agreement;

“**Ancillary Facilities**” shall have the meaning set forth in Article 3.1.2;

“**Appendix**” shall have the meaning set forth in Article 10.3.1;

“**Applicable Laws**” shall mean all laws, brought into force and effect by GOI or the [UT Administration/State Government] including rules, regulations, notifications, directives, policies and office memorandums, made thereunder, and judgements, decrees, injunctions, writs and orders of any court of record, applicable to this Agreement and the exercise, performance and discharge of the respective rights and obligations of the Parties hereunder, as may be in force and effect on or before the Bid Date;

“**Applicable Permits**” shall mean all clearances, licenses, permits, authorizations, no objection certificates, consents, approvals and exemptions required to be obtained or maintained under Applicable Laws in connection with the development, construction, operation and maintenance of the Project and the Project Infrastructure during the subsistence of this Agreement and upon termination, the transfer of the Project and Project Infrastructure to the Authority;

“**Appointed Date**” shall mean the date on which Financial Close is achieved and the Conditions Precedent are either satisfied and/or waived in accordance with the terms of this Agreement, and shall be deemed to be the date of commencement of the Contract Period;

“**Approved Valuer**” shall mean a firm of valuers recognized as such by the Income Tax Department and having experience of valuing at least 5 (five) properties exceeding Rs. 100 cr. (Rupees one hundred Crores) each in value;

“**Arbitration Act**” shall mean the Arbitration and Conciliation Act, 1996 and shall include amendments, modifications to or any re-enactment thereof, as in force from time to time;

“**Associate**” or “**Affiliate**” shall mean, 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);

“Associated Services” shall have the meaning set forth in Article 25.1.3;

“Authority” shall have the meaning attributed thereto in the array of Parties hereinabove as set forth in the Recitals;

“Authority Default” shall have the meaning set forth in Article 32.2;

“Authority Indemnified Persons” shall have the meaning set forth in Article 37.1.1;

“Authority Representative” shall mean such person or persons as may be authorized 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 fulfill any obligations of the Authority under this Agreement;

“Average Daily Gross Revenue” shall mean the average daily Gross Revenue determined upon division of the annual Gross Revenue of the preceding Accounting Year by 365 (three hundred and sixty five), and increasing the quotient thereof by [5% (five per cent)]; provided that the Average Daily Gross Revenue for any period prior to completion of the first Accounting Year following Project COD shall be simple average of the Gross Revenue realized with respect to every day during the period between Project COD and the last day of the month preceding the date on which the event requiring calculation hereof occurred;

“Award” shall have the meaning set forth in Article 39.3;

“Bank” shall mean a bank incorporated in India and having a minimum net worth of [Rs 1,000 Crores (Rupees one thousand Crores)] or any other bank acceptable to the senior Lenders, but does not include a bank in which the Senior Lender has an interest;

“Bank Rate” shall mean the rate of annual 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” shall mean the documents in their entirety comprised in the bid submitted by the Selected Bidder in response to the Request for Proposal in accordance with the provisions thereof;

“Bid Date” shall mean the last date on which the Bid may have been submitted in accordance with the provisions of the Request for Proposal;

“Bid Security” shall mean the security provided by the Selected Bidder to the Authority along with the Bid in accordance with the Request for Proposals, and which is to remain in force until substituted by the Performance Security;

“Change in Law” shall mean the occurrence of any of the following after the date of Bid:

- (a) the enactment of any new Indian law as applicable to the Project;
- (b) the repeal, modification or re-enactment of any existing Applicable Law;
- (c) the commencement of any Indian law which has not entered into effect until the Bid Date;
- (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” shall mean 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 {existing promoters/selected bidder/Consortium Members}, together with {its/their} Associates in the total equity to decline below (i) [51% (fifty one per cent)] at any time prior during the Construction Period and until the expiry of the 2nd (second) anniversary of the Project COD; (ii) the shareholding of each of the technical member and the financial member of the Consortium declines below [26% (twenty six per cent)] until the expiry of the 2nd (second) anniversary of the Project COD; and (iii) [26% (twenty six per cent)] thereof, or such lower proportion as may be permitted by the Authority during the remaining Contract Period; provided that any material variation (as compared to the representations made by the Selected Agency 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 {existing promoters/Selected Bidder/ any Consortium Member} to the total equity, if it occurs prior to the 2nd (second) anniversary of Project COD, shall constitute Change in Ownership;

“Change of Scope” shall have the meaning set forth in Article 16.1;

“Change of Scope Notice” shall have the meaning set forth in Article 16.2;

“Change of Scope Order” shall have the meaning set forth in Article 16.2;

“Companies Act” shall mean, as applicable, the Companies Act, 1956 and the Companies Act, 2013 as amended from time to time;

“Completion Certificate” shall have the meaning set forth in Article 14.2;

“Complainant” shall have the meaning set forth in Article 41.1;

“Complaint Register” shall have the meaning set forth in Article 41.1;

“Contract” shall have the meaning set forth in Article 3.1;

“Selected Agency” shall have the meaning attributed thereto in the array of Parties hereinabove as set forth in the Recitals;

“**Selected Agency Default**” shall have the meaning set forth in Article 32.1.1;

“**Contract Fee**” shall have the meaning set forth in Article 24.1;

“**Contract Period**” shall have the meaning set forth in Article 3.2;

“**Conditions Precedent**” shall have the meaning set forth in Article 4.1;

“**Consortium**” shall have the meaning as set forth in Recital (C);

{“**Consortium Member** or **Member**” shall mean a company specified in Recital (C) as a member of the Consortium;}

“**Construction Period**” shall mean the period beginning from the Appointed Date and ending on Project COD and subject to the provisions of this Agreement, which shall be a period of [3 (three) years] from the Appointed Date, provided the Construction Period of the Optional Development Obligation shall be mutually agreed by the Parties;

“**Contractor**” shall mean the person or persons, as the case may be, with whom the Selected Agency has entered into any of the EPC Contracts, the O&M Contracts, or any other material agreement for the construction, operation and/or maintenance of the Project or the Project Infrastructure or matters incidental thereto, but does not include a person who has entered into an agreement for providing financial assistance to the Selected Agency;

“**Covenant**” shall have the meaning set forth in Article 5.2.5;

“**Cure Period**” shall mean 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 Selected Agency requires any reasonable action by the Selected Agency that must be approved by the Authority or the Authority hereunder, the applicable Cure Period shall be extended by the period taken by the Authority or the Authority after the receipt of the relevant information to accord their approval;

“**Damages**” shall have the meaning set forth in Article 1.2.1 (w);

“**DBFOT**” shall have the meaning set forth in Recital (B);

“**Debt Due**” shall mean the aggregate of the following sums expressed in Indian Rupees outstanding on the Transfer Date:

- (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 [2 (two)] years prior to the Transfer Date;

- (b) all accrued interest, financing fees and charges payable under the Financing Agreements on, or in respect of, the debt referred to in sub- Article (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 pre- payment 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;

provided that if all or any part of the Debt Due is convertible into Equity at the option of Senior Lenders and/or the Selected Agency, 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;

Provided further that the Debt Due, on or after the Project COD, shall in no case exceed [50% (fifty per cent)] of the Total Project Cost;

“**Deemed Completion Certificate**” shall have the meaning set forth in Article 14.3;

“**Deemed Performance Security**” shall have the meaning as set forth in Article 9.4;

“**Debt Service**” shall mean 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 for and in respect of Debt Due under the Financing Agreements;

“**Development Works**” shall mean all construction works and things necessary to complete the Minimum Development Obligation and Optional Development Obligation, if applicable in accordance with this Agreement;

“**Dispute**” shall have the meaning set forth in Article 39.1;

“**Disputed Amounts**” shall have the meaning set forth in Article 24.6.1;

“**Dispute Resolution Procedure**” shall mean the procedure for resolution of Disputes set forth in Article 39;

“**Transfer Requirements**” shall mean the obligations of the Selected Agency for and in respect of Termination as set forth in Article 33;

“**Document**” or “**Documentation**” shall mean documentation in printed or written form, or in tapes, discs, drawings, computer programs, writings, reports, photographs, films, cassettes, or expressed in any other written, electronic, audio or visual form;

“**Drawings**” shall mean all of the drawings, calculations and documents pertaining to the

Project as set forth in Schedule D, and shall include as built drawings of the Project and Project Infrastructure;

“**EHS**” shall have the meaning set forth in Article 5.12;

“**EPC Contract**” shall mean the engineering, procurement and construction contract or contracts entered into by the Selected Agency with one or more EPC Contractors for, *inter alia*, engineering and construction of the Project in accordance with the provisions of this Agreement;

“**EPC Contractor**” shall mean the person with whom the Selected Agency has entered into an EPC Contract;

“**Emergency**” shall mean a condition or situation that is likely to endanger the security of the individuals on or about the Project and Project Infrastructure, including Users thereof, or which poses an immediate threat of material damage to any Project Assets;

“**Encumbrances**” shall mean, in relation to the Project and Project Infrastructure, 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 and Project Infrastructure, where applicable herein but excluding utilities referred to in Article 11.1;

“**Equity**” shall mean the sum expressed in Indian Rupees representing the paid up equity share capital of the Selected Agency for meeting the equity component of the Total Project Cost, and for the purposes of this Agreement shall include convertible instruments or other similar forms of capital, which shall compulsorily convert into equity share capital of the Company, and any interest-free loans advanced by any shareholder of the Company for meeting such equity component;

“**Execution Date**” shall mean the date on which this Agreement is executed by the Parties;

“**Financial Close**” shall mean the fulfillment of all conditions precedent to the initial availability of funds under the Financing Agreements;

“**Financial Default**” shall have the meaning set forth in Schedule O;

“**Financial Model**” shall mean 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 parameters used for making calculations and projections therein;

“**Financial Package**” shall mean the financing package indicating the total capital cost of the 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, if any;

“Financial Year” shall mean a year commencing on 1st April of a calendar year and ending on 31st March of the immediately succeeding calendar year;

“Financing Agreements” shall mean the agreements executed by the Selected Agency 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 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 made in accordance with Article 5.2.3;

“Force Majeure” or **“Force Majeure Event”** shall have the meaning ascribed to it in Article 29.1;

“Force Majeure Costs” shall have the meaning ascribed to it in Article 29.7;

“GOI” shall mean the Authority;

“Good Industry Practice” shall mean 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 Selected Agency in accordance with this Agreement, Applicable Laws and Applicable Permits and includes prudent Project and Project Infrastructure practices generally accepted by the hotel and hospitality industry for ensuring reliable, safe, economical and efficient construction, operation and maintenance of the Project and Project Infrastructure;

“Government Instrumentality” shall mean any department, division or sub-division of the Authority or the UT Administration and includes any commission, board, authority, agency or municipal and other local authority or statutory body including Panchayat under the control of the Authority or the [UT Administration/State Government], as the case may be, and having jurisdiction over the Project and the Project Infrastructure or the performance of all or any of the services or obligations of the Selected Agency under or pursuant to this Agreement;

“Gross Revenue” of the Project for and in respect of any Accounting Year shall mean the total amount of gross Revenues and receipts of every kind (from both cash and credit transactions computed prior to payment of any commission or service charge or fee thereon) derived by the Selected Agency from the operation of the Project and its facilities and provision of Associated Services, Hospitality Services and/or any other activity related to the Project, if any, as certified by the statutory auditors of the Selected Agency, and shall include Revenues and receipts from and on account of room occupancy charges, telephone including telefax and telex charges, laundry, food, beverages, liquor, recreational amenities (including outdoor pool, health club, spa, sauna, fitness facility etc.), outdoor catering, vending machines, parking, use of commercial or other spaces for rent or fee of every description and kind, and any other services or facility provided by

the Selected Agency, but shall exclude the following:

- (a) All statutory applicable indirect Taxes such as GST, expenditure tax, and the like by whatever name called now or in future, which the Selected Agency is bound to pay;
- (b) Any revenue earned by the Selected Agency on sale of assets of a capital nature which are owned by the Selected Agency; and
- (c) Interest income from investment made;

For the avoidance of doubt, Gross Revenue shall also include any amount received by the Affiliate to whom the Selected Agency has contracted any Associated Services, Hospitality Services and/or any other activity related to the Project, and any amount received by the Selected Agency from a third party to whom it has contracted any Associated Services, Hospitality Services and/or any other activity related to the Project;

“Hospitality Services” shall mean the services performed under this Agreement such as reception of Users, provision of food and beverages, room services and any other services performed by the Selected Agency towards creating Revenue from the Project;

“Indemnified Party” shall mean the Party entitled to the benefit of an indemnity pursuant to Article 37;

“Indemnifying Party” shall mean the Party obligated to indemnify the other Party pursuant to Article 37;

“Authority” shall have the meaning set forth in Article 22;

“Indirect Political Event” shall have the meaning set forth in Article 29.3;

“Insolvency Event” in respect of a Party shall mean:

- (a) such Party has (A) applied for or consented to the appointment of, or the taking of possession by, a receiver, custodian, trustee, administrator, liquidator or the like of itself or of all or a substantial part of its assets or business; (B) been unable to pay its debts as such debts become due; (C) enters into a compromise arrangement with its creditors ; (D) an attachment or restraint has been levied on the assets of such entity Party which materially affects such Party’s ability to perform its obligations under this Agreement; (E) commenced proceedings under the (Indian) Insolvency and Bankruptcy Code, 2016 (the **“Code”**); (F) filed a petition seeking to take advantage of any other law relating to bankruptcy, insolvency, reorganization, winding up, or composition or readjustment of debts; or (G) taken any corporate or other action for the purpose of effecting any of the foregoing; or
- (b) a proceeding or case has been commenced without the application or consent of such Party in any court of competent jurisdiction seeking: (A) its liquidation, reorganization, dissolution or winding-up or the composition or readjustment of debts; (B) the appointment of an insolvency resolution professional, a trustee, receiver, custodian, administrator, liquidator or the like of such Party under the

Code and an order admitting the insolvency petition has been passed in such proceeding and such order has not been stayed or dismissed within a period of [90 (ninety)] days; or (C) directions with the same or similar effect happen under the provisions of the Companies Act or the Code in relation to the winding up of the company;

“Inspection Report” shall have the meaning set forth in Article 13.2;

“Insurance Cover” shall mean the aggregate of the maximum sums insured under the insurances taken out by the Selected Agency pursuant to Article 27, and includes all insurances required to be taken out by the Selected Agency under Article 27.1 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” shall mean all patents, trademarks, service marks, logos, get-up, trade names, internet domain names, rights in designs, blue prints, programs and manuals, drawings, copyright (including rights in computer software), database rights, 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;

“Keys” shall mean a room with maximum occupancy of two persons;

“L&FS” shall have the meaning set forth in Article 5.12;

“L&FS Standards” shall mean the standards prescribed under the National L&FS Standards and at least one internationally accepted L&FS standards such as US Life Safety Code (NFPA), as amended from time to time;

“Lead Member” shall have the meaning as set forth in Recital (C);

“LOA or Letter of Award” shall mean the letter of award referred to in Recital (D);

“Maintenance Requirements” shall have the meaning set forth in Article 17.2;

“Minimum Development Obligations” shall have the meaning set forth in Article 12.3.1 And shall mean the investment of 100% (one hundred per cent) of the Total Project Cost and a development of 110 (one hundred and ten) Keys;

“Material Adverse Effect” shall mean 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;

“Medical Aid Post” shall have the meaning set forth in Article 5.7;

“Mortgage Assets” shall have the meaning as set forth in Article 35.5.1;

“Mortgage Deed” shall have the meaning as set forth in Article 35.5.1;

“**MoU**” shall have the meaning as set forth in Article 29.12.6;

“**Nominated Company**” shall mean a company selected by the Lenders' Representative and proposed to the Authority for substituting the Selected Agency in accordance with the provisions of the Substitution Agreement;

“**Non-Political Event**” shall have the meaning set forth in Article 29.2;

“**NPV**” shall have the meaning set forth in Article 36.3;

“**O&M**” shall mean the operation and maintenance of the Project and the Project Infrastructure and includes all matters connected with or incidental to such operation and maintenance, provision of services and facilities, and collection of Revenue in accordance with the provisions of this Agreement;

“**O&M Contract**” shall mean the operation and maintenance contract that may be entered into between the Selected Agency and an O&M Contractor for performance of the O&M obligations in accordance with this Agreement;

“**O&M Contractor**” shall mean a contractor with whom the Selected Agency has entered into an O&M Contract, if any;

“**O&M Expenses**” shall mean expenses incurred by or on behalf of the Selected Agency 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, 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 Article 19.2;

“**Operation Period**” shall mean the period commencing from Project COD of the Minimum Development Obligations and ending on the Transfer Date;

“**Optional Development Obligation**” shall have the meaning set forth in Article 12.6.1;

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

“**Performance Guarantee**” shall have the meaning set forth in Article 34.2.2;

“**Performance Security**” shall have the meaning set forth in Article 9.1;

“**Performance Security Period**” shall have the meaning set forth in Article 9.3;

“**Political Event**” shall have the meaning set forth in Article 29.4;

“**Project**” shall mean the construction, development operation and maintenance of the Project and Project Infrastructure and undertaking Minimum Development Obligations and Optional Development Obligation on a DBFOT basis 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;

“**Escrow Account Agreement**” shall have the meaning set forth in Article 26.1.2;

“**Escrow Bank**” shall have the meaning set forth in Article 26.1.1;

“**Project Agreements**” shall mean this Agreement, the Financing Agreements, EPC Contract, O&M Contract, and any other material agreements or contracts that may be entered into by the Selected Agency with any person in connection with matters relating to, arising out of or incidental to the Project, but does not include the Substitution Agreement, or any agreement for procurement of goods and services involving a consideration of up to [Rs. 1,00,00,000 (Rupees one Crores)] for each such agreement;

“**Project Assets**” shall mean all physical and other assets relating to and forming part of the Project, Project Infrastructure and the Project Site including:

- (a) rights over the Project Site in the form of Right of Way;
- (b) tangible assets such as civil works including foundations, drainage works, pavements, electrical systems, communication systems, fare collection systems, rest areas and administrative offices;
- (c) Ancillary Facilities situated on the Project Site;
- (d) Buildings and immovable fixtures or structures forming part of the Project and Project Infrastructure;
- (e) all rights of the Selected Agency under the Project Agreements;
- (f) financial assets, such as receivables, security deposits etc.;
- (g) insurance proceeds; and
- (h) Applicable Permits and authorisations relating to or in respect of the Project and Project Infrastructure;

“**Project COD**” shall have the meaning set forth in Article 15.1 and shall include commercial operations date of Minimum Development Obligations or of any Optional Development Obligation, as the case may be;

“**Project Completion Schedule**” shall mean the progressive Project Milestones set forth in Schedule G for completion of the Project and Project Infrastructure on or before the Scheduled Completion Date;

“**Project Infrastructure**” shall mean collectively the captive facilities to be developed at the Project Site for the exclusive use of the Project the trunk infrastructure including water treatment plant, sewage treatment plant; the RO plant; the power facility as a renewable energy power project of at least 25000 kWh capacity; and the infrastructure to carry out the Associated Services;

“**Project Milestones**” shall mean the project milestones set forth in Schedule G;

“**Project Site**” shall have the meaning set forth in Article 10.1;

“**Protected Documents**” shall have the meaning set forth in Article 40.3;

“**Provisional Certificate**” shall have the meaning set forth in Article 14.1;

“**Punch List**” shall have the meaning set forth in Article 14.1;

“**Reference Exchange Rate**” shall mean, in respect of any one currency that is to be converted into another currency in accordance with the provisions of this Agreement, the exchange rate as of 12.00 (twelve) noon on the relevant date quoted in Delhi by the State Bank of India, and in the absence of such rate, the average of similar rates quoted in Delhi by the Bank of India and the Bank of Baroda;

“**Request for Proposals**” or “**RFP**” shall have the meaning set forth in Recital (C);

“**Project**” shall mean the Project which is at least 5 star rated by Ministry of Tourism, Authority, with 110 Keys and an investment of 100%⁵ of the Total Project Cost required to be built at the Project Site and includes the Ancillary Facilities;

“**Project Website**” shall have the meaning set forth in Article 5.15;

“**Revenue**” shall mean all amounts charged and recovered by the Selected Agency from the Users on mutually agreed terms and shall include user charges for use of the Project and Hospitality Services by the Users and shall also include but not be limited to all charges, rent, license fees, tariff, fee, compensation, benefits, deposits (whether long term or short term and whether refundable or not), capital receipts, insurance claims, or any other similar payment by whatever name called, received by or paid to the Selected Agency or receivable by the Selected Agency or payable to the Selected Agency or due and realizable by the Selected Agency, for or with respect to use of the Project and any of the Hospitality Services;

“**Right of Way**” shall mean the constructive possession of the Project 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 and the Project Infrastructure in accordance with this Agreement;

“**Rs.**” or “**Rupees**” or “**Indian Rupees**” shall mean the lawful currency of the Republic of India;

“**Safety Requirements**” shall have the meaning set forth in Article 18.1;

“**Schedule**” shall mean a schedule under this Agreement;

“**Scheduled Completion Date**” shall mean the scheduled date(s) for achieving Project COD as set forth in Schedule G;

⁵ The percentage to be inserted depending on the size of the project and the allocation of the Total Project Cost to the Project Infrastructure.

“Scope of the Project” shall have the meaning set forth in **Error! Reference source not found..1:**

“Selected Bidder” shall mean the Bidder selected by the Authority to award the Project following the completion of the Bidding Process (as defined under the RFP);

“Senior Lenders” shall mean 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 Selected Agency under any of the Financing Agreements for meeting all or any part of the Total Project Cost and who hold *pari passu* charge on the assets, rights, title and interests of the Selected Agency;

“Specialties” shall have the meaning set forth in Article 21.2;

“Specifications and Standards” shall mean the specifications and standards relating to the quality, quantity, capacity and other requirements for the Project and Project Infrastructure, as set forth in Schedule C, and any modifications thereof, or additions thereto, as included in the design and engineering for the Project and Project Infrastructure submitted by the Selected Agency to, and expressly approved by, the Authority;

“Specified Assets” shall mean and include such of the Project Assets which are constructed, acquired or installed after the 5th (anniversary) of Project COD, but no later than the 30th (thirtieth) anniversary of the Appointed Date, but shall in no case include land;

“Specified Documents” shall have the meaning set forth in Article 40.1;

“Statutory Auditors” shall mean a reputable firm of chartered accountants acting as the statutory auditors of the Selected Agency under the provisions of the Companies Act, 2013 including any statutory modification or re-enactment thereof, for the time being in force, and appointed in accordance with Article 28.2;

“Subordinated Debt” shall mean 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:

- (a) the principal amount of debt provided by lenders or the Selected Agency's shareholders for meeting the Total Project Cost and subordinated to the financial assistance provided by the Senior Lenders; and
- (b) all accrued interest on the debt referred to in sub-Article (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 denominated in Indian Rupees and lesser of the actual interest rate and [6 (six) month] LIBOR (London Inter-Bank Offer Rate) plus [2% (two per cent)] in case of loans denominated in foreign currency, but does not include any interest that had fallen due 1 (one) year prior to the Transfer Date;

provided that if all or any part of the Subordinated Debt is convertible into Equity at the option of the lenders and/or the Selected Agency's shareholders, 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;

“Substitution Agreement” shall have the meaning set forth in 35.3;

“Suspension” shall have the meaning set forth in Article 31.1;

“Taxes” shall mean 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 and Project Infrastructure 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” shall mean the expiry or termination of this Agreement and the Contract hereunder;

“Termination Notice” shall mean the communication issued in accordance with this Agreement by one Party to the other Party terminating this Agreement;

“Termination Payment” shall mean the amount payable by the Authority to the Selected Agency, under and in accordance with this Agreement, upon Termination;

“Tests” shall mean the tests set forth in Schedule H to determine the completion of Project in accordance with the provisions of this Agreement;

“Total Project Cost” shall mean the capital cost incurred on construction and financing of the Project and shall be limited to the lowest of:

- (a) the capital cost of the Project as set forth in the Financial Package;

- (b) the assessment of the Selected Agency's investment as made by the Approved Valuer to be appointed by the Authority; or
- (c) a sum of Rs. _____ Crores (Rupees _____) provided that in the event WPI increases, on an average, by more than [3% (three per cent)] per annum for the period between the Bid Date and Project COD, the amount mentioned in (a) and (b) above shall be increased such that the effect of increase in WPI, in excess of such [3% (three per cent)], is reflected in the Total Project Cost;

provided further 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 also that the Total Project Cost shall not exceed the actual capital cost of the Project upon completion of the Project;

“Transfer Date” shall mean the date on which this Agreement and the Contract hereunder expires pursuant to the provisions of this Agreement or is terminated by a Termination Notice;

“Unforeseen Events” shall have the meaning as set forth in Article 29.12.1;

“Users” shall mean the third parties who use the Project or any part thereof, in accordance with the provisions of this Agreement and Applicable Laws;

“Vesting Certificate” shall have the meaning set forth in Article 33.4; and

“WPI” shall mean the Wholesale Price Index for all commodities as published by the Ministry of Industry, GOI and shall include any index which substitutes the WPI, and any reference to WPI shall, unless the context otherwise requires, be construed as a reference to the latest monthly WPI published no later than [30 (thirty)] days prior to the date of consideration hereunder.

SIGNATORIES

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN.

THE COMMON SEAL OF **SELECTED AGENCY** has been affixed pursuant to the resolution passed by the Board of Directors of the Selected Agency at its meeting held on the

_____ day of _____ 20____

I, _____, hereunto affixed the common seal in the presence of

[_____, director, who has signed these presents in token thereof; and

_____, Company Secretary / Authorized Officer who has countersigned the same in token thereof:]

SIGNED, SEALED AND DELIVERED For and on behalf of **THE SELECTED AGENCY**
by:

(Signature)

(Name)

(Designation)

(Address)

(Fax No.)

(e-mail address)

In the presence of:

1. _____, Director

2. _____, Company Secretary

SIGNED, SEALED AND DELIVERED For and on behalf of **THE AUTHORITY** by:

(Signature)

(Name)

(Designation)

(Address)

For and on behalf of _____ by:

(Signature)

(Name)

(Designation)

(Address)

(Fax No.)

(E-mail address)

For and on behalf of _____ by:

(Signature)

(Name)

(Designation)

(Address)

(Fax No.)

(E-mail address)

SCHEDULES

SCHEDULE A: SITE OF THE PROJECT

(See Article 2.1(a))

1. The Project Site

Project Site of the Project shall include the land, as described in Annex-1 of this Schedule A.

An inventory of the Project Site including the land, buildings, structures, road works, trees and any other immovable property on, or attached to, the Project Site shall be prepared jointly by the Authority Representative and the Selected Agency, and such inventory shall form part of the memorandum referred to in Article 10.3.1 of the Agreement.

Additional land required for ancillary buildings, extension/ addition of Project or for construction of works specified in Change of Scope Order issued under Article 16.2.3 of this Agreement shall be acquired in accordance with the provisions of this Agreement. Upon acquisition, such land shall form part of the Project Site and vest in the Authority.

Annex-I (Schedule-A)

Project Site for the Project

State/UT:	Haryana
Total Land Area:	14.42Acres
Tikkar Taal -8.82 Acres	1. Renovation of Existing Buildings Complete renovation, retrofitting and upgradation of the following structures, including civil, architectural, structural repairs, waterproofing, roofing, flooring, electrical, plumbing, fire safety and allied works: • Residential Rooms – 1045 sqm • Renovation of 4 No. Rooms (105, 106, 107 & 108) – 224 sqm • Basement Rooms – 109 sqm • Restaurant Block – 620 sqm 2. New Construction – Design and construction of new support and utility buildings including foundations, superstructure, finishes and services: • Toilet Block – 60 sqm • Ticketing Block – 20 sqm • Food Kiosk – 20 sqm • Security Kiosk – 15 sqm • Gazebos – 2 Nos., total 56 sqm • Dormitory – 35 sqm • DG Shed – 40 sqm • LT Panel Shed – 42 sqm • Diesel Shed – 10 sqm • Firewood Shed – 10 sqm 4. Electrical & Utility Services

	• Supply, installation, testing & commissioning of DG Set (250 KW) • Internal & external electrification • LT panels, cabling, earthing and lightning protection • Water supply, sanitary, drainage and storm water systems • Fire detection and fire-fighting systems 5. Landscaping & External Development • New proposed Parking – 5500sqm with solar Pannels. • Boundary wall • Retaining wall and toe wall • Pathways in cobblestone and paver blocks • Entry & internal gates • Street furniture, signage and external lighting • Soft landscaping and plantation • Glass walk with renovation of viewing deck- 269sqm
Adventure Park – 5.6Acre	Proposed Built-up & Activity Facilities Design and construction of the following buildings and adventure facilities: 1. Reception Block – 125 sqm 2. Ticketing Kiosk – 8 sqm 3. Toilet Block – 100 sqm 4. Haunted House – 70 sqm 5. Maze – 250 sqm 6. Viewing Tower – 120 sqm 7. Tents – 10 Nos., 48 sqm each

	8. Open Air Theatre (OAT) – 330 sqm 9. Artificial Wall Climbing Facility – 60 sqm 10. Rope Courses – 600 sqm 3. Adventure Infrastructure & Safety • Design, supply and installation of adventure equipment • Structural design and load calculations • Safety harness systems, anchoring, nets and platforms • Certification of all adventure activities from approved agencies • Compliance with national/international adventure safety standards 4. Electrical & Services • Power distribution to all adventure facilities • Lighting for pathways and activity zones • Public address system (where required) • CCTV, access control and safety signage • Plumbing and sanitary installations • Fire safety provisions 5. External Development & Landscaping • Internal pathways and circulation • Viewing decks, resting areas and shaded zones • Landscape elements compatible with adventure activities • Signages, wayfinding and thematic

	elements
Estimated Project Cost	Rs. 2151.82 Lakhs Inclusive of all taxes

Project Site

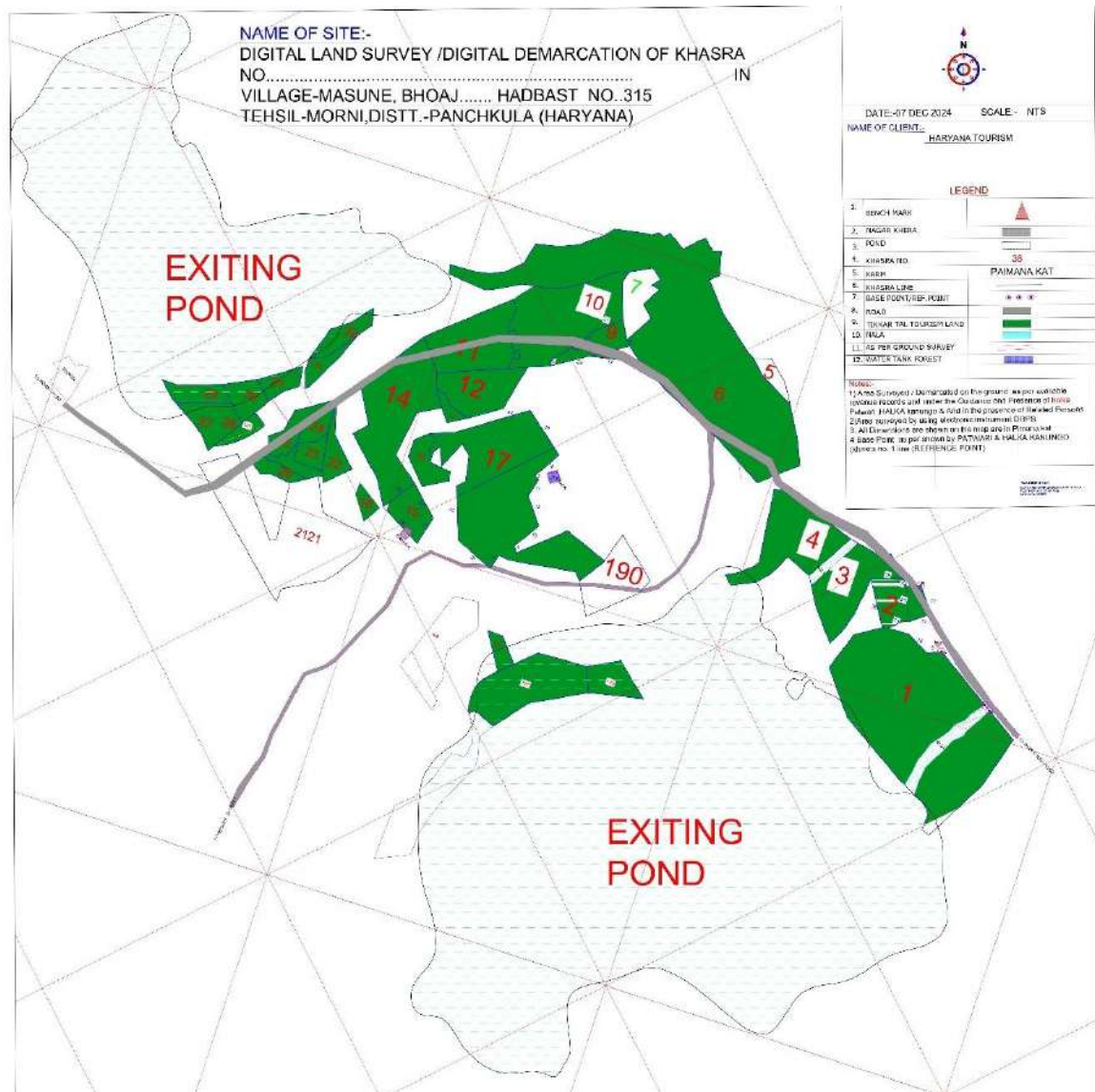


Figure 1: Land Details of Tikkar Taal & Adventure Park

TIKKAR TAL

032202100001784

नक़ल जमाबंदी (पड़त पटवार)

साल : 2019-2020

1	2	3	4	5	6	7	8	9	10	11	12
खेद या जमाबंदी नं.	खतानी नं.	नाम सरफ या पत्नी	विवरण सहित मातिका नाम	विवरण सहित कातकार	मुंर या शिफाई के अन्य साधन का नाम	नम्बर पखरा या मुन्ने और किले का नम्बर	रकबा और किसम जमीन	दर और संख्या के स्वीर के साथ लगान जो मुजारा देता है	हिस्सा या हकीकत का पैमाना और बाउ का दंग	मात और सावई के स्वीर सहित मांग	अभिपुस्तित
9	62	बात मसयुन	महकमा पर्यटन विभाग हरियाणा सरकार	मकदुला महकमा पर्यटन विभाग			14-9 कुत		कच्चा पड़ता बघरह टैगट नं.1		
							5-9 औबड दोम				
							5-0 गै. मु.				
							सातव				
							1-7 औबड दोम				
							3-4 कुत				
							1-7 गै. मु.				
							सातव				
							1-17 औबड दोम				
							3-16 कुत				
							0-12 औबड दोम				
							3-4 गै. मु.				
							सातव				
							0-12 औबड दोम				
							22-17 औबड अखत				
							0-3 औबड दोम				
							1-5 औबड दोम				
							4-17 औबड दोम				
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							6-9 औबड दोम				

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नक़ल जमाबंदी (पड़त पटवार)

साल : 2019-2020

1	2	3	4	5	6	7	8	9	10	11	12
खेद या जमाबंदी नं.	खतानी नं.	नाम सरफ या पत्नी	विवरण सहित मातिका नाम	विवरण सहित कातकार	मुंर या शिफाई के अन्य साधन का नाम	नम्बर पखरा या मुन्ने और किले का नम्बर	रकबा और किसम जमीन	दर और संख्या के स्वीर के साथ लगान जो मुजारा देता है	हिस्सा या हकीकत का पैमाना और बाउ का दंग	मात और सावई के स्वीर सहित मांग	अभिपुस्तित
							15	1-2 औबड दोम			
							16	0-17 औबड दोम			
							17	6-14 कुत			
								5-4 औबड दोम			
								1-10 गै. मु.			
								आवदी			
							18	0-5 औबड दोम			
							22	0-9 औबड दोम			
							23				
							23	0-15 औबड दोम			
							24	0-12 औबड दोम			
							25	0-14 औबड दोम			
							26	0-7 औबड दोम			
							27	0-9 औबड दोम			
							28	1-2 औबड दोम			
							29	0-13 औबड दोम			
							30	0-19 औबड अखत			
							31	0-15 औबड अखत			
							32	0-16 कुत			
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								आवदी			
								0-2 औबड दोम			
							124	0-5 औबड दोम			
							126	3-9 औबड अखत			
							176	0-11 औबड दोम			
							197	0-8 औबड दोम			
							201/125	0-11 औबड अखत			

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मकूल जमाबंदी (पट्टा पटवार)

मोटा : श्रीज पीट

हदबस्त नं. : 315

जिला : पंचकुला

तहसील : मोहनी

साल : 2019-2020

खेजट या जमाबंदी नं.	खतीनी नं.	नाम सरफ या बाली	विबरण सहित मासिक नाम	विबरण सहित काशतकार	मुंज या सिंगल के अन्य साधन का नाम	सम्बर धरता या मुम्मे और फिले का सम्बर	रकबा और फिले जमीन	दर और संपदा के हसी के साथ समान जो मुजरा देता है	हिसा का हकीकात का पैमाना और बाछ का दंग	नाम और खोई के खोई सहित सारा	अभिपुक्ति
							202/125	0-12 औरत अथवा			
							फिले 34	87-11			
							कुल मजरा	कुल गैर मजरा			
							75-16	11-15			
							46-13 औरत दंग	11-15 गै.मु.			
							29-3 औरत अथवा				

Issue: 063202100001784 : Dated: 16-07-2021 00:00:00 Issued to: रकर सरकर

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Date: 16/07/2021 06:57 PM



SCHEDULE B: DEVELOPMENT OF THE PROJECT

(See Article 2.1(b))

Development of the Project shall include development of the Project and the Project Infrastructure.

Development of the Project shall include construction of the Project as described in this Schedule B. Development of the Project shall conform with the provisions of Annex-I (Description of the Project) and Annex -II (Description of Ancillary Facilities) of this Schedule B.

Project shall be completed by the Selected Agency in conformity with the Specifications and Standards set forth in Schedule C.

Project Outcome

The aim of the project is to establish Tikkar Taal Adventure Park as a premier adventure tourism hub in Morni Hills, Panchkula, enhancing its natural and cultural appeal while promoting sustainable adventure tourism. The project seeks to balance ecological preservation with innovative tourism offerings, making it a destination for both thrill seekers and nature enthusiasts. The expected outcomes include:

1. **Enhanced visitor experience & reduced waiting time:**
The proposed changes in tourist circulation, increased number of touch points will not only improve overall visitor experience but also reduce their waiting times. The newer products will offer an alternative to the tourists to spend the saved time on revenue generating experiences. Provision of ample amenities like seating areas and shades, ensuring visitor comfort and facilities like food stalls, water and toilets.
2. **Information and Engagement:**
The introduction of multilingual information signages at the entrance will create a well-organized and informative starting point for visitors. A well-designed website providing all relevant information and services such as details on the available activities, online reservation to adventure zones, group bookings, parking, travel guides and contacts, informative maps, etc.
3. **Security and Access Control:**
Surveillance system aims to provide a safe & secured environment to the visitors This technology also offers cost & time savings and remote monitoring capabilities.
4. **Entertainment and Activities:**
Various activities throughout the journey, including the children's activity zones, selfie points, adventure zones, immersive gallery and the adventure activities will keep the visitors engaged and entertained.
5. **Universal Accessibility:**
Accessibility is improved with provisions for old-aged and especially abled visitors. Connectivity enhancement for better tourist convenience.
6. **Economic Benefits:**
Creation of job opportunities during the construction / installation process and in the on-going maintenance and management of the Adventure Park , benefitting the local community.

Table 0-1: Projected Tourism Potential and Job Creation at Tikkar Taal Adventure Park Under the Proposal

Tourism Attributes	Expected Potential																													
Expected Increase in Tourist footfall (in Lacs)	1.	The current tourist footfall at the Tikkar Taal is moderate at approximately 1.15 lakh in 2024.																												
	2.	The footfall is projected at 1.25 Lakhs in 2025, basis and average growth rate of 8%.																												
	3.	Post development, an average annual growth rate in footfall is projected at 60%, then taper to 20% and 10%, and stabilize at 8.87% after Year 5.																												
	4.	The expected annual footfall over the next few years is computed as below:																												
	<table><tr><th>Category</th><th>Year 1</th><th>Year 2</th><th>Year 3</th><th>Year 4</th><th>Year 5</th></tr><tr><td>Footfall</td><td>198317</td><td>237981</td><td>261779</td><td>287957</td><td>316753</td></tr><tr><td>Year</td><td>2026</td><td>2027</td><td>2028</td><td>2029</td><td>2030</td></tr><tr><td>Assumed Growth Rate</td><td>60%</td><td>20%</td><td>10%</td><td>10%</td><td>10%</td></tr></table>						Category	Year 1	Year 2	Year 3	Year 4	Year 5	Footfall	198317	237981	261779	287957	316753	Year	2026	2027	2028	2029	2030	Assumed Growth Rate	60%	20%	10%	10%	10%
	Category	Year 1	Year 2	Year 3	Year 4	Year 5																								
	Footfall	198317	237981	261779	287957	316753																								
	Year	2026	2027	2028	2029	2030																								
	Assumed Growth Rate	60%	20%	10%	10%	10%																								
	The project proposal envisages:																													
5.	To open new employment opportunities for the people from Morni and nearby who will be employed after necessary skill development training.																													
Projected Direct Job Creation during Operation Phase	The projected direct job creation during the operations phase is as below:																													
		Year 1 -5																												
	Total Direct Jobs	Approx. 60-80 people will be employed at the site for efficient operations & maintenance in year 1.																												
		With the addition of more experiences in future, more jobs can be created.																												
1.	The projected manpower will be engaged in different activities/services at the Tikkar Taal Adventure Park. Some of these activities/services include, supervisors/staff, cleanliness & hygiene, parking, security & surveillances, marketing & branding, Adventure Activities attendees etc.																													
2.	Consider a 10% growth rate in labour demand yaer on year as per the tourism sector trend.																													

Annex-I (Schedule-B)

Description of Project**1. Project Details:**

Name of the Project	Appointment of Agency (AGENCY) for development of Tourism Experience Development of Adventure Tourism Hub at Adventure Park
Location	Panchkula, Haryana
Total Land Area	14.42 Acres
Estimated Project Cost	Rs.2151.82 Lakhs Inclusive of all taxes
Contract period	Commencing from Appointed Date Maximum 12 Months for Experience Development

Phase I: Design & Development Period**Minimum Development Obligation**

The Project Facilities are to be developed by the Bidder and funded as per Norms and Guidelines provided by the Ministry of Tourism, Government of India (GoI) & Haryana State Government Building bye-laws and regulations. The bidder would be given the option to plan and design the facilities conforming to the applicable building bye-laws and regulations/norms/standards for respective project components including arranging approval from the competent authority. Minimum area of various components to be developed by the Agency, which will be funded by the Authority as enlisted below:

Activity	Area (Sqm)	Scope
Tikkar Taal Development Area – 8.82Sqm		
Parking		Development of designated parking areas finished with paver blocks, including excavation, sub-base preparation, edge restraints, drainage, signage and line marking.
Boundary Wall		Rubble boundary wall till 1.2 m height with chain link fencing on top total height 1.8 m height around demarcated Tikkar Taal campus including MS posts, struts, gates and anti-corrosion treatment.
Pathways		Internal pathways in cobble stone / paver blocks, including base preparation, edging, slopes for drainage and pedestrian safety features.
Landscaping & Site Development		Comprehensive site development including soil stabilization, retaining walls, toe walls wherever required, soft landscaping, plantation, lawns and ecological restoration in line with eco-tourism guidelines.

Street Furniture & Signage		Provision of benches, dustbins, wayfinding signage, interpretative signage and lighting fixtures compatible with the heritage and eco-tourism character.
Renovation of Existing Buildings		
Residential Rooms	1045	Renovation including replacing of Damaged Roofing, Water proofing, internal external paint, Flooring of Corridor and relaying of roofing on the external corridor.
Renovation of Rooms (105, 106, 107, 108)	224	Complete interior and service upgradation including furniture provisions, lighting, finishes and washroom refurbishment.
Basement Rooms	109	Renovation with waterproofing treatment, civil repairs, interior finishes, lighting, ventilation and service upgrades.
Restaurant Block	620	Renovation of restaurant, kitchen and service areas including civil repairs, flooring, wall treatments, ceiling, upgraded electrical, plumbing, drainage, fire safety and kitchen service coordination.
New Proposed Buildings & Structures		
Reception Block	125	Comprehensive construction of reception block including RCC structure, architectural finishes, electrical, plumbing, signage and commissioning.
Ticketing Kiosk	20	Construction of ticketing kiosk with counters, electrical fittings, lighting, data points and signage.
Toilet Block	60	Construction of toilet block in RCC framed structure complete with sanitary fittings, plumbing, electrical and ventilation.
Food Kiosk	20	Construction of food kiosk in line with eco-tourism guidelines including service counters, utilities and finishes.
Security Kiosk	15	Construction of security kiosk with electrical fittings and visibility provisions.
Gazebos (2 Nos.)	56	Construction of gazebos with seating, roofing, finishes and integration with landscaping.
Dormitory	35	Construction of dormitory with sleeping areas, lighting, ventilation and basic services.
DG Shed	40	Construction of DG shed with acoustic treatment, ventilation and safety provisions.
LT Panel Shed	42	Construction of LT panel shed including foundations, weather protection and safety clearances.
Diesel Shed	10	Construction of diesel storage shed with safety, fire protection and spill control measures.
Firewood Shed	10	Construction of firewood storage shed with covered structure and proper ventilation.
Utilities & Services		
Electrical Services		Internal and external electrification, lighting, power distribution, earthing, lightning protection and integration with DG backup Solar Pannels in parking area.
Water Supply & Plumbing		Complete water supply system, internal plumbing, sanitary installations, drainage and storm water management.
Fire Safety Systems		Fire detection, alarm and firefighting systems as per NBC and fire department norms.

External Services		Sewerage, drainage, rainwater management and utility coordination as per CPHEEO manual.
Adventure Park - 5.2 Acres		
Parking	1100	A proposed parking of 600 Sqm near the Staff Quarters finished with paver blocks Renovation & expansion of existing parking facility of 500sqm finished with paver blocks
Chain Link Fencing		Chain link fencing of 1.8m height to be done around the campus
Pathways	5000	Cobble stone Pathways inside the Adventure Park.
Open Air Theater	457	A comprehensive Open Air theatre for seating of 250 people with stage and backdrop facility including a landing pad for Zip line facility.
		Comprehensive development of project site with soil stabilization and retention via toe walls and retaining wall where ever necessary in line with eco-tourism guidelines. Adequate Signages, benches and Signanges to be provided on site
Renovation of Building		
Reception Block	60	The renovation includes dismantling of old interior finishes and, fixtures followed by civil repairs, flooring, and wall treatments. Scope covers new interior design implementation with upgraded lighting, ceiling work, and décor elements. Electrical systems will be upgraded to support modern equipment and enhanced customer experience. With touch screens for Nature Interpretation Facility Final, finishing includes signage, and commissioning, ensuring compliance with hospitality and safety standards.
Haunted House	150	The renovation includes dismantling of old interior finishes and, fixtures followed by civil repairs, flooring, and wall treatments. Scope covers new interior design implementation with upgraded lighting, ceiling work, and décor elements. Electrical systems will be upgraded to support modern equipment and enhanced customer experience with proposed technology for thematic haunted experience. A Proposed enclosed shed of 93sqm to extend the Haunted house should be built in compliance to eco-tourism guidelines, complete in all respects and comprehensive Haunted theme experience.
Maze	210	The renovation includes dismantling of old interior finishes and, fixtures followed by civil repairs, flooring, and wall treatments. Scope covers upgraded lighting. Final finishing includes signage, and commissioning, ensuring compliance with hospitality and safety standards.
Machaan	10	The renovation includes dismantling of old interior finishes and, fixtures followed by civil repairs, flooring, and wall treatments. The existing Cat ladder should be redone and the rood and railing should be replaced.. Scope covers new interior design implementation with upgraded lighting, ceiling work, and décor elements. Electrical systems will be upgraded to support modern equipment and enhanced

		customer experience. Final finishing includes signage, and commissioning, ensuring compliance with hospitality and safety standards.
Renovation of Toilet	20	The renovation includes dismantling of old interior finishes and, fixtures, followed by civil repairs, flooring, and wall treatments and replacement of all the sanitary and plumbing fixtures and piping.. Scope covers new interior design implementation with upgraded lighting, ceiling work, and décor elements. Electrical systems will be upgraded to support modern equipment and enhanced customer experience. Final finishing includes signage, and commissioning, ensuring compliance with hospitality and safety standards.
New Proposed Building		
100' Tall Viewing tower	180	Comprehensive design and construction of 100' high Viewing Tower in Structural steel with 3 landing platforms equally spaced as per the conceptual drawing attached. With a Panoramic Lift for 360 view of the area. A Proposed Zip line from intermittent landing level. The top most deck should be covered with roof. The tower should be complete in all aspects including all the axillary services.
Swiss tents – 10no.	500	Comprehensive development and hoisting of Swiss tents with attached washrooms with plug in facilities
Toilet		Comprehensive development of Portable plug in Toilets separate for male and female with Bathing, WC and WB facility.
Food Kiosk	24	Comprehensive development of a food kiosk in line with Eco Tourism Guidelines complete in all aspects
Toilet Block		Toilet Block to be built in R.C.C. frame structure as per conceptual drawing given in Schedule D. Complete as per detailed specification given in Schedule C
Utilities		
Services		All the auxiliary services should be provided as per CPHEEO manual and NBC

Utilities- Water Supply, Solid Waste and Effluent Management, Power Supply

1.1 Water Supply

Concept of the System

It is proposed to provide the following infrastructure Plumbing / Sanitary services for the Project:

- Municipal water supply collection and distribution system.
- Sewage and Sludge collection system based on IS: 1742 and disposal up to Sewage Treatment Plant (STP) comprising of preliminary, biological and tertiary treatment for recycling the effluent. The water thus generated shall be used for make-up landscaping.
- Landscape Water Supply system.

- Storm / rain water drainage system from various levels of the building and disposal to available municipal storm water disposal and Rain Water Harvesting.

1.2 Source of Water

Daily demand of water supply for the both the project locations shall be met through municipal water supply system which is meeting the prescribed limits of chemical standards as per the guidelines of Indian Standards / WHO, before supplying to the user outlets.

1.3 Water Quality

Water quality of municipal water is meeting with the all the standard of water quality for domestic uses. Thus, no any water treatment is required for domestic use.

1.4 Water Requirement

The water requirement for the domestic use in the building is proposed to be based on the provision of IS-1172/SP: 35 (S & T) 1987 and prevalent practice in the industry. It is estimated that the daily requirement of water for the Complex, as per National Building code of 2016.

Table 0-1: Water demand and sewerage generation estimates for Tikkar Taal by user category

Water Demand Calculation Tikkar Taal								
S No	Land use/Buildings	Total Population	LPCD (Population)	Potable demand (Liters)	Total Demand (KLD)	Add 10% for losses and unaccounted water	Gross Total (KLD)	Sewerage Generation (90%) (KLD)
1	Visitors	4500	15	67500.0	67.5	6.8	74.25	66.83
2	Staff	20	45	900.0	0.9	0.1	0.99	0.89
3	Motel Rooms	30	135	4050.0	4.1	0.4	4.46	4.01
4	Motel Staffs	10	45	450.0	0.5	0.0	0.50	0.45
5	Restaurant	1000	70	70000.0	70.0	7.0	77.00	69.30
	Total	5560		142900.0	142.9	14.3	157.19	141.47

Daily Water requirement for Adventure Park is 5000 litres for existing and proposed toilets.

1.5 Water Storage Sizing

Incoming water supply from municipal source in Tikkar Tall shall be brought to the Central underground water storage tanks at one central location. It is proposed to store Half Day water requirement as underground tank near new proposed toilet block and parking area. In Adventure Park, municipal water is directly supplied to the overhead tank near new proposed toilet block.

The incoming main from municipality water supply line shall be led into Fire Reserve tanks from where it will be allowed to overflow in domestic water tanks; thereafter the water shall be distributed to respective area through submersible water pump to overhead tanks of respective uses area like restaurant area, existing toilet blocks and newly proposed toilet block near parking area.

In Adventure Park, water shall be supplied through gravity to the proposed and existing toilet block and other uses if any. In addition, domestic water and flushing (recycled) water storage tanks equivalent to 1/3 of one day water requirement will also be provided in overhead tank will receive supply from the main underground water tank in Tikkar Taal. The flushing tank shall receive water from Sewage Treatment Plant and also a provision to receive water from main underground storage. The water shall then be fed to the various areas by gravity.

Table 0-2: Specifications and Capacities of Various Underground and Overhead Water Tanks

DETAIL OF TANKS							
S. No.	Type of Tank	Pro. Cap. (KLD)	Length (m)	Width (m)	Depth (m)	Free Board (m)	Depth with Free board (m)
A.	Under Ground Tank						
1	Domestic Water Tank (Potable Water)	75	6	4	3.15	0.35	3.5
B.	Over Head Tanks						
1	New toilet Block						
	Domestic water tank	5	2	1.5	2	0.3	2.3
	Flushing water Tank	5	2	1.5	2	0.3	2.3
2	Existing Toilet Block -1						
	Domestic water tank	5	2	1.5	2	0.3	2.3
3	Existing toilet block-2 and restaurant area						
	Domestic water tank	10	4	2	2	0.3	2.3

1.6 Rain Water Disposal

In general, the rain water from terraces and other open areas shall be collected through rain water down-take pipes and let off at surface. This water shall be allowed to flow through slope to pipe network in external area for final disposal in lake.

1.7 Soil/Waste Disposal

CONCEPT OF THE SYSTEM

The system shall be designed keeping in view the following:

- Natural grading of the site.
- Layout of different facilities in the building
- Levels of road and other services in the Vicinity.
- Sub-soil water table.
- Soil conditions

Approach to Planning

The system shall be designed as a separated system for sewage and sullage up to the first manhole, based on conventional water carriage method. The combined sewage and sullage shall be conveyed by gravity through a network of pipes and manholes starting from the first manhole. These manholes

shall be located adjacent driveways and pathways. Booster sewage pumping stations may be provided in order to restrict the last manhole depth to 3 m.

The drainage system shall be a 2-pipe system as per National Building Code, in which the soil & waste pipes shall be distinct and separate with independent vents. The disposal from water closets shall be connected to the soil stack and local man holes directly, and the waste pipes through a trapped Gully. All traps of water closets and the urinals shall be completely vented in the system. Local manholes shall be finally connected to sewage sump from where the sewage shall be pumped to sewage mains and to effluent treatment plant.

Vent system shall be designed to facilitate escape of gases and odour from all parts of sanitary & waste system to the atmosphere at a point above the building and to allow admittance of air to all part of the system, so that siphonage, aspiration or back pressure conditions do not cause loss of seal at traps.

The soil & waste piping in each toilet shall terminate in a header which will be subsequently connected to the vertical stack located inside the associated pipe shaft. The location of stacks shall be coordinated with other services and in consultation with the Architect. Provision for cleaning eyes shall be made at strategic locations to facilitate system maintenance. Grease interceptors shall be provided for effluent waste and kitchen waste, located near STP. The design of grease interceptors shall be in accordance with ASPE standard and shall include cleanout at entry as well as exit. The grease trap cover shall be non-slip type in order to prevent accidental opening. Provision of independent vent shall be made to avoid odour / smell nuisance in the surrounding areas.

Design Criteria

The system shall be designed as per design criteria stipulated in the “Manual for Sewerage & Treatment” published by the Central Public Health and Environment Engineering Organization, Ministry of Urban Development, Govt. of India, IS-SP/35(S&T)-1987 and National and International practices on the subject. These criteria are as follows:

Table 0-3: Design Parameters and Flow Characteristics for Sewage Pipeline System

a.	Flow of sewage	:	95% of water supply (peak flow)
b.	Peak flow	:	3 times average flow
c.	Min. diameter of pipe	:	150/200 mm diameter
d.	Min. velocity in pipe	:	0.6 m / second
e.	Max. velocity in pipe	:	3 m / second
f.	Flow conditions in pipes:		
	Pipes up to 400 mm diameter	:	0.75 full running
	Pipes above 400 mm diameter	:	0.67 full running

g. Min. depth of pipe below ground level:

For branches : 0.6 m

For other : 1.0 m

h. Formula for calculation and design of sewer lines : Manning's Formula

1.8 Disposal of the Treated Effluent from STP

The effluent after treatment in STP shall be stored in the treated effluent storage tank and used as flushing water in new proposed toilet block and horticulture green areas of the project.

1.9 Sewage Treatment Plant (STP)

It is proposed to install Sewage Treatment Plant of 35 KLD capacity to recover the effluent (recycled water) of quality suitable for use in landscaping and flushing. The process proposed to be adopted is high efficiency aerobic treatment scheme. Sewage Treatment Plant used for recycling of this sewage shall be compact, odour free and consume low power. Waste water after treatment shall be suitable for air landscape system.

Table 0-4: Specifications of Proposed Collection and Treated Water Tanks

S. No.	Proposed Collection Tank	Pro. Cap. (m3)	Length (m)	Width (m)	Depth (m)	Cap. (m3)	Depth with free board
1	Equalization tank with 12 hr. retention period of total Cap. 150 KLD	75	6	4	3.15	0.35	3.5
2	Treated Water Tank	75	6	4	3.15	0.35	3.5

1.9.1 BRIEF SCOPE OF WORK & SPECIFICATIONS FOR ALL E & M WORKS

This report is prepared to outline the basis for Electrical & Extra Low Voltage services which encompasses architectural planning, engineering standards and applicable national codes for

Lake Area at Tikar Tal

Adventure Park at Tikar Tal

The proposed Electrical & Extra Low Voltage services design will be appropriate for the above considering requirement aesthetic look, comfort, cleanliness & operating cost.

The design proposed shall meet the client, architecture & other service requirement without compromising engineering standards.

The design proposed in the report has been prepared based on the information furnished by the client & architect and available stand data.

While the basic system design is not likely to change, the rating and specifications of main equipment may change after firming up of detailed engineering.

The design basis covers technical requirements, calculations methods, functional requirements and any other minimum requirement.

The following outlines the concise scope of work encompassing Electrical & Extra Low Voltage services related tasks for both locations, unless otherwise specified.

2 Pole Structure with 1 No transformer along with HT cable along with end termination.

Diamantling and Handing over to competent authority of existing transformer and DG set at Lake area

1 Nos. 415 V LT Prime Rated Diesel Generating Set and all its associated works

MAIN LT & DG AMF Panels and other LT Panels with Switchgears.

Internal Electrifications at all the newly constructed toilet blocks/ticketing houses/other buildings etc and rewiring (at Lake area of existing buildings/Rooms etc as desired by engineer -in-charge) complete with fans, LED fittings etc complete as required.

DND & MMR Indicator 1M + 1M Bell Push complete for Rooms with smart hotel door lock with RIFD cards and associated software complete as required.- Lake Area

LDB's, PDB's complete with MCCB & MCB.

Earthing system.

HT and LT power cables with required numbers of glands, lugs, termination kits, jointing kits, etc as required for interconnection between various electrical equipment's along with cable markers.

Complete cable carrier system - cable trays, supports, brackets, clamps etc as well as GI conduits, floor and wall raceways, Hume pipes and all other installation materials as required for laying of power and control cables. HDPE/Hume pipes encased in concrete to be provided for crossing of cables below roads (If necessary).

External & Landscape Lighting

Wi-Fi Networking system for Lake Area.

Window and Split Air conditioners (BEE 5 Star rated) Location to be decided /finalised by Engineer –in-Charge. - Lake Area

Air Cooled Heat Pump (For Hot Water), Air Curtain , Fly Catcher, Air Curtains etc - Lake Area

Ventilation system for Toilets and water cooler & RO

Fire Alarm & Detection system as instructed by Engineer-in-Charge (Lake Area Locations) and Fire -Extinguishers Portable and Trolley type (4.5 kg CO2 High Pressure Portable Fire

Extinguisher and ABC Type Fire Extinguisher Cap. 4 kg / 22.5 kg CO2 High Pressure Trolley mounted Fire Extinguisher, 45 ltr. Mechanical Foam type Fire Extinguisher.

CCTV & PA System

Solar photo voltaic power generation system – Lake Area over parking sheds

EV Charging – Lake Area

Lift (For 30 mtrs Observation Tower)-Adventure Park

Electrical system related miscellaneous items namely rubber mats, danger boards, first aid charts, first aid boxes, insulated hand gloves, shock treatment chart, etc.

Adventure Activities)-Adventure Park

Haunted House)-Adventure Park

The tenderer should in his own interest visit the site and familiarize himself with the site conditions before tendering.

All the required approvals from statutory bodies and related all the required coordination charges, professional charges, etc. shall be in the scope.

Execution of electrical works shall be based on the final shop drawings prepared by contractor and approved by consultant. Its contractor responsibility to check the interferences with other services before issuing the final shop drawing for review of Consultant.

Civil work for wall opening, minor core cutting in floors, minor chipping works for lighting inside building, cable burial including excavation, back filling, and compression etc as detailed in technical specification. Foundation frames, bolts, bolts of special design, embedment's, anchor fasteners and inserts.

All equipment shall be suitable for smooth, efficient and trouble-free operation for power supply variations as mentioned herein below. The equipment shall be designed to give efficient and reliable performance even during various extreme atmosphere.

All services necessary for the erection, testing and commissioning and all instruments/services required for carrying out performance testing of all items of the work covered under this specification shall be arranged by the bidder.

The work shall be carried out as per directives and norms of following documents.

Indian Electricity Rules 2005 & Indian Electricity Act, 2003 amended up to date

Technical Specifications and list of preferred makes attached.

CPWD General Specifications for Electrical Works Part – I (Internal) , Part II (External) -1994 amended up to date, CPWD General Specifications for Electrical Works Part – III (Lifts and Escalators) – 2003, CPWD General Specifications for Electrical Works Part – IV (Substations) – 2013, Local Fire Regulations, CPWD General Specifications for Electrical Works Part – V (Wet riser & sprinkler system) – 2020, CPWD General Specifications for Airconditioning / HVAC works – 2017, National Electrical Code 2011 amended up to date and Relevant sections of National Building Code 2016 and CPWD Special publications available on CPWD website.

(Note: The higher specifications / stringent conditions of CPWD Specifications or NBC – 2016 shall be followed).

Relevant BIS standards as modified up to date.

Sound Engineering Practice as approved by the Engineer-in-charge.

Any additional item of work, if taken up subsequently, shall also confirm to the relevant specifications mentioned above.

All the equipment's shall be delivered with (i) Manufacturer's Test Certificate, (ii) Manufacturer's Technical Catalogues and Installation / Instruction (O&M) Manuals.

Scaffoldings & any other T&P required for execution, testing and commissioning of work shall be arranged by the contractor and is included in the cost of work tendered by the contractor.

Inspection before Dispatch: All routine tests shall be conducted before dispatch of equipment's. No equipment shall be dispatched out from the manufacturer's premises before such tests are conducted and test result recorded. These test certificates shall be given along with the supply of equipment's. The Engineer-in-charge shall, if he so desires, inspect and witness the pre-delivery tests. For this purpose, the agency shall give 15-day advance notice.

Agency shall arrange for inspection of the department. Department shall bear expenses of its officials for inspection as far as traveling, boarding and / lodging is concerned. However, the inspection shall be done at the discretion of the department without any cost implication, but ROUTINE TEST & TYPE TEST Certificates shall have to be submitted for equipment's. Prior to dispatch, all equipment's shall be adequately protected & insured for the whole period of transit, storage and erection against corrosion and incidental damages etc. from the effect of vermin, sunlight, rain, heat and humid climate.

Procedure for approval of materials, Shop floor drawings and Commencement of Work:

Within the time specified in table of milestone, the contractor shall submit following documents for approval:

List of makes & Model numbers of all items of equipment's and accessories each sub-Head of work.

Catalogues of the equipment's to be supplied.

Shop floor drawings of each packages/ Sub work separately for approval.

It is the responsibility of the tenderer to get the makes, models and shop floor drawings approved by the department before placing of order.

Insurance: The agency shall include storage cum erection insurance including third party insurance right from the storage to commissioning and handing over of various equipment's. In insurance, the beneficiary shall be Engineer-in-charge at the cost of the agency. All insurance which the agency is required to enter in to under the contract shall be affected by any authorized general insurance company and the agency shall produce the policies of insurance. In case of any delay in ITC & handing over, the insurance cover will be suitably extended by the contractor at his own cost.

Remedy of failure to insure: If the agency fails to effect and keep in force the insurance referred to in the preceding sub-clause, the department may affect and keep in force any such insurance and pay such premium as may be necessary for that purpose and from time to time deduct the amount, so paid by the department, from any money due or which may become due to bids or recover the same as debit from the agency's bill.

Quality of material and workmanship: All parts of the equipment shall be of such design, size and material so as to function satisfactorily under all rated conditions of operation. All components of the equipment's shall have adequate factor of safety. The work of fabrication and assembly shall conform to sound engineering practice and on the basis of "Fail Safe Design". The mechanical parts subject to wear and tear shall be easily replaceable type. The construction of the equipment's shall be such as to facilitate easy operation, inspection, maintenance and repairs. All connections and contacts shall be design edto minimize risk of accidental short circuits caused by animals, birds and vermin etc. All identical items and their component parts should be completely, interchangeable including spare parts.

Inspection and testing at site:

The installation shall be subject to necessary inspection during every stage of erection, by the Engineer In-charge or his authorized representative. The successful bidder shall provide all facilities and assistance for the purpose.

The completed installation shall be inspected and tested by the Engineer-in-charge in the manner as will be laid down by him, in consultation the agency.

All instruments and facilities necessary for the tests shall be provided by the agency.

Completeness of work:

The installations shall be completed in all respects and put into operation even where certain details have not been mentioned / left out in these specifications. Any discrepancy may be brought out in pre-bid meeting.

All E&M services shall be declared as completed after completion of completion of whole work.

The information and data mentioned in the tender document have been furnished in good faith and for general information and guidance only. The Engineer-in-Charge in no case shall be held responsible for the accuracy thereof and / or interpretations or conclusions drawn there from by the Contractor and all consequences shall be borne by the Contractor and no claim, what so ever, shall be entertained from the Contractor, if the data or information furnished in tender document is different from data / drawing after Preparation of architectural drawings, design and approved for construction.

It is presumed that the Contractor has satisfied himself for all possible contingencies, situations, bottlenecks and acts of coordination, which may be required between different agencies.

Incidental Charges: All incidental charges of any kind including cartage, storage, wastage and safe custody of material etc. shall be borne by the Contractor.

Quality Assurance: The Contractor shall make available, on request from the Department, for record, copies of challans, cash memos, receipts and other certificates, if any, vouchers towards the quantity and quality of various materials procured and the same shall be kept in record. These shall also provide information on the name of the manufacturer, manufacturer's product identification, manufacturer's instructions, warning, date of manufacturing and test certificates from manufacturers for the product for each consignment delivered at site, shelf life, if any, for the department to ensure that the material have been procured from the approved source and of the approved quality, as directed by the Engineer-

in-Charge. Day to day account of receipt of such material shall be maintained at site of work and shall be regulated by the department. Nothing extra shall be payable on this account.

Storage Of Materials: Storage and safe custody of all materials shall be the sole responsibility of the Contractor. Nothing extra shall be payable on this account. Storage space shall be the responsibility of Agency.

QUALITY CONTROL AND TESTING OF MATERIALS:

All the material to be used on works shall bear ISI certification mark unless otherwise the make is specified in the item or special conditions appended this tender document. In case ISI mark material or the materials mentioned in the tender documents are not available, as per opinion of Engineer-in-charge, which shall be final and binding, the material to be used shall conform to CPWD specifications applicable in this tender or IS Code. In such cases, Engineer-in-charge shall satisfy himself about the quality of such material and give his approval in writing. Only articles classified as first quality by the manufacturers shall be used unless otherwise specified. All material not having ISI mark shall be tested as per relevant ISI specification. The Engineer in charge may relax the condition regarding testing if the quantity of the materials required for the work is small. In all cases of use of ISI marked materials, proper proof of procurement of materials from authentic manufacturers shall be provided by the contractor to the entire satisfaction of Engineer-in-charge. All materials equivalent to the one specified should be got approved by the Engineer-in-charge before using the said materials in the work.

The material shall be offered for inspection for the quality assurance as per Quality assurance Policy 2016 of CPWD (available on website www.cpwd.gov.in/ documents).

If the department desires to send any samples of materials for testing in a accredited laboratory, the Contractor at his own expense shall supply all materials, labour for preparing and testing samples as required by the Engineer-in-Charge. If desired, the testing shall be carried out in the presence of the representative of the Engineer- in- Charge. The transportation and testing charges shall also be borne by the contractor.

No foreign exchange shall be made available by the department for importing (purchase) of equipment's, plants, machinery, materials of any kind. No delay and no claim of any kind shall be entertained from the Contractor on account of variation in the foreign exchange rate and/or any Custom duties / charges or any other levies.

NO WAIVING OF LEGAL RIGHTS AND POWERS: The Engineer-in-Charge shall not be precluded or stopped from taking any measurements, and framing of estimates or detaining any certificates made either before or after the completion and acceptance of the work and payment, from showing the true amount and character of the works performed and materials furnished by the Contractor and from showing that any such measurements, estimates or certificates untrue or incorrectly made and that Engineer-in-charge shall not be precluded or stopped from recovering from the Contractor such damages as it may be sustained by reasons of his failure to comply the terms and conditions of the contract.

The tenderers shall take into account the element of wastage(s) those are likely to be there in all elements of the work and quote his price, taking that into account. The tenderers shall study all the items from the point of view of wastage(s), which are likely to take place.

Power supply required for construction; testing & commissioning shall have to be arranged by the bidder at his own costs. Water required for testing of equipment's is also in the scope of agency.

The description of E&M services & specifications are given in general, but they are not exhaustive i.e., does not mention all the incidental works required to be carried out for complete execution of the item of work. The work shall be carried out, all in accordance with true intent and meaning of the specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawing and/or described in the specifications, provided that the same can be reasonably inferred there from. There may be several incidental works, which are not mentioned in the contract document/specifications but will be necessary to complete the item in all respect. All these incidental works/ costs which are not mentioned but are necessary to complete the work shall be deemed to have been included in the overall amount quoted by the contractor for various components of work. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation/change in actual working drawings. Also, no adjustment of rates shall be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such items in all respects) on account of the directions of Engineer-in-charge. Nothing extra shall be payable on this account.

The scope of works also covers the preparation of layout plans, drawings for E&M schemes and approval of the same from Engineer-in charge and the respective local bodies/ Fire Officer/Lift Inspector/ CFO/ CEA etc. Before the commencement of work. During execution, if the local bodies etc. require a modification; the same shall be executed without any extra cost. Finally, after execution, approvals /NOCs /clearances from local bodies etc. shall be the responsibility of successful bidder for which nothing extra is payable. In case any modification / extra work is required by the local bodies necessary for approvals / NOCs / clearances, the same shall be get executed and nothing extra shall be paid on this account. All statutory fees/charges required for obtaining clearances from Fire Officer/Lift Inspector/CEA / Local Bodies shall be paid by the agency.

Preferred make list of every item is mentioned in the subhead of each work. Contractor has to supply material from the make list mentioned in the NIT. Any other material not mentioned in make list shall be got approved from engineer in Charge.

Defect Liability Period:

All the equipment's shall have defect liability period of 12 months to be reckoned after the date of recording of completion certificates by the department or mention in detailed specifications elsewhere.

The equipment's or components or any part thereof, so found defective during the warrantee period shall be forthwith repaired or replaced free of cost, to the satisfaction of Engineer in charge.

In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor.

Supervision Of Work:

The Contractor shall depute Site Engineers & Skilled workers as required for the work as per the documents required in technical bids. He shall submit organization chart along with details of Engineers and supervisory staff. The Contractor shall also furnish list of persons for specialized works to be executed for various items of work. The Contractor shall identify and deploy key persons having qualifications and experience in the similar and other major works, as per the field of their expertise. If during the course of execution of work, the Engineer-in-Charge is of the opinion that the deployed staff is not sufficient or not well experienced; the Contractor shall deploy more staff or better-experienced staff at site to complete the work quality and in stipulated time limit.

INTERNAL ELECTRICAL INSTALLATION

GENERAL SCOPE OF WORK:

The specifications given below pertain to the internal electrical installation work i/c providing fans and LED fittings, light and power plugs etc to be carried out in the Toilet blocks, Ticketing counter, Haunted House or any other area at Adventure park and Lake Area and rewiring at locations in Park Area as decided by Engineer-in Charge.

The scope of works also covers the design, preparation of layout plans, drawings of schemes and obtaining approval of the same from Engineer-in charge.

All internal electrical works shall be carried out with PVC conduit. All switches, sockets, AC Starter, telephone socket, Data sockets, stepped type (2 modules) fan regulators, bell push and accessories along with matching mounting boxes shall be of modular type.

All mounting boxes for plate type accessories shall be of metallic construction and of the same make as that of the plate type switches and accessories.

The wires used for the point wiring and power wiring shall be of 650/1100 Volts grade FRLS PVC insulated multi stranded copper conductor single core cables.

All lighting fixtures to be used in for specific areas of the various buildings of project should comply to the specifications mentioned for that area. LM 79 & LM 80 test report from NABL accredited lab should be submitted by the agency for each type of luminaire. Colour temperature may be 3000 to 6000K as per site requirement.

Lighting Design should be carried out as per National Lighting Code 2010/ NBC 2016 / ECBC guidelines. Wherever range of illumination for space is mentioned, higher side of Lux level must be taken for design purpose.

Arrangement of luminaries in various areas of buildings shall be done on the basis of National Lighting code 2010 and NBC 2016.

Only BLDC type ceiling fans of size 1400/ 1200 mm shall be used. Optimum size and number of ceiling fans for rooms of different sizes shall be as per provision laid down in NBC 2016.

Tentative Light plug / power requirement to be provided in areas shall be got approved from Engineer- in charge.

Wiring with Cat 6A for LAN points, WiFi points and CCTV points shall be terminated in suitable size of G.I. Junction box and RJ-45 socket. All the other end of wiring shall be terminated in Patch panel including rack of each floor and in the server/services room. The wiring shall be suitably tagged/marked mentioning the location of each point.

Wiring for CCTV in MS conduit shall be provided as per the design and is to be terminated in G.I. Junction box.

The Tentative details along with Indicative Image of fittings and fans are mentioned below. Final Make, Model and Numbers must be got approved by the Engineer-in-charge before execution and fixtures shall as per tender make.

Sr No	specifications of different type of fittings	Indicative Image
	Supplying, installation, Testing & Commissioning of LED Recessed/ surface Down lighter (Round/ square/ Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS :10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -15 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80 , UGR (Unified Glare Rating) < 19, Flicker free (flicker should be below 5%), life time (LED,Driver & electrical circuitary), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends ,CCT 3000°K / 4000°K / 5700°K / 6000°K / 6500°K (As per ANSI Bin),SDCM (Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be confirming to relevant BIS standards and trade mark certificate (T.C.).Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. System lumen efficacy ≥105 and <120 lm/Watt output. LM79 & LM80 Test report from NABL lab for all testing required for LED fixtures as per BIS should be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement.(Thermal management: heat sink of aluminum housing such that LED junction temperature shall not rise above 90°C)- Powder coated die cast /Extruded aluminum Body including trim.-15 W	

Supplying, installation, Testing & Commissioning of LED surface mounted Batten light of following body material and construction as per IS : 10322 with driver (Replaceable) as per the requirement with Driver efficiency >85% ,Operating voltage AC 140-270 Volt, freq 50/60 hz, Operating temp range -15 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80,Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6000°K/6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. System lumen efficacy ≥105 <120 lm/Watt output. LM79 & LM80 Test report from NABL lab for all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminum housing such that LED junction temperature shall not rise above 90°C).- Powder coated die cast / Extruded aluminium Body (Thickness ≥ 1.20 mm)- 40 Watt- IP 40 Rated	
Supplying, Installation, Testing & Commissioning of mirror light integrated IP20 Batten Led fixture 600 mm 10 W with Surface Mounted with aluminium housing and Polycarbonate diffuser, minimum system efficacy of 100lm/W with P.F.>0.95 with THD<20% ,CCT 6500 K,CRI 80,Surge Protection 2 Kv, IP20.The LED with Useful life of 50000 Hrs at L70. The Input voltage range shall be 150V to 270V including making suitable arrangement for fixing. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. i	
Supplying, Installation, Testing & Commissioning of 30 Watt Suspended type decorative type luminaire circular ring type, luminaire shall be complete with LED Light Engine not LED Bulb Solution. Having Extruded Aluminium housing with HET diffuser with minimum system lumen efficacy of 100 lumen per watt. P.F.>0.95 with THD<10%, CCT 5700 K/4000K, CRI 80.The LED with Useful life of 50000 Hrs at L70. The Input voltage range shall be 140V to 300V. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. Complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement.	

	Supplying, Installation, Testing & Commissioning of 20 Watt Suspended type decorative type luminaire circular , luminaire shall be complete with LED Light Engine not LED Bulb Solution. Having Extruded Aluminium housing with HET diffuser with minimum system lumen efficacy of 100 lumen per watt. P.F.>0.95 with THD<10%, CCT 5700 K/4000K, CRI 80.The LED with Useful life of 50000 Hrs at L70. The Input voltage range shall be 140V to 300V. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. Complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement.	
	Supplying, Installation, Testing & Commissioning of curve light LED 15W/ mtr luminarie, absolute homogeneous illumination over the entire light emitting surface in curve form Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. Complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement.	
	Supply, Installation, Testing and Commissioning of Up Down Light, Material: Aluminum + Acrylic, Power: 2 X 5W, Voltage: 100-240V, CCT: 3000K, IP54 including making suitable arrangement for fixing, connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor complete as reqd. Name Engraved/ Embossing/ Screen printing on housing. Complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement.	
	Supply installation, testing & commissioning of 7/10 W LED STEP LIGHT having non-corrosive cast aluminium body. Low power White LEDs (WH) covered with heat resistant frosted glass fixed to the housing with frame protection grill. LED Used shall be COB type CCT up to 5700K, IP54. An operating Voltage Range of 140 to 280V AC, PF>90,50Hz. LED driver should be constant current type. The luminaire should have loop in loop out provision	

	for power complete i/c termination as reqd complete i/c all civil job associated with it.	
	Supply, installation, testing & Commissioning of Agora LED NM LED IP42 230V 2X6W 1h/3h/8h. The luminaire comes in plastic housing. Mounting bracket is not required for this luminaire, IP42/NA 0 Non -Maintained Self Testing 12V / 7Ah Pb, LED based for anti-panic area, surface assembly Delivered as self-contained/auto test luminaire Choice of 1, 3 or 8 hour autonomy via DIP switch High lumen output – 1h = 360lm / 3h = 170lm / 8h = 70lm Simple and quick assembly and maintenance Technical lifetime of LED > 100 000 hours • IP42 – dust and waterproof luminaire, Voltage 220-240VAC / 50-60Hz Power consumption 11.4W / 11.8VA Battery 12V / 7Ah Pb Battery protection Over charge protection /deep discharge protection Charging Time 23 hours, Battery back-up time 1 hour / 3 hours / 8 hours (from dip switch), Light source LED 2x6, Technical lifetime (light source) >100 000 hours, Lumen output, emergency (1h / 3h / 8h) 3200 / 1600 / 800 lm, Approvals EN 60598-1, EN 60598-2-22, EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3, Ambient temperature 5 to 40 °C,	
	Humidity Up to 95%, IP rating IP42, Dimensions 302 x 94 x 210 mm, Weight 4200 / 4420 gr, Materials PC/ABS, PC, Aluminium, Mounting method Wall mounting complete in all respects as approved and desired by the Engineer in-charge at site.	
	BLDC FANS & WALL FANS	
	Supply, erection, testing of Ceiling fans IS marked (as per IS code 374) with suitable GI pipe complete in all respects complete as per directions of Engineer-in-charge	
	48 " (1200 MM)	
	AIR VENTILATING FAN	

	Supplying, Installation, Testing & Commissioning of 250 mm sweep fresh air ventilating fan with aerodynamically designed & balanced blades suitable for operation on 230 v single phase AC supply complete connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor etc as required as reqd.with all accessories as required	
	EXHAUST FANS	
	Supplying, Installation, Testing & Commissioning of 300 mm sweep, 900 rpm heavy duty exhaust fans with suitable louvers / bird screen protection and all accessories complete with Aerodynamically designed & Balanced Blade, Dynamically balanced impellers for smooth & vibration-free operation,Pre-lubricated double ball bearing for maintenance free running suitable for operation on single phase AC supply complete connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor etc as required as reqd.	
	WALL BRACKET FAN	
	Supplying, Installation, Testing & Commissioning of Air Circulator Fan, Class of Insulation for fan and regulator :Class I Rated Voltage :230V AC Speed Control Mechanism :Pull Cord Or String Based Control, Number of Blades :3 ,Material of Blade :ABS Blade Colour:White Fan Guard Material :Powder Coated Metal Wire Number of Speed Steps:3, Type of Fan Mounting:Bracket Mounted Fan For Wall Mounting :Oscillating, Type of Fan Motor :Non-Capacitor Type Fan Size (Mm) :400.Minimum Air Delivery (CMM)-76	

Contractor has to submit LM79/LM80 reports to the engineer in charge before placing the order. All the technical data sheets to be got approved from Engineer in charge.

All LED fixtures provided under the contract shall be guaranteed for a period of 5 years from the date of completion. The contractor shall submit warranty/guarantee of material against manufacturing defects for a period of five years for LED fittings duly signed by not below the rank of Regional Manager / director / Owner of proprietor of the OEM.

Minimum size of copper conductor for power wiring shall be 4 Sq mm and for light and fan points wiring shall be 1.5 sq mm.

The size of DBs at one location shall be same irrespective of number of circuits connected from the DBs.

The wiring and conduit route plan/drawings shall be submitted by the contractor and shall be got approved from the Engineer-in-charge.

To facilitate drawing of wires, 18 SWG GI fish wire shall be provided in recessed conduit. Conduits laid for other services, like fire alarm, PA system etc., where wiring is not done along IEI works; fish wire shall be invariably drawn.

The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable.

Power supply to DBs located in lift machine room if provided as per design at suitable location as approved by Engineer-in-charge shall be done using suitable XLPE insulated armoured cable. Supply of cable shall be in the scope of work.

Size of distribution board shall be as per number of light / power circuits and same shall be got approved from Engineer in Charge before installation. All distribution boards shall be double door type. RCBO of suitable rating shall be provided as main incomer in all DBs.

MCCB, if used as incomer then it should have earth fault protection and time delay. Earth leakage modules are not acceptable.

Inside the lift shaft there shall be arrangement of one light point at each floor level and one light point at overhead, one light point in lift pit. All light points shall be in group controlled and wired with 2.5 sqmm FRLS copper conductor cable. 15amp power plug and 5amp power plug shall be provided at each floor. Wiring of this power plugs shall be done with 4sqmm FRLS copper wires. LED Bulkhead fittings of suitable rating to provide minimum 100 lux shall be connected with each point of lift shaft.

All Electrical panels /MCCBs /MCB DBs /MCBs should be provided as per the specification and makes given under the Substation Subhead.

While laying conduits for fire alarm system, sufficient junction outlets are to be provided as per the direction of the Engineer-in-Charge for detectors as required.

After completing the work, necessary test results as envisaged in local bylaws & Indian Electricity Rules shall be recorded and submitted to the department.

RCBO of 300 mA sensitivity of suitable rating shall be provided as Incomer of each Distribution board.

For accommodating various size of cables incoming to the building, medium class G.I. pipe of suitable size shall be provided.

Provision is to be taken into consideration during designing for power requirement to be provided in areas shall be got approved from Engineer -in- charge.

Also, Geysers of required capacity (outcome of detailed design) shall be provided in each common toilet, attached toilet, kitchen. The capacity of geyser shall be calculated based on the water requirement of students for bathing purpose. Wiring for the geysers shall be separate and considering the electrical load of geyser (Not less than 6 sqmm FRLS Copper conductor). Modular MCB with Modular socket/ industrial socket shall be provided for Geyser.

LED Exit signages with 2 hours battery back with bicoloured LED status indicator & should be visible from 40 mtrs, at every 6.00 m in corridor and at all conspicuous locations to indicate Exit, staircase location, toilet location, handicapped toilet location, lift location etc. as per NBC norms. All exit signage's in staircases, exit path and in critical areas shall be on UPS DB.

All Cables in Electrical Room, Panel room, LV rooms, Shafts shall be laid on cable trays and approx. 25% capacity of all such cable trays shall remain unused as future provision.

Such cable tray in Substation room, Electrical Room, Panel Rooms, area shall be hot dipped GI as per direction of E-in-C. Proper factory-made TEE, Bend, elbows, cross, joints and other accessories shall be used.

Cable trays above false ceiling on all other places shall be Perforated Hot Dipped Galvanised Iron (galvanisation thickness i.e average mass of Zinc coating shall not be less than 65 microns for 2 mm thick & 50 microns for 1.6 mm thick as per IS standard) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I.suspenders including G.I. bolts & nuts, etc. as required.

The rupturing capacity of the MCB's shall not be less than 10KA, higher capacity shall be provided if required in the detailed design. The MCB's shall have ISI mark and rupturing capacity of the MCCB's shall be as per design of fault level.

Make of MCB/MCCB shall be the same as the make of MCB DB (in that particular DB).

Earthing: All earthing shall be done with copper plate / GI plate earthing as per CPWD specifications. Earthing system comprising of earth electrode, earth conductor, earth bus, protective conductor etc.

All LT and HT cables laid outside the building portion in open area shall be either laid in RCC HUME pipes or in ground with Sand cushioning and brick protection or in RCC trench or in DWC pipes or in cable tray as per CPWD Specification and direction of Engineer-in-Charge.

Handing Over:

All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.

Contractor shall also handover, to the Engineer-in-Charge, all Test Certificates, and Reports, maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

The form of warranty shall be as approved by the Engineer-in-Charge.

The warranty of all the components shall be valid for a period of one year from the date of handing over.

The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

EXTERNAL LIGHTING

SCOPE OF WORK

The specifications given below pertain to the External & Landscape Lighting to be carried out at both locations as detailed below: -

Dismantling all the existing Light luminaries/fittings with all accessories complete with foundation, wiring / cables, pipes/ conduits, iron cage etc , shifting, loading and storage at designated location within premises and handing over the same to competent authority as per the instruction of Engineer-in- charge.

Dismantling of pole/ streetlight standard/ strut embedded in brick ballast / cement concrete foundation etc. as required complete with cables all accessories etc and per the instruction of Engineer-in- charge.

Carrying out new External & Landscape Lighting for Lake and Adventure Park using LED posttop on ornamental/decorative and octagonal poles, Bollards, spike/Bush lights, Mini floodlights, flexi Lights etc.

EXTERNAL & LANDSCAPE LIGHTING

The scope of this work consists of planning, designing and SITC of LED External & Landscape lighting with decorative/ ornamental poles single arm and octagonal at least 1 meter of arm, Landscape lighting consisting of Street and Gate, Bollards, post top light spike/ bush lights, mini flood lights, flexi lights etc. along roads, pathways, gardens, plantation, trees, 30 mtr tower, Wall along lake area, Gazebo & Internal open area etc and as per direction of E-in-C.

Exact quantity shall be determined as per the requirement of NBC 2016 and as per direction of E-in-C.

Appropriate size of aluminium / copper armoured /unarmoured XPLE cables shall be as per IS specifications and shall be laid with appropriate size GI / copper flexible wire required for earthing of every fitting.

Cable laying shall be done in appropriate size DWC pipes, which is laid inside ground at required depth below finished floor level including trenching, refilling of earth, compaction etc.

The scope of work is inclusive of RCC foundation of appropriate size with J bolts. The drawings of each and every item, layout drawings, foundations, poles shall be submitted for approval from Engineer-In-charge. The detailed specifications of items are as follows: -

Octagonal poles with street lighting for periphery of the at the spacing of 12-16 mtrs.

The cable entering and exiting provision using appropriate size of DWC pipe in the foundation of pole. RCC foundation (1:2:4 with 12mm reinforcement) as per manufactures designs and recommendations and suitable size cable entry pipes. (Design & drawing must be got approved from Engineer-in-Charge).

Landscape And External Lighting

Flexi lights-

Bollards along pathways

Bush/ spike lights for planters

Mini flood light for trees

Posttop & Gate Lights

Steps light along staircase at various locations.

Street and Gate Light

High masts with motorized arrangements

ILLUMINATION TO BE MAINTAINED AS PER NBC 2016 AND NATIONAL LIGHTING CODE AND SHALL BE AUTOMATIC CONTROLLED BY TIMER SWITCH PANEL.

Streetlight Control Panel

The panel shall be of cubicle compartmentalized wall/floor mountable indoor/outdoor type fabricated out of minimum 2.00 mm thick CRCA sheet, duly powder coated, manufactured by CPRI approved panel builders having in-house facilities for 7 tank process treatment and powder coating.

The panel shall have incoming MCCB, Busbar section with insulated tinned copper bus bars, metering section with ammeter, voltmeter, LED indicating lamps, cable alley etc. Street/compound lighting control section shall be provided with individual astronomical timer in outgoings required to feed street lighting for automatic operation.

There should be separate controls for Street/compound light. Earthing/loop earthing etc shall be done as per CPWD specifications.

The panel shall be of cubicle compartmentalized wall/floor mountable indoor/outdoor type fabricated out of minimum 2.00 mm thick CRCA sheet, duly powder coated, manufactured by CPRI approved panel builders having in-house facilities for 7 tank process treatment and powder coating.

Distribution of electric power to street / compound lighting etc. and gate lights shall be with FRLS XLPE insulated and PVC sheathed aluminum conductor armoured UG cable of 1100 having minimum size of 4 C X 6 sqmm XLPE cable Aluminium conductor

The cables shall be laid in DWC pipe in ground, pipe, closed or open duct, cable trays or on surface of wall etc. depending upon the site conditions and as per direction of Engineer-In-charge. Tagging of cables on both ends of each circuit of street, compound lighting and gate lights shall be done.

All lights of street, compound and gate shall be controlled by astronomical time switch. There shall be arrangement of bypass switch so that in case of failure of time switch, the lights can be operated after bypassing the same.

Earthing of Street / compound lighting shall be carried out as per CPWD General Specifications Part-I (Internal)-2023 and CPWD General Specifications Part-II (External)-2023.

NP-3 RCC pipe of suitable size (as mentioned below) for protection of UG cables shall be used for road crossing, entry into buildings and paved areas.

Underground cables of size up to size of 35 sq.mm (up to 2 runs of cables)- 150 mm dia.

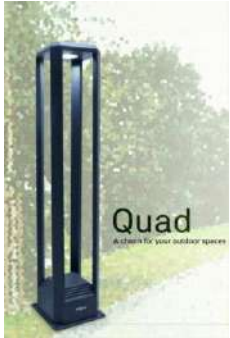
Underground cables of size exceeding 35 sq.mm but not exceeding 120 sq.mm (up to 2 runs of cables) - 200 mm dia.

Underground cables of size exceeding 120 sq.mm but not exceeding 300 sq.mm (up to 2 runs of cables) - 250 mm dia.

After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2023 and CPWD General Specifications Part-II (External)- 2023 shall be recorded and submitted to the department. The results shall be within the permissible limits.

The details along with Indicative Image of fittings are mentioned below. Final Make, Model and Numbers must be got approved by the Engineer-in-charge before execution and fixtures shall as per tender make.

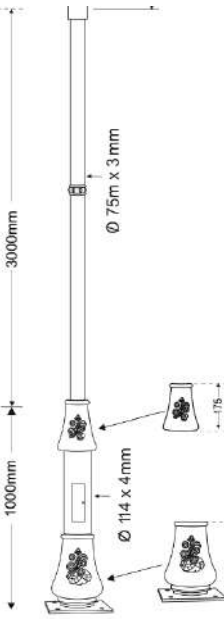
However below mentioned fittings shall not be limited to the areas proposed. The fittings can be added/ altered as per the decision of Engineer in Charge. As per design requirement, different fittings can be added.

Sr No	specification of the poles and fittings	Indicative Image
	BOLLARDS	
1	Supply, Installation, Testing and Commissioning of 800 mm long 11 W 1100 lumens LED IP 65 Bollard , Square shape & hollow in between ,Weather-proof and rust-free luminaire ,High-efficacy LEDs for optimum energy consumption, Potted driver and accessories pre-wired up to terminal block, having base plate with holes for direct mounting complete with all accessories including preparation of finished CC foundation with suitable size HDPE pipe for cable entry and exit, electrical connections for in coming and outgoing cables etc complete as per requirement at site (The rate must include junction box/terminal box suitable for incoming and outgoing cables i/c termination and other accessories and suitable earthing system). Lumen Efficacy of LED >100Lm/W @ 4000 K colour temperature ,PF ≥0.95, THD ≤10%,Input Voltage Range 140-280 V, 3 KV Inbuilt Surge protection & 10 KV External, IK07 Rating.	
	NEON FLEX STRIP LIGHT	
2	Supply, Installation, Testing & Commissioning of 16mm X 16mm of 5 meters length Mono Color CCT: 3000 K of 70 W Flexible and encapsulated LED Strip light with Non- Integral driver. The luminaire's shall be made of Silicon extrusion with high-efficiency, high grade appearance, soft bend flexibility & Option of Top bend, the same shall be so designed. The luminaire shall have silicon glue between optical cover & LED chamber to ensure proper IP67 protection. Brand name shall be embossed / printed on each an every light fixtures. CCT 3000 K and shall be complete with all necessary accessories required for proper working of fixture including weather proof connection cables, water proof connectors etc. as required. The Non Integral driver shall be installed in suitable Junction Boxes IP 66/67 "weather proof", for outdoor installation along with IP 67 Gland & lugs Cable Termination complete as required.	
	BUSH LIGHTS	
3	Supply installation, testing & commissioning of 9W LED BUSH LIGHT having Graphite grey powder coated integral aluminium housing. The Die-cast aluminium housing comprises Warm White (WW) COB LED and reflector. COB LED housing covered with die- cast aluminium ring with weatherproof gasket and toughened glass. LED Used shall be COB type CCT up to 3000K ±250K, IP65. Luminaire is wired with inbuilt driver with 5kV surge protection and should be constant current type with operating Voltage Range of 140 to 280V AC,PF>90,50Hz.Adjustable mounting bracket with spike should be provided for	

	easy to focus the object.2 nos., Ø8mm holes should also be provided on adjustable mounting bracket for surface mounting. Luminaire shall be complete with all necessary accessories required for proper working of fixture including weather proof connection cables, water proof connectors, weather proof IP66/67 junction Box etc. as required.	
	MINI FLOOD LIGHT	
4	Supply installation, testing & commissioning of 4000K Circular Mini Flood Light with Integral driver. The luminaire's shall be made of Extruded aluminum housing powder coated with toughened glass in Dark Gray color. The complete luminaire has IP65 & IK06 protection and it comprises of high purity integrated poly carbonate Lens. The LEDs shall have minimum CRI ≥70 (White LED) & shall have SDCM≤5. The luminaire shall have wattage 40W and shall deliver 3600 lumens. Beam angle of the Luminaire shall be 30 deg .Fixture shall operating temperature range of 0°C to 45°C. Input Voltage Range of 140 - 280V AC. The luminaire shall have declared life of 50,000 burning hours at L70.Luminaire and Driver must be made in India with same brand. The successful bidder must submit the NABL accreditation certificate for Luminaire manufacturer along with technical bid. LM80, RoHS compliance issued by LED luminaire manufacturer, BIS certificate for LED Luminaire. Brand name shall be embossed / engraved on each an every light fixtures. Luminaire, Driver and controller should be with same make and shall be complete with all necessary accessories required for proper working of fixture including weather proof connection cables, water proof connectors, weather proof IP66/67 junction Box etc. as required.	
	INGROUND LIGHT	
5	Supply installation, testing & commissioning of IP67 18W Mono Colour LED Inground light with all channel ON. Fixture shall be made up of Aluminum Housing for better heat decapitation having IP66 Dust and Water Protection for Outdoor usage. The Luminaire should have multiple beam options of 11/15/30/60° to be used as per design requirement. The luminaire shall have declared life of 50,000 burning hours at L70. Luminaire should be capable of operating at 24VDC , with External IP66 24Vdc Driver. Luminaire and Driver should be Made in India. Luminaire, Driver and controller should be with same make" and shall be complete with all necessary accessories required for proper working of fixture including weather proof connection cables, water proof connectors, weather proof IP66/67 junction Box etc. as required. The Non Integral driver shall be installed in suitable Junction Boxes IP 66/67 "weather proof", for outdoor installation along with IP 67 Gland & lugs Cable Termination complete as required.	

	LED STEP LIGHTS	
6	Supply installation, testing & commissioning of 7 W LED STEP LIGHT having non-corrosive cast aluminium body. Low power White LEDs (WH) covered with heat resistant frosted glass fixed to the housing with frame protection grill. LED Used shall be COB type CCT up to 5700K ,IP54. An operating Voltage Range of 140 to 280V AC,PF>90,50Hz. LED driver should be constant current type. The luminaire should have loop in loop out provision for power complete i/c termination as reqd complete i/c all civil job associated with it.	
	UP/DOWN LIGHT	
7	Supply, Installation, Testing and Commissioning of Up Down Light, Material: Aluminum + Acrylic, Power: 2 X 5W , Voltage: 100-240V,CCT: 3000K, IP54 including making suitable arrangement for fixing , connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor complete as reqd. Name Engraved/ Embossing/ Screen printing on housing. Complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement.	
	STREET LIGHT FITTINGS	
8	Supplying of Street light LED fixture powder coated pressure die cast aluminium body with driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270 Volt AC, freq 50/60 hz, Operating temp range -15 deg to 50 deg centigrade, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000- 3-2 , P. F.≥0.95, IP-66,IK-10, CRI >80, under voltage and over voltage protection, EMI-EMC As per CISPR 15 , lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement. suitable to fit in up to 65mm dia pipe, life time (LED, Driver & electrical circuitary) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report, CCT 3000°K / 4000°K / 5700°K /6000°K/6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥120 <135 lm/Watt output . LM79 & LM80 Test report from NABL lab for all testing required for LED fixtures as per BIS shall be submitted. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). -60 W	

	POST TOP FIXTURES	
9	Supply, Installation, Testing and Commissioning of 60W LED Dual Triangle Post Top pole mounted having System Lumens 7800 Lumens, IP66 Protection, IK 10 Rating, PF ≥ 0.95 and THD $\leq 10\%$, Housing Made of Aluminium Extrusion /die Cast Aluminum Housing, Powder coated with grey pure polyester powder, Diffuser is Poly carbonate, LED Life 50000 Hrs, Inbuilt Surge Protection 5 KV and 10 KV External Input Voltage Range 140-280 V. complete as per requirement at site /c termination as reqd complete .	
	GATE LIGHT FIXTURES	
10	Supply, Installation, Testing and Commissioning of 40 W LED Gate Light having System Lumens 4000 Lumens having system efficacy 120 Lumen Per Watt. IP66 Protection, PF ≥ 0.95 and THD $\leq 10\%$, Housing Made of Pressure Cast Aluminum Housing, Diffuser is Tempered Glass, IK 07 Rating, LED Life 50000 Hrs, Inbuilt Surge Protection 4 KV and 10 KV External Input Voltage Range 140-280 V. complete as per requirement at site. complete as per requirement at site.	
	OCTAGONAL POLE	
11	Supply and erection of Hot Dip Galvanized octagonal pole of 3mm thickness, with base plate including cost of nut and bolts, earthing studs, Integral Cable termination arrangement 5 mm thick Bakelite base plate on suitable welded MS/GI bracket 32 A four way connector 2 no 10 A SP MCB, end cover and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, anchor bolts etc. over a bed of PCC 1:5:10 of required dimensions for octagonal poles of various heights as per following specifications complete in all respects and as per directions of Engineer-in-charge	
	6 Metre Long pole with top dia 75 mm and bottom dia 150 mm with base plate of size 275 x 275 x 16 mm	
	Supply and erection of GI bracket made of 32 mm dia medium class GI pipe, having 15 deg angle from horizontal, suitable for fixing on top of Street Light pole 90 cm long, with 20 cm high suitable size pole cap	

	DECORATIVE POLES	
12	Supply and erection of Ornamental pole of 4 mtr. Height made out of galvanized Mild Steel tubes having 1000mmx114mmx4mm dia at Bottom and 3000mmx75mmx4mm dia at top fitted with decorative cast aluminium embellishment at middle and Decorative cast aluminium embellishment at bottom of dia 175 mm at middle & 305 mm at bottom. Pole should have a locked & non theft arrangement service window containing 6 Amp MCB & 4 way 25 Amp connector , pole should be with with base plate of 250x250x12mm including cost of nut and bolts of 500 mm x 16 mm Jtype , earthing studs, and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, over a bed of PCC 1 :5: 10 of required dimensions for poles of as per manufacturers specifications complete in all respects and as per directions of Engineer-in-charge. The Poles should be primer coated and painted with polyurethane paint.	
	B.S.E.N. 10025 High Masts	
13	Supply, installation, testing and commissioning of 16 mtr. long High Mast manufactured from B.S.E.N. 10025 or equivalent grade material in, 2 (two) section hot dip, galvanized inside and outside in single dip, suitable for wind velocity as per IS 875 Part-3 suitable for 9/12 nos. luminaire loading fully motorized (power tool) with starter & cable complete along with standard accessories supplied by the manufacturer with 3 nos. steel wire rope double drum system and twin dome aviation light with LED without foundation but including cost of set of foundation nut and bolts, installation at site complete in all respect upto entire satisfaction of Engineer -in-Charge. Thickness of Top and Bottom Section = 3 mm & 4mm (minimum) Top Dia = 150 mm and Bottom Dia = 410mm Thickness of Galvanization - Top = 65 micron (minimum) and Bottom = 85 micron (minimum)"	

Any other area specifically not mentioned above shall be covered with LED luminaires of required numbers design as per directions of Engineer-in-charge.

LIST OF PREFERRED MAKES

Sr. No.	Details of Material	Preferred Make
1	FRLS Copper Wire/Telephone Cable	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
2	Aluminium and copper XLPE Power cables Armoured / unarmoured	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
3	Cat 6A cable	Molex/Belden/Legrand/Panduit/Comscope
4	Modular Switch, Socket, Telephone socket/ Cable TV Socket/Data Outlet socket/Fan regulator/USB Sockets/GI Boxes etc (Wiring accessories) and accessories	Legrand: ARTEOR Honeywell: ORNA Panasonic: EUROPA Schneider: ZENCELO Wipro: (Northwest- Artisa) (Duly ISI Marked)
5	PVC conduit with accessories	Finolex/Supreme/BEC/NIC/Polycab/AKG (Min. 2mm thick and ISI marked)
6	MS conduit with accessories	AKG/NIC/BEC/RMCON (Note: - The accessories shall be same that of conduit pipe & will comply to IS/4768 Part 2 2003)
7	DWC-HDPE underground cable duct	REX/Duraline/Duraplast/Tirupati (Duly ISI Marked)
8	Protection Device (MCB / RCCB / DBs) / Industrial socket	Siemens (Betagard) / Schneider (Acti9) /Legrand (DX3) / LK (AU)/Hager (Novello+)
9	300 mm Exhaust Fan / 250 mm dia fresh air fan	Usha/Havells / Khaitan/Crompton/Orient
10	Ceiling Fan (BEE rated star)	Usha/Havells / Khaitan/Crompton/Orient
11	LED Fittings (Indoor)	Phillips/Wipro/Trilux/LT
12	LED Fittings Outdoor Landscape / External Lighting	Phillips/Wipro/Trilux/LT/ Twinkle-Luxmax
13	Electric Water Heater	Racold / Crompton/Usha /Havells
14	Hand Drier	EURONICS/Jaquar/Dolphy

15	Facade Lighting	Phillips/Wipro/Ligman/LT
16	Controllers for Facade Lighting	Phillips/Wipro/Ligman/Iguzzini
17	Junction Boxes	Hensel/OBO
18	GI Pole (Ornamental)	Twinkle-Luxmax/K-Lite/Baja/ Crompton/Surya
19	GI pole Octagonal	Bajaj/Valmount / Crompton /Transrail/Surya
20	LT Panel / Feeder Pillar	Kalyani Switchgear/ ADLEC/ Tricolite/ Milestone / Ambit Switchgear India Pvt. Ltd./ Sudhir Power Limited
21	Current Transformers	Automatic Electric/Kappa/L&T/C&S
22	Potential Transformers	Automatic Electric/Kappa/L&T/C&S
23	DOL/Star Delta Starter	Legrand/L&T/Seimens/Schneider
24	Digital Indicating Measuring Instruments/Multifunction Meters/Digital Energy Meter	L&T/Conzerv/Automatic Electgric ABB/C&S Neptune
25	Selector Switch	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider
26	Indication Lamp & Pash button/Relay/Timer	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider/Indoasian
27	APFC Relays	L&T/Siemens/Schneider/ABB/Automatic Electric/Kappa
28	Cable Glands/ Lugs/ Thimble	Comet/Jaisons/Braco/Dowells
29	GI/ MS Perforated Cable Tray	OBO/Indiana/PILCO/APEX/LEGRAND
30	Under floor raceways	Legrand/Honeywell/OBO
31	Any other item	To be approved from Engineer in Charge

TRANSFORMER SUBSTATION & POWER DISTRIBUTION

The Lake and Adventure Park area shall be supplied Main power by providing Transformer substation & DG power backup for smooth operation of essential services.

The detailed scope shall be designing the capacity of transformer and then supply, installation, testing and commissioning of the same as per direction of Engineer In charge:

Transformers shall be of 11/0.433 kV, Dyn11, 3 Phase, 50hz, Mineral oil filled hermetically sealed transformer with copper winding, +5% to 5% @ 2.5% with off Load tap changer having class-A insulation & temperature rise in oil/winding of 40/45 deg. C [Max.] along with standard fittings & accessories as per IS:1180

Transformers shall be designed with the latest technology which shall have more efficiency with lower losses. These losses shall be as per the latest ECBC Norms. Losses shall be as per 1180 Energy Efficiency Level 1(2021) Amendment no.-4

2 Pole structure with G.O switch shall also be installed for receiving power from SEB.

Revised Load shall be applied to SEB for both the locations

11 KV cable including end termination and shall be laid underground at a depth of 1200 mm below RFL / Trenches as per site requirements.

Location of the proposed Sub Station and DG sets for Lake and Adventure Park is indicated in drgs attached.

ELECTRICAL LOAD CALCULATIONS

The total Electrical load for adventure Park for the proposed new facilities at Lake and Adventure Park is 207 and 128 KVA respectively as detailed in Annexures attached.

POWER DISTRIBUTION-

Power distribution shall consist of the following Panels

Main Distribution cum Non- Essential Panel (Tikkar Taal)	
Proposed 250 KVA Transformer	Main Distribution cum Non- Essential Panel (Lake Area)
Main Distribution cum Non- Essential Panel (Lake Area)	Main cum AMF Panel (Essential Panel)
do	High Mast -1
do	High Mast -2
do	EV Charging Stations
do	Shops /Lease

do	Shops /Lease
	APFC 75 KVAR
SPV	Main Distribution cum Non- Essential Panel (Lake Area)
Main cum AMF Panel (Essential Panel)	
Proposed 250 KVA DG Set	Main cum AMF Panel (Essential Panel)
Main cum AMF Panel (Essential Panel)	Main Panel for Sub distribution
do	External lighting P-1
do	External lighting P-2
do	External lighting P-3
do	Plumbing
Main Panel for Sub distribution	
Panel	Ticket counter/Toilet block/Food court DB
Panel	Existing Rooms
External lighting FP to Pole/Light Ckts	
External lighting	
External lighting	
External lighting	
External lighting	
External lighting	
External lighting	
External lighting	
Toilet Blocks	

POWER DISTRIBUTION- Adventure Park Area

Power distribution shall consist of the following Panels

A	MAIN Cum AMF PANEL (ESSENTIAL PANEL)-(Adventure Park)	
	Proposed 160 KVA Transformer	Main cum AMF Panel (Essential Panel)
	Proposed 125 KVA DG Set	Main cum AMF Panel (Essential Panel)
1	Main cum AMF Panel (Essential Panel)	Sub distribution Panel -B
2	do	APFC 50 KVAR
3	do	Maze
4	do	High Mast-1
5	do	External lighting Panel - 3
6	do	Toilet
7	do	Reception Block
8	do	Plumbing
9	do	Spare-1
10	do	Spare-2
11	do	Haunted House
B	SUB DISTRIBUTION PANEL-(Adventure Park)	
1	do	Tent Panel -1
2	do	Tent Panel -2
3	do	Toilet Block
4	do	OAT
5	do	Viewing Tower i/c Lift
6	do	High Mast-2

7	do	External lighting Panel-1
8	do	External lighting Panel-2
9	do	Spare-1
10	do	Spare-2

POWER FACTOR IMPROVEMENT.

As per the condition of Electricity Board, consumers are advised to improve and maintain the power factor of their installation to minimum 0.95 or above because of various advantages.

Improvement in the power factory would affect savings in the energy bill. Also, the life of individual apparatus can be increased considerably by high power factor.

APFC Panels being proposed

Lake Area-75 KVAR

Adventure Park-50 KVAR

The capacitor bank should be put on/off automatically depending on the load requirement.

APFCR is provided to achieve this function. Contactor based switching arrangement shall be provided to sense the variable power factor in the system shall automatically switch ON/OFF the capacitor units to achieve the pre-set power factor. The capacitor should be switched OFF when DG supply is ON.

The power factor shall be maintained around 0.95 to 0.99 through this system.

SYSTEM EARTHING

Earthing system shall be designed in accordance with IS3043 & IEC-62561 for earthing system. Dedicated earthing pits shall be provided for established Switchgears neutral earthing of major substation equipment like Transformers & DG sets as detailed below: -

EARTHING DETAILS		
	Coper Plate	GI Plate
2 Pole structure		2
Transformer Neutral & Body		4
DG set Neutral & Body		4
Distribution Panel		2
AMF Panel		2
External Lighting Panel		2
High Mast- Pipe Earth		

The earth resistance value shall less than 5.0 Ohm as per IS 3043.

LT POWER & CONTROL CABLES

SCOPE

This specification covers the supply & installation of LT power & control cables.

The cable of sizes shall be selected by considering the voltage drop and current carrying capacity. The higher size among size as derived based on mentioned parameter shall be selected.

While deciding upon the cable sizes, de-rating factors for the type of cable and depth of laying, grouping, ambient temperature, ground temperature, and soil resistivity shall be taken into account.

In the design / selection of the cables, the consideration of the power distribution losses as defined in the ECBC shall be complied with, subject to the condition that the voltage drop permissible shall not be more than 8 volts.

Cables shall be tested at works and supplied in accordance with drawings, specifications, relevant Indian Standard Specifications and cable manufacturer's instructions. The cables shall be delivered at site in original drums with manufacturer's name clearly written on the drum.

MATERIAL

The LT power cables shall be XLPE insulated, Aluminum conductor armoured cable conforming to IS: 7098 (Part - I).

The LT control cable shall be PVC insulated copper conducted armoured stranded cable.

TESTS

Shop Tests:

The cables shall be subjected to shop tests in accordance with relevant standards to prove the design and general qualities of the cables as below (as per IS 10810):

Routine tests on each drum of cables.

Acceptance tests on drums chosen at random for acceptance of the lot.

Type tests on each type of cable, inclusive of measurement of armour DC resistance of power cables.

Test certificates

Test certificates of all the tests carried out at the works shall be furnished for approval of the Engineer-in-charge before the cables are dispatched from the manufacturer's works to the site.

Tests reports shall be complete with all details and shall also contain IS specified limit values wherever applicable to facilitate review.

Drawings, Data and Manuals

Drawings, data and manuals shall be submitted for the following:-

Manufacturer's catalogues giving cable construction details and characteristics.

Cable current ratings for different types of installation inclusive of derating factors for ambient temperatures, grouping etc.

Write up on manufacturer's recommended method of splicing, jointing, termination etc of the cables.

DESIGN CRITERIA

The cables will be used for connection of power circuits of the electrical system.

Cables will be generally laid in soft soil, surface or in RCC Hume/GI pipes/ cable tray/ sand cushioning with brick protection

For continuous operation at specified rating, maximum conductor temperature shall be limited to the permissible value as per relevant standard and (or this specification).

The insulation and sheath materials shall be tough enough to withstand mechanical stresses during handling.

Armouring shall be single round/flat wire of galvanised steel.

Core identification for multi core cable shall be provided by colour coding.

SPECIFIC REQUIREMENTS

Drum length & tolerance: the cables shall be supplied in wooden drums, each containing minimum 500 meters length of cable. Allowable tolerance on individual drum length is $\pm 5\%$.

Cable identification: cable identification shall be provided by embossing on the outer sheath the following at regular intervals of 2/3 meters.

Manufacturer's name or brand name or trademark.

Type of cable and voltage grade.

INSPECTION

All cables shall be inspected upon receipt at site and checked by the Engineer-in-charge for any damage during transit.

LAYING OF CABLES

The cable laying including necessary jointing etc. shall be carried out in accordance with the specifications given herein. For details not covered in these specifications, IS: 1255 - 1967 shall be followed.

No straight through joints shall be permitted in the L.V. system.

Cable Identification Tags

Wherever more than one cable is laid/run side by side, marker tags (pre-approved), inscribed with cable identification details shall be permanently attached to all the cables in the manholes/pull pits/joint pits/entry pits in buildings/open ducts etc. These shall also be attached to various cables laid direct in ground at suitable intervals, as decided by the Engineer-in-Charge, before the trenches are filled up.

Termination/Joining

Heat shrinkable ferrule-based joints shall be provided for HT cables and Brass double compression glands shall be provided for LT cable terminals.

Joining work shall be carried out only by licensed/experienced cable jointers.

At the very preliminary stages of laying of cables, a proper joining position should be selected.

Sufficient surplus cable loops (Minimum 3.0 MD) shall be left on each side of joints, as mentioned above.

Joints shall be staggered by 2 to 3 m, when two or more cables are laid together, in the same trench.

All Cable glands shall be earthed with suitable Copper earth clips.

Joining pits shall be of sufficient dimensions to allow easy and comfortable working at site. The sides of the pit shall be well protected from loose earth falling into it. It shall also be covered by a tarpaulin to prevent dust and other foreign matter on the exposed joints and joining materials.

Sufficient ventilation shall be provided, during joining operations, to disperse fumes given by fluxing.

Joining materials and accessories like conductor, ferrules, solder, flux, insulating and protective tapes, filling compound, joining boxes etc. of right quality and correct sizes, conforming to relevant Indian Standards, wherever they exist, shall be used. The design of the joint box and the composition of the filling compound shall be such as to provide an effective sealing against entry of moisture in addition to affording proper electrical characteristic to joints. Where special type of splicing connector kits, or epoxy resin spliced joints are specified, materials pre-approved for such applications shall only be used and instructions of the manufacturer/supplier of such materials shall be followed.

Insulation resistance of cables to be jointed shall be measured with 500 V Megger upto 1.1 KV grade and with 2,500/5,000 V Megger for cables of higher voltage. Unless the insulation resistance values are satisfactory, joining shall not be done.

Before joining is commenced, all safety precautions like isolation, discharging, earthing etc., Shall be taken to ensure that the cable would not be inadvertently charged from live supply. Metallic armour and external metallic bonding shall be connected to earth. Where "Permit to work" system is in vogue, prescribed safety procedures shall be complied with.

Cores of the cables must be properly identified before joining.

Whenever Aluminum conductor is exposed to outside atmosphere, a highly tenacious oxide film is formed which makes the soldering of Aluminum conductor difficult. This oxide film should be removed, using appropriate type of flux.

The clamps for the armour shall be clean and tight.

Where a cable is to be jointed with the existing cable, the sequence should be so arranged as to avoid misplacement of cores while jointing.

Cable termination shall be done in terminal cable box, using double Brass compression glands, and the cable ends sealed with sealing compound. The cable boxes of transformers shall be filled with bituminous compound of reputed make. For all LV cable terminations/joints, Contractor shall provide for brass/copper thimbles, insulation tape, etc. of pre-approved makes.

Testing

As already specified all cables before laying shall be tested with a 500 V Megger (for 1.1 KV grade), or with a 2,500/5,000 V Megger (for cables of higher voltages). The cable cores shall be tested for continuity, cross phasing, insulation resistance to earth/sheath/armour and insulation resistance between conductors.

All cables shall be subjected to above mentioned tests during laying, before covering the cables by, protective covers and back filling and also before the jointing operations are carried out.

Further items required for the substation:

Required Bus connections / cabling for interconnection between HT panel, transformer and LT Panel, connections, inter connections, loop earthing of all equipments from the common earth bus, as required. The connection between Aluminium and copper shall be done using bi-metallic joints.

Providing suitable size cement concrete foundation for the Transformer, DG set, Feeder Pillars etc

Checked plate of appropriate thickness and size shall be used to cover the cable trench, located inside Panel rooms etc.

Handing Over:

All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.

Contractor shall also handover, to the Engineer-in-Charge, all Test Certificates, and Reports, maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

The form of warranty shall be as approved by the Engineer-in-Charge.

The warranty of all the components shall be valid for a period of one year from the date of handing over.

The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

LIST OF PREFERRED MAKES OF SUB-STATION

Sr. No.	Details of Material	Preferred Make
1	Transformers	Sudhir Power Limited/ ABB / Siemens / Kirloskar / Crompton
2	HT Panel 11 KV /VCB Panel	Sudhir Power Limited /ABB /Schneider /Siemens
3	LT Panel / Feeder Pillar	Kalyani Switchgear/ ADLEC/ Tricolite/ Milestone / Ambit Switchgear India Pvt. Ltd./ Sudhir Power Limited
4	Protective relays, Contractor	SIEMENS/Legrand/ABB/L&T/Schneider
5	CT/PT	KAPPA/AE/SIEMENS/L&T
6	ACB	Siemens (3WL) / Schneider Electric (Easypact MVS -Masterpact NW)/ ABB (E-MAX2)/ Legrand DMX3 /Hager (H3)
7	MCCB	L&T D Sine / Schneider Compact NSX / Legrand DPX3 / Siemens 3VA / ABB T-Max/ Hager (H3)
8	MCB	L&T/Scheider/Siemens/ABB/Hager
9	ATS	Caterpillar/ Siemens /ASCO /Russ electric
10	Voltmerer/Ammeter/Multi-function meter	SIEMENS / SCHNEIDER ELECTRIC/ Enercon / L&T/ Legrand / ABB / Neptune
11	11 KV XPLE cables	KEI / LAPP CABLE / Polycab / Havells / Finolex (Duly ISI Marked)

12	11 KV cables jointing kit	3M /Raychem / Jaison
13	Cable Lugs/Glands	Comet / Dowells/ Jaison / HMI / Raychem / Braco
14	Aluminium and copper XLPE Power cables Armoured / unarmoured	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
15	11 KV CT/ PT	AE / Crompton Greaves / Kappa /BHEL /Alstom/ Gilbert
16	DWC Pipe	Rex /Duralin/Duroplast/Tripudi
17	Current Transformers	Automatic Electric/Kappa/L&T/C&S
18	Potential Transformers	Automatic Electric/Kappa/L&T/C&S
19	DOL/Star Delta Starter	Legrand/L&T/Seimens/Schneider
20	Digital Indicating Measuring Instruments/Multifunction Meters/Digital Energy Meter	L&T/Conzerv/Automatic Electgric ABB/C&S Neptune
21	Selector Switch	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider
22	Indication Lamp & Pash button/Relay/Timer	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider/Indoasian
23	APFC Relays	L&T/Siemens/Schneider/ABB/Automatic Electric/Kappa
24	Cable Glands/ Lugs/ Thimble	Comet/Jaisons/Braco/Dowells
25	GI/ MS Perforated Cable Tray	OBO/Indiana/PILCO/APEX/LEGRAND
26	Under floor raceways	Legrand/Honeywell/OBO
27	Any other item	To be approved from Engineer in Charge

DG SET

SCOPE OF WORK

The detailed scope shall be designing the capacity of DG set and then supply, installation, testing and commissioning of the same as per direction of Engineer In charge at both locations:

The provided Electrical load calculation is preliminary. The actual Electrical load calculation must be performed by the bidder. If the calculated Electrical demand load exceeds the afore mentioned figure, the equipment rating shall be determined based on the actual calculation. Conversely, if the calculated Electrical demand load is less than the afore mentioned figure, the equipment capacity shall remain unchanged as per the initial calculation.

The DG sets should deliver the given capacity at 0.8 powerfactor developing 415 volts 3phase 4wire output with the engine and alternator mounted on common bed plate complete and all accessories required. The DG Sets shall be capable of delivering desired KVA at 0.8 P. F. for the load after meeting it down requirement for auxiliaries etc. and after accounting for de-rating due to various factors (temperature, altitude), site conditions.

Work covered by this contract include design, manufacture, supply, transportation, delivery, installation and commissioning of automatic start direct coupled Diesel Generator Sets suitable for continuous round the clock operation at upto rated output with permissible overload with associated works. Items included (but not limited to) in the contract are abstract below.

Diesel engines directly coupled with alternators mounted on a rigid fabricated base frame with resilient anti vibration mountings.

DG cooling system.

Silencer to provide 25 DBA insertion loss

Electric starting equipment including batteries and battery chargers.

Fuel supply system.

Acoustic Enclosure as per C.P.C.B. Norms latest.

Clearance/Approval of the complete installation from CPCB/State Pollution control Board, central Electricity Authority (CEA)/Local Bodies and Other licensing authorities, wherever required.

D.G. Control Panels.

Engine

The diesel engine shall be indoor-type, four stroke, multi-cylinder, 1500RPM with 2% speed variation for operation between 10% and 100% load, Turbo charged inner cooled, compression ignition with residential type Governor Fuel system complete with its self-contained lubricating system.

Engine mounted radiator designed to dissipate the generated heat effectively shall be used.

High speed diesel oil shall be used as fuel for the engine.

The engine shall be de-rated in accordance with the tables given in BS649 to suit site conditions.

The engine shall be directly coupled to the generator.

The noise level limitations shall be as per latest CPCB norms.

The engine shall be capable of taking 10% overload for one hour in every 12 hours

The engine shall be capable of producing the desired nominal output at site referred generator terminals and with machine operating under ambient conditions as special the specific requirements.

The Engine to be fitted with silencer to provide min 25 DBA insertion loss.

Alternator With Accessories:

The Alternator shall have the following characteristics

Type - Brushless, rotating field design alternator rated for 415 volts / 50 complying to IS 4722-1992, BS 5000 Part- III and IEC 34 amended upto date.

Excitation system - Self Excited

Speed - 1500 RPM

Net Site Output - Rated continuous at ambient conditions and as per Schedule of quantities.

Voltage Regulation - Within 0.5% of the rated voltage

Overload duration - 10% for 1 hour in every Capacity 12 Hours of Continuous use.

Harmonics - Less than 3%.

The Alternator shall be capable of delivering the rated output at rated power factor.

The Alternator shall be capable of withstanding without damage a three-phase short circuit at its terminals when operating at rated KVA and PF and at 5% over voltage with fire excitation for 3 seconds.

The alternator shall be capable of withstanding without damage

a) 50% overload for 15 seconds.

b) 10% overload for one hour every twelve hours.

The line and neutral leads of phase windings of the Alternators shall be in suitable terminal boxes.

The Alternator winding shall have class of insulation H class with temperature rise limited to Class H insulation.

Drawing Submission:

The following drawings shall be submitted for approval for DG set:

a) Foundation drawing with loading data:

b) Schematic drawings:

c) All control & indication circuit drawings :

Test Certificates

Copies of all documents of routine and type test certificates of the equipment's shall be furnished to the HTC along with the supply of equipment's and these are as below.

Routine Test Certificates.

Engine separately

Alternator Separately

The inspection & testing shall be carried out as per clause no. 1.15 of CPWD General Specifications for electrical works Part –VII (DG Set).

Handing Over:

All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.

Contractor shall also handover, to the Engineer-in-Charge, all Test Certificates, and Reports, maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

The form of warranty shall be as approved by the Engineer-in-Charge.

The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

LIST OF PREFERRED MAKES FOR DG SET WORK

1.	DIESEL ENGINE	:	CUMMINS/ CATERPILLAR/ perkins/ kirloskar (KOEL)/ Greaves (CG)
2.	ALTERNATOR	:	STAMFORD/ LOREYSOMERS/ MECALTTE/ GREAVES (CG)/ KIRLOSKAR (KOEL)

3	ACB	:	L&T(UPOWER)/SIEMENS(3WL)/SCHNEIDER (MASTERPACT NW)/ ABB/ Hager (H3)
4	DIGITAL PANEL METERS / ELECTRONIC LOAD MANAGER	:	CONZERV / KRYKARD / ENERCON/ NEPTUNE
5	MCCB	:	L&T D SINE / SCHNEIDER COMPACT NSX / LEGRAND DPX3 / SIEMENS 3VL/ Hager (H3)
6	INDICATING LAMP (LED TYPE)/ PUSH BUTTONS	:	SIEMENS /L&T /TEKNIC
7	POWER CABLES COPPER /ALUMINIUM ARMOURED /UNARMOURED	:	FINOLEX/KEI/ RR KABEL/ POLYCAB / HAVELLS (All shall be ISI Marked) /
8	SELECTOR SWITCH	:	L&T/ GE/ KAYCEE /AE /IMP/ RASS CONTROL /SALZER.
9	CT'S	:	AE /KAPPA /L&T/C&S.
10	G.I. PIPE	:	TATA / JINDAL (HISSAR) / SAIL
11	BATTERIES	:	EXIDE (POWER-SAFE)/CUMMINS PLUS/ PANASONIC/NED/GLOBAL YUASA/aMAR RAJA.
12	M.S PIPES	:	TATA/JINDAL(HISSAR)/SAIL
13	ATS	:	L&T / SCHNEIDER/ LEGRAND/ ABB/ SIEMENS
14	ANY OTHER ITEM	:	TO BE APPROVED BY ENGINEER-IN-CHARGE

LIFTS

SCOPE OF WORK

The Scope of work includes SITC (Supply, Installation, Testing, Commissioning) and then handing over to client and to liaison and pursue the local bodies for getting required certificates for functioning of lifts in complete for the following lifts.

The Lift (For 30 mtrs Observation Tower) details are as below:

Lift shall be provided in the observation tower.

TECHNICAL SPECIFICATION :-A00	
I PRODUCT DETAILS	
Building Type	Government - Turnkey
Product Name	NEXTRA CIRCULAR (PANORAMIC)
Number of Units	1
Lift Designation	-
Lift Type	Passenger Lift
Rated Capacity Persons / Kgs / Class of Loading	13 Persons / 884 Kgs / P - Passengers
Rated Speed m/s	1.25
Number of stops / openings	4 / 4
Floor Designation	G+3
Access Sides Inline/Thru Type	1 (One), In Front Only
Floor Display Character (Entrance Position)	0(F),1(F),2(F),3(F)
II MACHINE AND CONTROLLER DETAILS	
Machine Location / Type	Directly Above The Lift Well -Gearless
Drive System	Micro Processor Based VVVF
Control system	Microprocessor Based Simplex Selective Collective Control With / Without Attendant
Main Power Supply	AC 3 Phase, 50 Cycles, 415 Volts $\pm 10\%$
Light Power Supply	220 Volts 50Hz LNE
III SHAFT DETAILS	
Shaft Type	STEEL - Steel Structural
Shaft Width mm X Shaft Depth mm	2500 X 2700
Overhead mm	4200
Pit Depth mm	2000
Travel Height (in Meters)	30
Shaft Reduction Channel	Not Required
Shaft Reduction Channel Weight (in Kgs)	No
IV CABIN DETAILS	
A) SIZES	
Car Width mm X Car Depth mm	900 X 2400
Car Clear Height mm	2200
Car Door Type Center/Side	Power Operated Centre Opening Sliding Door
No Of Door Panels	2 Panel
Type of Door Drive	Linear Door Drive System
Car Door (W X H) mm	900 X 2000
B) FINISHES - *SUBJECT TO AVAILABILITY	
Design Of Lift Cabin*	Stainless Steel

TECHNICAL SPECIFICATION :- A00	
Lift Cabin Finish*	Hairline Finish
Car Door*	Glass - Ss Enveloped Non Fire Rated
Car Door Finish*	Hairline Finish
Ceiling Finish*	Ss Mirror Finish
Ceiling Type	Sleek Small Circular-JLFC 03
Ceiling Light	Led Lights-03
Fan	Regular (Circular) - Fan
Flooring Type	20 Mm Recess
Handrail Type	Ss Round Handrail JLHR01
Handrail Location	Rear Side
Car Door Sill	Aluminum
V LANDING DOORS DETAILS	
A) SIZES	
Door Type	Centre Opening Sliding Door
Door Size (W x H) mm	900 X 2000
Door Sill	Aluminum
B) FINISHES	
Landing Door Finish*	1-4-Glass - Ss Enveloped - Hairline Finish Non Fire Rated
Landing Door Frame / Finish*	1-4-Stainless Steel - Hairline Finish
Main Landing Floor	0
Other Landing Floors	1,2,3
Jamb Type	Slim Frame
VI SIGNALIZATION / FIXTURES DETAILS	
A) CABIN OPERATING PANEL	
Car Operating Panel Type	Car Operating Panel - JLCP01
Number of Car Operating Panel	1
COP Faceplate Finish	Stainless Steel - Hairline Finish
Button Model	1s4 - Bas128 (Round)
Car Display	Orange Square Dot-Matrix Scrolling Display-Vertical
Car Display Location	Car Operating Panel
Call Register Signal	Yes
Floor Annunciator	Yes
B) LANDINGS INDICATORS	
Landing Operating Panel Type	Landing Operating Panel - JLLP01
LOP Location	Landing Display On Wall
LOP Mounting Type	Grouting

TECHNICAL SPECIFICATION :-A00	
LOP Faceplate Material	Stainless Steel - Hairline Finish
Landing Display	I-4-OSDM-V
Landing Display Location	I-4-LOP
Call Register Signal	Yes
Stainless Steel Braille Button	Yes
C) HALL LANTERN	
Hall Lantern Model	Hall Arrival Lantern - Horizontal - J1hl01
Hall Lantern Faceplate Material	Stainless Steel - Hairline Finish
Hall Lantern Location	Above Door Frame (Flush Mount)
VII SAFETY DETAILS	
Over Speed Governor	Yes
Door Protection	Infra Red Door Screen
Counterweight Screen	Inbuilt
Over Load Indicator	Yes
Fireman Switch	Yes
Automatic Rescue Device	Yes
Battery Operated Emg Alarm Light	Yes

GENERAL

The equipment and installation covered by specifications and drawings shall conform to codes of practice and highest standards of workmanship and materials. This work shall be done in accordance with the provisions of the Lifts Act, and subsequent provisions, as also any state or local Act in force and latest Indian Standard 14665, 15330.

The Electrical wiring shall strictly comply with IS:732 and the entire installation shall be in accordance with the Indian Electricity Act 2003 and Indian Electricity Rules 1956 as amended to-date.

The Contractor shall follow all statutory requirements as well as best trade practices in the manufacture & installation of elevators. The Contractor shall arrange to obtain the approval of the Inspectorate of Lifts for commissioning of the Lifts and getting RR number and handover for operation after satisfactory tests.

TRACTION MACHINE AND DRIVE

The motor shall be controlled by a variable voltage variable frequency (V.V.V.F.) micro-processor control system which shall control and monitor every aspect of elevator operation at all stages of the car motion cycle on real time basis.

The A.C. V.V.V.F. drive system shall control A.C. voltage and frequency concurrently with the hoist motor to regulate the elevator's actual performance to match closely the ideal speed pattern to obtain maximum efficiency of operation and provide a very smooth ride.

Frequency shall range fully between zero and rated value.

The Controller shall be provided with a self-diagnostic programme to keep downtime to a minimum possible.

The controller shall intelligently adjust door times in response to car calls, hall calls and "Door Open" button operation.

The braking of machine shall be of regenerative type.

SAFETY

In the addition to other specifications the Lifts shall be provided with safety devices as follows:

Safety gear on car so that in the event of rope breaking or loosening the car will be brought to rest immediately by means of grips on the guides.

The over speeding car shall be automatically brought to a gradual stop on guide rails and power supply to the hoist motor shall be switched off.

Car gate lock so that in the event of car gate gets opened when passengers are in the car, the elevator shall be brought to rest.

TECHNICAL SPECIFICATION :- A00	
LOP Faceplate Material	Stainless Steel - Hairline Finish
Landing Display	I-4-OSDM-V
Landing Display Location	I-4-LOP
Call Register Signal	Yes
Stainless Steel Braille Button	Yes
C) HALL LANTERN	
Hall Lantern Model	Hall Arrival Lantern - Horizontal - Jlh101
Hall Lantern Faceplate Material	Stainless Steel - Hairline Finish
Hall Lantern Location	Above Door Frame (Flush Mount)
VII SAFETY DETAILS	
Over Speed Governor	Yes
Door Protection	Infra Red Door Screen
Counterweight Screen	Inbuilt
Over Load Indicator	Yes
Fireman Switch	Yes
Automatic Rescue Device	Yes
Battery Operated Emg Alarm Light	Yes

LIST OF PREFERRED MAKES–FOR LIFT WORKS

Sr.No.	Equipment	Preferred Make
1.	Lift	OTIS / KONE / SCHINDLER / JOHNSON / MITSUBISHI

CCTV SURVEILLANCE SYSTEM

SCOPE OF WORK

The scope of work includes design, supply, installation, testing and commissioning of IP based CCTV Surveillance system for Adventure Park and for any other areas instructed by Engineer-in-Charge.

It shall be fully on Digital IP technology. The system proposed shall be an open platform type and shall be possible to add or connect any make open platform camera (ONVIF compliant) to installed system.

The system shall consist of minimum following components. Additional items if required may be added as per the approved design.

Varifocal IR dome camera,

Outdoor Vari focal IR Bullet camera

Outdoor IR PTZ camera

Advanced Video Management Software with Server, storage etc.

POE/ POE+ network switches (Layer -2) with SFP/SFP+ modules

Layer 3 switch for backbone connection to server (Fibre connection to L2 switches)

LED display for 24X 7 monitoring along with required accessories to make system fully functional like Pole, Rack, junction Box, Patch panel, LIU, fibre optic cable, Cat 6A cable etc.

The POE / POE + switches from the shaft shall be connected with the distribution /L 3 core switch /server in star topology.

In order to tap from floor switches appropriate type of cable (Cat 6A for below 100 mtrs and OFC for above 100 mtrs) shall be used, the required convertors (SFP/SFP+) shall be included in the quoted rates.

The system shall be designed to keep the backup for 30 days for all the cameras and all the cameras shall record at 2 MP resolution 30 FPS with continuous recording (24/7).

The spacing between the cameras shall be so selected such that the video is clearly seen. The system layout, location of cameras, spacing between the cameras, network architect, location of server, LED TVs shall be got approved from Engineer in charge.

TECHNICAL SPECIFICATION:

The following are the technical parameters for the CCTV work along with the Quantity. Final design and quantities are to be got approved from the Engineer –in-Charge before start of work

Sr No	Description Of Items		
	CCTV SYSTEM		
1	Supply, Installation, Testing, commissioning of 5MP Dome Camera with 2.8-12mm Motorized Varifocal lens, 1/2.8" SONY - CMOS 5MP Active Pixel, Minimum Illumination - Color - 0.01 Lux @F1.2, Focal Length - 2.8mm - 12mm, Focus Range - 0.3m to infinity, Aperture (F#) - F1.6-F2.8, Iris Type - Motorized Varifocal Iris, IR Range - Up to 50m, IR Led Wavelength - 850nm, IR Switching - Auto/ Manual, Audio IN - 1, Audio OUT - 1, Two-way Audio -Supported, Audio Compression - G.726 and G.711g, Alarm In - 1 (Phoenix type connector), Alarm Out - 1 (Phoenix type connector), SD Card - Up to 512GB, Available Resolutions - 2592 x 1944, 2592 x 1520, 2048 x 1536, 1920 x 1080, 720p, D1, 2CIF, CIF, Max Resolution - 2592 x 1944, Bitrate - 128 kbps-16Mbps, Bitrate Type - CBR, VBR, Video Compression - H.265, H.264, MJPEG, Frame Rate - 1- 30fps, Shutter Speed - 1/15s - 1/100000s, Adaptive Streaming - Yes, ONVIF Profiles - S, G, and T, Edge Recording - Yes, Alarm Recording - Pre and Post, Motion Recording - Yes, Time Triggered - Yes, WDR True -WDR (120dB), SNR - >70dB, Storage - NAS, SD Card, Certifications - NDAA Compliant, BIS, CE, IP67, FCC Part-15 Subpart — B, ONVIF S, G & T, IK10, UL, NEMA 4X**, STQC Certified with OWASP ASVS 4.0L2, SIRA	Nos	14
2	Supply, Installation, Testing, commissioning of 5MP Bullet Camera with 2.8-12mm Motorized Varifocal lens, 1/2.8" SONY - CMOS 5MP Active Pixel, Minimum Illumination - Color - 0.01 Lux @F1.2, Focal Length - 2.8mm — 12mm, Focus Range - 0.3m to infinity, Aperture (F#) - F1.6-F2.8, Iris Type - Motorized Varifocal Iris, IR Range - Up to 50m, IR Led Wavelength - 850nm, IR Switching - Auto/ Manual, Audio IN - 1, Audio OUT - 1, Two-way Audio -Supported, Audio Compression - G.726 and G.711g, Alarm In - 1 (Phoenix type connector), Alarm Out - 1 (Phoenix type connector), SD Card - Up to 512GB, Camera Adjustment Angle - Pan: 0° to 360°, Tilt: 0° to 90°, Rotate: 0° to 360°, Available Resolutions - 2592 x 1944, 2592 x 1520, 2048 x 1536, 1920 x 1080, 720p, D1, 2CIF, CIF, Max Resolution - 2592 x 1944, Bitrate - 128 kbps-16Mbps, Bitrate Type - CBR, VBR, Video Compression - H.265, H.264, MJPEG, Frame Rate - 1-30fps, Shutter Speed - 1/15s 1/100000s, Adaptive Streaming - Yes, ONVIF Profiles - S, G, and T, Edge Recording - Yes, Alarm Recording - Pre and Post, Motion Recording - Yes, Time Triggered - Yes, WDR True - WDR (120dB), SNR - >70dB, Storage - NAS, SD Card, Certifications - NDAA Compliant, BIS, CE, IP67, FCC Part-15 Subpart - B, ONVIF S, G & T, IK10, UL, NEMA 4X**, STQC Certified with OWASP ASVS 4.0L2, SIRA	Nos	15

3	Supply, Installation, Testing, commissioning of 2MP PTZ Camera, Image Sensor 1/ 2.8" CMOS, Minimum Illumination Color: 0.03lux@F1.69, 0Lux with IR Shutter Speed 1/15s to 1/10000s, Day and Night Yes, Wide Dynamic Range 120dB, Optical Zoom 38x, Digital Zoom 16x, focal Length 4.4 mm – 169.4 mm, Zoom Speed Approximately 6s from wide to tele at Max Speed, Aperture Range F 1.6 – F4.9, IR Range Up to 300m, IR irradiance Angle Adjustable by Zoom, Video Compression H.265/H.264/M-JPEG, Video Bitrate 128kbps 16Mbps, Audio Compression G.726 ,G.711 a-law and u-law, Audio Bitrate 128kbps 16Mbps IMAGE, Max Resolution 2MP – 1920×1080 5MP – 2592 x 1944, Stream Profiles Four streams support 5MP, Profile 1:- 2592 x 1944p/ 2592 x 1520/ 2048 x 1536/ 1920 x 1080/ 720P/ D1/ 2CIF/ VGA/ CIF/ QCIF @30fps (H.264/H.265), Video Analytics Motion/No Motion Detection, View Tamper Detection, Trip/No Trip Detection, Object Intrusion/Zone Intrusion, Loitering, Missing/ Object Counting, Abandoned Object, Audio Exception, Alarm In, Protocol TCP/IP, UDP, HTTP, HTTPS, DHCP, DNS, DynDNS, RTP, RTCP, RTSP, RTSPS, PPPOE, SMTP, NTP, SNMP, HTTPS, FTP, SMTP, 802.1x , IGMPv2& v3, ICMP, IPv4,IPv6,QoS Layer 3, CIFS,SSH, ARP, Communication Interface 1 RJ45 10/100 Self Adaptive Ethernet Port, Built-in Micro SD card slot up to 512GB, Power Supply 24VDC 2.5A , AC(Optional), Power Consumption Max 25W, Protection IP67.	Nos	10
4	Supply, Installation, Testing and commissioning of 32 Channel NVR with 4K Support and 2 HDD Slot, 32 IP Channel Inputs; HDMI, 1/1 Audio I/O and 2/1 Alarm I/O, 12MP, 8MP, 5MP, 4MP, 3MP, 2MP, 720p, D1 and CIF Recording Resolution, 4x 4K/ 10x 3MP/16x 1080p Local Decoding, 4 SATA HDD Support (Maximum 10TB Capacity per Slot), Save Storage Space with Adaptive Recording and Camera-wise Recording Retention, SMS & Email Notification, Video Pop-up and Alarms, 512 Mbps Throughput - 256 Uplink, 256 Downlink, NAS Support: 2 NAS (CIFS, NFS), Mobile Viewer Application Should Support Calling from Mobile App Feature Where a Mobile Number Can be Added Per Camera in the Device and The User Can Directly Call a Concerned Person by Just One Click on Camera View from Mobile(without any SIM card in NVR), The device should be capable of acting as a Master device and should be able to Add,View,Playback and Configure at least 20 other connected slave devices (NVRs) camera's from the Local View via HDMI, without need of any Server/workstation., BIS, FCC.	Nos	1
5	Supply Installation testing and Commissioning of 16 Channel NVR with 1 SATA Port,Input - 16 IP Channels, Output - HDMI (2.0) – 1 Port, Compression - H.265/H.264/Motion JPEG, AUDIO - Input - 1 Channel, RCA Port(2.0Vp-p), Range (-2dBu to 22dBu), Output - 1 Channel, RCA Port (Mono, Unbalanced Output, 2.0Vp-p, Range (-2dBu to 22dBu),	Nos	1

	Compression -G.711, G.726, PCM, 512Mbps, RECORDING - Image Resolution- 12MP, 8MP, 5MP,3MP, 2MP, 1080P, D1, CIF, Pre-Record - Up to 30 Sec, Post-Record - 10-300 Sec, Snapshot Format - JPEG, Recording Types - Scheduled, Manual, Alarm, STORAGE AND BANDWIDTH OPTIMIZATION - Storage - Adaptive Recording: Automatically Reduces the Number of Frames, Captured Per Second Where There is No Motion, Thereby Saving Storage Space. Bandwidth - Automatically Adapts Optimized Resolution on Local Display Through HDMI, SATA Interface - 1 SATA III (10TB per port), NAS - 2 NAS, USB- 1 TB USB Drive, RAID- Single Disk, Retention - Camera Wise, HDD usage % wise, Day wise, Network Interface - 1 Ports x Ethernet (RJ-45) 10/100/1000Mbps, USB - 3 Ports (1x USB 3.0, 2x USB2.0), Alarm Input -2, Alarm Output - 1, Operating Temperature -0°C to +50°C (32°F to 122°F) NVR should be compatible with the Central Server/NVR.		
6	Supply, installation, testing & commissioning of 10 TB Surveillance Hard Disk complete etc. as required..	Nos	4
7	Supply, Installation, Testing and comissioning of 65" 4KUHD resolution LED Display with Android 11, 400 nits brightness, Cortex A55 1.3Ghz processor, Mali G31 MP2, Open GLES3.2, 2 GB DDR RAM, 16 GB Memory, Wifi Type support both 2.4 & 5G Standard, Dolby Audio, Built in Wifi and Cromecast, HDMI CEC, HDMI ARC, Built-in Bluetooth, Hotel mode, Meeting Mode,20W built in speakers, HDMI 2.0 X 2, AV X 1, USB X 2, RJ45 X 1, SPDIF Out x 1,24/7 operational.	Nos	2
8	Supply, Installation, Testing and comissioning of 5 Mtr HDMI cable Connectors at both ends	Nos	2
9	Supply, Installation, Testing and comissioning of PC Client Intel i7 processor with clock speed- minimum 3.0GHz, RAM8 GB & Expandable. Window 10 or Window 2016 Server or Unix based Edition .Minimum 1TB . LAN Interface 10/100/1000 Mbps Ethernet.).. Mouse Optical . USB port at front and Software of cameras.	Nos	1

10	Supply, Installation, Testing and commissioning of Switch should be Web Managed, Should have 8 port 1000BASE-T with 4 Port 1000BASE-T PoE PoE power budget 160 Watt or higher, Maximum Per port PoE Power 30 WattIEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX Ethernet, IEEE 802.3ab 1000BASE-T Ethernet, IEEE 802.3az EEE support, IEEE 802.3x flow control, IEEE 802.3z 1000BASE-X,IEEE 802.1p CoS, IEEE 802.3af PoE, IEEE 802.3at PoE Plus, IEEE802.1Q VLAN Tagging, Minimum 8 VLAN support Port based VLAN, IEEE802.3ad link aggregation should be MAC based Switching Capacity 16 Gbps, Packet buffer 192KB,MAC address support 4K Jumbo frame support 9K, Should support loop detection, Should support Broadcast storm control QoS Support (WRR and strict priority) Port based QoS 20 Multicast group or higher, Maximum power consumption 72W,Operating temperature 0°C to 40°C Storage Temperature -40°C to 70°C Certification: CE, FCC, C-Tick, , LVD EN60950-1, ROHS compliant. Should be built-in IEEE 802.3az Energy Efficient Ethernet (EEE)	Nos	As per site requirement
11	Supply, Installation, Testing and commissioning of Layer-2 POE plus Gigabit Ethernet 1RU chassis with 24 PoE 10/100/1000 BaseT ports and 4 Gigabit SFP ports. Includes an internal AC power supply 370W atleast or higher power budget) with a power cord, manuals access card, and RJ-45 to DB-9 adaptor. The Access Switch should have 4 ports of 1 G SFP. The Access Switch should provide Non-Blocking switch fabric capacity of 56 Gbps or more. L-2 switch should provide wire-speed packet forwarding of 41 Mpps or more. L-2 Switch should support min 16K MAC addresses and min 4000 active VLANs.	Nos	As per site requirement
12	Supply, Installation, Testing and comissioning of 9U outdoor IPV5 rated rack with 2 side FAN with 3 socket PDU with 15 AMP DP for power surge safty. With pole mount accessories. Rack should be certified.	Nos	As per site requirement
13	Supplying and drawing of 1 no UTP 4 pair CAT 6 LAN Cable in the existing surface/recess MS/PVC conduit as required	Meter	As per site requirement
14	S/E mark double walled corrugated (DWC) HOPE, pipe 10 Kg/Cm2 ,laid 0.75 Metre below ground level including digging and refilling of earth including cost of suitable size socket/coupler for HOPE pipe including the cost of labour and material required to complete the job in all respect up to the entire satisfaction of Engineer in charge of the work.		As per site requirement
	DWC/HOPE pipe 50/40 mm outer dial inner dia	Meter	

15	Supply, Installation, Testing and comissioning of 2 KVA Online UPS Overvoltage cut-off device (OVCD),Support for up to 42 AH external battery cabinets, Generator Compatible with Wide Input. Wide Input Voltage window (110 – 280Vac) for IndianEnvironmental Condition andfor Optimized BatteryPerformance. UPS would support SNMP Mnagaer and web browser On Line With 1 hour Backup	Nos	As per site requirement
16	Wiring main and sub mains in two single core for phase and neutral wire and one single core for earth wire FRLS PVC insulated Copper conductor cable 1100 Volts grade in existing MS/PVC Conduit etc as required.		
	3 run of Size 1.50 Sqmm(1/1.40mm) For Light Ckts	Metre	As per site requirement
17	"Supply and erection of Hot Dip Galvanized octagonal pole of 3mm thickness, with base plate including cost of nut and bolts , earthing studs,Integral Cable termination arrangement 5 mm thick Bakelite base plate on suitable welded MS/GI bracket 32 A four way connector 2 no 10 A SP MCB , end cover and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, anchor bolts etc. over a bed of PCC 1:5:10 of required dimensions for octagonal poles of various heights as per following specifications complete in all respects and as per directions of Engineer-in-charge 5 Metre Long pole with top dia 65 mm and bottom dia 130mm with base plate of size 250 x 250 x 16 mm"	Each	7

LIST OF PREFERRED MAKES CCTV

Sr. No.	Description of item	Manufacturer's Name
1	Cameras	Matrix/ Honeywell/Prima
2	Hard disk	WD/Seagate/Toshiba
3	Network Switch, SFP module	Alied /Juniper / Netgear/ Zyxel.

4	Jack panel, LIU, LC to SC Cable, Fiber Cable	R&M/ Siemon/ Systimax/D link.
5	LED display	Samsung / LG / Panasonic
6	PC	HP/ Dell/ Lenovo
7	Equipment Rack	Valrack /Netrack/ Comrack/ Dlink
8	Power cable	Finolex/ Polycab/ Havel's
9	Cat 6 Cable	Panduit / R&M / Systimax/ Dlink
10	UPS	APC/ LIBERT / EINOVA / DELTA/Emerson
8.	All other items not covered above	As per approval of Engineer-in-charge

PUBLIC ADDRESS SYSTEM

The following are the technical parameters for the work along with the Quantity. Final design and quantities are to be got approved from the Engineer –in-Charge before start of work

1	Supply, Installation, Testing and commissioning of Mixer amplifier Inbuilt Bluetooth for audio streaming, Supports audio playback from USB pen drive, 4 microphone/line inputs, plus music source input, Insert feature to use as a pre/power amplifier, Optional 2-tone chime generation for input 1, 40 A, Max. / rated 360 W / 240 W, 31 V (240 W), Approx. 10.5 kg, Connector Cinch, stereo converted to mono, Sensitivity 200 mV to 300 mV	No	2
2	Supply, Installation, Testing and commissioning of Tabletop Unidirectional Condenser Microphone Voltage range 12 to 48 V Current consumption <8 mA ,Sensitivity 0.7 mV @ 85 dB SPL (2 mV/Pa), Maximum input sound level 110 dB SPL, Distortion <0.6% (maximum input) ,Input noise level (equiv.) 28 dB SPLA (S/N 66 dBA ref. 1 Pa),Frequency response 100 Hz to 16 kHz Output impedance 200 ohm.	No	2
3	Supply, Installation, Testing and commissioning of 480W Booster amplifier , Battery voltage -24Vdc (max.10%deviation), Frequency response-60Hz to 15 kHz(+1/-3 db), Distortion (at rated out power at 1 khz)- <3%, Inputs- XLR , Impedance-20k , Sensitivity-1V (mic inputs), S/N->80 DB.	No	2
4	Supply, Installation, Testing and commissioning of Horn Loudspeaker made with ABS, water and dust protected to IP 65 Sound pressure level at 15W/1W - 115/103 dB (SPL), Effective frequency range 500 Hz to 5 kHz, Rated power 15W.	No	38
5	Supply, Installation, Testing and commissioning of Wall Speaker Premium-sound cabinet loudspeaker ,Maximum power -22.5 W , Rated power - 15 W (15/7.5/3.75/1.9 W), Sound pressure level at rated / 1 W (1 kHz, 1 m) -99/87 dB (SPL), Effective frequency range (-6 dB) - 95 Hz to 20 kHz, Rated input voltage - 11/70/100 V, Rated impedance -8/326/667 ohm.	No	2

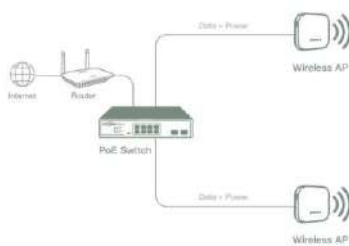
	CABLING & WIRING		
6	Supplying and drawing of cable Fire Retardant PVC insulated copper conductor cable in the existing surface / recessed steel conduit of following pairs, cores and size including connections and interconnections etc. as required.		
	Speaker cable Single pair, 2-core, 1.5 sqmm	Metre	As per site requirement
7	S/E mark double walled corrugated (DWC) HDPE, pipe 10 Kg/Cm ² , laid 0.75 Metre below ground level including digging and refilling of earth including cost of suitable size socket/coupler for HDPE pipe including the cost of labour and material required to complete the job in all respect up to the entire satisfaction of Engineer in charge of the work.		
	DWC/HDPE pipe 40/32 mm outer dia/ inner dia	Meter	As per site requirement

LIST OF PREFERRED MAKES

Description of item	Manufacturer's Name
6-zone controller, Amplifier, Speaker	Autronica/ Notifire / Bosch /Simens- EN
Amplifier	Autronica/ Notifire / Bosch /Simens- EN
Speaker	Autronica/ Notifire / Bosch /Simens- EN
Speaker cable	Finolex/ Polycab/ Havel's
PVC conduit	Diplast/Polyplast
All other items not covered above	As per approval of Engineer-in-charge

Wi-Fi NETWORKING SYSTEM

It is proposed to install Wi-Fi networking system for the Guests to provide seamless WiFi network providing high-speed internet across the designated area.



The system shall consist of minimum following components. Additional items if required may be added as per the approved design

Core switch / Distribution switch

Access Points (Indoor)

Wireless Hardware Based Controller for Access points

CAT-6 A & OFC Cables

Rack Switches.

The following are the technical parameters for the work along with the Quantity. Final design and quantities are to be got approved from the Engineer –in-Charge before start of work.

	Wi-Fi NETWORKING SYSTEM		
	Supply, Installation, Testing and Commissioning of 24 x 10/100/1000BASE-T Interface (inbuilt 6kV surge Protection, 2 x 10G Copper 4 & 10G SFP+ Uplink, Internal/External Redundant Power supply Support, Physical stack of up to 8 units, 80 Gbps per device physical stacking bandwidth, Switching capacity 168 Gbps or non-blocking architecture. Packet forwarding rate 125 Mpps. RAM/DRAM: 2GB & Flash/SSD : 256MB, Packet Buffer Size 2 MB, 2 Internal Fans, MAC Address Table 16K, Support IPv4 & IPv6: OSPFv2/v3, IEEE 802.3ah, IEEE 802.1ag, ITU-T Y.1731, ERPS, PBR, LLDP/LLDP-MED, UDLD/DULD, SPQ, WRR, Strict + WRR, WDRR, WRED, GVRP, BPDU Filtering, Root Guard, Loop Guard, Loopback Detection, HOL Blocking Prevention, RSPAN/SPAN, L2PT, UDLD or equivalent, Dying Gasp, 4 x Smart fans, Operating Temp 0 to 50 °C, Storage Temperature -20 to 70°C, Certificate: CE, FCC, UL, MTC/TEC-ER (as notified vide Indian Telegraph (Amendment) Rules, 2017), ISO 27001, IEC-62443-4-1:2018 or Equivalent.	Nos	1
	Supply, Installation, Testing and Commissioning of Wireless Hardware Based Controller for Access Points with 1x 2.5GbE RJ45 port, 1x USB Type-A port.	Nos	1
	Supply, Installation, Testing and Commissioning of 24 Port Gigabit Switch with Fiber Uplink 4 x RJ45/SFP 10/100/1000Mbps Combo Ports, 802.3at PoE+ & 802.3af 370watt Power Budget. Switching Capacity: 128 Gbps, MAC Address Supply, Installation, Testing and Commissioning of Table 8K, Packet Forwarding Rate: 41 Mpps, Flash Memory 64 MB, DRAM Size 256 MB DDR3, 2 x Internal Fans for Cooling & Air Circulation, CPU Speed 500MHz. MAC Address Table 8K entries, IGMP Snooping, IGMP v1/v2 Snooping, IGMP v3 awareness, 256 IGMP groups, 64 static multicast addresses, IGMP per VLAN, IGMP Snooping Querier, Loopback Detection, 802.3ad Link Aggregation: groups/8 ports per group, LLDP, LLDP-MED, jumbo Frame 10,000 bytes, 802.1D STP, 802.1W RSTP, 802.1s MSTP, 802.3x Flow Control, HOL Blocking Prevention, Port Mirroring One-to-One/Many-to-One, Multicast Filtering, Configurable MDI/MDIX, MLD snooping v1/v2 (256 groups). IEEE 802.3az.	Nos	4

	SPQ & WRR, IPv6 ND, DHCP snooping & DHCP server screening. ARP spoofing prevention. 802.1X port-based authentication. 802.1X RADIUS & local server database authentication. Port security to secures the access port based on MAC address. Broadcast, multicast, & unicast storm control. Traffic Segmentation, SSH & SSL for IPv4 & IPv6. DoS attack preventio, IP + MAC + Port Binding, LLDP & LLDP-MED. Compact CLI, Telnet Server, TFTP Client, Configurable MDI/MDIX, SNMP v1/v2c/v3, SNMP Trap , Backup/upgrade firmware, Upload/download configuration file, BootP/DHCP Client, System Log, Max. 500 log entries, SNTP, ICMP v6, IPv4/v6 Dual Stack , DHCP Auto Configuration, Time setting, SNTP, RMONv1, Trusted host, Dual image, Dual configuration. Operating Temperature -5 to 50°C, Storage Temperature -20 to 70°C, Operating/Storage Humidity 0% to 95% relative humidity. Power input 100 to 240 V AC 50/60 Hz internal universal power supply, EN 550 32, EN 55024, EN 61000 3 2, IEC 61000 4 2, EN 61000-3-3, IEC 61000 4 3, IEC 61000-4-4, IEC 61000-4-5, IEC 61000-4-6, IEC 61000-4-8, IEC 61000-4-11, EN 62368-1, CISPR 22, FCC Part 15, ICES 003, IEC 63000, UL 60950-1, & CAN/CSA C22.2 No. 60950-1-07. Certifiante: CE, FCC, UL, MTCTE/TEC-ER (as notified vide Indian Telegraph (Amendment) Rules, 2017), ISO 27001, IEC-62443-4-1:2018 or Equivalent.		
	Supply, Installation,Testing and Commissioning of 1G SFP Transceiver single-mode 9/125um fiber 10km, Transceiver should be Small Form-Pluggable (SFP) form factor & compatible with quoted switches. IEEE 802.3z 1000BASE-LX Gigabit Ethernet, SFP (Small Form Pluggable), LC Duplex, IEEE 802.3 compatible, 1310 nm, Single-mode fiber (9/125µm), Operating Temperature: 0 to 70 °C, Storage Temperature: -40 to 85 °C, Compliance: MSA Compliant, Switch & Fiber Modules should be Form Same OEM. Module shall be is in compliance with the essential requirements & other relevant provisions of the directives 2014/30/EU (EMC), 2014/35/EU (LVD) & 2011/65/EU (RoHS). EMC: EN 55032:, Class B; EN 55024, Safety: EN 62368-1, EN 60825-1, EN 60825-2, RoHS: Restriction of Hazardous Substances EN IEC 63000.	Nos	10
	ISupply, Installation,Testing and Commissioning of EEE 802.11ax with a data rate of 1800 Mbps, configured in a 2x2+2x2 setup. Additionally, it should feature high output power for both 2.4GHz & 5GHz frequencies, & support Power over Ethernet (PoE) compliant with 802.3at standards. must support IEEE 802.11b for 11 Mbps, 802.11g for 54 Mbps, 802.11a for 54 Mbps, 802.11n for 300 Mbps, & 802.11ac for 867 Mbps wireless data	Nos	14

	rates. must support IEEE 802.11ax for 1200 Mbps on the 5GHz band & 574 Mbps on the 2.4GHz band. Support 1024QAM on both of 2.4GHz & 5GHz. The operation of be within the 2.425GHz & 5.155.85GHz frequency bands to comply with worldwide regulations. supports enhanced security features, including WPA/WPA2/WPA3 for both Personal & Enterprise use, RADIUS client integration, & Cipher negotiation. be equipped with the following interfaces: Power Jack, Factory Reset Button, one RJ45 console port, & LAN ports supporting Power over Ethernet (PoE). comprehensive network management capabilities, including HTTP, HTTPS, Software Controller, Hardware Controller, SNMP support, Telnet, Email Notification, & Secure SSH Telnet. Extensible Authentication Protocols (EAP), including EAP, EAP-TLS, EAP-TTLS/MSCHAPv2, PEAPv0/MSCHAPv2, PEAPv1/EAP-GTC, & EAP-SIM. four dual-band internal antennas, with specifications of 3.2 dBi for 2.4 GHz & 4.3 dBi for 5 GHz. Additionally, it should have a maximum output power of 23 dBm for 2.4 GHz & 26 dBm for 5 GHz. 802.1x, RADIUS Server, POP3 & LDAP. Multi-Tenant & Role-Based Administration. Wireless Resource Airtime Fairness, Connect Limit, Aging Out, ACL RSSI & Band Steering, Wireless MAC ACL, & WLAN Partition. ARP Spoofing Prevention, Wireless Intrusion Protection, & Bandwidth Optimization. Captive Portal with industry-standard authentication. MAC-based access filtering & WLAN partitioning, Wi-Fi Multimedia Quality of Service (QoS), Traffic Control Uplink & Downlink limit. Ethernet traffic statistics & WLAN traffic statistic. Load balancing to optimize performance between Access Points. FCC, CE Certifications. Product Should Approved from TEC under Mandatory Testing & Certification of Telecom Equipment as notified vide Indian Telegraph (Amendment) Rules, 2017. Make - D Link		

	Supply, Installation, Testing and Commissioning of Unified Outdoor Enterprise, dual radio, 5 GHz & 2.4 GHz 11ax min 2x2+2x2 MIMO, min 2401 Mbps (5GHz) + min 574Mbps(2.4GHz), Security features WPA3 & Enhanced Open security, RADIUS client, Cipher negotiation & Support External / Internal RADIUS server & Support OFDMA , Support Wi-Fi 6, IEEE 802.3af & 802.3at, Band Steering, Minimum 2 x dual-band Internal Antennas: Min 3dBi for 2.4 Ghz & 3dBi for 5 Ghz. Support 1024QAM on both of 2.4GHz & 5GHZ, Support 2.4~2.5GHz and 5.15~5.85GHz frequency band, 11ax, 2x2+2x2, high output power design for 2.4GHz/5GHz, 1 x RJ45 console port, 1 x 2.5G Ethernet (PoE) LAN, factory reset, power input, SNMP v1, v2c, and v3, & be capable of integration with both hardware and software controllers. Additionally, function as an individual access point if required, with internal Radius server support during individual installation. Fast Roaming Support with 802.11k, 802.11v, and 802.11r and Support Passpoint Wi-Fi (hotspot 2.0) Seamless cellular-to-Wi-Fi carryover for guests. Access Point Should Support Radio & Modulation Schemes for BPSK, QPSK, 16QAM, 64QAM, 256QAM, up to 1024QAM with OFDMA & in complied with ac & b/g/n compliant equipments. Operating / Storage Temperature -30 to 60 °C, / -30 to 65 °C, Operating / Storage Humidity 10% to 90%, / 5% to 95%. Direct power and Power over Ethernet both options. Wi-Fi CERTIFIED™ Certificate & Certificate lists: www.wi-fi.org/certification/programs, Support Wi-Fi Multimedia, by enabling this feature it will improve the user experience for audio and video applications over a Wi-Fi network. Access Point Wi-Fi CERTIFIED for WMM, W-Fi Agile Multiband. Certifications CE, FCC, Wi-Fi, IEC 60601-1, UL, IP68. OEM ISO 45001, ISO 27001, ISO 9001, ISO 14001 & ISO 14064-1, Certificate for Industrial Cyber Security Capability (Like - IEC-62443-4-1:2018 or Equivalent) Make - D Link	Nos	5
	Supplying and drawing of 1 no UTP 4 pair CAT 6 LAN Cable in the existing surface/recess MS/PVC conduit as required	Meter	As per site requirement

	Supply, Installation, Testing and Commissioning of Category 6 Unshielded Twisted 4 pair Armoured Cable, Conductor 23 AWG Solid Bare Electronic Grade Copper. Insulation material Polyethylene, Inner jacket PVC of Grey Color, Thickness of Inner Jacket 0.65 to 0.70mm. Outer Jacket FR PVC in Black Color, Outer Jacket Thickness 0.85mm (Nom.). Armouring: Aluminium Wire, Rip Cord, Filler: HDPE. Outer Diameter 9.50 mm and Conductor Diameter 0.56 mm (23 AWG). Cable support Conductor Resistance 93.5 OHMS/1000Mtr@20°C. Mutual Capacitance of cable < 5.6nF/100m. Max Resistance Unbalance of cable 5% Max. Capacitance Unbalance of cable should max 330pF/100m. Cable support Worst Case cable skew < 45nS/100m, NVP: 69%. Capacitance Unbalance 330PF/100M Max. Characteristics Impedance 100±15%OHMS. Supports Gigabit Ethernet (1000 base-T) standard and Operates at bandwidth of 250MHz. Supports transmission of high-speed data signals on LANs, compliant with TIA/EIA-568-C.2, should operate on bandwidth up to 250MHz, channel performance up to 70 meters. Operating Temperature from -20° to +60°C. Supports Gigabit Ethernet (1000 baseT) standard. Cable should come with printed sequential Length Counter on each meter. Cable Attenuation (< 36 db/100m), Pair – to – pair and PS NEXT, ELNEXT and PSELFEXT, Return Loss, ACR and PS ACR. OEM for the cable Box and all copper Accessories from same OEM. OEM for the cable Box & all copper Accessories from same OEM. OEM should have Indian based operation at least for a period of 20+ years & should have an Annual Turnover of Rs. 500 Crores & above in any of last three consecutive Audited Financial years. OEM International certification for the ISO 45001, ISO 9001, ISO 14001, & ISO 14064-1.	Meter	As per site requirement
	Supply, Installation, Testing and Commissioning of Patch Panel 24 Port 1U Size loaded with 24 port RJ-45 IO. Mounts in standard 19 inch racks. Cable manager for improvement management. Patch panel suitable for Category 6 keystone. SPCC & Black Color. Rear support bar material SPCC & Black Color. RJ-45 jack housing PBT + Glass fiber UL94V-O & Contact brackets PBT + Glass fiber UL94V-O. Rj-45 contact material phosphor bronze with nickel plated & plug contact area finish with 50 micro-inches Gold plated. Contact resistance maximum 20 miliohm. Operating Temperature -10° Celsius to 60° Celsius. Life of RJ-45 Jack 750 cycles minimum @ 500 VDC. ETL Verified / UL Listed. Manufacturer ISO 9001, ISO 45001, ISO 9001, ISO 14001 & ISO 14064-1.	Nos	4

	Supply, Installation, Testing and Commissioning of Patch Cord 1 Mtr. TIA/EIA 568C.2 standard. 24 AWG, multi-strands. conductor metal made from bare copper. Insulation material high density polyethylene. patch cord jacket LSZH. Conductor size: 24 -26 AWG stranded bare copper, Jacket: FR-PVC, Mechanical Characteristics – Plug, Operating life: Minimum 750 insertion cycles, Contact blade: Copper Alloy, Contact plating: 03Mμ” Gold, Electrical Characteristics – Plug, Dielectric withstanding Voltage: 1000VDC or 700 VAC, Insulation resistance: >500 MegaOhms @ 1000V DC/min, Operating temperature: - 20 Degree C to 75 Degree C, Clear Polycarbonate for RJ-45 And Clear PVC for Boot Material, factory molded Boot, RJ-45 standards: ISO/IEC 60603-7-4 and FCC 47 part 68, UL Application : PC UL94-V-0, UL Listed & ETL Listed Certified, Patch cord plug gold plated. Contact blade of plug made from copper / alloy. Insertion cycle 750 times. Temperature range should support from 10° Celsius to 60° Celsius. Vertical flame propagation IEC 60332-1-2, Acid Gas Emission Test – IEC 60754 - 1 & 2, Smoke Density Test – IEC 61034-2. Manufacturer ISO 9001, ISO 45001, ISO 9001, ISO 14001 & ISO 14064-1. OEM for the cable Box and all copper Accessories from same OEM.	Nos	38
	Providing and fixing modular type accessories of approved make in existing box including fixing and making necessary connections,complete in all respect. RJ 45 Computer DATA socket outlet for CAT 6 or CAT6e cable Modular type	Nos	19
	Supply, Installation,Testing and Commissioning of O. F.Cable 06F Outdoor - Armoured Unitube SM - HDPE Sheath (OS1). Fiber type 9/125 / G.652D & Refractive Index should be 1.4670/1.4675. Standard ISO 11801, IEC 60793-1/60794-1-2 & ITU-T-REC G.652D. Testing methods in accordance with the following standard Telecordia : GR-20 Core, ISO : 11801. Jacket Thickness 1.8 + 0.2 mm, Outer diameter should be 9 ± 0.3 mm. 3000N/100mm Crush Load (IEC 60794-1-2-E3). Bend Radius (IEC 60794-1-2-E11 & E6) should be Short Term 20D in mm & Long Term 10D in mm. Pulling Tension: Short Term 2000N, Long term 1000N pulling tension (IEC 60794-1-2-E1). Mode field diameter 9.2um ±0.5, Clad Diameter 125um ±1.0. Dispersion At 1285 - 1330nm should be <=3.5 ps/nm.km. Dispersion At 1550nm should be <=18.0 ps/nm.km. PMD value <=0.2 (ps/km). Maximum Attenuation at 1310nm should be <=0.36 dB/km. Maximum Attenuation at 1550nm should be <=0.22 dB/km. Cabled Cutoff Wavelength should be <=1260 nm. Operating	Meter	As per site requirement

	Temperature should be – 20 deg C to +60 deg C. All Passive of the same make. (Copper, Fiber & Racks)		
	Supply, Installation, Testing and Commissioning of PATCH CORD LC-LC SM DUPLEX LENGTH- 1m, 9/125µm Single mode G652D, Duplex Type, (EIA/TIA, IEC, ANSI). Physical Contact (PC) connectors return loss > 45 dB. Ultra Physical Contact (UPC) connectors return loss > 50 dB. Angled Physical Contact (APC) connectors return loss > 60 dB. Repeatability < 0.2dB 1000 times Mating Cycle. Working Temperature –10°C ~+70°C, Storage Temperature –20°C ~+70°C. All Passive of the same make. (Copper, Fiber & Racks).	Nos	As per site requirement
	Supply, Installation, Testing and Commissioning of LIU 06 Port Rack Mount - Loaded (LC) SM, 1U height, 19-inch rack mountable. Fiber optic LIU should include with LIU Box itself, Adapter Panel, Adapters & Pigtail as per requirement. Adapter panel - Cold Steel, 1.5mm Thickness. Rubber fiber slotted bracket built-in, metal splice shelf to protect the fibers. 4 Fiber spools Built-In for 900um tight buffered Fiber Storing. Optical Fiber Pigtail – SC Type 1 Meter Provide a field installable Single mode SC pigtails to terminate fiber optic cables from cable-to-cable, cable-to-equipment & equipment-to-equipment. Utilize a UPC polishing on the tip to provide high yield during installation. Meet TIA/EIA 568.C.3 standards for repeatability. Buffer diameter 900um Tight buffer, Minimum bend Radius: Install :30mm, Retention Strength: 20N, Cable: 900um Buffered. SM fiber pigtail, the cable type shall be HDPE/LSZH with a diameter of 3.0mm / 2.0mm. Insertion Loss (Max) <0.3 db Max, Return Loss >= 50 db for UPC. Connector ferrule Ceramic, SC Type Simplex Type, Cable Color Yellow. Repeatability < 0.2dB 200	Nos	4

	times Mating Cycle. Working Temp. -10 deg. C to + 70 deg. C, Storage Temp. -20 deg. C to + 70 deg. C		
	Supply, Installation, Testing and Commissioning of Wall Mount Rack, 9U x 500 W x 500 D indoor rack for switch Mounting with Fan & power Strip, PDU, Hardware Mounting Kit. Front Glass Door (tinted, Toughened) with Lock & Key. 2 pairs of 19" Mounting Rails with U-Marking. Provision to mount cooling fans Unit / 90 CFM / 230V AC (1 No) on the top panel. Rack shall Conforms to DIN 41494 OR equivalent ISO Standards. Welded Side Walls, CRCA steel Frame & powder coated with highest quality standards. 19" Mounting angles made of formed steel. Depth adjustable mounting slots for verticals provide better mounting flexibility & maximizes the usable mounting space. Top & bottom Panel with ventilation & cable entry facility. Rack Powder coated finish with pretreatment process meeting all industry standards. Grounding & Bonding Options. 100% assured compatibility with all equipment conforming to DIN 41494 (General industrial standard for equipment). Rack Welded to Frame Top & Bottom Cover, Vented & Field Cable entry exit cut outs. Standard Accessories: 1U Cable Manager (1), Hardware Pkt of 20 (1 Pkt), 6 Socket 5 Amp. Power Distribution Unit (1 No), Standard Color : Grey, Static Load : 40 kgs. The OEM must possess international certifications for ISO 45001, ISO 9001, ISO 14001, ISO 27001, ISO 14064-1. The OEM should have Indian-based operations for a minimum of 20 years, demonstrating a long-standing presence & experience in the industry.	Nos	4

	Supply, Installation, Testing and Commissioning of 17U Closed Rack / Width 600 / Depth 1000 indoor rack for switch Mounting with Fan & power Strip, PDU, Hardware Mounting Kit. Depth adjustable mounting slots for verticals provide the better mounting flexibility maximizing the usable mounting space. Openings/Cut outs for field cable entry from Top & Bottom of the Rack. Provision to mount the cooling fans on the top panel. Powder coated finish with pretreatment process meeting all industry standards. Grounding & Bonding Options. Conforms to DIN 41494 or equivalent standard. 17U Closed Rack / Width 600/ Depth 1000. Lockable Toughened Glass Door, Steel Single, Steel Dual. Equipment Mounting : DIN Standard 10mm Sq. Slots / Direct M6 Tap. 19" Mounting angles made of formed steel. Top & Bottom Cover : Welded to Frame, Vented & Field Cable entry exit cut outs. Mounting Option : Castor wheels (Front 2 wheels with Break & rear without break) Or Levelers or Base plinth. Accessories: Doors & Side Panels, Power Distribution Units, FHU with 4 FAN 360CFM, Jacking Feet, Mounting Hardware-(Pack of 20), Vertical Power Distribution Unit with 12 x 5/15 sockets Round Pin, 230 Volts AC, 32 Amp with Plug, Horizontal Cable Manager-1U-Loop, Casters Set of 4, Adjustable Levelers set of 4. Standard Color: Black or Grey. Static Load: 300 kgs. The OEM must possess international certifications for ISO 45001, ISO 9001, ISO 14001, ISO 27001, ISO 14064-1. The OEM should have Indian-based operations for a minimum of 20 years, demonstrating a long-standing presence & experience in the industry.	Nos	1

LIST OF PREFERRED MAKES

Sr. No.	Description of item	Manufacturer's Name
1	Network Switch, SFP module, Controller	D link/ Cisco/ HP
2	Hard disk	WD/Seagate/Toshiba
3	Jack panel, Patch cord, LIU, LC to SC Cable, Fiber Cable	D link/ Molex/Panduit
4	Equipment Rack	Valrack /Netrack/ Comrack/ Dlink
5	Cat 6 Cable	Panduit / R&M / Systimax/ Dlink

SOLAR PHOTO VOLTAIC POWER GENERATION SYSTEM

It is proposed to install the solar panel to generate the electrical power with net metering, duly grid connected with earthing.

Solar Photovoltaic grid connected roof top Plant (On the Parking Sheds) of capacity 200 KWp conforming to MNRE specifications as amended, consisting of Mono/Poly Crystalline silicon solar cells, net metering facility, necessary protections, earthing, mounted on Aluminium/GI structure of suitable strength.

Solar Photovoltaic Module shall manufactured in India, conforming to IS 14286/IEC 61215, IS/IEC 61730-Part-1, IS/IEC 61730-Part-2. Solar Photovoltaic Module conversion efficiency shall not be less than 16.5%. PV modules used in solar power plants/ systems must be warranted for their output peak watt capacity, which should not be less than 90% at the end of 10 years and 80% at the end of 25 years.

Connections and Interconnections by supplying and fixing required size XLPE insulated copper conductor 1.1 kV grade armoured power and control cables between solar modules, main power cable to grid supply PCU unit along with supplying and fixing of necessary channel/conduit lugs and other accessories etc. as required.

All the Civil Structure and support and other required accessories shall also be provided.

Makes should be got approved from Engineer-in -charge before start of work

EV CHARGING STATION

Electrical vehicle (EV) charging facilities are proposed at Lake parking area.

EV Charging station @ 7.4 KW @ 2 No



EV Charging station @ 3.3 KW @ 3 No



LIST OF PREFERRED MAKE

Description of item	Manufacturer's Name
EV Charging stations	Exicom, Delta Electronics, Statiq, Lubi Ev Solutions
All other items not covered above	As per approval of Engineer-in-charge

ADVENTURE ACTIVITIES

The following outdoor activities have been planned with the indicative image.

Final design and quantities are to be got approved from the Engineer –in-Charge before start of work

	ADVENTURE ACTIVITY	INDICATIVE IMAGE
(a)	Supplying, constructing, erecting, testing and commissioning of the following adventure activities with specifications detailed below:- (i) Climbing Wall with following specifications:- Climbing Wall Height - 28 Ft Climbing Wall Width - 12 Climbing Surface Panel - Fiber Climbing Panel 10-Mm Thickness Fastener - Ss Fastener	 Qty – 04 OS

Climbing Wall Type - 3d+2d Total Climbing Surface - 288 Sqft Panel Warranty - 02 Year Climbing Hold - 100 Climbing Hold Allen Bolt - 100 Pcs of Allen Bolt Carriage Bolt - 100 Pcs For Panel Fixing Chain Anchor - 02 Including Painting Work (ii) Civil work details:- Foundation Depth - 05 Ft Pillar Thickness - 15 inch Beam Thickness - 09/09 inch Iron Rod - 16mm 12mm 06mm Foundation Bolt - 24mm Each Pillar 04 Total Foundation Bolt - 16 Nos Foundation Plate - 12mm Rib Plate - 08mm		
(b) (i) Zip Line with following specifications:- Zip line Length -200 meters approx. Zip line type- Classic Zip line wire -02 Weight load-40 to 105 kg Wire load capacity-8000 kg Wire-12 mm Galvanized steel core zip line wire.	Qty – 01 nos	

Total Wire length-500 meters

Wire lock gear-Galvanized turn lock and U-clamps

Welding work-Running welding work

Brakes-Dynamic brakes system with spring bungee cord

Warranty-01 year

Walkie- talkie-01 Pair

Equipment-06- set (Harness -06, pulley – 06, Hemet -06,screw carabineers – 14, tape sling – 14

Equipment pulling system-01 with 12mm wire

(ii) Iron & Fabrication Work Details

Pillar-06-inch square pipe 5-mm thick

Beam-04-inch square pipe 4-mm thick

Bracing-03-inch square pipe 3-mm thick

Stair both side-Iron angle and flat (width - 2.5 ft)

Standing platform-05- checker plate

Width of top platform-14x12

Landing platform-14x16 feet (its depends on speed)

Total tower numbers-02

(iii) Civil Work Details

Foundation depth-7-ft

Pillar thickness-18-inch

Beam thickness-12x12 inch

Iron rod-20mm 16mm 12mm 08mm



Foundation bolt-24-mm thick

Foundation plate-16mm

Rib plate-10mm thick L 10 x w 05 inch

(c) (i) Sky Cycle with following specifications:-

Qty – 01 nos

Length-100 mt approx.

Platform-24 ft

Tower height-32 ft

Type-Tandem (double seat)

Sky cycle line wire-02

Weight load-40 to 105 kg

Wire load capacity-8000 kg

Wire-12 mm Galvanized steel core zip line wire.

Total Wire length-480 meters

Wire lock gear-Galvanized turn lock and U-clamps

Welding work-Running welding work

Super-vision-By Big Boulder

Safety-Top self-anchor belay system

Warranty-01 year

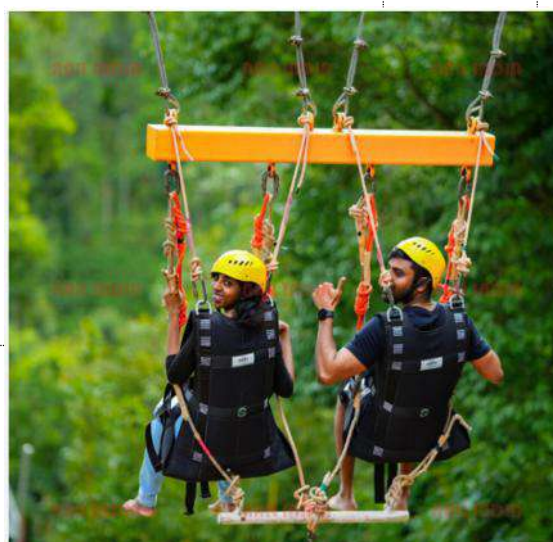
Walkie- talkie-01 Pair

Equipment-08- set (Harness -08, pulley – 06, Hemet -08, screw carabiners – 12, tape sling - 18

(ii) Iron and fabrication work details

Pillar-05-inch square pipe 4-mm thick

Beam-04-inch square pipe 3-mm thick



Bracing-03-inch square pipe 2.5-mm thick

Stair both side-Iron angle and flat (width - 2.5 ft)

Standing platform-05- checker plate

Width of top platform-14x14 ft

Landing platform-14x14 ft

Total tower numbers-02

Shade on top-Yes both side (metro sheet)

(iii) Civil work details

Foundation depth-5.6 -ft

Pillar thickness-15-inch

Beam thickness-12x12 inch

Iron rod-20mm 16mm 12mm 08mm

Foundation bolt-24-mm thick

Foundation plate-16mm

Rib plate-10mm thick L 08 x w 05 inch

(d) Gaint Swing with following Specifications:- Qty – 02 nos

Height-60 feet

Width-20 feet approx.

Main iron pillar-06- inch 6-mm iron pole

Support pole-04-inch iron pole

Welding and machinery work-Running welding work

Swing wire-12 mm galvanized steel core wire

Back pull structure type-65x65x05 Iron angel Truss

Swing Harness-02

Safety harness-02

Carabiners-08

Paint work

Iron structure-Iron welding work

Support rope-10 mm 50 mtr climbing rope

Back pole pulley-01

Motor -02 hp

Hanging pole-01

Pulling lock-01

Foundation-07-ft down from the ground level



- (e) Rope Course with following Specifications:- Qty – 04 nos
(List of Activities Burma Bridge ,Zig zag walks , Tyre bridge,Beam walk)

Length-25 feet each activity

Width-30 inch each section

Type-Low rope

Activity fix on-12 mm galvanized wire

Iron structure-04-inch iron pole structure and ladder work

Structure & Activity Paint work

Wooden plank-All wooden plank

Used scooty tyre-100 no's

Total rope course-05

Platform-Iron plate

Foundation-Foundation / civil work



The following Haunted House activity has been planned with the indicative image.

Final design are to be got approved from the Engineer –in-Charge before start of work



Legend

1. Entrance
2. Curtained portal
3. Rickety bridge across infinite abyss
4. Infinite abyss
5. Into the illusion.
6. Themed illusion.
7. Savage howling werewolf appears and lunges at visitors
8. Animated horrible and scary face suddenly appearing
9. Rattling skeleton with voiceover: help me I am not dead!
10. Ghostly figure tries to catch visitors
11. Explosion of fire roasting the visitors
12. Dark escape passage but attacked by vampire bats, gale force wind
13. Curtained portal
14. Exit
15. Service door
16. Service door
17. Service door
18. Control space

In client's scope:

1. Level floor with suitable floor
2. Ventilation, fans, a-c etc
3. Clear height to be min 23

Tentative Load details for Adventure Park

Sr No	Type of Load	LOAD ON MAINS			LOAD ON DG SET		
		Total Connected Load in KW	Demand Factor	Demand Load in KW	Connected Load on DG Set in KW	Demand Factor	Demand Load on DG Set in KW
1	Proposed Tents						
	10 nos @ 2 kw each	20	0.9	18.00	20	0.9	18.00
2	Load for newly proposed Buildings						
	El Load	3	0.9	2.70	3	0.9	2.70
	Power points	4	0.8	3.20	4	0.8	3.20
3	External & Land scape Lighting	17	0.9	15.30	17	0.9	15.30
4	High mast 2 nos @ 5 kw each	10	0.9	9.00	10	0.9	9.00
5	Plumbing System Load	5	0.8	4.00	5	0.8	4.00

6	Lift	15	0.9	13.50	15	0.9	13.50
7	Haunted House	20	1	20.00	20	1	20.00
	Add Extra for unforeseen load			20.00			
	Total Connected Load (A)			106			86
	Diversity (K1) @ 1.1						
	Maximum Demand Load in kW (A/K1)			97			78
	Transformer Capacity						
	Maximum Demand @ 0.9 P.F in KVA			108			
	Rating of @ 85% Loading in kVA			128			
	Proposed Transformer capacity - 160 KVA						
	Diesel Generator Back Up power Requirement						
	Maximum Demand in kW						78
	Maximum Demand @ 0.85 P.F in KVA						92
	Prime rating of DG Set @ 85% Loading in kVA						108
	Proposed Capacity to be installed in kVA						125
	Actual loading on DG Set						86%
	Proposed DG Set capacity 125 KVA						

Tentative Load details for Lake Area

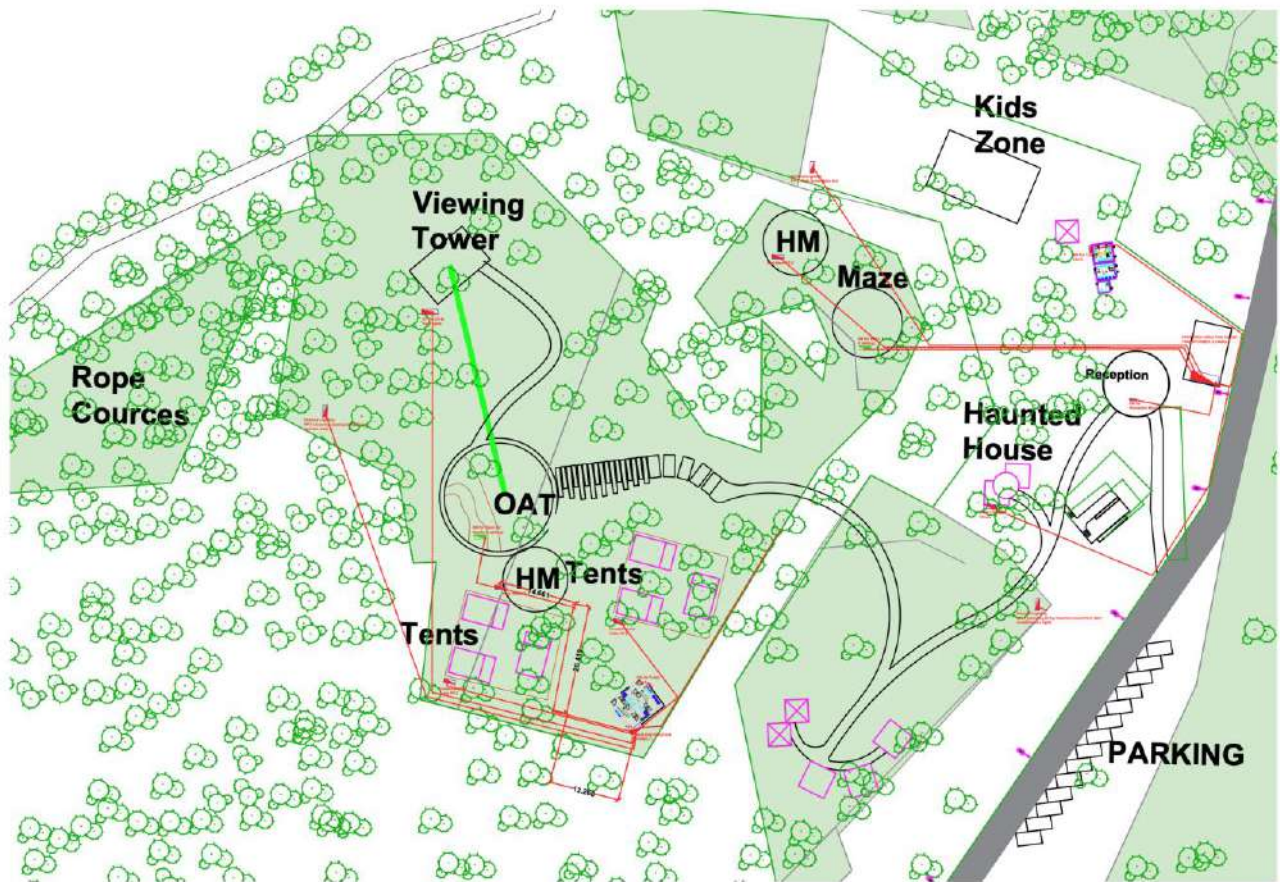
LOAD ON MAINS

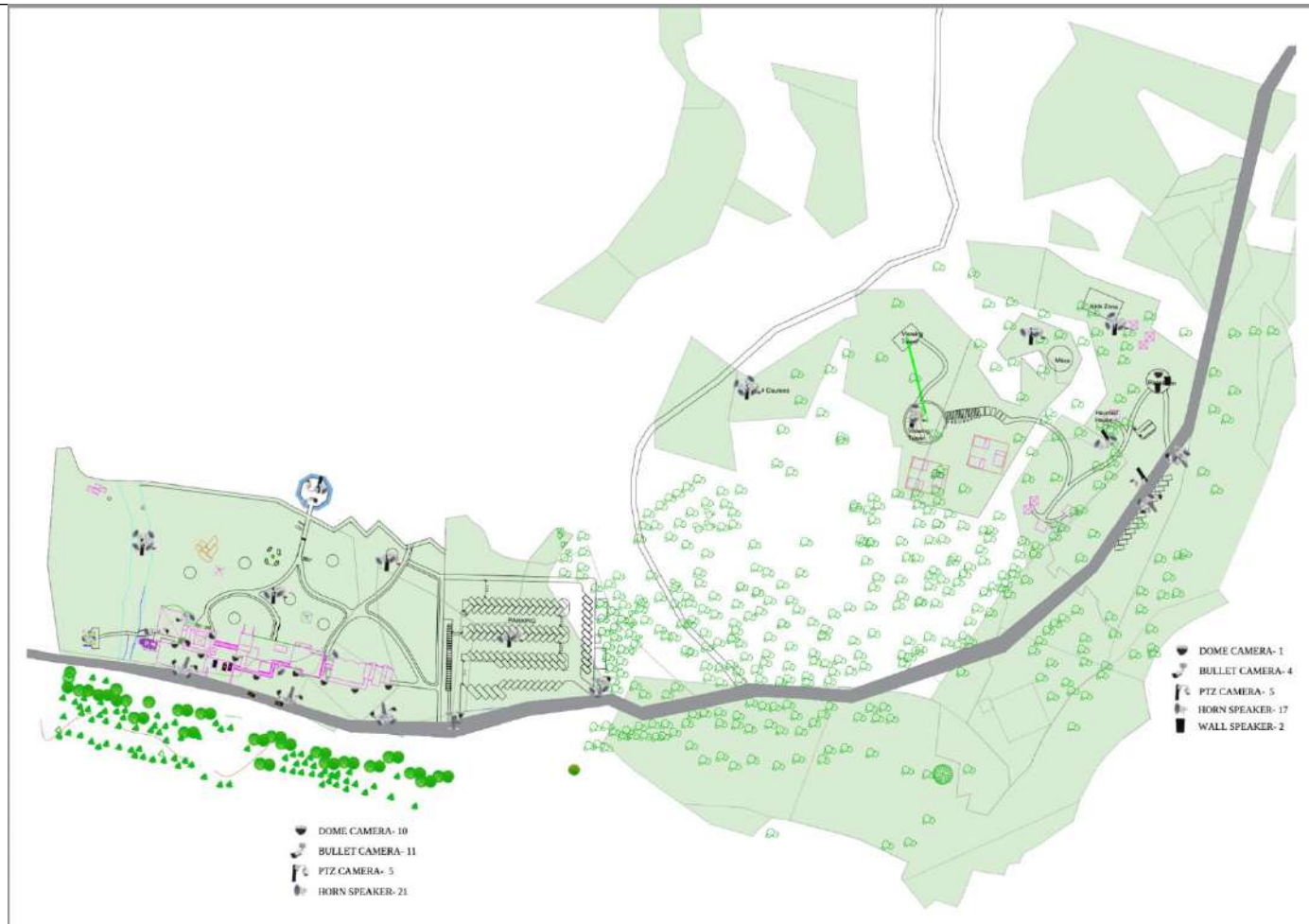
LOAD ON DG SET

Sr No	Type of Load	Total Connected Load in KW	Demand Factor	Demand Load KW	Connected Load on DG Set in KW	Demand Factor	Demand Load on DG Set in KW
1	Existing Rooms						
	8 nos @ 4 kw each	32	0.9	28.80	32	0.9	28.80
2	Load for rennovated Buildings						
	Resto Bar AC load (Area 1296 sqft) 12 TR @ 1.5 kw /TR	18	1	18.00	18	1	18.00
	Area below Resto Bar AC load (Area 1296 sqft) 12 TR @ 1.5 kw /TR	18	1	18.00	18	1	18.00
	Bar Area (256 sqft) 3 TR @ 1.5 kw/TR	4.5	1	4.50	5	1	4.50
	Adjacent to reception (322 sqft) 4 TR @ 1.5 kw/TR	6	1	6.00	6	1	6.00
3	E I Load	8	0.9	7.20	8	0.9	7.20
4	Power points	31	0.8	24.80	31	0.8	24.80
5	External & Land scape Lighting	15	0.9	13.50	15	0.9	13.50
6	Heat Pump	2.5	0.8	2.00	3	0.8	2.00
7	High mast @ 5 kw each	10	0.9	9.00			
8	EV Charging						
	3.3 KW @ 2 nos	6.6	0.9	5.94			
	7.4 KW @ 3 nos	22.2	0.9	19.98			
9	Plumbing System Load	10	0.8	8.00	10	0.8	8.00
10	Shops & Lease	20	0.8	16.00	20	0.8	16.00
10	STP	15	0.8	12.00	15	0.8	12.00

11	Add Extra for unforeseen load	10.00	10.00
	Total Connected Load (A)	204	169
	Diversity (K1) @ 1.1		
	Maximum Demand Load in kW (A/K1)	186	153
	Transformer Capacity		
	Maximum Demand @ 0.9 P.F in KVA	207	
	Rating of @ 85% Loading in kVA	244	
	Proposed Transformer capacity - 250 KVA		
	Diesel Generator Back Up power Requirement		
	Maximum Demand in kW		153
	Maximum Demand @ 0.85 P.F in KVA		181
	Prime rating of DG Set @ 85% Loading in kVA		212
	Proposed Capacity to be installed in kVA		250
	Actual loading on DG Set		85%
	Proposed DG Set capacity 250 KVA		

The provided Electrical load calculation is preliminary. The actual Electrical load calculation must be performed by the bidder. If the calculated Electrical demand load exceeds the afore mentioned figure, the equipment rating shall be determined based on the actual calculation. Conversely, if the calculated Electrical demand load is less than the afore mentioned figure, the equipment capacity shall remain unchanged as per the initial calculation.





2. Scope of Work:

(As per Section 6 of the RFP)

3. Specifications and Standards

The Project shall be constructed in conformity with the Specifications and Standards specified in Schedule-C.

Annex-II (Schedule-B)**Description of Ancillary Facilities*****[To be customised]***

The Project shall be a self-sustainable project and shall include supporting infrastructure components. The Selected Agency shall construct the Ancillary Facilities described in this Annex-II to form part of the Project. The Ancillary Facilities shall include, *inter alia*, following:

- Site Development-Clearing, Levelling and Grading
- Internal Pathways
- Drainage network
- Water Supply-Pump set, Treatment, Overhead Tank and distribution lines
- Sewerage-STP, Conveyance network
- Solid waste Management-Segregated Dustbins; waste disposal to be made as per the guidelines mentioned prescribed by MoEF&CC.
- Boundary Wall and Fencing
- Power facility, distribution and external lighting
- Borewells
- Toilet Blocks
- Landscaping

Any other supporting infrastructure deemed necessary by the Selected Agency

SCHEDULE C: SPECIFICATIONS AND STANDARDS

(See Article 2.1(b))

1. Project

- 1.1 The Project shall conform with the Specifications and Standards as specified in this Schedule-C and in this Agreement.
- 1.2 The Specifications and Standards applicable to the design and construction of the Project shall conform with the National Building Code of India, relevant specifications and standards specified by the Bureau of Standards, other Applicable Laws and Good Industry Practice.
- 1.3 In the absence of any specific provision in this Agreement, the following standards shall apply in order of priority:
 - 1.3.1 National Building Code
 - 1.3.2 Bureau of Indian Standards (BIS); and
 - 1.3.3 International guidelines including [GRIHA/LEED/Green Globe]
 - 1.3.4 Any other specifications/standards/codes proposed by the Selected Agency and reviewed by the Authority.
- 1.4 The latest version of the specified codes and standards which were notified published at least [60 (sixty)] days prior to the Bid Date in respect of this Agreement shall apply.

2. IMPORTANT CONSIDERATIONS IN STRUCTURAL WORKS

Proposed structures are to be constructed as either Reinforced Concrete or Structural Steel framed structures to suit the functional & service requirements of the overall project. Structural design of the proposed buildings shall be based on the following important design principles.

- All RC structural elements shall be designed as per IS 456 – 2000.
 - All Steel structural elements shall be designed as per IS 800.
 - Detailing of reinforcements shall be carried out as stipulated in handbook for Reinforcement detailing SP- 34.
 - In case of Steel Structure structural system shall be moment resisting frames in the transverse direction and bracings in the longitudinal direction.
 - Project site is located at “Morni Hills, Panchkula, Haryana” which falls under “Severe” exposure condition. Hence, all the structural elements are to be designed for severe exposure condition as per Table 5 of IS: 456-2000.
 - M25 grade of concrete to be considered as per IS: 456-2000.
-

- The minimum cement content should be 300 kg/m³ with maximum water cement ratio (w/c) of 0.45 as per table in section 7 of IS 456-2000.
- The poison's ratio (μ) for concrete as 0.15 & 0.2 for structural steel
- Concrete cover and fire rating should be as per IS: 456 – 2000
- All applicable primary loads listed below shall be considered in the structural design.
 - Dead load shall include weight of all structural and Architectural components. Self-weight of the materials shall be calculated based on the unit weights given in IS: 875 (Part-1)
 - Live Loads or superimposed loads shall be considered as per the provisions of IS: 875 (Part-2) based on Occupancy classification of the structure.
 - Wind loads shall be calculated in accordance with IS: 875 (Part-3):2015.
 - Earthquake loads are assessed based on the provisions of IS: 1893 (Part-4:2016) considering Zone-II with zone factor 0.10, Importance factor (I)-1, Response reduction factor (R) – 3 and having medium soil strata.
 - Load combinations shall be considered as per IS: 875 (Part-5).
- The effect of temperature will be considered wherever applicable in accordance with relevant Indian Codes. The coefficient for thermal expansion and contraction will be in accordance with IS: 456 and IS: 800 for concrete and steel respectively.
- Critical forces and moments from the 3D analysis for the governing load combinations shall be used in the design of the structural components.
- Type of foundation system shall be decided based on loading arrangement, load intensity and soil strata. Detailed soil investigation shall be carried out giving information on hydro-geological data such as sub-soil strata, ground water, presence of harmful pollutants & suspended matter, HFL, precautions to be taken etc. As per the preliminary assessment of the nature of soils in the project site, type of foundation can be considered as Isolated foundation. However, If soil strata is not found to be good then suitable soil improvement techniques can be followed to improve the bearing capacity of soil.
- Structural components shall be designed as per applicable BIS codes of practice, satisfying the limits of strength (Flexure, Shear & Torsion) and serviceability (Deflection, Vibration and crack width).
- The mixing, placing, compacting, curing and finishing of concrete shall be done according to IS: 456-2000: "Code of Practice for Plain and Reinforced Concrete".

The design of mixes shall be made according to I.S. 10262-2009 or any other approved standard methods through any of the reputed Institute to be approved by the Engineer

MATERIALS SPECIFICATIONS

Materials shall be conforming to the following IS specifications.

Table 0-1 Material Specifications

43 Grade ordinary Portland cement	IS: 8112
53 grade	IS:12269
Specification for Coarse and Fine Aggregates from Natural Sources For Concrete	IS: 383:1970
Code of Practice for Anti-Termite. Measures in Buildings	IS: 6313: 2001
Details and Preparatory Work for Damp-Proofing and Waterproofing of Buildings	IS: 3067:1988
Code of practice for brickworks	IS: 2212 :1991
Code of Practice for Application of Cement and Cement-Lime Plaster Finishes	IS: 1661 :1972
Cover white cement based polymeric putty	IS: 17545
Plastic emulsion paint	IS: 5411
Plastic Emulsion Paint	IS: 5411
Pressed ceramic tiles	IS: 15622
Timber Panelled and Glazed (Reaffirmed 2008) Shutters	IS: 1003
uPVC Profiles for Windows and Doors	IS: 17953: 2023
Un-plasticized PVC Pipes for Potable Water Supplies	IS:4985
Un-plasticized Polyvinyl Chloride (UPVC) Injection Moulded Fittings for Soil and Waste Discharge System for Inside and Outside Buildings Including Ventilation and Rainwater System	IS:14735
Specification for Wooden Flush Door Shutters (Cellular and Hollow Core Type)	IS-2191 Part-I
Adhesives for Use With Ceramic Tiles and Mosaics	IS: 15477
Brick Works	IS: 2212: 1991

High Strength Deformed Steel Bars and Wires for Concrete reinforcement	IS: 1786-2008
Plain and Reinforced Concrete	IS: 456: 2000
Plain and Reinforced Concrete	IS: 456: 2000
Hexagonal Wire Netting for General Purposes	IS: 3150
polished building stones, Part 1: Granite	IS: 14223-1:1995
Acoustics - Measurement of sound absorption in a reverberation room	IS: 8225:1987
Polished Building Stones	IS: 14223-1:1995
Code of Practice for Construction with Large Panel Prefabricates	IS: 11447 :1985
Specification for Steel Doors, Windows and Ventilators	IS: 1038
Continuously pre-painted galvanised steel sheets and coils	IS: 14246 (1995)
Preservation of bamboo for structural purposes - Code of practice.	IS: 9096 (2006)
Galvanized Steel Chain Link Fence Fabric	IS: 2721 (2003)
Continuously Pre-Painted Galvanized Steel Sheets and Coils	IS: 14246 (1995)
Code of practice for laying and finishing of cement concrete flooring tiles	IS: 1443 (1972)
Preservation of Bamboo for Structural Purposes	IS: 9096 (2006)
General Construction in Steel	IS: 800 (2007)
Glass Fibre Reinforced Plastic (Grp) Panel Type Door Shutters for Internal Use	IS: 14856 (2000)
Guidelines on Landscaping and Tree Plantation	IRC SP 021
Precast Concrete Pipes (With and Without Reinforcement	IS: 458 (2003)
Recommendation Of Dressing of Natural Building Stones	IS: 1129 (1972)
Construction of stone masonry	IS: 1597-1 (1992)
Code Of Practice for Road Signs	IRC 067

3. SITE WORK

3.1 Intimation about commencement of work:

Before commencing the works and also during progress the bidder shall give due notice to the concerned authorities, the Municipality, the Roads and Buildings and Electricity Board, Telephone Department, the Traffic Department attached to the Police, other Departments and companies as may be required to the effect that the work is being taken up in a particular locality and that necessary diversion of traffic may be arranged for. The bidder shall cooperate with the Departments concerned and provide for necessary barricading of roads, protection to existing underground mains, cables etc.

3.2 Cross Drainage:

The bidder shall handle all flows from natural drainage channels intercepted by the work under these specifications, perform any additional excavation and grading for drainage as directed and maintain any temporary construction required to bypass or otherwise cause the flows to be harmless to the work and property. When the temporary construction is no longer needed and prior to acceptance of the work, the bidder shall remove the temporary construction and restore the site to its original condition as approved by the Authority. The cost of all work and materials required by this paragraph shall be included by the bidder in the unit prices quoted in the section 6 of Vol. III (bill of quantities) and no separate payment will be made for the same.

3.3 Stacking of Excavated Material:

Where the location of the work is such and does not permit the deposition of excavated earth while digging trenches for laying pipes, the excavated earth should be conveyed to a convenient place and deposited there temporarily, as directed by the Authority. Such deposited earth shall be reconveyed to the site of work for the purpose of refilling of trenches, if such deposited soil is suitable for refilling. The unit rate for trench work of excavation and refilling shall include the cost of such operations.

3.4 Disposal of Surplus Earth:

The rate for excavation of trench work shall include charges of shoring, strutting, any of these contingent works. While bailing out water care should be taken to see that the bailed-out water is properly channelized to flow away without stagnation or inundating the adjoining road surfaces and properties.

3.5 Shoring, Strutting and Bailing out Water:

The rate for excavation of trench work, shall include charges of shoring, strutting, bailing out water wherever necessary and no extra payment will be made for any of these contingent works. While bailing out water care should be taken to see that the bailed-out water is properly channelized to flow away without stagnation or

inundating the adjoining road surfaces and properties.

4. WORK MANSHIP

A high standard of workmanship in all trades will be required. The Contractor shall ensure that only skilled and experienced workmen are employed. Also, good quality materials conforming to specifications stipulated in relevant codes shall be used for the items of work that too from approved make only.

All the work shall be carried out with utmost quality to the satisfaction of the end user in line with the standard construction practices and following the applicable codes of practice.

3.6 Development of the Project Roads and Utilities/Services

Development of the Project Roads and Utilities/Services shall include detailed design and Construction of the following as described in this section.

3.7 Design Standards for Roads and utilities

General

All Materials works and construction operations shall conform to the Manual of MORTH Specifications for Road and Bridge Works (5th revision). Where the specification for a work is not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer

Standards and Specifications to be adopted of following Project components are given in this section.

- Road Works: Carriageway, road furniture, road markings, road signage, traffic control devices, safety Works, pedestrian facilities, median plantation, etc.
- Where the Contractor intends to use an alternative to the Standards/Guidelines defined in section or delivering an equal or better product, he shall be permitted to use such alternative subject to the following conditions:
- He shall demonstrate that the proposed alternative conforms to any of the following International Standards, Codes of Practice, Specifications, Guidelines, etc.
- American Association of State Highway and Transportation Officials (AASHTO)
- American Society for Testing of Materials (ASTM)
- Euro Codes
- National Standards of any of the following countries: United States of America (USA), Canada, United Kingdom (UK), France, Germany, Sweden, Denmark, Norway, Netherlands, Spain, Australia, New Zealand, Japan and South Africa
- In case the Contractor intends to use any alternative Material / technology/ method, whether patented or otherwise, that is not specifically covered in the Indian or

International Standards as listed above, but the use of which has been permitted on similar Projects (similar in category of road, traffic and climatic conditions) as the Project Road, he would be permitted, its use on certification by the owners of such similar Projects regarding the continued successful performance of such Materials, technologies, methods, procedures or processes for at-least 4 years of the service life of the Project. Such a certification shall be supported with details of critical performance parameters.

3.7.1 Design Standards

The Project Roads and Utilities/ Services shall confirm to design requirements set forth in this document. List of Design Standards

List of Standards are given in Table 2-1, Table 2-2, Table 2-3, Table 2-4. Latest revision of codes shall be referred.

3.7.2 Standards and Specifications

i. Construction

The Contractor shall comply with the Specifications and Standards set forth in this document for Construction of the Project Roads and Utilities/ Services.

All Materials, Works and Construction operations shall conform to the Specifications for Road and Bridge Works (Fifth Revision, April 2013), issued by the Ministry of Road Transport & Highways (MoRT&H). Where the Standards and Specifications for a work are not given, Good Industry Practice shall be adopted to the satisfaction of the Authority's Engineer.

ii. Clearing and grubbing

Clearing Road land including uprooting rank vegetation, grass, bushes, shrubs, saplings and trees girth up to 300 mm, removal of stumps of trees cut earlier and disposal of unserviceable materials and stacking of serviceable material to be used or auctioned, including all leads and lifts, including removal and disposal of top organic soil not exceeding 150 mm in thickness as per Technical Specification Clause 201 MORTH Fifth Revision.

iii. Tack Coat

Providing and applying tack coat with bitumen emulsion conforming to IS: 8887, using emulsion pressure distributor including preparing the surface & cleaning with mechanical broom. On bituminous surface to be applied as per clause 503 of MoRT&H Fifth Revision.

iv. Bituminous Concrete

Providing and laying Bituminous concrete with required compacted thickness with bitumen of grade and lime filler (percentage by weight of Aggregate) according to IRC 29 with prepared in Batch Type Hot Mix Plant of relevant TPH capacity, laying with a hydrostatic paver finisher with sensor control to the required grade, level and

alignment, rolling with smooth wheeled, tandem vibratory rollers to achieve the desired compaction as per MORTH specification clause No. 509 complete in all respects.

- The minimum content of bitumen shall be 5.0% (for layer thickness of 50mm, grading 2) and 5.4% (for layer thickness of 30-40mm, grading 2). The filler shall be only “Unslaked lime/cement” of grade approved by the Authority’s Engineer.

Bitumen VG30 conforming to IRC and MoRT&H specifications shall be used for BC surface course.

Table 3 Standards and Guidelines for Road design

	IRC: SP:63-2018	Guidelines for the Use of Interlocking Concrete Block Pavement (First Revision)
Road markings	IRC: 35-2015	Code of Practice for Road Markings (Second Revision)
Signage	IRC:67-2022 IRC: SP:31-1992	Code of Practice for Road Signs (Fourth Revision) New Traffic Signs
Landscaping	IRC: SP:21-2009	Guidelines on Landscaping and Tree Plantation
Pedestrian facilities	IRC:103-2022	Guidelines for Pedestrian Facilities (Second Revision)
Safety features	IRC: SP: 44-1996	Highway Safety Code
Parking Facilities	IRC: SP: 12-2015	Guidelines for Parking Facilities in Urban Roads (First Revision)
Traffic lights	IRC: 93-1985	Guidelines on Design and Installation of Road Traffic Signals

5. SPECIAL CONDITIONS FOR PROCUREMENT OF CEMENT

- The contractor shall procure OPC cement in work from reputed manufacturers of cement having a production capacity not less than one million tonnes or more per annum, such as ACC, Ultra Tech, Siddhi, Sanghi Cement, Birla Jute & cement

corporation of India etc., as approved by Ministry of Industry, Government of India and holding license to use ISI certification mark for their product. The tenderers may also submit a list of names of cement manufacturers which he proposes to use in the work. The tender accepting authority reserves rights to accept or reject name (s) of cement manufacturer(s) which the tenderer proposes to use in the work. No change in the tendered rates will be accepted if the tender accepting authority does not accept the list of cement manufacturers, given by the tenderer fully or partially.

- ii. The supply of cement shall be taken in 50 kg. bags bearing manufacturer's name and ISI marking. Samples of cement arranged by the contractors shall be taken by the Authority and got tested in accordance with provisions of relevant BIS codes. In case of test results indicate that the cement arranged by the contractor does not conform to the relevant BIS Codes, the same shall stand rejected, and it shall be removed from the site by the contractor at his own cost within a week's time of written order from the Authority to do so.
- iii. The cement shall be got tested by the Authority and shall be used on the work only after satisfactory test results have been received. The contractor shall supply free of charge the cement required for testing including its transportation cost to testing labs. The cost of tests shall be borne by the contractor / department in the manner indicated below:
 - a) By the contractor, if the result shows that the cement does not conform to relevant BIS code.
 - b) By the department, if the result shows that the cement conforms to relevant BIS codes.
- iv. The actual issue and consumption of cement on work shall be regulated and proper accounts maintained as provided in clause 10 of the contract. The theoretical consumption of cement shall be worked out as per procedure prescribed in clause 42 of the contract and shall be governed by conditions laid therein. In case of cement consumption is less than theoretical consumption including permissible variation; recovery at the rate show prescribed shall be made. In case of excess consumption, no adjustment needs to be made.

6. SPECIAL CONDITION FOR PROCUREMENT OF STEEL

The contractor shall procure TMT bars of **Fe500-D grade** (the grade to be procured is to be specified) from primary producers such as SAIL or TISCO or RINL or JINDAL or JSW Steel Ltd. as approved by the Ministry of Steel. In case of non-availability of steel from primary producers, the NIT approving authority may permit use of TMT reinforcement bars procured from secondary producers. In such cases following action is to be taken by NIT approving authority:

- a) The grade of the steel **Fe500-D grade** to be procured is to be specified as per BIS 1786-2008.

- b) TMT bars procured either from primary producers or secondary producers, the specifications shall meet the provisions of IS 1786: 2008 pertaining to **Fe500-D grade** of steel as specified in the tender of steel as specified in the tender.

All TMT Bars to be duly factory coated against corrosion in coastal environments.

7. STACKING AND STORAGE OF MATERIAL

7.1 CEMENT & LIME

a. In case cement is received in bags.

- i. Cement shall be stored at the work site in a building or a shed which is dry, leak-proof and as moisture proof as possible. The building or shed for storage should have minimum number of windows and close-fitting doors and these should be kept closed as far as possible.
- ii. Cement shall be stored and stacked in bags and shall be kept free from the possibility of any dampness or moisture coming in contact with them. Cement bags shall be stacked off the floor on wooden planks in such a way as to keep about 150 mm to 200 mm clear above the floor. The floor may comprise of lean cement concrete, or two layers of dry bricks laid on well consolidated earth. A space of 600 mm minimum shall be left all-round between the exterior walls and the stacks in the stacks the cement bags shall be kept close together to reduce circulation of air as much as possible. Owing to pressure on the bottom layer of bags sometimes ‘warehouse pack’ is developed in these bags. This can be removed easily by rolling the bags when the cement is taken out for use. Lumbed bags, if any should be removed and disposed of.

b. In case cement is received in drums

These shall be stored on plane level ground, as far as possible near the concrete mixing place. After taking out the required quantity of cement, the lid of the drum shall be securely tied to prevent ingress of moisture.

c. In case cement is received in silos

The silos shall be placed near the concrete batching plant. Proper access shall be provided for the replacement of silos.

Different types of cements shall be stacked and stored separately.

7.2 Lime:

Un-slaked lime shall be stored in a place inaccessible to water and because of the fire hazard, shall be segregated from the consumable material

7.3 BRICKS / BELA STONES

- i. Bricks shall be stacked in regular tiers as and when they are unloaded to minimize breakage and defacement. These shall not be dumped at site.

- ii. Bricks shall be stacked on dry firm ground. For proper inspection of quality and ease in counting the stacks shall be 50 bricks long, 10 bricks high and not more than 4 bricks in width, the bricks being placed on edge, two at a time along the width of the stack. Clear distance between adjacent stacks shall not be less than 0.8 m. Bricks of each truck load shall be put in one stack.
- iii. Bricks of different types, such as clay bricks, clay fly ash bricks, fly ash lime bricks, sand lime (calcium silicate) bricks, Bela stone, auto-clave bricks etc. shall be stacked separately. Bricks of different classification and size consideration (such as, conventional and modular) shall be stacked separately. Also bricks of different types, such as, solid, hollow and perforated shall be stacked separately.

7.4 FLOOR, WALL AND ROOF TILES

- i. Floor, wall and clay roof tiles of different types, such as, cement concrete tiles (plain, coloured and terrazzo) and Vitrified Tile Flooring (glazed and unglazed) shall be stacked on regular platform as far as possible under cover in proper layers and in tiers and they shall not be dumped in heaps. In the stack, the tiles shall be so placed that the mould surface of one faces that of another. Height of the stack shall not be more than one metre. During unloading, these shall be handled carefully so as to avoid breakage.
- ii. Vitrified tiles and clay roof tiles are generally supplied in cartons which shall be handled with care. It is preferable to transport these at the site on platform trolleys.

8. EARTH WORK

8.1 EARTH WORK - GENERAL:

8.1.1 Earth work diagrams and Data:

To the extent that they exist plans and earth work data prepared for the Government's (that is Government of Andhra Pradesh) studies of earth work for construction of the related works will be available for Inspection by the Contractor in the Office of the concerned Authority.

Such information is made available solely for the convenience of Contractors. The Government does not represent that this information is accurate or complete. Contractors are cautioned that this information is subject to revision and that the Government disclaims responsibility for any interpretations, deductions or conclusions which may be made therefrom. It is not intended that this earth work information will limit or prescribe the excavation and handling procedure of the contractor, and the Government reserves the right to utilize and distribute earth work materials during the progress of work as best serves the interest of the Government.

8.1.2 Compacting Earth Materials:

Where compacting of earth materials is required, the materials shall be deposited

in horizontal layers and compacted as specified in this paragraph. The excavation, placing, moistening and compacting operations shall be such that the materials will be uniformly compacted throughout the required section and will be homogeneous, free from lenses, pockets, streaks, voids, lamination or other imperfections. The compaction shall be carried out in accordance with the relevant clauses of I.S 4701 – 1982.

8.2 EXCAVATION:

8.2.1 Classification of Excavation:

Except as otherwise provided in these specifications, material excavated will be measured in excavation to the lines shown on the drawings or as provided in this specification, and all materials so required to be excavated will be paid for at the applicable prices bid in the schedule for excavation. No additional allowance above the price bid in the schedule will be made on account of any of the material being wet. Contractors and the contractors must assume all responsibility for deducting and concluding as to the nature of the materials to be excavated and the difficulties of making and maintaining the required excavation. The Government does not represent that the excavation can be performed or maintained at the paylines described in these specifications or shown on the drawings.

Excavation for removal of debris and deposited earth on berms while forming roads is to be carried out as specified in relevant clauses of 154701-1982 as compared before lying of berms with the same setting of roads.

8.2.2 Excavation for Structures:

a. General:

Excavation for the foundation of structures shall be to the elevation shown on the drawings or as directed by the Authority. In so far as practicable, the material removed in excavation for structures shall be used for back fill and embankments. Otherwise, it shall be disposed of as specified in paragraph 2.4.

b. Foundations for Structures:

The Contractor shall prepare the foundations at structure/sites by methods which will provide firm foundation for the structures. The bottom and side slopes of common excavation upon or against which the structure is to be placed shall be finished to the prescribed dimensions and the surfaces so prepared shall be moistened and tamped with suitable tools to form firm foundation upon or against which to place the structure. The Contractor shall prepare the foundation for the structures as shown on respective drawings. The natural foundation material beneath, the required excavation shall be moistened if required and compacted in place.

Separate payment will not be made to the contractor for moistening and compacting the foundation of structures. The contractor shall include cost thereof in the price

bid per cubic meter of the item of the Bill of quantities for preparation of foundations.

Whenever unsuitable material is encountered in the foundation for a structure the Authority will direct additional excavation to remove the unsuitable material. The cost of such additional excavation shall be paid at the unit price bid in the Bill of quantities for earth. The additional excavation shall be refilled by selected bedding material and compacted.

c. Over Excavation:

If at any point in common excavation the foundation material is excavated beyond the lines required to receive the structure, or if at any point in common excavation the natural foundation material is disturbed or loosened during the excavation process, it shall be compacted in place or where directed, it shall be removed and replaced as follows. In excavation soils, the over excavation shall be filled in by selected bedding material and compacted. In excavation in rock it shall be filled with M5 grade cement concrete. Any and all excess excavation or over excavation performed by the Contractor for any purpose or reason except for additional excavation as may be prescribed by the Authority and whether or not due to the fault of the contractor shall be at the expense of the contractor. Filling for such excess excavation or over excavation shall be at the expense of the contractor.

8.3 BACKFILL:

8.3.1 Back Fill Around Structures:

a. General:

The item of the schedule for backfill around structures including pipe portions of structures includes all backfill required to be placed under these specifications.

b. Materials:

The type of material used for backfilling, the amount thereof, and the manner of depositing the material shall be subject to approval of Authority. In so far as practicable backfill material shall be obtained from material removed in required excavations for structures. But when sufficient suitable material is not available from this source, additional material shall be obtained from approved borrow areas. The borrow pit excavation shall be in accordance with clause-9.1 to 9.3 of I.S 4701-1982.

Backfill material shall contain no stones larger than 80 millimeters in diameter. If the excavation for the foundation of the structure is in swelling soils, a layer of cohesive non-swelling soil conforming to I.S.9451-1980 should be interposed between the swelling soil of the structure and compacted to at least 95% standard proctors density.

c. Placing Backfill:

Backfill shall be placed to the lines and grades shown on the drawings as prescribed in this paragraph or as directed by the Authority. All backfill shall be placed carefully and spread in uniform layers not exceeding 150 mm, so that all spaces about rocks and clods will be filled. Each layer shall be watered and well compacted before the succeeding layer is laid, care being taken not to disturb the constructed structure. Backfill shall be brought up as uniformly as practicable on both sides of walls and all sides of structure to prevent unequal loading. Backfill shall be placed to about the same elevation on both sides of the pipe positions of the structures to prevent unequal loading and displacement of the pipe.

9. MASONRY

9.1 MATERIALS:

9.1.1 Stone for Masonry:

a. General:

The stones used for stone masonry shall conform to the relevant specifications of Clause 4.1 of I.S 1597 (Part-I) 1967 code of practice for construction of stone Masonry Part-I Rubble Stone Masonry.

The stone of the required quality shall be obtained from the quarries specified in the lead chart appended to the Schedule. The common types of natural stones which are generally used are Granite and other ingenious rocks, and shall be free from defects like decay, cavities, cracks, flaws, sand, holes, soft seams, veins, patches of soft or loose materials or any other deleterious materials like iron oxide Organic Impurities etc. They shall be free from rounded, worn or weathered surfaces or skin or coating which prevents the adherence of mortar. All stones used shall be clean of uniform color and texture, strong, hard and durable.

The percentage of water absorption shall not exceed 5% by weight as determined in accordance with I.S. 1124-1974.

The approval of the quarries by the Authority shall not be constructed as constituting approval of all or any of the stones collected from the deposits; and the Contractor will be held responsible for suitability of the stones used in the work.

9.1.2 Brick for Masonry

General:

Bricks used for brick masonry shall conform to the relevant specifications of I.S. 1077-1986 common burnt clay building bricks.

Bricks shall be hand or machine molded. They shall be sound, hard, homogeneous in texture well burnt and shall give a clear ringing sound when struck. They shall be clean, free from warping, distortion, cracks, chips, flaws, stones and nodules of free lime. Unless otherwise specified the sizes of the bricks shall be 190 x 90 x 90 mm. The compressive strength shall not be less than 40 Kg/Cm². The percentage of water

absorption shall not be more than 20 per cent by weight after 24 hours immersion in cold water.

9.1.3 Sand for Masonry:

General:

Sand shall generally conform to specifications given in paragraph 6.2.5 except that the sand for mortar shall conform to the grading of sand given in clause 4 of I.S.2116-1189 as detailed below in Table 4(b).

Table 4(b): Grading of Sand for use in Masonry Mortars:	
I.S. Sieve Designation	Percentage passing by Mass
4.75 mm	100
2.36 mm	90 to 100
1.18 mm	70 to 100
600 Micron	40 to 100
300 Micron	5 to 70
150 Micron	0 to 15

A sand whose grading falls outside the specified limits due to excess or deficiency of coarse or fine particles may be processed to comply with the standard by screening through a suitably sized sieve and/or blending with required quantities of suitable size and particles.

The procurement of sand for masonry shall conform to the specifications given in paragraph 6.2.5.

9.1.4 Cement:

General:

As per clause 4 of I.S. 456-1978 for the purposes of these specifications, cement used shall be any of the following with the prior approval of the Authority for Ordinary Portland (OPC) – GRADES 43 & 53 Conforming to BIS: 811: 12269 respectively (or) Portland pozzolana cement conforming to I.S. 1489 relevant amendments up to date.

The provisions of this paragraph apply to cement for use in cast-in-place concrete required under these specifications. Portland cement required for items such as concrete pipes, precast concrete structural members and other precast concrete products, for grout and mortar and for other item is provided for in the applicable paragraphs of these specifications covering the items for which such Portland cement is required.

The water used in making and curing of concrete, mortar and grout shall be free from objectionable quantities of silt, organic matter, injurious amounts of oils, acids, salts, and other impurities etc., as per I.S. specification No.456-1978.

The Authority will determine whether or not such quantities of impurities are objectionable. Such determination will usually be made by comparison of compressive strength, water requirement, time of set and other properties of concrete made with distilled or very clean water and concrete made with the water proposed for use. Permissible limits for solids when tested in accordance with I.S. 3025-1964 shall be as tabulated below.

Permissible limit for Solids:	Maximum permissible limit
1. Organic	200 mg/L
2. Inorganic	3000 mg/L
3. Sulphate (as SO ₄)	500 mg/L
4. Chlorides (as CL)	2000 mg/L for plain concrete work and 1000 mg/L for R.C.C. work
5. Suspended matter	2000 mg/L

If any water to be used in concrete, mortar or grout is suspected by the Authority of exceeding the permissible limits of solids, samples of water will be obtained and tested by the Authority in accordance with I.S. 3025-1964.

9.2 MORTAR

a. Preparation of Mortar:

Unless otherwise specified, the cement mortar used in Masonry works shall be cement mortar mix MM5 (1:5) grade using minimum 288 Kgs. of cement per cubic meter of mortar.

Mixing shall be done thoroughly preferably in a mechanical mixer. In such cases, the cement and sand in the specified proportions shall be mixed dry thoroughly in the mixer operated manually or by power.

Water shall be added gradually and wet mixing continued at least for 3 minutes. Water should not be more than that required for bringing the mortar to the required working consistency of 90 to 130 milli meters as required in clause 9.11 of I.S. 2250-1981. The mix shall be clean and free from injurious kind of soil, acid, alkali, organic matter or deleterious substances.

b. Time of use of Cement Mortar:

Cement mortar shall be used as soon as possible after mixing and before it has begun to set, within 30 minutes after the water is added to the dry mixture.

Mortar unused for more than 30 minutes should not be used and shall be removed from the site of work. The cost of such wasted mortar shall be borne by the Contractor. The use of retempered mortar will not be permitted to be used for the masonry.

c. Tests of Mortar:

Mortar Test cubes shall be cast for the mortar used on the work and shall be tested in accordance with Appendix-A of I.S.2250-1965 code of practice for preparation and use of Masonry Mortars. Such cubes shall develop a compressive strength of at least 50 Kg/square centimeter for MM5 (1:5) Grade cement mortar mix, 75 Kg/square centimeter for MM 7.5 (1:4) grade cement mortar mix and 30 Kg/ square centimeter for MM-3 grade cement mortar mix.

Mortar not conforming to the specifications will be rejected, and the cost of such wasted mortar shall be borne by the Contractor.

d. Dismantling of Structures:

During course of excavation of drainage works certain dismantling of brick masonry / R.R. masonry retaining walls in CM C.C M10 grade levelling course are to be carried out. These have to be carried out as specified under section 202 of A.P.S.S, and as per directions of Authority and site cleared before facing up actual execution.

10. PLASTERING & POINTING**10.1 SECTION – MATERIALS:****10.1.1 Sand for Mortar for Plastering and Pointing:****e. General:**

The sand for preparation of Mortar for plastering and pointing shall confirm to the following gradation, shown in Table 5(A).

TABLE 5 (A)**REQUIREMENTS OF GRADING FOR SANDS FOR EXTERNAL PLASTERING AND RENDERING**

		Percentage by weight passing	
I.S.	SIEVE	I.S., Sieve	
	Designation	Class – A	Class - B
	4.75 MM	100	100
	2.36 MM	90 to 100	90 to 100
	1.18 mm	70 to 100	70 to 100
	600 Microns	40 to 85	40 to 95
	300 Microns	5 to 50	10 to 65
	150 Microns	0 to 10	0 to 10

For the purpose of indicating the suitability for use, the sand is classified as Class A and Class B in accordance with the limits of grading. Class 'A' sands shall be used generally for plastering and pointing, and when they are not available, Class 'B' sands may be used with the approval of Engineer-in-Charge.

The procurement of sand for Mortar for plastering and pointing shall conform to the specifications given in paragraph 6.2.5.

10.1.2 Cement:

The specifications and conditions specified for supply for cement in paragraph 4.1.4 shall be applicable here also.

Portland pozzolana cement conforming to I.S. 1489-1976 shall be used for preparation of mortar for plastering and pointing work. Ordinary Portland cement – Grades 43 & 53 may also be used in the event of non-availability of P.P.C.

10.1.3 Water:

The specifications and conditions specified for procurement of water shall be applicable as per IS code.

10.2 SECTION – MORTAR:

10.2.1 Preparation of Mortar for Plastering work:

Unless otherwise specified, the cement mortar used in plastering work shall be in cement mortar mix of MM. 7.5 (1:4) grade, using minimum 360 Kgs. of cement per cubic meter of mortar.

The other specifications and conditions enunciated in this Clause 10.2 shall apply for this mortar for plastering work also.

10.2.2 Preparation of Mortar for Pointing:

The cement mortar used in pointing work shall be cement mortar mix of M.M 7.5 grade, using 480 Kgs. of cement per cubic meter of mortar.

The other specifications and conditions enunciated in this Clause 10.2 shall apply for this mortar for pointing work also.

10.3 SECTION – PLASTERING WITH CEMENT MORTAR MIX. MM 7.5 GRADE 20 MM THICK:

10.3.1 Preparation of Surface:

The roughening of the background improves the bond of plaster. All joints shall be thoroughly raked. After roughening the surface, care shall be taken to moisten the surface sufficiently before plastering as otherwise rashly exposed surface may tend to absorb considerable amount of water from the plaster. The surface shall be wetted evenly before applying the plaster. Care shall be taken to see that the surface is not too dry as this may cause lack of adhesion or excessive suction of water from the plaster. A fog spray may be used for this work. As far as possible, the plaster work shall be done under shade.

10.3.2 Laying of Plastering with Cement Mortar Mix MM.7.5 grade 20 mm thick:

The mortar used for plastering shall be stiff enough to cling and hold when laid. To ensure even thickness and true surface, plaster shall be applied in patches of 150 mm x 150 mm of the required 20 mm thickness at not more than 2 meters intervals horizontally and vertically over the entire surface to serve as guides. The surface of these guides shall be truly in the plane of the furnished plaster surface and truly plumb. The mortar shall then be applied to the surface to be plastered between the guides with a trowel. Each trowel full of mortar shall overlap and sufficient pressure shall be used to force it into thorough contact with the surface. On relatively smooth surfaces, the mortar shall be dashed on with the trowel to ensure adequate bond. The mortar shall be applied to a thickness slightly more than that specified, using a string, stretched out between the guides. This shall then be brought to a true surface by working with a long wooden float with small sawing motion. The surface shall be periodically checked with a string stretched across it. Finally the surface shall be rendered smooth with a small wooden float, over working shall be avoided. All corners, arises, and junctions shall be brought truly to a line with any necessary rounding or chamfering.

If it is necessary to suspend the work at the end of the day, it shall be left in a clean horizontal or vertical line not nearer than 150 millimeters for any corner or arises or on parapet tops or on copings etc. When recommending the work, the edges of the old work shall be scraped clean and treated with cement slurry before the new plaster is laid adjacent to it. After the first coat is done, it shall be kept undisturbed for the next 24 hours and thereafter kept moist and not permitted to dry until the final rendering is applied.

After the plaster has sufficiently hardened cement slurry with cream like consistency shall be applied as thinly and evenly and rubbed to a fine condition.

The finished surface shall be cured with water for a period of 10 days.

10.4 SECTION – Pointing to Stone Masonry with Cement Mortar Mix mm 7.5 Grade

The joints in the masonry shall be raked out to a depth not less than the width of the joint or as directed when the mortar is green. Joints are to be brushed clean of dust and loose particles with a stiff brush. The area shall then be washed and the joints thoroughly wetted before pointing is commenced.

10.4.1 Flush Pointing with Cement Mortar Mix MM. 7.5 Grade for Rubble Masonry:

The pointing to be done shall be flush pointing with cement mortar mix MM. 7.5 grade. The mortar shall be pressed into the raked out joints according to the types of pointing required. The mortar shall not be spread over the corners, edges or surface of the masonry. The pointing shall then be finished as detailed below. The mortar shall be finished off flush and level with the edges of the stones, so as to give a smooth appearance. The edges shall be neatly trimmed with a trowel and a straight edge.

The pointing shall be cured for seven days.

11. CONCRETE

11.1 CONCRETE STRUCTURES:

11.1.1 Concrete in Structures:

Concrete in structures shall conform to the requirements of Paragraph 12.2

11.1.2 Construction of Structures:

Cast-in-place concrete for the structures shall conform to the requirements of section.

The structures shall be built to the lines, grades and dimensions shown on the drawings. The dimensions of each structure as shown in the drawings will be subject to such modifications as may be found necessary by the Authority to adopt the structure to the conditions disclosed by the excavation or to meet other conditions. Where the thickness of any portion of a concrete structure is variable, it shall vary uniformly between the dimensions shown.

Where necessary, as determined by the Authority, the Contractor will be furnished with additional detailed drawings of the structures to be constructed. The Contractor will not be entitled to any additional allowances above the prices bid in the schedule by reason of the dimensions fixed by the Authority or by reasons of any modifications or extensions of a minor character to adopt a structure to a structure at site, as determined by the Authority.

The cost of furnishing all materials and performing all work for installing timber, metal and other accessories for which specific prices are not provided in the schedule, shall be included in the applicable prices bid in the schedule for the work to which such items are appurtenant.

11.2 GENERAL CONCRETE REQUIREMENTS:

11.2.1 Composition:

a) General:

Concrete shall be composed of cement, sand, coarse aggregate, water and admixtures (if any) as specified, all well mixed and brought to the proper consistency.

b) Nominal maximum size of Aggregates:

In coarse aggregates to be used in concrete shall be as large as practicable, consistent with required strength, spacing of reinforcement and embedded items, and placement thickness. The size of the coarse aggregate to be used will be determined by the Authority and may vary incrementally according to the conditions encountered in each concrete placement. Nominal maximum size of aggregate for concrete in structures shall be as indicated in the relevant drawings appended to the contract documents. Smaller coarse aggregate than specified shall be used where in the opinion of the Authority that proper placement of concrete is impracticable with

the size of the aggregate specified in the drawings.

c) Mix Proportions:

The proportions of various ingredients to be used in the concrete for different parts of the work will be established by proper mix design by the Contractor and approved by the Authority during the progress of the work. In proportioning concrete, the quantity of both cement and aggregate should be determined by mass as per clause 9.2 of I.S. 456-1978 water shall be either measured by volume in calibrated tanks or weighted. All measuring equipment shall be maintained in a clean serviceable condition and their accuracy periodically checked. Adjustments shall be made as directed to obtain concrete having suitable workability, impermeability, density, strength and durability without use of excessive cement. The acceptance or rejection of concrete shall be as per the acceptance criteria laid down in clause 15 of I.S. 456-1978.

The mix design and average concrete strength shall be adjusted according to the cube strength test results conforming to clauses 14.2, 14.3, 14.4, 14.5 of I.S. 456-1978. The Contractor shall not be entitled for any additional allowances above the prices bid in the schedule due to adjustments of the mix proportions.

The net water cement ratio exclusive of water absorbed by the aggregate shall be sufficiently low to provide adequate durability in concrete. The water-cement ratio for various grades of concrete shall be as determined.

d) Consistencies:

i) The slump of concrete at the placement shall be as follows:

Reinforced Cement Concrete:

S. No.	Placing Condition	Degree of Workability	Value of Workability
1.	Concreting of lightly reinforced sections without vibration or heavily reinforced sections with vibration	Medium	25 mm to 75 mm slump for 20 mm aggregate
2.	Concreting of heavily reinforced section without vibration	High	75 mm to 125 mm slump for 20 mm aggregate

ii) For plain concrete work, slump requirements mentioned in item - (i) above are applicable.

If the specified slump is exceeded at the placement, the concrete is unacceptable. The Authority reserves the right to require lesser slump whenever concrete of such lesser slump can be consolidated readily into place by means of vibration specified by the Authority. The use of any equipment which will not readily handle and place concrete of the specified slump will not be permitted.

To maintain concrete at proper consistency, the amount of water and sand batched for concrete shall be adjusted to compensate for any variation in the moisture content or grading of the aggregates as they enter the mixer. Addition of water to compensate for stiffening of the concrete after mixing but before placing will not be permitted. Uniformity in concrete consistency from batch to batch will be required.

11.2.2 Concrete Quality Control Measures and Concrete Quality Assurance Test Programme.

- a) **Concrete Quality Control Measures:** The Contractor shall be responsible for providing quality concrete to ensure compliance of the bid requirements.
- b) **Concrete Quality Assurance Program:** The concrete samples will be taken by the Departmental Engineers and its quality will be tested in the departmental laboratory as per the relevant Indian Standard Specifications I.S. No. 516-1959 and I.S. 1199-1959.

Tests: The Government will obtain samples and conduct tests as specified in I.S. 456-1978, I.S. 1199-1959 and I.S. 516-1959.

Test Facilities: The Contractor shall furnish free of cost samples of all ingredients of concrete for testing and obtain approval from the Authority. He should also supply free of cost, the samples of all the ingredients of concrete for conducting the required tests.

11.2.3 Cement:

General:

Shall conform as per Clause 11.1.2.

11.2.4 Water: Shall conform as per Clause 11.1.3

11.2.5 Sand (Fine Aggregate):

a) General:

The term sand is used to designate aggregate most of which passes 4.75 millimeter I.S. Sieve and contains only so much coarser material as permitted in Clause 4.3 of IS: 383-1970. Sand shall be predominantly natural sand which may be supplemented with crushed sand to make up deficiencies in the natural sand gradings.

All sand shall be furnished by the Contractor from any source and approved by the Authority.

Sand as delivered shall have a uniform and stable moisture content. Determination of moisture content shall be made as frequently as possible, the frequency for a given job being determined by the Authority according to weather conditions (I.S. 456-1978).

b) Quality:

The sand shall consist of clean, dense, durable, un-coated rock fragments, as per I.S.383-1970. Sand may be rejected if it fails to meet any of the following quality requirements.

Organic impurities in Sand: Color no darker than the specified standard in clause 6.2.2 of I.S 2386 (Part-II) 1963. (Indian Standard method of test for aggregates for clearance Part-II estimation of deleterious materials and organic impurities).

Sodium Sulphate Test for Soundness: The sand to be used shall pass a Sodium of Magnesium Sulphate accelerated test as specified in I.S. 2386 (Part-V) 1963 for limiting loss of weight.

Specific Gravity: 2.6 minimum

Deleterious Substances:

The amounts of deleterious substances in sand shall not exceed the maximum permissible limits prescribed in Table I Clause 3.2.1 of I.S. 383-1970 (Indian Standard specification for coarse and fine aggregate from natural sources for concrete when tested in accordance with I.S. 2386-1963.

c) Grading:

The sand as batched shall be well graded and when tested by means of standards sieves shall conform to the limits given in Table-4 of I.S. 383-1970, and shall be described as fine aggregates, grading zones-I, II, III and IV. Sand complying with the requirements of any of the four grading zones is suitable for concrete but sand conforming to the requirements of grading Zone-IV shall not be used for reinforced cement concrete work.

11.2.6 Coarse Aggregate:

a) General:

For the purposes of these specifications, the term “Coarse Aggregate” designates clean well graded aggregate most of which is retained on 4.75 mm I.S. Sieve containing only so much finer material as permitted for various types described under clause 2.2 of I.S 383-1970. Coarse aggregate for concrete shall consist of uncrushed, crushed and partially crushed stone.

Coarse Aggregate for concrete shall be furnished by the Contractor from the sources approved by the Engineer-in-Charge.

Coarse Aggregate as delivered shall generally have uniform and stable moisture content. In case of variations clause 9.2.3 of I.S 456-1978 shall govern during batching.

b) Quality:

The Coarse aggregate shall consist of natural occurring (crushed or uncrushed) stones, and shall be hard, strong, durable, clear and free from veins and adherent

coating, and free from injurious amounts of disintegrated pieces, alkali, vegetable matter and other deleterious materials.

Coarse aggregate for concrete shall be separated into various nominal maximum sizes specified in the relevant drawings. Separation of the coarse aggregate into the specified sizes shall conform to the grading requirements specified in Table-2 of I.S. 383-1970, when tested in accordance with I.S. 2386-(Part-I) 1963 (Method of test for aggregates for concrete Part-I Particle size and shape).

Coarse aggregate for mass concrete may be separated as previously herein specified. Separation of the coarse aggregate into the various sizes shall be such that when tested in accordance with I.S. 2386 (Part-I) 1963 shall conform to the requirements specified in Table-3 of I.S. 383-1970.

Sieves used in grading tests will be standard mesh sieves conforming to I.S. 460 (Part-I) – 1978 (Specification for test sieves Part-I wire cloth test sieves).

11.2.7 Mixing:

a) General:

The concrete ingredients shall be thoroughly mixed in mechanical mixers designed to positively insure uniform distribution of all the component materials throughout the concrete at the end of the mixing period. Mixing shall be done as per clause 9.3 of I.S. 456-1978. The mixer should comply with I.S. 1971-1968 (I.S. Specifications for batch type concrete mixers).

The concrete as discharged from the mixer, shall be uniform in composition and consistency from batch to batch. Workability shall be checked at frequent intervals as per I.S. 1199-1969. Mixers will be examined regularly by the Authority for changes in conditions due to accumulation of hardened concrete or mortar or to wear of blades. The mixing shall be continued until there is a uniform distribution of the materials so that the mass is uniform in color and consistency and to the satisfaction of the Authority. If there is segregation after unloading, the concrete should be remixed.

Any mixer that at any time produces unsatisfactory mix, shall not be used until repaired. If repair attempts are unsuccessful, a defective mixer shall be replaced. Batch size shall be at least 10% of, but not in excess of the rate capacity of the mixer unless otherwise authorized by the Engineer-in-Charge.

b) Concrete Mixers:

Water shall be admitted prior to and during charging of mixer with all other concrete ingredients. After all materials are in the mixer, each batch shall be mixed for not less than the time specified by the Authority. The minimum mixing time shall be 2 minutes. The minimum mixing time specified is based on average mixer performance.

The Authority will adjust the minimum mixing time as required by the observations of the mix delivered from mixer. Excessive over mixing which require addition of water to maintain the required concrete consistency will not be permitted.

11.2.8 Forms:

- a) **General:** Forms shall be used wherever necessary, to confine the concrete and shape it to the required lines. The Contractor shall set and maintain concrete forms so as to insure completed work is within the applicable to clearance limits prescribed in clause 10 of I.S 456-1978. If a type of form does not consistently perform in an acceptable manner, as determined by the Engineer-in-Charge, the type of form shall be changed and method of erection shall be modified by the Contractor subject to approval by the Authority.

Plumb and string lines shall be installed before and maintained during concrete placement. Such lines shall be used by the Contractor's representatives and verified by the Authority and shall be in sufficient number and properly installed as determined by the Authority. During concrete placement, the Contractor shall continuously monitor plumb, and string line, form positions and immediately correct deficiencies.

Forms shall have sufficient strength to with stand the pressure resulting from placement and vibration of the concrete and shall be maintained rigidly in position. Where form vibrators are to be used, forms shall be sufficiently rigid to effectively transmit, energy, from the form vibrators to the concrete, while not damaging or altering the positions of forms. Forms shall be sufficiently tight to prevent loss of mortar from the concrete. Chamfer strips shall be placed in the corners of forms and at the top of walls placements to produce levelled edges on permanently exposed concrete surfaces. Interior angle of intersecting concrete surface and edges of construction joints shall not be levelled except where indicated on the drawings.

Suitable struts or stiffeners or ties shall be used for the form work wherever necessary. All supports, shall be braced and cross braced in two directions. All splices and braces shall be secured by bolting unless specially intended otherwise. All struts shall be firmly supported against settlement and slipping by suitable means as directed. All supports shall be cut square at both ends and firmly supported against settlement and slipping. When the form work is supported on soils, planks, sleepers etc., shall be used to properly disperse the loads. In case, the supports rest on already completed beam or slab, suitable props shall be provided under the latter.

The form work shall be of well-seasoned timber or steel. When timber forms are used, they shall be lined with M.S sheet or other suitable smooth faced non-absorbent material as specified. Supports may be of timber or steel. Suitable wedges in pairs to facilitate adjustment and subsequent releasing of forms shall be provided preferably at the upper end of the supports. The details of the proposed form work and supports shall be submitted to the Authority and got approved before erection.

In case of columns, retaining walls or deep vertical component, the height of the column shall facilitate any placement and compaction of concrete and suitable arrangement may be made for securing the form to the already poured concrete for placing the subsequent lifts. No steel ties or wires used for securing this form work shall be left exposed on the face of the finished work.

Suitable inserts for block outs for electrical and other service fixtures where necessary shall be provided in the required locations as specified.

- b) **Cleaning and Oiling of Forms:** At the time the concrete is placed in forms, the surfaces of the forms shall be free from encrustation of mortar, grout or other foreign materials. Before concrete is placed, the surface of the forms shall be oiled with commercial forms of oil.
- c) **Removal of Forms:** The stripping of form work shall be conforming to clause 10.3 of I.S. 456-1978. The Contractor shall be liable for damage and injury caused by removing forms before the concrete has gained sufficient strength. Forms on upper sloping faces of concrete such as forms on the water sides of warped transitions, shall be removed as soon as the concrete has attained sufficient to prevent sagging. Any needed repairs or treatment required on such sloping surfaces shall be performed at once and be followed immediately by the specified curing.

To avoid excessive stresses in concrete that might result from swelling of forms, wood forms for wall openings shall be loosened as soon as the loosening can be accomplished without damaged to the concrete. Forms shall be removed with care so as to avoid injury to the concrete, and any concrete so damaged shall be repaired in accordance with paragraph 6.2.16.

- d) **Cost:** The cost of furnishing all materials and performing all work for constructing forms, including any necessary treatment or coating of forms shall be included in the applicable prices bid in the schedule for the items of concrete for which the forms are used.

11.2.9 Concrete Surface Irregularities:

Surface Irregularities:

- a) **General:** Bulges, depressions and offsets are defined as concrete surface irregularities. Concrete surface irregularities are classified as “abrupt” or “gradual” and are measured relative to the actual concrete surface.
- b) **Abrupt Surface Irregularities:** Abrupt surface irregularities are defined herein as offsets such as those caused by misplaced or loose forms, loose knots in form Lumber, or other similar forming faults. Abrupt surface irregularities are measured using a straight edge held firmly against the concrete surface over the irregularity and the magnitude of the offset is determined by direct measurement.
- c) **Gradual Surface Irregularities:** Gradual surface irregularities are defined herein as bulges and depressions resulting in gradual changes on the concrete surface.

Gradual surface irregularities are measured using a suitable template conforming to the design profile of the concrete surface being examined. The magnitude of the gradual surface irregularities is defined herein as a measure of the rate of change in slopes of the concrete surface.

The surface irregularities shall not exceed 6 mm for bottom slab and 12 mm for side slopes when tested with a straight edge of 1.5 meters in length. The magnitude of gradual surface irregularities on concrete shall be checked by the Contractor to insure that the surfaces are within the specified tolerances. The Engineer-in-Charge will also make such checks to hardened concrete surfaces as determined necessary to ensure compliance with these specifications.

d) Repair of Hardened Concrete not within specified tolerance:

Hardened concrete which is not within specified tolerances shall be repaired to bring it within those tolerances. Such repair shall be in accordance with paragraph 6.2.16 and shall be accomplished in a manner approved by the Engineer-in-Charge. Concrete repair to bring concrete within the tolerances shall be done only after consultation with a representative of Engineer-in-Charge regarding the method of repair. The Government shall be notified as to the time when repair will be performed.

Concrete which will be exposed to public view shall be repaired in a manner which will result in a concrete surface with a uniform appearance. Grinding of concrete surface exposed to view shall be limited in depth such that no aggregate particles are exposed to view shall be limited in a depth such that no aggregate particles are exposed more than 1.5 millimeters at the finished surface. Where grinding causes exposure of aggregate particles greater than 1.5 millimeters at the finished surface. Concrete shall be repaired by excavating and replacing the concrete.

e) Prevention of Repeated failure to meet tolerances:

When concrete placements result in hardened concrete that does not meet the specified tolerances, the Contractor shall submit to the Government an outline of all preventive actions such as modification to forms, modified procedure for setting screeds, and different finishing techniques to be implemented by the Contractor to avoid repeated failures.

The Government reserves the right to delay concrete placement until the Contractor implements such preventive actions which are approved by the Engineer-in-Charge.¹²³

11.2.10 Reinforcing Bars:

- a) **General:** Reinforcing bars shall be placed in the concrete as shown in the drawings or as directed.
- b) **Materials:** Unless shown otherwise on the drawings, the reinforcement to be used shall be or High Yield strength deformed (H.Y.S.D) bars of grade Fe-415 conforming

to I.S.

1786-1979 (IS. Specifications for High Yield strength deformed steel bars and wires for concrete reinforcement).

- c) **Placing:** Reinforcement shall be bent and fixed in accordance with the procedure specified in I.S. 2502-1963 (code of practice for bending and fixing of bars for concrete reinforcement). All reinforcement shall be placed and maintained in the position shown in the drawings, splices shall be located where shown on the drawings provided that the location of the splices may be altered subject to the written approval of the Authority.

Subject to the written approval of the Authority, the Contractor may for his convenience, splice bars at additional locations other than those shown on the drawings.

All additional splices allowed shall be at the expense of the Contractor. In order to meet design and space limitation. On splicing, some bent bars may exceed usual clearance cutting and bending of such bars from stock lengths may be required at the site.

Unless otherwise prescribed, placement dimensions shall be to the center lines of the bars. Reinforcement will be inspected for compliance with requirements as to size, shape, length, splicing, position, and amount after it has been placed, but before being covered with concrete.

Before reinforcement is embedded in concrete, the surfaces of the bars and the surfaces of any supports shall be cleaned of heavy flaky rust, loose mill scale, dirt, grease or other foreign substances which in the opinion of the Authority, are objectionable. Heavy flaky rust that can be removed by firm rubbing with burlap, or equivalent treatment is considered objectionable.

As specified in Clause 11.3 of I.S. 456-1978 unless otherwise specified by the Authority, reinforcement shall be placed within the following tolerances:

a) For effective depth 200 mm or less	-	± 10 mm
b) For effective depth more than 299 m	-	± 15 mm

The cover in no case be reduced by more than one third of specified over or 5 mm whichever is less. Reinforcement shall be securely held in position so that it will not be displaced during the placing of the concrete and special care shall be exercised to prevent any disturbance of the reinforcement in concrete that has already been placed. Welding of bars shall be done as directed by the Authority and in conformity with the requirements of clause 11.4 of I.S 456-1978. Chairs, hangers, spacers and other supports for reinforcement shall be of concrete, metal or other approved material. Concrete over shall be as shown on the drawings.

d) Reinforcement Drawings:

The EPC Contractor shall design and take approval from the Authority and the work shall be executed as per approved drawing, reinforcement details and bar bending schedules.

11.2.11 Preparation for Placing:

- a) **General:** No concrete shall be placed until all form work, installation of items to be embedded, and preparation of surface involved in the placement have been approved.

All surfaces of forms embedded materials shall be free from curing compound, dried mortar from previous placement, and other foreign substances before the adjacent or surroundings concrete placement is begun.

Prior to beginning concrete placement, the Contractor shall make ready, a sufficient number of properly operating vibrators and operators, and shall have readily available additional vibrators to replace defective ones during the progress of the placement. The Engineer's representative at the placement may require that the Contractor delay the start of the concrete placement until the number of working vibrators available is acceptable.

- b) **Foundation Surface:** All surfaces upon or against which concrete is to be placed shall be free from frost, ice, water, mud and debris.

Rock surfaces shall be free from oil, objectionable coatings, and loose, semidetached and unsound fragments. Immediately prior to placement of concrete, surfaces of rock shall be washed with an air water jet and shall be brought to a uniform surface dry condition.

Earth foundation surfaces shall be wet to a depth of 15 cm. or to impermeable material whichever is less before concrete is placed.

- c) **Construction Joint:** Construction joints are defined as concrete surface upon or against which concrete is to be placed and to which new concrete is to adhere but which have become so rigid that the new concrete cannot be incorporated integrally with that previously placed. The provision of construction joints shall conform to clauses 12.4.1 and 12.4.2 of I.S. 456-1978.

When the work has to be resumed on a surface which has hardened such surface shall be roughened. It shall be swept clean and thoroughly wetted. For vertical joints neat cement slurry shall be applied on the surface before it is dry. For horizontal joints the surface shall be covered with a layer of mortar about 10 to 15 mm thick composed of cement and sand in the same ratio as the cement and sand in concrete mix. This layer of cement slurry or mortar shall be freshly mixed and applied immediately before placing of the concrete.

Where the concrete has not fully hardened all balance shall be removed by scrubbing the wet surface with wire or bristle brushes, care being taken to avoid dislodgment

of particles of aggregate. The surface shall be thoroughly wetted and all free water removed. The surface shall then be coated with neat cement slurry. On this surface, a layer of concrete not exceeding 150 mm in thickness shall first be placed and shall be well rammed against old work, particular attention being paid to corners and close spots, and work thereafter shall proceed in the normal way.

11.2.12 Placing:

- a) **General:** The Contractor shall notify the Engineer-in-Charge before batching begins for placement of concrete. Placing shall be performed only in the presence of an authorized Authority's representative. Placement shall not begin until after all preparations are complete to the satisfaction of the Authority.

All surfaces upon or against which concrete is to be placed shall be prepared in accordance as per this Clause 12.12.11.

Re-tampering of concrete will not be permitted. Any concrete which has becomes so stiff that proper placing cannot be assured shall be wasted.

Concrete shall not be placed in standing water except with written permission of the Engineer-in-Charge and the method of placing shall be subject to approval. Concrete shall not be placed in running water and shall not be subjected to running water until after the concrete has hardened.

Concrete shall be deposited as nearly as practical in its final position and shall not be allowed to flow in such a manner that the lateral movement will cause segregation of the coarse aggregate from the concrete mass. Methods and equipment employed in depositing concrete informs shall minimize clusters of coarse aggregate. Clusters that occur shall be scattered before the concrete is vibrated.

Forms shall be constantly monitored and their position adjusted as necessary during concrete placement as per this Clause 12.2.8.

All concrete shall be placed in approximately horizontal layers. The depth of layers shall not exceed 25 cm. The Engineer-in-Charge reserves the right to require lesser depths of layers where concrete cannot otherwise be placed and consolidated in accordance with the requirements of these specifications. All construction joints which intersect exposed concrete surface shall be made straight and level to plumb as shown otherwise on the drawings.

The placing of concrete shall be in accordance with clause 12.2 of I.S.456-1978.

If concrete is placed monolithically around openings having vertical dimensions greater than 60 cm. or if concrete in decks, floor slabs or other similar parts of structures is placed monolithically with supporting concrete, the following requirements shall be strictly observed.

Concrete shall be placed up to the top of the formed openings at which point further placement will be delayed to accommodate settlement of fresh concrete. If levels are

specified beneath nearly horizontal structural members such as decks, floor slabs, beams and girders, such bevels being between the nearly horizontal members and the vertical supporting concrete below, concrete shall be placed to the bottom of the levels before delay of placement.

The last 60 cm or more of concrete placed below horizontal members of levels shall be placed with a 50 mm or less slump and shall be thoroughly consolidated.

In placing concrete on unformed slopes so steep as to make internal vibration of the concrete impractical without forming, the concrete shall be placed ahead of non-vibrating slip form screed extending approximately 0.75 meters back from its leading edge. Concrete ahead of the slip form screed shall be consolidated by internal vibrators so as to insure complete filling under the slip form.

A cold joint is an unplanned joint resulting when a concrete surface hardens before the next batch is placed against it. Cold joints will be allowed only in the event of equipment breakdown or other unavoidable prolonged interruption of continuous placing. If such unavoidable delays in placing occur which make it appear that unconsolidated concrete may harden to the extent that alter vibration will not fully consolidate it, the Contractor shall immediately consolidate such concrete to a stable and uniform slope. If the delay of placement is then short enough to permit penetration of the underlying concrete, placement shall resume with particular care being taken to thoroughly penetrate and reverberate the concrete surface placed before the delay. If concrete cannot be penetrated with vibrator, the cold joint shall be then treated as a construction joint. Care shall be taken to prevent cold joints when placing concrete in any part of the work. The concrete placing rate shall insure concrete is placed while the previously placed adjacent concrete is plastic so that the concrete can be made monolithic by normal use of vibrators.

Concrete shall not be placed in rain sufficiently heavy or prolonged to wash mortar from concrete. A cold joint may necessary result from prolonged heavy rainfall.

The Contractor shall not be entitled to any additional payment, over the unit prices bid in the schedule for concrete, by reason of any limitation in the placing of concrete required under the provisions of this paragraph.

b) Transportation:

The transportation of concrete to clause 12.1 of I.S.456-1978.

c) Consolidation:

The consolidation of concrete shall conform to clause 12.3 of I.S. 456-1978

Concrete shall be consolidated by vibrators. The vibration shall be sufficient to remove the undesirable air voids from the concrete, including the air voids trapped against the forms. After consolidation, the concrete shall be free of rock pockets and honey bomb areas and shall be closed snugly against all surfaces of forms and embedded materials. All concrete shall be properly consolidated before it hardens.

Except as hereinafter provided, consolidation of all concrete shall be by immersion type vibrators. Immersion type vibrators shall be operated in nearly vertical position and the vibrating head shall penetrate and reverberate the concrete in the upper portion of the underlying layer. Care shall be exercised to avoid contact of the vibrating head with embedded items and with formed surfaces which will later be exposed to view. Concrete shall not be placed upon either plastic concrete until the previously placed concrete has been thoroughly consolidated.

11.2.13 Finished and Finishing:

The requirements for finishing of concrete surface shall be as specified in this paragraph, paragraph 6.2.9 or as otherwise indicated on the drawings. The Contractor shall notify the Authority before finishing concrete. Unless inspection is waived, in each specific case, finishing of concrete shall be performed only when the Authority's representative is present. Finished concrete which is not within the specified tolerances shall be repaired as per this Clause 11.2.16.

Interior surface shall be sloped for drainage where shown on the drawings or as directed. Surfaces which will be exposed to the weather, and which would normally be level, shall be sloped for drainage.

Floating may be performed by use of hand or power driver equipment. Floating shall be started as soon as the screeded surface has stiffened sufficiently and shall be the minimum necessary to produce a surface that is free from screed marks and is uniform in texture. Joints and edge shall be tooled where shown on the drawings or as directed.

11.2.14 Protection:

The Contractor shall protect all concrete against damage until final acceptance by the Authority.

The Contractor shall provide protection to prevent erosion to fresh concrete whenever precipitation either periodic or sustaining is imminent or occurring.

When precipitation appears imminent, the Contractor shall immediately make ready at the placement site all materials, which may be required for protection of fresh concrete. The Authority may delay placement of concrete until adequate provisions for protection against weather are made.

All fresh concrete surfaces shall be protected from contamination and from foot traffic until the concrete has hardened. Hardened concrete surfaces which have to receive finish shall be protected against damage from foot traffic and other construction activity by covering with protective mats, ply-wood, or by other effective means. Methods of protection shall be subject to approval by the Authority.

Concrete curing membranes shall be kept intact, and other curing materials and process shall be maintained as necessary to assure continuous curing for a minimum specified curing time. Protection of curing membranes and other curing methods

shall be as described in this Clause 12.2.15.

11.2.15 Curing :

a) General :

The Contractor shall furnish all materials and perform all work required for curing concrete. The curing of concrete shall conform to clause 12.5 to I.S. 456-1978 and clause 5.8. IS.. 3873 – 1978.

Concrete shall be cured by water curing.

The unformed top surfaces of bridges or culvert decks shall be cured for 28 days with damp sand cover or curing mat cover. The sand or curing mats shall not be kept so wet as to allow water to drain from them and stain other concrete. The sand or curing mats shall be removed after the expiry of the curing period.

All concrete surfaces shall be treated as specified to prevent loss of moisture from the concrete until the required curing period elapsed or until immediately prior to placement of other concrete or back fill against those surfaces. Only sufficient time to prepare construction joint surfaces and to bring them to a surface dry condition shall be allowed between discontinuance of curing and placement of adjacent concrete.

Forms shall be removed within 24 hours after the concrete has hardened sufficiently conforming to clause 10.3 of I.S. 456-1978, to prevent structural collapse or other damage by careful from removal. Where required, repair of all minor surface imperfections shall be made immediately after form removal and prior to curing. Minor surface repair shall be completed within 2 hours after from removal and shall be immediately followed by the initiation of curing by the applicable method specified herein. Concrete surfaces shall be kept continuously moist after from removal until initiation of curing.

b) Materials:

Concrete cured with water shall be kept wet for at least 28 days from the time the concrete has obtained sufficient set to prevent detrimental effects to the concrete surfaces. The concrete surfaces to be cured shall be kept wet by covering them with water-saturated material by using a system of perforated pipes, mechanical sprinklers or porous-hose, or by other methods which will keep all surfaces continuously (not periodically) wet. All curing methods are subjected to approval of Authority.

11.2.16 Repair of Concrete:

a) General:

Concrete shall be repaired in accordance with clause 5.7 to I.S. 3873-1978. Imperfections and irregularities on concrete surface shall be corrected in accordance with this Clause 12.2.9 and clause 5.7. of I.S. 3873-1978.

b) Types of Repair:

All repairs shall be made with concrete. Repairs to concrete surfaces and addition were required shall be made by cutting regular opening into the concrete and placing fresh concrete to the required lines. The chipped openings shall be sharp and shall not be less than 70mm in depth. The fresh concrete shall be reinforced and chipped and trawled to the surface to the surface of the openings. The mortar shall be placed in layers not more than 20 mm in thickness after being compacted and each layer shall be compacted thoroughly. All exposed concrete surfaces shall be cleaned of impurities, lumps of mortar or grout and unsightly stains.

Utilities- Water supply, Power Supply, Solid Waste and Effluent Management**1.9.2 Water Supply****1.9.3 Concept of the System**

It is proposed to provide the following infrastructure Plumbing / Sanitary services for the Project:

- Municipal water supply collection and distribution system.
- Sewage and Sludge collection system based on IS: 1742 and disposal up to Sewage Treatment Plant (STP) comprising of preliminary, biological and tertiary treatment for recycling the effluent. The water thus generated shall be used for make-up landscaping.
- Landscape Water Supply system.
- Storm / rain water drainage system from various levels of the building and disposal to available municipal storm water disposal and Rain Water Harvesting.
-

1.9.4 Source of Water

Daily demand of water supply for the both the project locations shall be met through municipal water supply system which is meeting the prescribed limits of chemical standards as per the guidelines of Indian Standards / WHO, before supplying to the user outlets.

1.9.5 Water Quality

1.9.6 Water quality of municipal water is meeting with the all the standard of water quality for domestic uses. Thus, no any water treatment is required for domestic use.

1.9.7 Water Requirement

The water requirement for the domestic use in the building is proposed to be based on the provision of IS-1172/SP: 35 (S & T) 1987 and prevalent practice in the industry. It is estimated that the daily requirement of water for the Complex, as per National Building code of 2016.

Table 0-2: Water demand and sewerage generation estimates for Tikkar Taal by user category

Daily Water requirement for Adventure Park is 5000 litres for existing and proposed toilets.

1.9.8 Water Storage Sizing

Incoming water supply from municipal source in Tikkar Tall shall be brought to the Central underground water storage tanks at one central location. It is proposed to store Half Day water requirement as underground tank near new proposed toilet block and parking area. In Adventure Park, municipal water is directly supplied to the overhead tank near new proposed toilet block.

The incoming main from municipality water supply line shall be led into Fire Reserve tanks from where it will be allowed to overflow in domestic water tanks; thereafter the water shall be distributed to respective area through submersible water pump to overhead tanks of respective uses area like restaurant area, existing toilet blocks and newly proposed toilet block near parking area.

In Adventure Park, water shall be supplied through gravity to the proposed and existing toilet block and other uses if any. In addition, domestic water and flushing (recycled) water storage tanks equivalent to 1/3 of one day water requirement will also be provided in overhead tank will receive supply from the main underground water tank in Tikkar Taal. The flushing tank shall receive water from Sewage Treatment Plant and also a provision to receive water from main underground storage. The water shall then be fed to the various areas by gravity.

Table 0-3: Specifications and Capacities of Various Underground and Overhead Water Tanks

1.9.9 Rain Water Disposal

In general, the rain water from terraces and other open areas shall be collected through rain water down-take pipes and let off at surface. This water shall be allowed to flow through slope to pipe network in external area for final disposal in lake.

1.9.10 Soil/Waste Disposal

CONCEPT OF THE SYSTEM

The system shall be designed keeping in view the following:

- Natural grading of the site.
- Layout of different facilities in the building
- Levels of road and other services in the Vicinity.
- Sub-soil water table.
- Soil conditions

Approach to Planning

The system shall be designed as a separated system for sewage and sullage up to the first manhole, based on conventional water carriage method. The combined sewage and sullage shall be conveyed by gravity through a network of pipes and manholes starting from the first manhole. These manholes shall be located adjacent driveways and pathways. Booster sewage pumping stations may be provided in order to restrict the last manhole depth to 3 m.

The drainage system shall be a 2-pipe system as per National Building Code, in which the soil & waste pipes shall be distinct and separate with independent vents. The disposal from water closets shall be connected to the soil stack and local man holes directly, and the waste pipes through a trapped Gully. All traps of water closets and the urinals shall be completely vented in the system. Local manholes shall be finally connected to sewage sump from where the sewage shall be pumped to sewage mains and to effluent treatment plant.

Vent system shall be designed to facilitate escape of gases and odor from all parts of sanitary & waste system to the atmosphere at a point above the building and to allow admittance of air to all part of the system, so that siphonage, aspiration or back pressure conditions do not cause loss of seal at traps.

The soil & waste piping in each toilet shall terminate in a header which will be subsequently connected to the vertical stack located inside the associated pipe shaft. The location of stacks shall be coordinated with other services and in consultation with the Architect. Provision for cleaning eyes shall be made at strategic locations to facilitate system maintenance. Grease interceptors shall be provided for effluent waste and kitchen waste, located near STP. The design of grease interceptors shall be in accordance with ASPE standard and shall include cleanout at entry as well as exit. The grease trap cover shall be non-slip type in order to prevent accidental opening. Provision of independent vent shall be made to avoid odor / smell nuisance in the surrounding areas.

Design Criteria

The system shall be designed as per design criteria stipulated in the “Manual for Sewerage & Treatment” published by the Central Public Health and Environment Engineering Organization, Ministry of Urban Development, Govt. of India, IS-SP/35(S&T)-1987 and National and International practices on the subject. These criteria are as follows:

Table 0-4: Design Parameters and Flow Characteristics for Sewage Pipeline System

a.	Flow of sewage	:	95% of water supply (peak flow)
b.	Peak flow	:	3 times average flow
c.	Min. diameter of pipe	:	150/200 mm diameter
d.	Min. velocity in pipe	:	0.6 m / second
e.	Max. velocity in pipe	:	3 m / second
f.	Flow conditions in pipes:		
	Pipes up to 400 mm diameter	:	0.75 full running
	Pipes above 400 mm diameter	:	0.67 full running
g.	Min. depth of pipe below ground level:		
	For branches	:	0.6 m
	For other	:	1.0 m
h.	Formula for calculation and design of sewer lines	:	Manning’s Formula

15.0 Handing Over

All commissioning and testing shall be done by the Contractor to the complete satisfaction of the Architect & Project Manager along with handing over of all maintenance & operation manuals.

16.0 Guarantees

The system shall be guaranteed of its smooth functioning and defect free system as per General Condition, 24 months from issue of Virtual Completion Certificate. The contractor will submit the guarantee on Judicial Stamp paper of Rs.100/- between contractor, sub-contractor, manufacturer and

CGEWHO to the effect that the said system and material will remain defect free for the next two years from the date of issue of virtual completion certificate and during this period of guarantee, the guarantors shall make good all manufacturing and working defects and for that matter, shall replace at their risk and cost such defective work and materials as observed to the satisfaction of Architect/CGEWHO within 7 days (seven) from date of issuing notice from the Project Manager calling upon them to rectify the defects. The guarantee shall be submitted on a format approved by CGEWHO.

16.1 The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

16.2 The warranty shall be valid for a period of two years from issue of Virtual Completion Certificate.

16.3 The warranty shall expressly include replacement of all defective or under capacity equipment. Architect/Project Manager may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

16.4 The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Architect/Project Manager.

BRIEF SCOPE OF WORK & SPECIFICATIONS FOR ALL E & M WORKS

This report is prepared to outline the basis for Electrical & Extra Low Voltage services which encompasses architectural planning, engineering standards and applicable national codes for Adventure Park at Tiker Tal

The proposed Electrical & Extra Low Voltage services design will be appropriate for the above considering requirement aesthetic look, comfort, cleanliness & operating cost.

The design proposed shall meet the client, architecture & other service requirement without compromising engineering standards.

The design proposed in the report has been prepared based on the information furnished by the client & architect and available stand data.

While the basic system design is not likely to change, the rating and specifications of main equipment may change after firming up of detailed engineering.

The design basis covers technical requirements, calculations methods, functional requirements and any other minimum requirement.

The following aspects of system design are covered in this document for both project sites.

Following are the brief scope of work involved in Electrical and its E&M associated works.

2 Pole Structure with 1 No transformer along with HT cable along with end termination.

1 Nos. 415 V LT Prime Rated Diesel Generating Set and all its associated works

MAIN LT & DG AMF Panels and other LT Panels with Switchgears.

LDB's, PDB's complete with MCCB & MCB.

Earthing system.

HT and LT power cables with required numbers of glands, lugs, termination kits, jointing kits, etc as required for interconnection between various electrical equipments along with cable markers.

Complete cable carrier system - cable trays, supports, brackets, clamps etc as well as GI conduits, floor and wall raceways, Hume pipes and all other installation materials as required for laying of power and control cables. HDPE/Hume pipes encased in concrete to be provided for crossing of cables below roads (If necessary).

External & Landscape Lighting for the entire adventure park.

Window and Split Airconditioners (BEE 5 Star rated) Location to be decided /finalised by Engineer –in-Charge. Ventilation system for Toilets and water cooler & RO (Qty- 04 Nos Location to be decided /finalised by Engineer – in-Charge before start of work

Fire Alarm & Detection as instructed by Engineer-in-Charge along with Fire -Extinguishers Portable and Trolley type (4.5 kg CO2 High Pressure Portable Fire Extinguisher and ABC Type Fire Extinguisher Cap. 4 kg / 22.5 kg CO2 High Pressure Trolley mounted Fire Extinguisher, 45 ltr. Mechanical Foam type Fire Extinguisher)

CCTV & PA System

Lift (For 30 mtrs Observation Tower)-Adventure Park

Electrical system related miscellaneous items namely rubber mats, danger boards, first aid charts, first aid boxes, insulated hand gloves, shock treatment chart, etc.

Adventure Activities

Haunted House

The tenderer should in his own interest visit the site and familiarize himself with the site conditions before tendering.

All the required approvals from statutory bodies and related all the required coordination charges, professional charges, etc. shall be in the scope.

Execution of electrical works shall be based on the final shop drawings prepared by contractor and approved by consultant. Its contractor responsibility to check the interferences with other services before issuing the final shop drawing for review of Consultant.

Civil work for wall opening, minor core cutting in floors, minor chipping works for lighting inside building, cable burial including excavation, back filling, and compression etc as detailed in technical specification. Foundation frames, bolts, bolts of special design, embedments, anchor fasteners and inserts.

All equipment shall be suitable for smooth, efficient and trouble-free operation for power supply variations as mentioned herein below. The equipment shall be designed to give efficient and reliable performance even during various extreme atmosphere.

All services necessary for the erection, testing and commissioning and all instruments/services required for carrying out performance testing of all items of the work covered under this specification shall be arranged by the bidder.

The work shall be carried out as per directives and norms of following documents.

Indian Electricity Rules 2005 & Indian Electricity Act, 2003 amended up to date

Technical Specifications and list of preferred makes attached.

CPWD General Specifications for Electrical Works Part – I (Internal) , Part II (External) -1994 amended up to date, CPWD General Specifications for Electrical Works Part – III (Lifts and Escalators) – 2003, CPWD General

Specifications for Electrical Works Part – IV (Substations) – 2013, Local Fire Regulations, CPWD General Specifications for Electrical Works Part – V (Wet riser & sprinkler system) – 2020, CPWD General Specifications for Airconditioning / HVAC works – 2017, National Electrical Code 2011 amended up to date and Relevant sections of National Building Code 2016 and CPWD Special publications available on CPWD website.

(Note: The higher specifications / stringent conditions of CPWD Specifications or NBC – 2016 shall be followed).

Relevant BIS standards as modified up to date.

Sound Engineering Practice as approved by the Engineer-in-charge.

Any additional item of work, if taken up subsequently, shall also confirm to the relevant specifications mentioned above.

All the equipment's shall be delivered with (i) Manufacturer's Test Certificate, (ii) Manufacturer's Technical Catalogues and Installation / Instruction (O&M) Manuals.

Scaffoldings & any other T&P required for execution, testing and commissioning of work shall be arranged by the contractor and is included in the cost of work tendered by the contractor.

Inspection before Dispatch: All routine tests shall be conducted before dispatch of equipment's. No equipment shall be dispatched out from the manufactures premises before such tests are conducted and test result recorded. These test certificates shall be given along with the supply of equipment's. The Engineer-in-charge shall, if he so desires, inspect and witness the pre-delivery tests. For this purpose, the agency shall give 15-day advance notice.

Agency shall arrange for inspection of the department. Department shall bear expenses of its officials for inspection as far as traveling, boarding and / lodging is concerned. However, the inspection shall be done at the discretion of the department without any cost implication, but ROUTINE TEST & TYPE TEST Certificates shall have to be submitted for equipment's. Prior to dispatch, all equipment's shall be adequately protected & insured for the whole period of transit, storage and erection against corrosion and incidental damages etc. from the effect of vermin, sunlight, rain, heat and humid climate.

Procedure for approval of materials, Shop floor drawings and Commencement of Work:

Within the time specified in table of milestone, the contractor shall submit following documents for approval:

List of makes & Model numbers of all items of equipment's and accessories each sub-Head of work.

Catalogues of the equipment's to be supplied.

Shop floor drawings of each packages/ Sub work separately for approval.

It is the responsibility of the tenderer to get the makes, models and shop floor drawings approved by the department before placing of order.

Insurance: The agency shall include storage cum erection insurance including third party insurance right from the storage to commissioning and handing over of various equipment's. In insurance, the beneficiary shall be Engineer-in-charge at the cost of the agency. All insurance which the agency is required to enter in to under the contract shall be affected by any authorized general insurance company and the agency shall produce the policies of insurance. In case of any delay in ITC & handing over, the insurance cover will be suitably extended by the contractor at his own cost.

Remedy of failure to insure: If the agency fails to effect and keep in force the insurance referred to in the preceding sub-clause, the department may affect and keep in force any such insurance and pay such premium as may be necessary for that purpose and from time to time deduct the amount, so paid by the department, from any money due or which may become due to bids or recover the same as debit from the agency's bill.

Quality of material and workmanship: All parts of the equipment shall be of such design, size and material so as to function satisfactorily under all rated conditions of operation. All components of the equipment's shall have adequate factor of safety. The work of fabrication and assembly shall conform to sound engineering practice and on the basis of "Fail Safe Design". The mechanical parts subject to wear and tear shall be easily replaceable type. The construction of the equipment's shall be such as to facilitate easy operation, inspection, maintenance and repairs. All connections and contacts shall be design edto minimize risk of accidental short circuits caused by animals, birds and vermin etc. All identical items and their component parts should be completely, interchangeable including spare parts.

Inspection and testing at site:

The installation shall be subject to necessary inspection during every stage of erection, by the Engineer In-charge or his authorized representative. The successful bidder shall provide all facilities and assistance for the purpose.

The completed installation shall be inspected and tested by the Engineer-in-charge in the manner as will be laid down by him, in consultation the agency.

All instruments and facilities necessary for the tests shall be provided by the agency.

Completeness of work:

The installations shall be completed in all respects and put into operation even where certain details have not been mentioned / left out in these specifications. Any discrepancy may be brought out in pre-bid meeting.

All E&M services shall be declared as completed after completion of completion of whole work.

The information and data mentioned in the tender document have been furnished in good faith and for general information and guidance only. The Engineer-in-Charge in no case shall be held responsible for the accuracy thereof and / or interpretations or conclusions drawn there from by the Contractor and all consequences shall be borne by the Contractor and no claim, what so ever, shall be entertained from the Contractor, if the data or information furnished in tender document is different from data / drawing after Preparation of architectural drawings, design and approved for construction.

It is presumed that the Contractor has satisfied himself for all possible contingencies, situations, bottlenecks and acts of coordination, which may be required between different agencies.

Incidental Charges: All incidental charges of any kind including cartage, storage, wastage and safe custody of material etc. shall be borne by the Contractor.

Quality Assurance: The Contractor shall make available, on request from the Department, for record, copies of challans, cash memos, receipts and other certificates, if any, vouchers towards the quantity and quality of various materials procured and the same shall be kept in record. These shall also provide information on the name of the manufacturer, manufacturer's product identification, manufacturer's instructions, warning, date of manufacturing and test certificates from manufacturers for the product for each consignment delivered at site, shelf life, if any, for the department to ensure that the material have been procured from the approved source and of the approved quality, as directed by the Engineer-in-Charge. Day to day account of receipt of such material shall be maintained at site of work and shall be regulated by the department. Nothing extra shall be payable on this account.

Storage Of Materials: Storage and safe custody of all materials shall be the sole responsibility of the Contractor. Nothing extra shall be payable on this account. Storage space shall be the responsibility of Agency.

QUALITY CONTROL AND TESTING OF MATERIALS:

All the material to be used on works shall bear ISI certification mark unless otherwise the make is specified in the item or special conditions appended this tender document. In case ISI mark material or the materials mentioned in the tender documents are not available, as per opinion of Engineer-in-charge, which shall be final and binding, the material to be used shall conform to CPWD specifications applicable in this tender or IS Code. In such cases, Engineer-in-charge shall satisfy himself about the quality of such material and give his approval in writing. Only articles classified as first quality by the manufacturers shall be used unless otherwise specified. All material not having ISI mark shall be tested as per relevant ISI specification. The Engineer in charge may relax the condition regarding testing if the quantity of the materials required for the work is small. In all cases of use of ISI marked materials, proper proof of procurement of materials from authentic manufacturers shall be provided by the contractor to the entire satisfaction of Engineer-in-charge. All materials equivalent to the one specified should be got approved by the Engineer-in-charge before using the said materials in the work.

The material shall be offered for inspection for the quality assurance as per Quality assurance Policy 2016 of CPWD (available on website www.cpwd.gov.in/ documents).

If the department desires to send any samples of materials for testing in a accredited laboratory, the Contractor at his own expense shall supply all materials, labour for preparing and testing samples as required by the Engineer-in-Charge. If desired, the testing shall be carried out in the presence of the representative of the Engineer-in-Charge. The transportation and testing charges shall also be borne by the contractor.

No foreign exchange shall be made available by the department for importing (purchase) of equipment's, plants, machinery, materials of any kind. No delay and no claim of any kind shall be entertained from the Contractor on account of variation in the foreign exchange rate and/or any Custom duties / charges or any other levies.

NO WAIVING OF LEGAL RIGHTS AND POWERS: The Engineer-in-Charge shall not be precluded or stopped from taking any measurements, and framing of estimates or detaining any certificates made either before or after the completion and acceptance of the work and payment, from showing the true amount and character of the works performed and materials furnished by the Contractor and from showing that any such measurements, estimates or certificates untrue or incorrectly made and that Engineer-in-charge shall not be precluded or stopped from recovering from the Contractor such damages as it may be sustained by reasons of his failure to comply the terms and conditions of the contract.

The tenderers shall take into account the element of wastage(s) those are likely to be there in all elements of the work and quote his price, taking that into account. The tenderers shall study all the items from the point of view of wastage(s), which are likely to take place.

Power supply required for construction; testing & commissioning shall have to be arranged by the bidder at his own costs. Water required for testing of equipment's is also in the scope of agency.

The description of E&M services & specifications are given in general, but they are not exhaustive i.e., does not mention all the incidental works required to be carried out for complete execution of the item of work. The work shall be carried out, all in accordance with true intent and meaning of the specifications and the drawings taken together, regardless of whether the same may or may not be particularly shown on the drawing and/or described in the specifications, provided that the same can be reasonably inferred there from. There may be several incidental works, which are not mentioned in the contract document/specifications but will be necessary to complete the item in all respect. All these incidental works/ costs which are not mentioned but are necessary to complete the work shall be deemed to have been included in the overall amount quoted by the contractor for various components of work. No adjustment of rates shall be made for any variation in quantum of incidental works due to variation/change in actual working drawings. Also, no adjustment of rates shall be made due to any change in incidental works or any other deviation in such element of work (which is incidental to the items of work and are necessary to complete such items in all respects) on account of the directions of Engineer-in-charge. Nothing extra shall be payable on this account.

The scope of works also covers the preparation of layout plans, drawings for E&M schemes and approval of the same from Engineer-in charge and the respective local bodies/ Fire Officer/Lift Inspector/ CFO/ CEA etc. Before the commencement of work. During execution, if the local bodies etc. require a modification; the same shall be executed without any extra cost. Finally, after execution, approvals /NOCs /clearances from local bodies etc. shall be the responsibility of successful bidder for which nothing extra is payable. In case any modification / extra work is required by the local bodies necessary for approvals / NOCs / clearances, the same shall be get executed and nothing extra shall be paid on this account. All statutory fees/charges required for obtaining clearances from Fire Officer/Lift Inspector/CEA / Local Bodies shall be paid by the agency.

Preferred make list of every item is mentioned in the subhead of each work. Contractor has to supply material from the make list mentioned in the NIT. Any other material not mentioned in make list shall be got approved from engineer in Charge.

Defect Liability Period:

All the equipments shall have defect liability period of 12 months to be reckoned after the date of recording of completion certificates by the department or mentioned in detailed specifications elsewhere.

The equipments or components or any part there of, so found defective during the warranty period shall be forthwith repaired or replaced free of cost, to the satisfaction of Engineer in charge.

In case it is felt by the department that undue delay is being caused by the contractor in doing this, the same will be got done by the department at the risk and cost of the contractor.

Supervision Of Work:

The Contractor shall depute Site Engineers & Skilled workers as required for the work as per the documents required in technical bids. He shall submit organization chart along with details of Engineers and supervisory staff. The Contractor shall also furnish list of persons for specialized works to be executed for various items of work. The Contractor shall identify and deploy key persons having qualifications and experience in the similar and other major works, as per the field of their expertise. If during the course of execution of work, the Engineer-in-Charge is of the opinion that the deployed staff is not sufficient or not well experienced; the Contractor shall deploy more staff or better-experienced staff at site to complete the work quality and in stipulated time limit.

INTERNAL ELECTRICAL INSTALLATION

GENERAL SCOPE OF WORK:

The specifications given below pertain to the internal electrical installation work i/c providing fans and fittings, light and power plugs etc to be carried out in the Toilet blocks, Ticketing counter, Haunted House or any other area as decided by Engineer-in Charge.

The scope of works also covers the design, preparation of layout plans, drawings of schemes and obtaining approval of the same from Engineer-in charge.

All internal electrical works shall be carried out with PVC conduit. All switches, sockets, AC Starter, telephone socket, Data sockets, stepped type (2 modules) fan regulators, bell push and accessories along with matching mounting boxes shall be of modular type.

All mounting boxes for plate type accessories shall be of metallic construction and of the same make as that of the plate type switches and accessories.

The wires used for the point wiring and power wiring shall be of 650/1100 Volts grade FRLS PVC insulated multi stranded copper conductor single core cables.

All lighting fixtures to be used in for specific areas of the various buildings of project should comply to the specifications mentioned for that area. LM 79 & LM 80 test report from NABL accredited lab should be submitted by the agency for each type of luminaire. Colour temperature may be 3000 to 6000K as per site requirement.

Lighting Design should be carried out as per National Lighting Code 2010/ NBC 2016 / ECBC guidelines. Wherever range of illumination for space is mentioned, higher side of Lux level must be taken for design purpose.

Arrangement of luminaries in various areas of buildings shall be done on the basis of National Lighting code 2010 and NBC 2016.

Only BLDC type ceiling fans of size 1400/ 1200 mm shall be used. Optimum size and number of ceiling fans for rooms of different sizes shall be as per provision laid down in NBC 2016.

Tentative Light plug / power requirement to be provided in areas shall be got approved from Engineer- in charge.

Wiring with Cat 6A for LAN points, WiFi points and CCTV points shall be terminated in suitable size of G.I. Junction box and RJ-45 socket. All the other end of wiring shall be terminated in Patch panel including rack of each floor and in the server/services room. The wiring shall be suitably tagged/marked mentioning the location of each point.

Wiring for CCTV in MS conduit shall be provided as per the design and is to be terminated in G.I. Junction box.

The Tentative details along with Indicative Image of fittings and fans are mentioned below. Final Make, Model and Numbers must be got approved by the Engineer-in-charge before execution and fixtures shall as per tender make.

Sr No	specifications of different type of fittings	Indicative Image
	Supplying, installation, Testing & Commissioning of LED Recessed/ surface Down lighter (Round/ square/ Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS :10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -15 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80 , UGR (Unified Glare Rating) < 19, Flicker free (flicker should be below 5%), life time (LED,Driver & electrical circuitary), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends ,CCT 3000°K / 4000°K / 5700°K / 6000°K / 6500°K (As per ANSI Bin),SDCM (Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be confirming to relevant BIS standards and trade mark certificate (T.C.).Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. System lumen efficacy ≥105 and <120 lm/Watt output. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement.(Thermal management: heat sink of aluminum housing such that LED junction temperature shall not rise above 90°C)- Powder coated die cast /Extruded aluminum Body including trim.-15 W	

Supplying, installation, Testing & Commissioning of LED surface mounted Batten light of following body material and construction as per IS : 10322 with driver (Replaceable) as per the requirement with Driver efficiency >85% ,Operating voltage AC 140-270 Volt, freq 50/60 hz, Operating temp range -15 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80,Flicker free, (flicker should be below 5 %), life time (LED,Driver & electrical circuitary), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6000°K/6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. System lumen efficacy ≥105 <120 lm/Watt output. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminum housing such that LED junction temperature shall not rise above 90°C).- Powder coated die cast / Extruded aluminium Body (Thickness ≥ 1.20 mm)- 40 Watt- IP 40 Rated



Supplying, Installation, Testing & Commissioning of mirror light integrated IP20 Batten Led fixture 600 mm 10 W with Surface Mounted with aluminium housing and Polycarbonate diffuser,minimum system efficacy of 100lm/W with P.F.>0.95 with THD<20% ,CCT 6500 K,CRI 80,Surge Protection 2 Kv, IP20.The LED with Useful life of 50000 Hrs at L70. The Input voltage range shall be 150V to 270V including making suitable arrangement for fixing. Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required.



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Supply, installation, testing & Commissioning of Agora LED NM LED IP42 230V 2X6W 1h/3h/8h. The luminaire comes in plastic housing. Mounting bracket is not required for this luminaire, IP42/NA 0 Non -Maintained Self Testing 12V / 7Ah Pb, LED based for anti-panic area, surface assembly Delivered as self-contained/auto test luminaire Choice of 1, 3 or 8 hour autonomy via DIP switch High lumen output – 1h = 360lm / 3h = 170lm / 8h = 70lm Simple and quick assembly and maintenance Technical lifetime of LED > 100 000 hours • IP42 – dust and waterproof luminaire, Voltage 220-240VAC / 50-60Hz Power consumption 11.4W / 11.8VA Battery 12V / 7Ah Pb Battery protection Over charge protection /deep discharge protection Charging Time 23 hours, Battery back-up time 1 hour / 3 hours / 8 hours (from dip switch), Light source LED 2x6, Technical lifetime (light source) >100 000 hours, Lumen output, emergency (1h / 3h / 8h) 3200 / 1600 / 800 lm, Approvals EN 60598-1, EN 60598-2-22, EN 55015, EN 61547, EN 61000-3-2, EN 61000-3-3, Ambient temperature 5 to 40 °C, Humidity Up to 95%, IP rating IP42, Dimensions 302 x 94 x 210 mm, Weight 4200 / 4420 gr, Materials PC/ABS, PC, Aluminium, Mounting method Wall mounting complete in all respects as approved and desired by the Engineer in-charge at site.



BLDC FANS & WALL FANS

Supply, erection, testing of Ceiling fans IS marked (as per IS code 374) with suitable GI pipe complete in all respects complete as per directions of Engineer-in-charge

48 " (1200 MM)

AIR VENTILATING FAN

Supplying, Installation, Testing & Commissioning of 250 mm sweep fresh air ventilating fan with aerodynamically designed & balanced blades suitable for operation on 230 v single phase AC supply complete connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor etc as required as reqd.with all accessories as required

EXHAUST FANS

Supplying, Installation, Testing & Commissioning of 300 mm sweep, 900 rpm heavy duty exhaust fans with suitable louvers / bird screen protection and all accessories complete with Aerodynamically designed & Balanced Blade, Dynamically balanced impellers for smooth & vibration-free operation, Pre-lubricated double ball bearing for maintenance free running suitable for operation on single phase AC supply complete connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor etc as required as reqd.		
WALL BRACKET FAN		
Supplying, Installation, Testing & Commissioning of Air Circulator Fan, Class of Insulation for fan and regulator :Class I Rated Voltage :230V AC Speed Control Mechanism :Pull Cord Or String Based Control, Number of Blades :3 ,Material of Blade :ABS Blade Colour:White Fan Guard Material :Powder Coated Metal Wire Number of Speed Steps:3, Type of Fan Mounting:Bracket Mounted Fan For Wall Mounting :Oscillating, Type of Fan Motor :Non-Capacitor Type Fan Size (Mm) :400.Minimum Air Delivery (CMM)-76		

Contractor has to submit LM79/LM80 reports to the engineer in charge before placing the order. All the technical data sheets to be got approved from Engineer in charge.

All LED fixtures provided under the contract shall be guaranteed for a period of 5 years from the date of completion. The contractor shall submit warranty/guarantee of material against manufacturing defects for a period of five years for LED fittings duly signed by not below the rank of Regional Manager / director / Owner of proprietor of the OEM.

Minimum size of copper conductor for power wiring shall be 4 Sq mm and for light and fan points wiring shall be 1.5 sq mm.

The size of DBs at one location shall be same irrespective of number of circuits connected from the DBs.

The wiring and conduit route plan/drawings shall be submitted by the contractor and shall be got approved from the Engineer-in-charge.

To facilitate drawing of wires, 18 SWG GI fish wire shall be provided in recessed conduit. Conduits laid for other services, like fire alarm, PA system etc., where wiring is not done along IEI works; fish wire shall be invariably drawn.

The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable.

Power supply to DBs located in lift machine room if provided as per design at suitable location as approved by Engineer-in-charge shall be done using suitable XLPE insulated armored cable. Supply of cable shall be in the scope of work.

Size of distribution board shall be as per number of light / power circuits and same shall be got approved from Engineer in Charge before installation. All distribution boards shall be double door type. RCBO of suitable rating shall be provided as main incomer in all DBs.

MCCB, if used as incomer then it should have earth fault protection and time delay. Earth leakage modules are not acceptable.

Inside the lift shaft there shall be arrangement of one light point at each floor level and one light point at overhead, one light point in lift pit. All light points shall be in group controlled and wired with 2.5 sqmm FRLS copper conductor cable. 15amp power plug and 5amp power plug shall be provided at each floor. Wiring of this power plugs shall be done with 4sqmm FRLS copper wires. LED Bulkhead fittings of suitable rating to provide minimum 100 lux shall be connected with each point of lift shaft.

All Electrical panels /MCCBs /MCB DBs /MCBs should be provided as per the specification and makes given under the Substation Subhead.

While laying conduits for fire alarm system, sufficient junction outlets are to be provided as per the direction of the Engineer-in-Charge for detectors as required.

After completing the work, necessary test results as envisaged in local bylaws & Indian Electricity Rules shall be recorded and submitted to the department.

RCBO of 300 mA sensitivity of suitable rating shall be provided as Incomer of each Distribution board.

For accommodating various size of cables incoming to the building, medium class G.I. pipe of suitable size shall be provided.

Provision is to be taken into consideration during designing for power requirement to be provided in areas shall be got approved from Engineer -in- charge.

Also, Geysers of required capacity (outcome of detailed design) shall be provided in each common toilet, attached toilet, kitchen. The capacity of geyser shall be calculated based on the water requirement of students for bathing purpose. Wiring for the geysers shall be separate and considering the electrical load of geyser (Not less than 6 sqmm FRLS Copper conductor). Modular MCB with Modular socket/ industrial socket shall be provided for Geyser.

LED Exit signages with 2 hours battery back with bicoloured LED status indicator & should be visible from 40 mtrs, at every 6.00 m in corridor and at all conspicuous locations to indicate Exit, staircase location, toilet location, handicapped toilet location, lift location etc. as per NBC norms. All exit signage's in staircases, exit path and in critical areas shall be on UPS DB.

All Cables in Electrical Room, Panel room, LV rooms, Shafts shall be laid on cable trays and approx. 25% capacity of all such cable trays shall remain unused as future provision.

Such cable tray in Substation room, Electrical Room, Panel Rooms, area shall be hot dipped GI as per direction of E-in-C. Proper factory-made TEE, Bend, elbows, cross, joints and other accessories shall be used.

Cable trays above false ceiling on all other places shall be Perforated Hot Dipped Galvanised Iron (galvanisation thickness i.e average mass of Zinc coating shall not be less than 65 microns for 2 mm thick & 50 microns for 1.6 mm thick as per IS standard) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I.suspenders including G.I. bolts & nuts, etc. as required.

The rupturing capacity of the MCB's shall not be less than 10KA, higher capacity shall be provided if required in the detailed design. The MCB's shall have ISI mark and rupturing capacity of the MCCB's shall be as per design of fault level.

Make of MCB/MCCB shall be the same as the make of MCB DB (in that particular DB).

Earthing: All earthing shall be done with copper plate / GI plate earthing as per CPWD specifications. Earthing system comprising of earth electrode, earth conductor, earth bus, protective conductor etc.

All LT and HT cables laid outside the building portion in open area shall be either laid in RCC HUME pipes or in ground with Sand cushioning and brick protection or in RCC trench or in DWC pipes or in cable tray as per CPWD Specification and direction of Engineer-in-Charge.

Handing Over:

All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.

Contractor shall also handover, to the Engineer-in-Charge, all Test Certificates, and Reports, maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

The form of warranty shall be as approved by the Engineer-in-Charge.

The warranty of all the components shall be valid for a period of one year from the date of handing over.

The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

EXTERNAL LIGHTING

SCOPE OF WORK

The specifications given below pertain to the External & Landscape Lighting and Facade Lighting work to be carried out as detailed below: -

Dismantling all the existing Light luminaries/fittings (within Adventure Park area installed on ground, poles on buildings etc) with all accessories complete with foundation, wiring / cables, pipes/ conduits, iron cage etc , shifting, loading and storage at designated location within premises and handing over the same to competent authority as per the instruction of Engineer-in- charge.

Dismantling of pole/ streetlight standard/ strut embedded in brick ballast / cement concrete foundation etc. as required. (Approx 300 poles complete with cables all accessorie etc) and per the instruction of Engineer-in- charge.

Carrying out new External & Landscape Lighting for Adventure Park using LED posttop on ornamental/decorative and octagonal poles, Bollards, spike/Bush lights, Mini floodlights, flexi Lights etc.

EXTERNAL & LANDSCAPE LIGHTING

The scope of this work consists of planning, designing and SITC of LED External & Landscape lighting with decorative/ ornamental poles single arm and octagonal at least 1 meter of arm, Landscape lighting consisting of Bollards, post top light spike/ bush lights, mini flood lights, flexi lights etc. as mentioned below along roads, pathways, gardens, plantation, trees & Internal open area etc. Exact quantity shall be

determined as per the requirement of NBC 2016 and as per direction of E-in-C but not less than detailed below.

Appropriate size of aluminium / copper armoured /unarmoured XPLE cables shall be as per IS specifications and shall be laid with appropriate size GI / copper flexible wire required for earthing of every fitting.

Cable laying shall be done in appropriate size DWC pipes, which is laid inside ground at required depth below finished floor level including trenching, refilling of earth, compaction etc.

The scope of work is inclusive of RCC foundation of appropriate size with J bolts. The drawings of each and every item, layout drawings, foundations, poles shall be submitted for approval from Engineer-In-charge. The detailed specifications of items are as follows: -

Octagonal poles with street lighting for periphery of the at the spacing of 12-16 mtrs.

The cable entering and exiting provision using appropriate size of DWC pipe in the foundation of pole. RCC foundation (1:2:4 with 12mm reinforcement) as per manufactures designs and recommendations and suitable size cable entry pipes. (Design & drawing must be got approved from Engineer-in-Charge).

LANDSCAPE LIGHTING

Flexi lights-

Bollards along pathways

Bush/ spike lights for planters

Mini flood light for trees

Posttop & Gate Lights

Steps light along staircase at various locations.

High masts with motorized arrangements

ILLUMINATION TO BE MAINTAINED AS PER NBC 2016 AND NATIONAL LIGHTING CODE AND SHALL BE AUTOMATIC CONTROLLED BY TIMER SWITCH PANEL.

Streetlight control panel

The panel shall be of cubicle compartmentalized wall/floor mountable indoor/outdoor type fabricated out of minimum 2.00 mm thick CRCA sheet, duly powder coated, manufactured by CPRI approved panel builders having in-house facilities for 7 tank process treatment and powder coating.

The panel shall have incoming MCCB, Busbar section with insulated tinned copper bus bars, metering section with ammeter, voltmeter, LED indicating lamps, cable alley etc. Street/compound lighting control section shall be provided with individual astronomical timer in outgoings required to feed street lighting for automatic operation.

There should be separate controls for Street/compound light. Earthing/loop earthing etc shall be done as per CPWD specifications.

The panel shall be of cubicle compartmentalized wall/floor mountable indoor/outdoor type fabricated out of minimum 2.00 mm thick CRCA sheet, duly powder coated, manufactured by CPRI approved panel builders having in-house facilities for 7 tank process treatment and powder coating.

Distribution of electric power to street / compound lighting etc. and gate lights shall be with FRLS XLPE insulated and PVC sheathed aluminum conductor armored UG cable of 1100 having minimum size of 4 C X 6 sqmm XLPE cable Aluminium conductor

The cables shall be laid in DWC pipe in ground, pipe, closed or open duct, cable trays or on surface of wall etc. depending upon the site conditions and as per direction of Engineer-In-charge. Tagging of cables on both ends of each circuit of street, compound lighting and gate lights shall be done.

All lights of street, compound and gate shall be controlled by astronomical time switch. There shall be arrangement of bypass switch so that in case of failure of time switch, the lights can be operated after bypassing the same.

Earthing of Street / compound lighting shall be carried out as per CPWD General Specifications Part-I (Internal)-2023 and CPWD General Specifications Part-II (External)-2023.

NP-3 RCC pipe of suitable size (as mentioned below) for protection of UG cables shall be used for road crossing, entry into buildings and paved areas.

Underground cables of size up to size of 35 sq.mm (up to 2 runs of cables)- 150 mm dia.

Underground cables of size exceeding 35 sq.mm but not exceeding 120 sq.mm (up to 2 runs of cables) - 200 mm dia.

Underground cables of size exceeding 120 sq.mm but not exceeding 300 sq.mm (up to 2 runs of cables) - 250 mm dia.

After completing the work, necessary test results as envisaged in CPWD General Specifications Part-I (Internal)-2023 and CPWD General Specifications Part-II (External)- 2023 shall be recorded and submitted to the department. The results shall be within the permissible limits.

The details along with Indicative Image of fittings are mentioned below. Final Make, Model and Numbers must be got approved by the Engineer-in-charge before execution and fixtures shall as per tender make.

However below mentioned fittings shall not be limited to the areas proposed. The fittings can be added/ altered as per the decision of Engineer in Charge. As per design requirement, different fittings can be added.

Sr No	specification of the poles and fittings	Indicative Image
	BOLLARDS	
1	Supply, Installation, Testing and Commissioning of 800 mm long 11 W 1100 lumens LED IP 65 Bollard , Square shape & hollow in between ,Weather-proof and rust-free luminaire ,High-efficacy LEDs for optimum energy consumption, Potted driver and accessories pre-wired up to terminal block, having base plate with holes for direct mounting complete with all accessories including preparation of finished CC foundation with suitable size HDPE pipe for cable entry and exit, electrical connections for incoming and outgoing cables etc complete as per requirement at site (The rate must include junction box/terminal box suitable for incoming and outgoing cables i/c termination and other accessories and suitable earthing system). Lumen Efficacy of LED >100Lm/W @ 4000 K color temperature ,PF ≥0.95, THD ≤10%,Input Voltage Range	

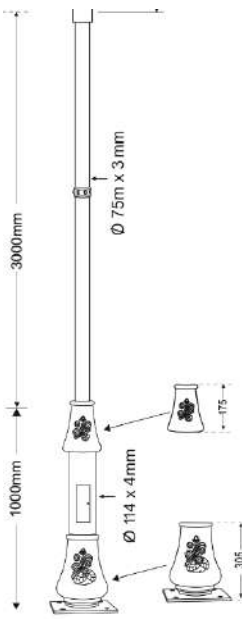
	140-280 V, 3 KV Inbuilt Surge protection & 10 KV External, IK07 Rating.	
	NEON FLEX STRIP LIGHT	
2	Supply, Installation, Testing & Commissioning of 16mm X 16mm of 5 meters length Mono Color CCT : 3000 K of 70 W Flexible and encapsulated LED Strip light with Non- Integral driver. The luminaire's shall be made of Silicon extrusion with high-efficiency, high grade appearance, soft bend flexibility & Option of Top bend , the same shall be so designed. The luminaire shall have silicon glue between optical cover & LED chamber to ensure proper IP67 protection. Brand name shall be embossed / printed on each an every light fixtures. CCT 3000 K and shall be complete with all necessary accessories required for proper working of fixture including weather proof connection cables, water proof connectors etc. as required. The Non Integral driver shall be installed in suitable Junction Boxes IP 66/67 "weather proof", for outdoor installation along with IP 67 Gland & lugs Cable Termination complete as required.	
	BUSH LIGHTS	

3	Supply installation,testing & commissioning of 9W LED BUSH LIGHT having Graphite grey powder coated integral aluminium housing.The Die-cast aluminium housing comprises Warm White (WW) COB LED and reflector.COB LED housing covered with die- cast aluminium ring with weatherproof gasket and toughened glass.LED Used shall be COB type CCT up to 3000K $\pm$250K,IP65. Luminaire is wired with inbuilt driver with 5kV surge protection and should be constant current type with operating Voltage Range of 140 to 280V AC,PF>90,50Hz.Adjustable mounting bracket with spike should be provided for easy to focus the object.2 nos., Ø8mm holes should also be provided on adjustable mounting bracket for surface mounting. Luminaire shall be complete with all necessary accessories required for proper working of fixture including weather proof connection cables, water proof connectors, weather proof IP66/67 junction Box etc. as required.	
	MINI FLOOD LIGHT	
4	Supply installation,testing & commissioning of 4000K Circular Mini Flood Light with Integral driver. The luminaire's shall be made of Extruded aluminum housing powder coated with toughened glass in Dark Gray color.The complete luminaire has IP65 & IK06 protection and it comprises of high purity integrated poly carbonate Lens.The LEDs shall have minimum CRI $\geq$70 (White LED) & shall have SDCM$\leq$5. The luminaire shall have wattage 40W and shall deliver 3600 lumens. Beam angle of the Luminaire shall be 30 deg .Fixture shall operating temperature range of 0°C to 45°C. Input Voltage Range of 140 - 280V AC.. The luminaire shall have declared life of 50,000 burning hours at L70.Luminaire and Driver must be made in India with same brand. The successful bidder must submit the NABL accreditation certificate for Luminaire manufacturer along with technical bid. LM80 , RoHS compliance issued by LED luminaire manufacturer, BIS certificate for LED Luminaire. Brand name shall be embossed / engraded on each an every light fixtures. Luminare, Driver and controller should be with same make and shall be complete with all necessary accessories required for proper working of fixture including weather proof connection cables, water proof connectors, weather proof IP66/67 junction Box etc. as required.	
	INGROUND LIGHT	

5	Supply installation,testing & commissioning of IP67 18W Mono Colour LED Inground light with all channel ON. Fixture shall be made up of Aluminum Housing for better heat decapitation having IP66 Dust and Water Protection for Outdoor usage. The Luminaire should have multiple beam options of 11/15/30/60° to be used as per design requirement. The luminaire shall have declared life of 50,000 burning hours at L70. Luminaire should be capable of operating at 24VDC , with External IP66 24Vdc Driver. Luminaire and Driver should be Made in India. Luminare, Driver and controller should be with same make" and shall be complete with all necessary accessories required for proper working of fixture including weather proof connection cables, water proof connectors, weather proof IP66/67 junction Box etc. as required.The Non Integral driver shall be installed in suitable Junction Boxes IP 66/67 "weather proof", for outdoor installation along with IP 67 Gland & lugs Cable Termination complete as required.	
	LED STEP LIGHTS	
6	Supply installation,testing & commissioning of 7 W LED STEP LIGHT having non-corrosive cast aluminium body.Low power White LEDs (WH) covered with heat resistant frosted glass fixed to the housing with frame protection grill.LED Used shall be COB type CCT up to 5700K ,IP54. An operating Voltage Range of 140 to 280V AC,PF>90,50Hz. LED driver should be constant current type.he luminaire should have loop in loop out provision for power complete i/c termination as reqd complete i/c all civil job associated with it.	
	UP/DOWN LIGHT	
7	Supply, Installation, Testing and Commisioning of Up Down Light, Material: Aluminum + Acrylic, Power: 2 X 5W , Voltage: 100-240V,CCT: 3000K, IP54 ncluding making suitable arrangement for fixing , connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor complete as reqd.Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement.	
	STREET LIGHT FITTINGS	

8	Supplying of Street light LED fixture powder coated pressure die cast aluminium body with driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270 Volt AC, freq 50/60 hz, Operating temp range -15 deg to 50 deg centigrade, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000- 3-2 , P. F.≥0.95, IP-66,IK-10, CRI >80, under voltage and over voltage protection, EMI-EMC As per CISPR 15 , lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement.suitable to fit in up to 65mm dia pipe, life time (LED,Driver & electrical circuitary) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM-21-11 report,CCT 3000°K / 4000°K / 5700°K /6000°K/6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5 year OEM warranty. System lumen efficacy ≥120 <135 lm/Watt output . Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C). -60 W	
	POST TOP FIXTURES	
9	Supply, Installation, Testing and Commissioning of 60W LED Dual Triangle Post Top pole mounted having System Lumens 7800 Lumens, IP66 Protection,IK 10 Rating , PF ≥0.95 and THD ≤10% , Housing Made of Aluminium Extrusion /die Cast Aluminum Housing, Powder coated with grey pure polyester powder, Diffuser is Poly carbonate, LED Life 50000 Hrs , Inbuilt Surge Protection 5 KV and 10 KV External Input Voltage Range 140-280 V.complete as per requirement at site /c termination as reqd complete .	
	GATE LIGHT FIXTURES	

10	Supply, Installation, Testing and Commissioning of 40 W LED Gate Light having System Lumens 4000 Lumens having system efficacy 120 Lumen Per Watt. IP66 Protection, , PF ≥ 0.95 and THD $\leq 10\%$, Housing Made of Pressure Cast Aluminum Housing , Diffuser is Tempered Glass , IK 07 Rating, LED Life 50000 Hrs , Inbuilt Surge Protection 4 KV and 10 KV External Input Voltage Range 140-280 V.complete as per requirement at site. complete as per requirement at site.	
	OCTAGONAL POLE	
11	Supply and erection of Hot Dip Galvanized octagonal pole of 3mm thickness, with base plate including cost of nut and bolts , earthing studs, Integral Cable termination arrangement 5 mm thick Bakelite base plate on suitable welded MS/GI bracket 32 A four way connector 2 no 10 A SP MCB , end cover and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, anchor bolts etc. over a bed of PCC 1:5:10 of required dimensions for octagonal poles of various heights as per following specifications complete in all respects and as per directions of Engineer-in-charge	
	6 Metre Long pole with top dia 75 mm and bottom dia 150 mm with base plate of size 275 x 275 x 16 mm	
	Supply and erection of GI bracket made of 32 mm dia medium class GI pipe, having 15 deg angle from horizontal, suitable for fixing on top of Street Light pole 90 cm long, with 20 cm high suitable size pole cap	
	DECORATIVE POLES	

12	Supply and erection of Ornamental pole of 4 mtr. height made out of galvanized Mild Steel tubes having 1000mmx114mmx4mm dia at Bottom and 3000mmx75mmx4mm dia at top fitted with decorative cast aluminium embellishment at middle and Decorative cast aluminium embellishment at bottom of dia 175 mm at middle & 305 mm at bottom. Pole should have a locked & non theft arrngment service window containing 6 Amp MCB & 4 way 25 Amp connector , pole should be with with base plate of 250x250x12mm including cost of nut and bolts of 500 mm x 16 mm Jtype , earthing studs, and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, over a bed of PCC 1 :5: 10 of required dimensions for poles of as per manufacturers specifications complete in all respects and as per directions of Engineer-in-charge. The Poles should be primer coated and painted with polyurethane paint.	
	B.S.E.N. 10025 High Masts	
13	Supply, installation, testing and commissioning of 16 mtr. long High Mast manufactured from B.S.E.N. 10025 or equivalent grade material in, 2 (two) section hot dip, galvanized inside and outside in single dip, suitable for wind velocity as per IS 875 Part-3 suitable for 9/12 nos. luminaire loading fully motorized (power tool) with starter & cable complete along with standard accessories supplied by the manufacturer with 3 nos. steel wire rope double drum system and twin dome aviation light with LED without foundation but including cost of set of foundation nut and bolts, installation at site complete in all respect upto entire satisfaction of Engineer -in-Charge. Thickness of Top and Bottom Section = 3 mm & 4mm (minimum) Top Dia = 150 mm and Bottom Dia = 410mm Thickness of Galvanization - Top = 65 micron (minimum) and Bottom = 85 micron (minimum)"	

Any other area specifically not mentioned above shall be given with LED luminaires of required numbers design as per directions of Engineer-in-charge.

LIST OF PREFERRED MAKES

Sr. No.	Details of Material	Preferred Make
1	FRLS Copper Wire/Telephone Cable	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
2	Aluminium and copper XLPE Power cables Armoured / unarmoured	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
3	Cat 6A cable	Molex/Belden/Legrand/Panduit/Comscope
4	Modular Switch, Socket, Telephone socket/ Cable TV Socket/Data Outlet socket/Fan regulator/USB Sockets/GI Boxes etc (Wiring accessories) and accessories	Legrand: ARTEOR Honeywell: ORNA Panasonic: EUROPA Schneider: ZENCELO Wipro: (Northwest- Artisa) (Duly ISI Marked)
5	PVC conduit with accessories	Finolex/Supreme/BEC/NIC/Polycab/AKG (Min. 2mm thick and ISI marked)
6	MS conduit with accessories	AKG/NIC/BEC/RMCON (Note: - The accessories shall be same that of conduit pipe & will comply to IS/4768 Part 2 2003)
7	DWC-HDPE underground cable duct	REX/Duraline/Duraplast/Tirupati (Duly ISI Marked)
8	Protection Device (MCB / RCCB / DBs) / Industrial socket	Siemens (Betagard) / Schneider (Acti9) /Legrand (DX3) / LK (AU)/Hager (Novello+)
9	300 mm Exhaust Fan / 250 mm dia fresh air fan	Usha/Havells / Khaitan/Crompton/Orient
10	Ceiling Fan (BEE rated star)	Usha/Havells / Khaitan/Crompton/Orient
11	LED Fittings (Indoor)	Phillips/Wipro/Trilux/LT
12	LED Fittings Outdoor Landscape / External Lighting	Phillips/Wipro/Trilux/LT/ Twinkle-Luxmax
13	Electric Water Heater	Racold / Crompton/Usha /Havells
14	Hand Drier	EURONICS/Jaquar/Dolphy

15	Facade Lighting	Phillips/Wipro/Ligman/LT
16	Controllers for Facade Lighting	Phillips/Wipro/Ligman/Iguzzini
17	Junction Boxes	Hensel/OBO
18	GI Pole (Ornamental)	Twinkle-Luxmax/K-Lite/Baja/ Crompton/Surya
19	GI pole Octagonal	Bajaj/Valmount / Crompton /Transrail/Surya
20	LT Panel / Feeder Pillar	Kalyani Switchgear/ ADLEC/ Tricolite/ Milestone / Ambit Switchgear India Pvt. Ltd./ Sudhir Power Limited
21	Current Transformers	Automatic Electric/Kappa/L&T/C&S
22	Potential Transformers	Automatic Electric/Kappa/L&T/C&S
23	DOL/Star Delta Starter	Legrand/L&T/Seimens/Schneider
24	Digital Indicating Measuring Instruments/Multifunction Meters/Digital Energy Meter	L&T/Conzerv/Automatic Electgric ABB/C&S Neptune
25	Selector Switch	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider
26	Indication Lamp & Pash button/Relay/Timer	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider/Indoasian
27	APFC Relays	L&T/Siemens/Schneider/ABB/Automatic Electric/Kappa
28	Cable Glands/ Lugs/ Thimble	Comet/Jaisons/Braco/Dowells
29	GI/ MS Perforated Cable Tray	OBO/Indiana/PILCO/APEX/LEGRAND
30	Under floor raceways	Legrand/Honeywell/OBO
31	Any other item	To be approved from Engineer in Charge

TRANSFORMER SUBSTATION & POWER DISTRIBUTION

The Adventure Park area shall be supplied power from the state electricity authorities & it is proposed to provide DG power backup for smooth operation of essential services.

The detailed scope shall be designing the capacity of transformer and then supply, installation, testing and commissioning of the same as per direction of Engineer In charge:

Transformers shall be of 11/0.433 kV, Dyn11, 3 Phase, 50Hz, Mineral oil filled hermetically sealed transformer with copper winding, +5% to 5% @ 2.5% with off Load tap changer having class-A insulation & temperature rise in oil/winding of 40/45 deg. C [Max.] along with standard fittings & accessories as per IS:1180

Transformers shall be designed with the latest technology which shall have more efficiency with lower losses. These losses shall be as per the latest ECBC Norms. Losses shall be as per 1180 Energy Efficiency Level 1(2021) Amendment no.-4

2 Pole structure with G.O switch shall also be installed for receiving power from SEB.

Revised Load shall be applied to SEB for both the locations

11 KV cable including end termination and shall be laid underground at a depth of 1200 mm below RFL / Trenches as per site requirements.

Location of the proposed Sub Station and DG sets for Adventure Park is indicated in Annexure-1

ELECTRICAL LOAD CALCULATIONS

The total Electrical load for adventure Park for the proposed new facilities / Adventure Park is 128 KVA as detailed in Annexure-1.

POWER DISTRIBUTION

Power distribution shall consist of the following Panels

A	MAIN Cum AMF PANEL (ESSENTIAL PANEL)-(Adventure Park)	
	Proposed 160 KVA Transformer	Main cum AMF Panel (Essential Panel)
	Proposed 125 KVA DG Set	Main cum AMF Panel (Essential Panel)
1	Main cum AMF Panel (Essential Panel)	Sub distribution Panel -B
2	do	APFC 50 KVAR
3	do	Maze
4	do	High Mast-1
5	do	External lighting Panel - 3
6	do	Toilet
7	do	Reception Block
8	do	Plumbing
9	do	Spare-1

10	do	Spare-2
11	do	Haunted House
B	SUB DISTRIBUTION PANEL-(Adventure Park)	
1	do	Tent Panel -1
2	do	Tent Panel -2
3	do	Toilet Block
4	do	OAT
5	do	Viewing Tower i/c Lift
6	do	High Mast-2
7	do	External lighting Panel-1
8	do	External lighting Panel-2
9	do	Spare-1
10	do	Spare-2

POWER FACTOR IMPROVEMENT.

As per the condition of Electricity Board, consumers are advised to improve and maintain the power factor of their installation to minimum 0.95 or above because of various advantages.

Improvement in the power factory would affect savings in the energy bill. Also, the life of individual apparatus can be increased considerably by high power factor.

APFC Panels being proposed

Adventure Park-50 KVAR

The capacitor bank should be put on/off automatically depending on the load requirement.

APFCR is provided to achieve this function. Contactor based switching arrangement shall be provided to sense the variable power factor in the system shall automatically switch ON/OFF the capacitor units to achieve the pre-set power factor. The capacitor should be switched OFF when DG supply is ON.

The power factor shall be maintained around 0.95 to 0.99 through this system.

SYSTEM EARTHING

Earthing system shall be designed in accordance with IS3043 & IEC-62561 for earthing system. Dedicated earthing pits shall be provided for established Switchgears neutral earthing of major substation equipment like Transformers & DG sets as detailed below: -

EARTHING DETAILS

	Coper Plate	GI Plate
2 Pole structure		2
160 KVA Transformer Neutral & Body		4
125 KVA DG set Neutral & Body		4
Distribution Panel		2
AMF Panel		2
External Lighting Panel		2
High Mast- Pipe Earth		

The earth resistance value shall less than 5.0 Ohm as per IS 3043.

LT POWER & CONTROL CABLES

SCOPE

This specification covers the supply & installation of LT power & control cables.

The cable of sizes shall be selected by considering the voltage drop and current carrying capacity. The higher size among size as derived based on mentioned parameter shall be selected.

While deciding upon the cable sizes, de-rating factors for the type of cable and depth of laying, grouping, ambient temperature, ground temperature, and soil resistivity shall be taken into account.

In the design / selection of the cables, the consideration of the power distribution losses as defined in the ECBC shall be complied with, subject to the condition that the voltage drop permissible shall not be more than 8 volts.

Cables shall be tested at works and supplied in accordance with drawings, specifications, relevant Indian Standard Specifications and cable manufacturer's instructions. The cables shall be delivered at site in original drums with manufacturer's name clearly written on the drum.

MATERIAL

The LT power cables shall be XLPE insulated, Aluminum conductor armoured cable conforming to IS: 7098 (Part - I).

The LT control cable shall be PVC insulated copper conducted armoured stranded cable.

TESTS

Shop Tests:

The cables shall be subjected to shop tests in accordance with relevant standards to prove the design and general qualities of the cables as below (as per IS 10810):

Routine tests on each drum of cables.

Acceptance tests on drums chosen at random for acceptance of the lot.

Type tests on each type of cable, inclusive of measurement of armour DC resistance of power cables.

Test certificates

Test certificates of all the tests carried out at the works shall be furnished for approval of the Engineer-in-charge before the cables are dispatched from the manufacturer's works to the site.

Tests reports shall be complete with all details and shall also contain IS specified limit values wherever applicable to facilitate review.

Drawings, Data and Manuals

Drawings, data and manuals shall be submitted for the following:-

Manufacturer's catalogues giving cable construction details and characteristics.

Cable current ratings for different types of installation inclusive of derating factors for ambient temperatures, grouping etc.

Write up on manufacturer's recommended method of splicing, jointing, termination etc of the cables.

DESIGN CRITERIA

The cables will be used for connection of power circuits of the electrical system.

Cables will be generally laid in soft soil, surface or in RCC Hume/GI pipes/ cable tray/ sand cushioning with brick protection

For continuous operation at specified rating, maximum conductor temperature shall be limited to the permissible value as per relevant standard and (or this specification).

The insulation and sheath materials shall be tough enough to withstand mechanical stresses during handling.

Armouring shall be single round/flat wire of galvanised steel.

Core identification for multi core cable shall be provided by colour coding.

SPECIFIC REQUIREMENTS

Drum length & tolerance: the cables shall be supplied in wooden drums, each containing minimum 500 meters length of cable. Allowable tolerance on individual drum length is $\pm 5\%$.

Cable identification: cable identification shall be provided by embossing on the outer sheath the following at regular intervals of 2/3 meters.

Manufacturer's name or brand name or trademark.

Type of cable and voltage grade.

INSPECTION

All cables shall be inspected upon receipt at site and checked by the Engineer-in-charge for any damage during transit.

LAYING OF CABLES

The cable laying including necessary jointing etc. shall be carried out in accordance with the specifications given herein. For details not covered in these specifications, IS: 1255 - 1967 shall be followed.

No straight through joints shall be permitted in the L.V. system.

Cable Identification Tags

Wherever more than one cable is laid/run side by side, marker tags (pre-approved), inscribed with cable identification details shall be permanently attached to all the cables in the manholes/pull pits/joint pits/entry pits in buildings/open ducts etc. These shall also be attached to various cables laid direct in ground at suitable intervals, as decided by the Engineer-in-Charge, before the trenches are filled up.

Termination/Jointing

Heat shrinkable ferrule-based joints shall be provided for HT cables and Brass double compression glands shall be provided for LT cable terminals.

Jointing work shall be carried out only by licensed/experienced cable jointers.

At the very preliminary stages of laying of cables, a proper jointing position should be selected.

Sufficient surplus cable loops (Minimum 3.0 MD) shall be left on each side of joints, as mentioned above.

Joints shall be staggered by 2 to 3 m, when two or more cables are laid together, in the same trench.

All Cable glands shall be earthed with suitable Copper earth clips.

Jointing pits shall be of sufficient dimensions to allow easy and comfortable working at site. The sides of the pit shall be well protected from loose earth falling into it. It shall also be covered by a tarpaulin to prevent dust and other foreign matter on the exposed joints and jointing materials.

Sufficient ventilation shall be provided, during jointing operations, to disperse fumes given by fluxing.

Jointing materials and accessories like conductor, ferrules, solder, flux, insulating and protective tapes, filling compound, jointing boxes etc. of right quality and correct sizes, conforming to relevant Indian Standards, wherever they exist, shall be used. The design of the joint box and the composition of the filling compound shall be such as to provide an effective sealing against entry of moisture in addition to affording proper electrical characteristic to joints. Where special type of splicing connector kits, or epoxy resin spliced joints are specified, materials pre-approved for such applications shall only be used and instructions of the manufacturer/supplier of such materials shall be followed.

Insulation resistance of cables to be jointed shall be measured with 500 V Megger upto 1.1 KV grade and with 2,500/5,000 V Megger for cables of higher voltage. Unless the insulation resistance values are satisfactory, jointing shall not be done.

Before jointing is commenced, all safety precautions like isolation, discharging, earthing etc., Shall be taken to ensure that the cable would not be inadvertently charged from live supply. Metallic armour and external metallic bonding shall be connected to earth. Where "Permit to work" system is in vogue, prescribed safety procedures shall be complied with.

Cores of the cables must be properly identified before jointing.

Whenever Aluminum conductor is exposed to outside atmosphere, a highly tenacious oxide film is formed which makes the soldering of Aluminum conductor difficult. This oxide film should be removed, using appropriate type of flux.

The clamps for the armour shall be clean and tight.

Where a cable is to be jointed with the existing cable, the sequence should be so arranged as to avoid misplacement of cores while jointing.

Cable termination shall be done in terminal cable box, using double Brass compression glands, and the cable ends sealed with sealing compound. The cable boxes of transformers shall be filled with bituminous compound of reputed make. For all LV cable terminations/joints, Contractor shall provide for brass/copper thimbles, insulation tape, etc. of pre-approved makes.

Testing

As already specified all cables before laying shall be tested with a 500 V Megger (for 1.1 KV grade), or with a 2,500/5,000 V Megger (for cables of higher voltages). The cable cores shall be tested for continuity, cross phasing, insulation resistance to earth/sheath/armour and insulation resistance between conductors.

All cables shall be subjected to above mentioned tests during laying, before covering the cables by, protective covers and back filling and also before the jointing operations are carried out.

Further items required for the substation:

Required Bus connections / cabling for interconnection between HT panel, transformer and LT Panel, connections, inter connections, loop earthing of all equipments from the common earth bus, as required. The connection between Aluminium and copper shall be done using bi-metallic joints.

Providing suitable size cement concrete foundation for the Transformer, DG set, Feeder Pillars etc

Checked plate of appropriate thickness and size shall be used to cover the cable trench, located inside Panel rooms etc.

Handing Over:

All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.

Contractor shall also handover, to the Engineer-in-Charge, all Test Certificates, and Reports, maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

The form of warranty shall be as approved by the Engineer-in-Charge.

The warranty of all the components shall be valid for a period of one year from the date of handing over.

The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

LIST OF PREFERRED MAKES OF SUB-STATION

Sr. No.	Details of Material	Preferred Make
1	Transformers	Sudhir Power Limited/ ABB / Siemens / Kirloskar / Crompton

2	HT Panel 11 KV /VCB Panel	Sudhir Power Limited /ABB /Schneider /Siemens
3	LT Panel / Feeder Pillar	Kalyani Switchgear/ ADLEC/ Tricolite/ Milestone / Ambit Switchgear India Pvt. Ltd./ Sudhir Power Limited
4	Protective relays, Contractor	SIEMENS/Legrand/ABB/L&T/Schneider
5	CT/PT	KAPPA/AE/SIEMENS/L&T
6	ACB	Siemens (3WL) / Schneider Electric (Easypact MVS -Masterpact NW)/ ABB (E-MAX2)/ Legrand DMX3 /Hager (H3)
7	MCCB	L&T D Sine / Schneider Compact NSX / Legrand DPX3 / Siemens 3VA / ABB T-Max/ Hager (H3)
8	MCB	L&T/Scheider/Siemens/ABB/Hager
9	ATS	Caterpillar/ Siemens /ASCO /Russ electric
10	Voltmeter/Ammeter/Multi-function meter	SIEMENS / SCHNEIDER ELECTRIC/ Enercon / L&T/ Legrand / ABB / Neptune
11	11 KV XPLE cables	KEI / LAPP CABLE / Polycab / Havells / Finolex (Duly ISI Marked)
12	11 KV cables jointing kit	3M /Raychem / Jaison
13	Cable Lugs/Glands	Comet / Dowells/ Jaison / HMI / Raychem / Braco
14	Aluminium and copper XLPE Power cables Armoured / unarmoured	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
15	11 KV CT/ PT	AE / Crompton Greaves / Kappa /BHEL /Alstom/ Gilbert
16	DWC Pipe	Rex /Duralin/Duroplast/Triputi
17	Current Transformers	Automatic Electric/Kappa/L&T/C&S
18	Potential Transformers	Automatic Electric/Kappa/L&T/C&S
19	DOL/Star Delta Starter	Legrand/L&T/Seimens/Schneider

20	Digital Indicating Measuring Instruments/Multifunction Meters/Digital Energy Meter	L&T/Conzerv/Automatic Electgric ABB/C&S Neptune
21	Selector Switch	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider
22	Indication Lamp & Pash button/Relay/Timer	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider/Indoasian
23	APFC Relays	L&T/Siemens/Schneider/ABB/Automatic Electric/Kappa
24	Cable Glands/ Lugs/ Thimble	Comet/Jaisons/Braco/Dowells
25	GI/ MS Perforated Cable Tray	OBO/Indiana/PILCO/APEX/LEGRAND
26	Under floor raceways	Legrand/Honeywell/OBO
27	Any other item	To be approved from Engineer in Charge

DG SET

SCOPE OF WORK

The detailed scope shall be designing the capacity of DG set and then supply, installation, testing and commissioning of the same as per direction of Engineer In charge:

The provided Electrical load calculation is preliminary. The actual Electrical load calculation must be performed by the bidder. If the calculated Electrical demand load exceeds the afore mentioned figure, the equipment rating shall be determined based on the actual calculation. Conversely, if the calculated Electrical demand load is less than the afore mentioned figure, the equipment capacity shall remain unchanged as per the initial calculation.

The complete load for musical fountains shall be derived by the successful bidder as per the general engineering practices and equipment loading at 85%.

The DG sets should deliver the given capacity at 0.8 powerfactor developing 415 volts 3phase 4wire output with the engine and alternator mounted on common bed plate complete and all accessories required. The DG Sets shall be capable of delivering desired KVA at 0.8 P. F. for the load after meeting it down requirement for auxiliaries etc.and after accounting for de-rating due to various factors (temperature, altitude), site conditions.

Work covered by this contract include design, manufacture, supply, transportation, delivery, installation and commissioning of automatic start direct coupled Diesel Generator Sets suitable for continuous round the clock operation at upto rated output with permissible overload with associated works. Items included (but not limited to) in the contract are abstract below.

Diesel engines directly coupled with alternators mounted on a rigid fabricated base frame with resilient anti vibration mountings.

DG cooling system.

Silencer to provide 25 DBA insertion loss

Electric starting equipment including batteries and battery chargers.

Fuel supply system.

Acoustic Enclosure as per C.P.C.B. Norms latest.

Clearance/Approval of the complete installation from CPCB/State Pollution control Board, central Electricity Authority (CEA)/Local Bodies and Other licensing authorities, wherever required.

D.G. Control Panels.

Engine

The diesel engine shall be indoor-type, four stroke, multi-cylinder, 1500RPM with 2% speed variation for operation between 10% and 100% load, Turbo charged inner cooled, compression ignition with residential type Governor Fuel system complete with its self-contained lubricating system.

Engine mounted radiator designed to dissipate the generated heat effectively shall be used.

High speed diesel oil shall be used as fuel for the engine.

The engine shall be de-rated in accordance with the tables given in BS649 to suit site conditions.

The engine shall be directly coupled to the generator.

The noise level limitations shall be as per latest CPCB norms.

The engine shall be capable of taking 10% overload for one hour in every 12 hours

The engine shall be capable of producing the desired nominal output at site referred generator terminals and with machine operating under ambient conditions as special the specific requirements.

The Engine to be fitted with silencer to provide min 25 DBA insertion loss.

Alternator With Accessories:

The Alternator shall have the following characteristics

Type - Brushless, rotating field design alternator rated for 415 volts / 50 complying to IS 4722- 1992, BS 5000 Part- III and IEC 34 amended upto date.

Excitation system - Self Excited

Speed - 1500 RPM

Net Site Output - Rated continuous at ambient conditions and as per Schedule of quantities.

Voltage Regulation - Within 0.5% of the rated voltage

Overload duration - 10% for 1 hour in every Capacity 12 Hours of Continuous use.

Harmonics - Less than 3%.

The Alternator shall be capable of delivering the rated output at rated power factor.

The Alternator shall be capable of withstanding without damage a three-phase short circuit at its terminals when operating at rated KVA and PF and at 5% over voltage with fire excitation for 3 seconds.

The alternator shall be capable of withstanding without damage

a) 50% overload for 15 seconds.

b) 10% overload for one hour every twelve hours.

The line and neutral leads of phase windings of the Alternators shall be in suitable terminal boxes.

The Alternator winding shall have class of insulation H class with temperature rise limited to Class H insulation.

Drawing Submission:

The following drawings shall be submitted for approval for DG set:

- a) Foundation drawing with loading data:
- b) Schematic drawings:
- c) All control & indication circuit drawings :

Test Certificates

Copies of all documents of routine and type test certificates of the equipments shall be furnished to the HTC along with the supply of equipments and these are as below.

Routine Test Certificates.

Engine separately

Alternator Separately

The inspection & testing shall be carried out as per clause no. 1.15 of CPWD General Specifications for electrical works Part –VII (DG Set).

Handing Over:

All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.

Contractor shall also handover, to the Engineer-in-Charge, all Test Certificates, and Reports, maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

The form of warranty shall be as approved by the Engineer-in-Charge.

The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

LIST OF PREFERRED MAKES OF MATERIALS FOR DG SET WORK

1.	DIESEL ENGINE	:	CUMMINS/ CATERPILLAR/ perkins/ kirloskar (KOEL)/ Greaves (CG)
2.	ALTERNATOR	:	STAMFORD/ LOREYSOMERS/ MECALTTE/ GREAVES (CG)/ KIRLOSKAR (KOEL)
3	ACB	:	L&T(UPOWER)/SIEMENS(3WL)/SCHNEIDER (MASTERPACT NW)/ ABB/ Hager (H3)
4	DIGITAL PANEL METERS / ELECTRONIC LOAD MANAGER	:	CONZERV / KRYKARD / ENERCON/ NEPTUNE
5	MCCB	:	L&T D SINE / SCHNEIDER COMPACT NSX / LEGRAND DPX3 / SIEMENS 3VL/ Hager (H3)
6	INDICATING LAMP (LED TYPE)/ PUSH BUTTONS	:	SIEMENS /L&T /TEKNIC
7	POWER CABLES COPPER /ALUMINIUM ARMoured /UNARMoured	:	FINOLEX/KEI/ RR KABEL/ POLYCAB / HAVELLS (All shall be ISI Marked) /
8	SELECTOR SWITCH	:	L&T/ GE/ KAYCEE /AE /IMP/ RASS CONTROL /SALZER.
9	CT'S	:	AE /KAPPA /L&T/C&S.
10	G.I. PIPE	:	TATA / JINDAL (HISSAR) / SAIL
11	BATTERIES	:	EXIDE (POWER-SAFE)/CUMMINS PLUS/ PANASONIC/NED/GLOBAL YUASA/aMAR RAJA.
12	M.S PIPES	:	TATA/JINDAL(HISSAR)/SAIL
13	ATS	:	L&T / SCHNEIDER/ LEGRAND/ ABB/ SIEMENS
14	ANY OTHER ITEM	:	TO BE APPROVED BY ENGINEER-IN-CHARGE

LIFTS

SCOPE OF WORK

The Scope of work includes SITC (Supply, Installation, Testing, Commissioning) and then handing over to client and to liaison and pursue the local bodies for getting required certificates for functioning of regenerative drive type lifts in complete for the following lifts. The Lift (For 30 mtrs Observation Tower) details are as below:

Lift shall be provided in the observation tower.

TECHNICAL SPECIFICATION :-A00	
I PRODUCT DETAILS	
Building Type	Government - Turnkey
Product Name	NEXTRA CIRCULAR (PANORAMIC)
Number of Units	1
Lift Designation	-
Lift Type	Passenger Lift
Rated Capacity Persons / Kgs / Class of Loading	13 Persons / 884 Kgs / P - Passengers
Rated Speed m/s	1.25
Number of stops / openings	4 / 4
Floor Designation	G+3
Access Sides Inline/Thru Type	1 (One), In Front Only
Floor Display Character (Entrance Position)	0(F),1(F),2(F),3(F)
II MACHINE AND CONTROLLER DETAILS	
Machine Location / Type	Directly Above The Lift Well -Gearless
Drive System	Micro Processor Based VVVF
Control system	Microprocessor Based Simplex Selective Collective Control With / Without Attendant
Main Power Supply	AC 3 Phase, 50 Cycles, 415 Volts $\pm 10\%$
Light Power Supply	220 Volts 50Hz LNE
III SHAFT DETAILS	
Shaft Type	STEEL - Steel Structural
Shaft Width mm X Shaft Depth mm	2500 X 2700
Overhead mm	4200
Pit Depth mm	2000
Travel Height (in Meters)	30
Shaft Reduction Channel	Not Required
Shaft Reduction Channel Weight (in Kgs)	No
IV CABIN DETAILS	
A) SIZES	
Car Width mm X Car Depth mm	900 X 2400
Car Clear Height mm	2200
Car Door Type Center/Side	Power Operated Centre Opening Sliding Door
No Of Door Panels	2 Panel
Type of Door Drive	Linear Door Drive System
Car Door (W X H) mm	900 X 2000
B) FINISHES - *SUBJECT TO AVAILABILITY	
Design Of Lift Cabin*	Stainless Steel

TECHNICAL SPECIFICATION :-A00	
Lift Cabin Finish*	Hairline Finish
Car Door*	Glass - Ss Enveloped Non Fire Rated
Car Door Finish*	Hairline Finish
Ceiling Finish*	Ss Mirror Finish
Ceiling Type	Sleek Small Circular-JLFC 03
Ceiling Light	Led Lights-03
Fan	Regular (Circular) - Fan
Flooring Type	20 Mm Recess
Handrail Type	Ss Round Handrail JLHR01
Handrail Location	Rear Side
Car Door Sill	Aluminum
V LANDING DOORS DETAILS	
A) SIZES	
Door Type	Centre Opening Sliding Door
Door Size (W x H) mm	900 X 2000
Door Sill	Aluminum
B) FINISHES	
Landing Door Finish*	1-4-Glass - Ss Enveloped - Hairline Finish Non Fire Rated
Landing Door Frame / Finish*	1-4-Stainless Steel - Hairline Finish
Main Landing Floor	0
Other Landing Floors	1,2,3
Jamb Type	Slim Frame
VI SIGNALIZATION / FIXTURES DETAILS	
A) CABIN OPERATING PANEL	
Car Operating Panel Type	Car Operating Panel - JLCP01
Number of Car Operating Panel	1
COP Faceplate Finish	Stainless Steel - Hairline Finish
Button Model	1s4 - Bas128 (Round)
Car Display	Orange Square Dot-Matrix Scrolling Display-Vertical
Car Display Location	Car Operating Panel
Call Register Signal	Yes
Floor Annunciator	Yes
B) LANDINGS INDICATORS	
Landing Operating Panel Type	Landing Operating Panel - JLLP01
LOP Location	Landing Display On Wall
LOP Mounting Type	Grouting

TECHNICAL SPECIFICATION :-A00	
LOP Faceplate Material	Stainless Steel - Hairline Finish
Landing Display	1-4-OSDM-V
Landing Display Location	1-4-LOP
Call Register Signal	Yes
Stainless Steel Braille Button	Yes
C) HALL LANTERN	
Hall Lantern Model	Hall Arrival Lantern - Horizontal - Jlh101
Hall Lantern Faceplate Material	Stainless Steel - Hairline Finish
Hall Lantern Location	Above Door Frame (Flush Mount)
VII SAFETY DETAILS	
Over Speed Governor	Yes
Door Protection	Infra Red Door Screen
Counterweight Screen	Inbuilt
Over Load Indicator	Yes
Fireman Switch	Yes
Automatic Rescue Device	Yes
Battery Operated Emg Alarm Light	Yes

GENERAL

The equipment and installation covered by specifications and drawings shall conform to codes of practice and highest standards of workmanship and materials. This work shall be done in accordance with the provisions of the Lifts Act, and subsequent provisions, as also any state or local Act in force and latest Indian Standard 14665, 15330.

The Electrical wiring shall strictly comply with IS:732 and the entire installation shall be in accordance with the Indian Electricity Act 2003 and Indian Electricity Rules 1956 as amended to-date.

The Contractor shall follow all statutory requirements as well as best trade practices in the manufacture & installation of elevators. The Contractor shall arrange to obtain the approval of the Inspectorate of Lifts for commissioning of the Lifts and getting RR number and handover for operation after satisfactory tests.

TRACTION MACHINE AND DRIVE

The motor shall be controlled by a variable voltage variable frequency (V.V.V.F.) micro- processor control system which shall control and monitor every aspect of elevator operation at all stages of the car motion cycle on real time basis.

The A.C. V.V.V.F. drive system shall control A.C. voltage and frequency concurrently with the hoist motor to regulate the elevator's actual performance to match closely the ideal speed pattern to obtain maximum efficiency of operation and provide a very smooth ride.

Frequency shall range fully between zero and rated value.

The Controller shall be provided with a self-diagnostic programme to keep downtime to a minimum possible.

The controller shall intelligently adjust door times in response to car calls, hall calls and "Door Open" button operation.

The braking of machine shall be of regenerative type.

SAFETY

In the addition to other specifications the Lifts shall be provided with safety devices as follows:

Safety gear on car so that in the event of rope breaking or loosening the car will be brought to rest immediately by means of grips on the guides.

The over speeding car shall be automatically brought to a gradual stop on guide rails and power supply to the hoist motor shall be switched off.

Car gate lock so that in the event of car gate gets opened when passengers are in the car, the elevator shall be brought to rest.

TECHNICAL SPECIFICATION :- A00	
LOP Faceplate Material	Stainless Steel - Hairline Finish
Landing Display	1-4-OSDM-V
Landing Display Location	1-4-LOP
Call Register Signal	Yes
Stainless Steel Braille Button	Yes
C) HALL LANTERN	
Hall Lantern Model	Hall Arrival Lantern - Horizontal - Jlh101
Hall Lantern Faceplate Material	Stainless Steel - Hairline Finish
Hall Lantern Location	Above Door Frame (Flush Mount)
VII SAFETY DETAILS	
Over Speed Governor	Yes
Door Protection	Infra Red Door Screen
Counterweight Screen	Inbuilt
Over Load Indicator	Yes
Fireman Switch	Yes
Automatic Rescue Device	Yes
Battery Operated Emg Alarm Light	Yes

LIST OF PREFERRED MAKES–FOR LIFT WORKS

Sr.No.	Equipment	Preferred Make
1.	Lift	OTIS / KONE / SCHINDLER / JOHNSON / MITSUBISHI

CCTV SURVEILLANCE SYSTEM

SCOPE OF WORK

The scope of work includes design, supply, installation, testing and commissioning of IP based CCTV Surveillance system for Adventure Park and for any other areas instructed by Engineer-in-Charge.

It shall be fully on Digital IP technology. The system proposed shall be an open platform type and shall be possible to add or connect any make open platform camera (ONVIF compliant) to installed system.

The system shall consist of minimum following components. Additional items if required may be added as per the approved design.

Varifocal IR dome camera,

Outdoor Vari focal IR Bullet camera

Outdoor IR PTZ camera

Advanced Video Management Software with Server, storage etc.

POE/ POE+ network switches (Layer -2) with SFP/SFP+ modules

Layer 3 switch for backbone connection to server (Fibre connection to L2 switches)

LED display for 24X 7 monitoring along with required accessories to make system fully functional like Pole, Rack, junction Box, Patch panel, LIU, fibre optic cable, Cat 6A cable etc.

The POE / POE + switches from the shaft shall be connected with the distribution /L 3 core switch /server in start topology.

In order to tap from floor switches appropriate type of cable (Cat 6A for below 100 mtrs and OFC for above 100 mtrs) shall be used, the required convertors (SFP/SFP+) shall be included in the quoted rates.

The system shall be designed to keep the backup for 30 days for all the cameras and all the cameras shall record at 2 MP resolution 30 FPS with continuous recording (24/7).

The spacing between the cameras shall be so selected such that the video is clearly is seen. The system layout, location of cameras, spacing between the cameras, network architect, location of server, LED TVs shall be got approved from Engineer in charge.

TECHNICAL SPECIFICATION:

The following are the technical parameters for the CCTV work along with the Quantity. Final design and quantities are to be got approved from the Engineer –in-Charge before start of work

Sr No	Description Of Items		
	CCTV SYSTEM		

1	Supply, Installation, Testing, commissioning of 5MP Dome Camera with 2.8-12mm Motorized Varifocal lens, 1/2.8" SONY - CMOS 5MP Active Pixel, Minimum Illumination - Color - 0.01 Lux @F1.2, Focal Length - 2.8mm - 12mm, Focus Range - 0.3m to infinity, Aperture (F#) - F1.6-F2.8, Iris Type - Motorized Varifocal Iris, IR Range - Up to 50m, IR Led Wavelength - 850nm, IR Switching - Auto/ Manual, Audio IN - 1, Audio OUT - 1, Two-way Audio -Supported, Audio Compression - G.726 and G.711g, Alarm In - 1 (Phoenix type connector), Alarm Out - 1 (Phoenix type connector), SD Card - Up to 512GB, Available Resolutions - 2592 x 1944, 2592 x 1520, 2048 x 1536, 1920 x 1080, 720p, D1, 2CIF, CIF, Max Resolution - 2592 x 1944, Bitrate - 128 kbps-16Mbps, Bitrate Type - CBR, VBR, Video Compression - H.265, H.264, MJPEG, Frame Rate - 1- 30fps, Shutter Speed - 1/15s - 1/100000s, Adaptive Streaming - Yes, ONVIF Profiles - S, G, and T, Edge Recording - Yes, Alarm Recording - Pre and Post, Motion Recording - Yes, Time Triggered - Yes, WDR True -WDR (120dB), SNR - >70dB, Storage - NAS, SD Card, Certifications - NDAA Compliant, BIS, CE, IP67, FCC Part-15 Subpart — B, ONVIF S, G & T,IK10,UL, NEMA 4X**, STQC Certified with OWASP ASVS 4.0L2, SIRA	Nos	4
2	Supply, Installation, Testing, commissioning of 5MP Bullet Camera with 2.8-12mm Motorized Varifocal lens, 1/2.8" SONY - CMOS 5MP Active Pixel, Minimum Illumination - Color - 0.01 Lux @F1.2, Focal Length - 2.8mm — 12mm, Focus Range - 0.3m to infinity, Aperture (F#) - F1.6-F2.8, Iris Type - Motorized Varifocal Iris, IR Range - Up to 50m, IR Led Wavelength - 850nm, IR Switching - Auto/ Manual, Audio IN - 1, Audio OUT - 1, Two-way Audio -Supported, Audio Compression - G.726 and G.711g, Alarm In - 1 (Phoenix type connector), Alarm Out - 1 (Phoenix type connector), SD Card - Up to 512GB, Camera Adjustment Angle - Pan: 0° to 360°, Tilt: 0° to 90° , Rotate: 0° to 360°, Available Resolutions - 2592 x 1944, 2592 x 1520, 2048 x 1536, 1920 x 1080, 720p, D1, 2CIF, CIF, Max Resolution - 2592 x 1944, Bitrate - 128 kbps-16Mbps, Bitrate Type - CBR, VBR, Video Compression - H.265, H.264, MJPEG, Frame Rate - 1-30fps, Shutter Speed - 1/15s 1/100000s, Adaptive Streaming - Yes, ONVIF Profiles - S, G, and T, Edge Recording - Yes, Alarm Recording - Pre and Post, Motion Recording - Yes, Time Triggered - Yes, WDR True - WDR (120dB), SNR - >70dB, Storage - NAS, SD Card, Certifications - NDAA Compliant, BIS, CE, IP67, FCC Part-15 Subpart - B, ONVIF S, G & T,IK10,UL, NEMA 4X**, STQC Certified with OWASP ASVS 4.0L2, SIRA	Nos	4

3	Supply, Installation, Testing, commissioning of 2MP PTZ Camera, Image Sensor 1/ 2.8" CMOS, Minimum Illumination Color: 0.03lux@F1.69, 0Lux with IR Shutter Speed 1/15s to 1/10000s, Day and Night Yes, Wide Dynamic Range 120dB, Optical Zoom 38x, Digital Zoom 16x, focal Length 4.4 mm – 169.4 mm, Zoom Speed Approximately 6s from wide to tele at Max Speed, Aperture Range F 1.6 – F4.9, IR Range Up to 300m, IR irradiance Angle Adjustable by Zoom, Video Compression H.265/H.264/M-JPEG, Video Bitrate 128kbps 16Mbps, Audio Compression G.726 ,G.711 a-law and u-law, Audio Bitrate 128kbps 16Mbps IMAGE, Max Resolution 2MP – 1920×1080 5MP – 2592 x 1944, Stream Profiles Four streams support 5MP, Profile 1:- 2592 x 1944p/ 2592 x 1520/ 2048 x 1536/ 1920 x 1080/ 720P/ D1/ 2CIF/ VGA/ CIF/ QCIF @30fps (H.264/H.265), Video Analytics Motion/No Motion Detection, View Tamper Detection, Trip/No Trip Detection, Object Intrusion/Zone Intrusion, Loitering, Missing/ Object Counting, Abandoned Object, Audio Exception, Alarm In, Protocol TCP/IP, UDP, HTTP, HTTPs, DHCP, DNS, DynDNS, RTP, RTCP, RTSP, RTSPS, PPPOE, SMTP, NTP, SNMP, HTTPS, FTP, SMTP, 802.1x , IGMPv2& v3, ICMP, IPv4,IPv6,QoS Layer 3, CIFS,SSH, ARP, Communication Interface 1 RJ45 10/100 Self Adaptive Ethernet Port, Built-in Micro SD card slot up to 512GB, Power Supply 24VDC 2.5A , AC(Optional), Power Consumption Max 25W, Protection IP67.	Nos	5
4	Supply Installation testing and Commissioning of 16 Channel NVR with 1 SATA Port,Input - 16 IP Channels, Output - HDMI (2.0) – 1 Port, Compression - H.265/H.264/Motion JPEG, AUDIO - Input - 1 Channel, RCA Port(2.0Vp-p), Range (-2dBu to 22dBu), Output - 1 Channel, RCA Port (Mono, Unbalanced Output, 2.0Vp-p, Range (-2dBu to 22dBu), Compression - G.711, G.726, PCM, 512Mbps, RECORDING - Image Resolution- 12MP, 8MP, 5MP,3MP, 2MP, 1080P, D1, CIF, Pre-Record - Up to 30 Sec, Post-Record - 10-300 Sec, Snapshot Format - JPEG, Recording Types - Scheduled, Manual, Alarm, STORAGE AND BANDWIDTH OPTIMIZATION - Storage - Adaptive Recording: Automatically Reduces the Number of Frames, Captured Per Second Where There is No Motion, Thereby Saving Storage Space. Bandwidth - Automatically Adapts Optimized Resolution on Local Display Through HDMI, SATA Interface - 1 SATA III (10TB per port), NAS - 2 NAS, USB- 1 TB USB Drive, RAID-Single Disk, Retention - Camera Wise, HDD usage % wise, Day wise, Network Interface - 1 Ports x Ethernet (RJ-45) 10/100/1000Mbps, USB - 3 Ports (1x USB 3.0, 2x USB2.0),	Nos	1

	Alarm Input -2, Alarm Output - 1, Operating Temperature -0°C to +50°C (32°F to 122°F) NVR should be compatible with the Central Server/NVR.		
5	Supply, installation, testing & commissioning of 10 TB Surveillance Hard Disk complete etc. as required..	Nos	1
6	Supply, Installation, Testing and comissioning of 65" 4KUHD resolution LED Display with Android 11, 400 nits brightness, Cortex A55 1.3Ghz processor, Mali G31 MP2, Open GLES3.2, 2 GB DDR RAM, 16 GB Memory, Wifi Type support both 2.4 & 5G Standard, Dolby Audio, Built in Wifi and Cromecast, HDMI CEC, HDMI ARC, Built-in Bluetooth, Hotel mode, Meeting Mode,20W built in speakers, HDMI 2.0 X 2, AV X 1, USB X 2, RJ45 X 1, SPDIF Out x 1,24/7 operational.	Nos	1
7	Supply, Installation, Testing and comissioning of 5 Mtr HDMI cable Connectors at both ends	Nos	1
8	Supply, Installation, Testing and comissioning of PC Client Intel i7 processor with clock speed- minimum 3.0GHz, RAM8 GB & Expandable. Window 10 or Window 2016 Server or Unix based Edition .Minimum 1TB . LAN Interface 10/100/1000 Mbps Ethernet.).. Mouse Optical . USB port at front and Software of cameras.	Nos	1

9	Supply, Installation, Testing and comissioning of Switch should be Web Manged, Should have 8 port 1000BASE-T with 4 Port 1000BASE-T PoE PoE power budget 160 Watt or higher, Maximum Per port PoE Power 30 WattIEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX Ethernet,IEEE 802.3ab 1000BASE-T Ethernet, IEEE 802.3az EEE support,IEEE 802.3x flow control,IEEE 802.3z 1000BASE-X,IEEE 802.1p CoS,IEEE 802.3af PoE, IEEE 802.3at PoE Plus, IEEE802.1Q VLAN Tagging, Minimum 8 VLAN supportPort based VLAN, IEEE802.3ad link aggregation should be MAC based Switching Capacity 16 Gbps,Packet buffer 192KB,MAC address support 4K Jumbo frame support 9K, Should support loop detection,Should support Broadcast storm control QoS Support (WRR and strict priority) Port based QoS 20 Multicast group or higher, Maximum power consumption 72W,Operating temperature 0°C to 40°C Storage Temperature -40°C to 70°C Certification: CE, FCC, C-Tick, , LVD EN60950-1, ROHS compliant.Should be built-in IEEE 802.3az Energy Efficient Ethernet (EEE)	Nos	4
10	Supply, Installation, Testing and comissioning of Layer-2 POE plus Gigabit Ethernet 1RU chassis with 24 PoE 10/100/1000 BaseT ports and 4 Gigabit SFP ports. Includes an internal AC power supply 370W atleast or higher power budget) with a power cord, manuals access card, and RJ-45 to DB-9 adaptor.The Access Switch should have 4 ports of 1 G SFP.The Access Switch should provide Non-Blocking switch fabric capacity of 56 Gbps or more. L-2 switch should provide wire-speed packet forwarding of 41 Mpps or more. L-2 Switch should support min 16K MAC addresses and min 4000 active VLANs.	Nos	1
11	Supply, Installation, Testing and comissioning of 9U outdoor IPV5 rated rack with 2 side FAN with 3 socket PDU with 15 AMP DP for power surge safty. With pole mount accessories. Rack should be certified.	Nos	1
12	Supplying and drawing of 1 no UTP 4 pair CAT 6 LAN Cable in the existing surface/recess MS/PVC conduit as required	Meter	As per site requirement

13	S/E mark double walled corrugated (DWC) HOPE, pipe 10 Kg/Cm2 ,laid 0.75 Metre below ground level including digging and refilling of earth including cost of suitable size socket/coupler for HOPE pipe including the cost of labour and material required to complete the job in all respect up to the entire satisfaction of Engineer in charge of the work.		As per site requirement
	DWC/HOPE pipe 50/40 mm outer dial inner dia	Meter	
14	Supply, Installation, Testing and comissioning of 2 KVA Online UPS Overvoltage cut-off device (OVCD),Support for up to 42 AH external battery cabinets, Generator Compatible with Wide Input. Wide Input Voltage window (110 – 280Vac) for IndianEnvironmental Condition andfor Optimized BatteryPerformance. UPS would support SNMP Mnagaer and web browser On Line With 1 hour Backup	Nos	1
15	Wiring main and sub mains in two single core for phase and neutral wire and one single core for earth wire FRLS PVC insulated Copper conductor cable 1100 Volts grade in existing MS/PVC Conduit etc as required.		
	3 run of Size 1.50 Sqmm(1/1.40mm) For Light Ckts	Metre	As per site requirement
16	"Supply and erection of Hot Dip Galvanized octagonal pole of 3mm thickness, with base plate including cost of nut and bolts , earthing studs,Integral Cable termination arrangement 5 mm thick Bakelite base plate on suitable welded MS/GI bracket 32 A four way connector 2 no 10 A SP MCB , end cover and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, anchor bolts etc. over a bed of PCC 1:5:10 of required dimensions for octagonal poles of various heights as per following specifications complete in all respects and as per directions of Engineer-in-charge 5 Metre Long pole with top dia 65 mm and bottom dia 130mm with base plate of size 250 x 250 x 16 mm"	Each	7

PUBLIC ADDRESS SYSTEM

The Scope of Work of the project for Garden Area shall include the following major components with the below minimum quantities: -

Final design and quantities are to be got approved from the Engineer –in-Charge before start of work

(ii)	PA SYSTEM		
1	Supply, Installation, Testing and commissioning of Mixer amplifier Inbuilt Bluetooth for audio streaming, Supports audio playback from USB pen drive, 4 microphone/line inputs, plus music source input, Insert feature to use as a pre/power amplifier, Optional 2-tone chime generation for input 1, 40 A, Max. / rated 360 W / 240 W, 31 V (240 W), Approx. 10.5 kg, Connector Cinch, stereo converted to mono, Sensitivity 200 mV to 300 mV	No	1
2	Supply, Installation, Testing and commissioning of Tabletop Unidirectional Condenser Microphone Voltage range 12 to 48 V Current consumption <8 mA ,Sensitivity 0.7 mV @ 85 dB SPL (2 mV/Pa), Maximum input sound level 110 dB SPL, Distortion <0.6% (maximum input) ,Input noise level (equiv.) 28 dB SPLA (S/N 66 dBA ref. 1 Pa),Frequency response 100 Hz to 16 kHz Output impedance 200 ohm.	No	1
3	Supply, Installation, Testing and commissioning of 480W Booster amplifier , Battery voltage -24Vdc (max.10%deviation), Frequency response-60Hz to 15 kHz(+1/-3 db), Distortion (at rated out power at 1 khz)- <3%, Inputs- XLR , Impedance-20k , Sensitivity-1V (mic inputs), S/N->80 DB.	No	1
4	Supply, Installation, Testing and commissioning of Horn Loudspeaker made with ABS, water and dust protected to IP 65 Sound pressure level at 15W/1W - 115/103 dB (SPL), Effective frequency range 500 Hz to 5 kHz, Rated power 15W.	No	15
	CABLING & WIRING		
5	Supplying and drawing of cable Fire Retardant PVC insulated copper conductor cable in the existing surface / recessed steel		

	conduit of following pairs, cores and size including connections and interconnections etc. as required.		
	Speaker cable Single pair, 2-core, 1.5 sqmm	Metre	As per site requirement
6	S/E mark double walled corrugated (DWC) HOPE, pipe 10 Kg/Cm ² ,laid 0.75 Metre below ground level including digging and refilling of earth including cost of suitable size socket/coupler for HDPE pipe including the cost of labour and material required to complete the job in all respect up to the entire satisfaction of Engineer in charge of the work.		
	DWC/HDPE pipe 40/32 mm outer dia/ inner dia	Meter	As per site requirement

ADVENTURE ACTIVITIES

The following outdoor activities have been planned with the indicative image.

Final design and quantities are to be got approved from the Engineer –in-Charge before start of work

	ADVENTURE ACTIVITY	INDICATIVE IMAGE	
NS/ MR	Supplying, constructing, erecting, testing and commissioning of the following adventure activities with specifications detailed below:-		
(a)	(i) Climbing Wall with following specifications:- Climbing Wall Height - 28 Ft Climbing Wall Width - 12 Climbing Surface Panel - Fiber Climbing Panel 10-Mm Thickness Fastener - Ss Fastener Climbing Wall Type - 3d+2d Total Climbing Surface - 288 Sqft Panel Warranty - 02 Year		Qty – 04 nos

Climbing Hold - 100 Climbing Hold

Allen Bolt - 100 Pcs of Allen Bolt

Carriage Bolt - 100 Pcs For Panel Fixing

Chain Anchor - 02

Including Painting Work

(ii) Civil work details:-

Foundation Depth - 05 Ft

Pillar Thickness - 15 inch

Beam Thickness - 09/09 inch

Iron Rod - 16mm 12mm 06mm

Foundation Bolt - 24mm Each Pillar 04

Total Foundation Bolt - 16 Nos

Foundation Plate - 12mm

Rib Plate - 08mm

(i) Zip Line with following specifications:-

Qty – 01 nos

Zip line Length -200 meters approx.

Zip line type- Classic

Zip line wire -02

Weight load-40 to 105 kg

Wire load capacity-8000 kg

Wire-12 mm Galvanized steel core zip line wire.

Total Wire length-500 meters

Wire lock gear-Galvanized turn lock and U-clamps

Welding work-Running welding work

Brakes-Dynamic brakes system with spring bungee cord

Warranty-01 year

Walkie- talkie-01 Pair

Equipment-06- set (Harness -06, pulley – 06, Hemet -06,screw carabineers – 14, tape sling – 14

Equipment pulling system-01 with 12mm wire

(ii) Iron & Fabrication Work Details

Pillar-06-inch square pipe 5-mm thick

Beam-04-inch square pipe 4-mm thick

Bracing-03-inch square pipe 3-mm thick

Stair both side-Iron angle and flat (width - 2.5 ft)

Standing platform-05- checker plate

Width of top platform-14x12

Landing platform-14x16 feet (its depends on speed)

Total tower numbers-02

(iii) Civil Work Details

Foundation depth-7-ft

Pillar thickness-18-inch

Beam thickness-12x12 inch

Iron rod-20mm 16mm 12mm 08mm

Foundation bolt-24-mm thick

Foundation plate-16mm

Rib plate-10mm thick L 10 x w 05 inch



(c)

(i) Sky Cycle with following specifications:-

Length-100 mt approx.

Platform-24 ft

Tower height-32 ft

Qty – 01 nos

Type-Tandem (double seat)

Sky cycle line wire-02

Weight load-40 to 105 kg

Wire load capacity-8000 kg

Wire-12 mm Galvanized steel core zip line wire.

Total Wire length-480 meters

Wire lock gear-Galvanized turn lock and U-clamps

Welding work-Running welding work

Super-vision-By Big Boulder

Safety-Top self-anchor belay system

Warranty-01 year

Walkie- talkie-01 Pair

Equipment-08- set (Harness -08, pulley – 06, Hemet -08, screw carabiners – 12, tape sling - 18

(ii) Iron and fabrication work details

Pillar-05-inch square pipe 4-mm thick

Beam-04-inch square pipe 3-mm thick

Bracing-03-inch square pipe 2.5-mm thick

Stair both side-Iron angle and flat (width - 2.5 ft)

Standing platform-05- checker plate

Width of top platform-14x14 ft

Landing platform-14x14 ft

Total tower numbers-02

Shade on top-Yes both side (metro sheet)

(iii) Civil work details

Foundation depth-5.6 -ft

Pillar thickness-15-inch



Beam thickness-12x12 inch

Iron rod-20mm 16mm 12mm 08mm

Foundation bolt-24-mm thick

Foundation plate-16mm

Rib plate-10mm thick L 08 x w 05 inch

(d) Gaint Swing with following Specifications:-

Qty – 02 nos

Height-60 feet

Width-20 feet approx.

Main iron pillar-06- inch 6-mm iron pole

Support pole-04-inch iron pole

Welding and machinery work-Running welding work

Swing wire-12 mm galvanized steel core wire

Back pull structure type-65x65x05 Iron angel Truss

Swing Harness-02

Safety harness-02

Carabiners-08

Paint work

Iron structure-Iron welding work

Support rope-10 mm 50 mtr climbing rope

Back pole pulley-01

Motor -02 hp

Hanging pole-01

Pulling lock-01

Foundation-07-ft down from the ground level



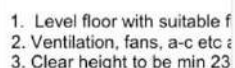
(e)	Rope Course with following Specifications:- (List of Activities Burma Bridge ,Zig zag walks , Tyre bridge,Beam walk) Length-25 feet each activity Width-30 inch each section Type-Low rope Activity fix on-12 mm galvanized wire Iron structure-04-inch iron pole structure and ladder work Structure & Activity Paint work Wooden plank-All wooden plank Used scooty tyre-100 no's Total rope course-05 Platform-Iron plate Foundation-Foundation / civil work	Qty – 04 nos



HAUNTED HOUSE

The following Haunted House activity has been planned with the indicative image.

Final design are to be got approved from the Engineer –in-Charge befor start of work

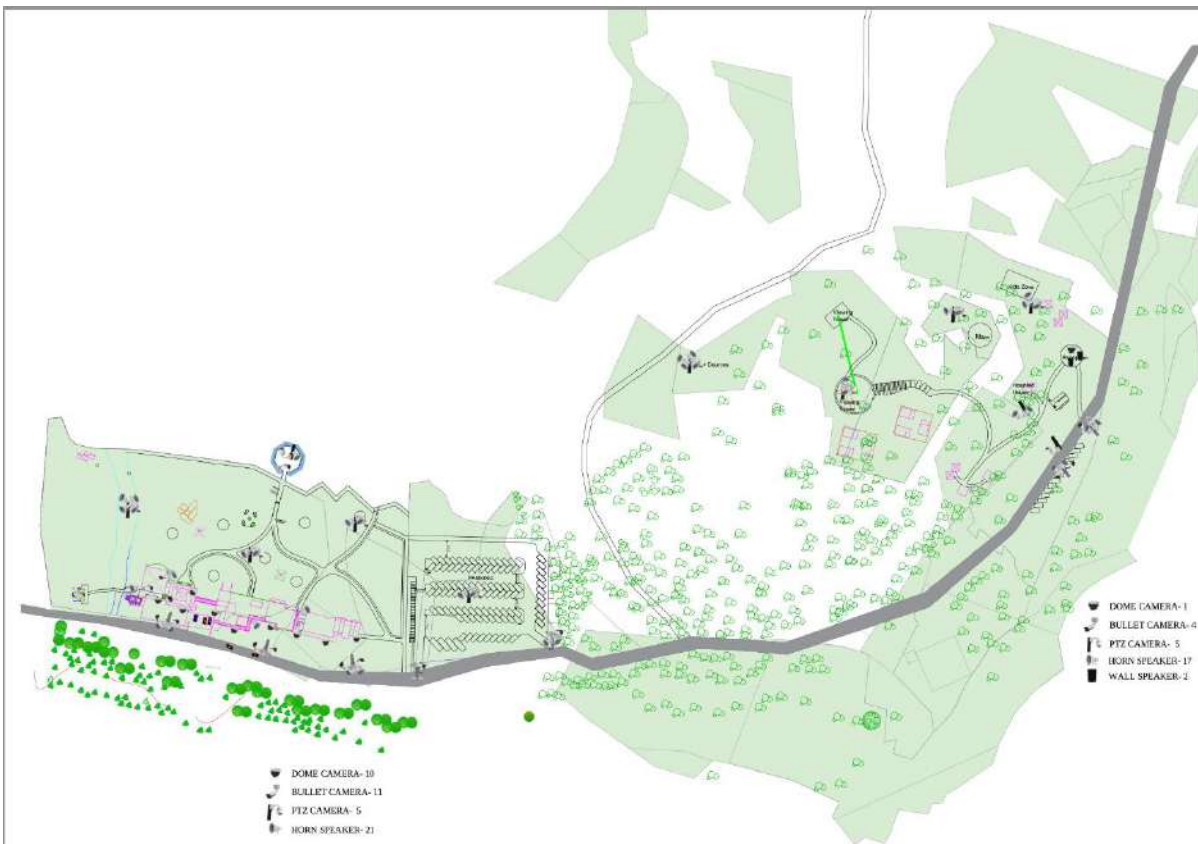
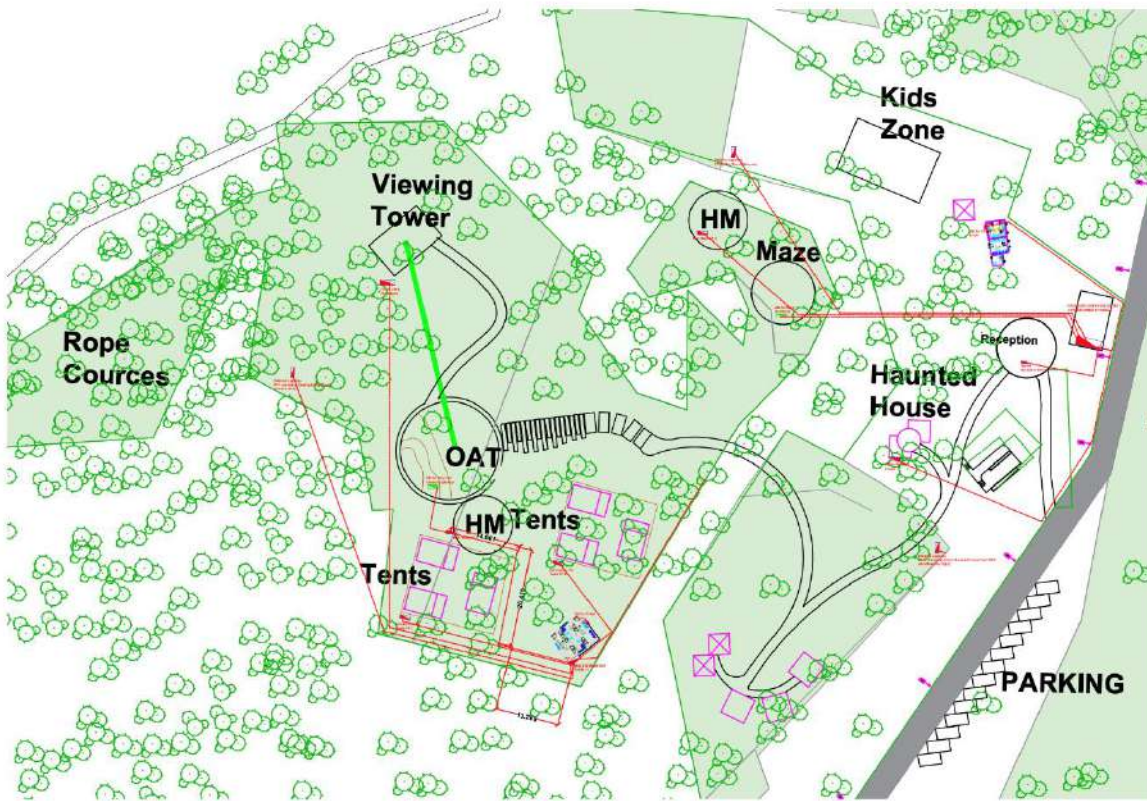


Annexure-1

Sr No	Type of Load	LOAD ON MAINS			LOAD ON DG SET		
		Total Connected Load in KW	Demand Factor	Demand Load in KW	Connected Load on DG Set in KW	Demand Factor	Demand Load on DG Set in KW
1	Proposed Tents						
	10 nos @ 2 kw each	20	0.9	18.00	20	0.9	18.00
2	Load for newly proposed Buildings						
	EI Load	3	0.9	2.70	3	0.9	2.70
	Power points	4	0.8	3.20	4	0.8	3.20
3	External & Land scape Lighting	17	0.9	15.30	17	0.9	15.30
4	High mast 2 nos @ 5 kw each	10	0.9	9.00	10	0.9	9.00
5	Plumbing System Load	5	0.8	4.00	5	0.8	4.00
6	Lift	15	0.9	13.50	15	0.9	13.50
7	Haunted House	20	1	20.00	20	1	20.00
	Add Extra for unforeseen load			20.00			
	Total Connected Load (A)			106			86
	Diversity (K1) @ 1.1						
	Maximum Demand Load in kW (A/K1)			97			78
	Transformer Capacity						
	Maximum Demand @ 0.9 P.F in KVA			108			
	Rating of @ 85% Loading in kVA			128			

	Proposed Transformer capacity - 160 KVA						
	Diesel Generator Back Up power Requirement						
	Maximum Demand in kW						78
	Maximum Demand @ 0.85 P.F in KVA						92
	Prime rating of DG Set @ 85% Loading in kVA						108
	Proposed Capacity to be installed in kVA						125
	Actual loading on DG Set						86%
	Proposed DG Set capacity 125 KVA						

The provided Electrical load calculation is preliminary. The actual Electrical load calculation must be performed by the bidder. If the calculated Electrical demand load exceeds the afore mentioned figure, the equipment rating shall be determined based on the actual calculation. Conversely, if the calculated Electrical demand load is less than the afore mentioned figure, the equipment capacity shall remain unchanged as per the initial calculation.



SECTION-B : GENERAL REQUIREMENTS OF INTERNAL PLUMBING AND SANITARY SYSTEM**1.0 General Requirements****a) General :**

These General requirements are intended to amplify the General conditions of contract and shall be read in conjunction with the same. For any discrepancies between the General Conditions and these general requirements, the more stringent shall apply. The general character and scope of work to be carried out under this contract is illustrated in drawings and specifications. The contractor shall carryout and complete the said work under this contract in every respect in conformity with the contract documents and with the directions of and to the satisfaction of Architect and Project Manager.

b) Scope of Work

- i) The form of Contract shall be according to the “Conditions of Contract”. All items of work under this contract shall be executed strictly to fulfill the requirements laid down under “Basis of Design” in the specifications. Type of equipment, material specifications, methods of installation and testing and type of control shall be in accordance with the specifications, approved shop drawings and relevant Indian Standard. The following clauses shall be considered as an extension and not in limitation of the obligation of the Contractor.
 - ii) Work under this Section shall consist of furnishing all labour, materials, equipment, appliances necessary and required and all incidental work not specifically mentioned herein or noted on the drawings/documents, but which are necessary and customary to be performed under this contract. The contractor is required to completely furnish all the plumbing and other specialized services as described hereinafter and as shown on the plumbing and sanitary approved shop drawings.
 - iii) Without restricting to the generality of the foregoing, the sanitary installations shall include the following :
 - Sanitary Fixtures.
 - Soil, Waste, Vent, Rainwater Pipes & Fittings (Sewerage and Storm Water Drainage)
 - Water Supply System.
 - iv) The contractor shall carefully study the tender drawings and carry out any modifications if required as per site conditions in his shop drawings. Before start of plumbing work the contractor shall submit 4 (four) sets of AutoCAD and colour shop drawings to the Architect through Project Manager which incorporate the details as per site conditions and contractor’s details for execution of the work and incorporate equipment manufacturer’s details and dimensions to ensure that the same can be

installed in the space provided. The plumbing work shall start only after the Architect has approved the shop drawings. No claim for extension of time shall be entertained because of any delay in the work due to contractor's failure to produce shop drawings at the right time and in accordance with approved work program. The said approval of shop drawings shall not mean that the drawings supersede the contract requirements nor does it in any way relieve the contractor of the responsibility or requirements to furnish material and perform work as required by the contract.

- v) All soil, waste & vent pipes and fittings laid inside toilets and kitchen are suspended pipes below bottom of RCC slab and supported with suitable MS hangers (galvanized) and supports fabricated from 12mm dia MS round rods and angle iron or size 30x30x4mm thick suspended from bottom of the slab and anchored with dash fasteners. All floor traps shall be suspended and suitable number of floor clean out with CP brass plugs shall be provided at the end of each header pipe to facilitates maintenance & cleaning of pipes from time to time.
- vi) All internal plumbing works upto first manhole including Gully trap and rainwater upto first Road Gully trap shall be covered in the lump-sum cost including the cost of Gully traps, manholes and Road Gully chambers.

2.0 Specifications

- 2.1 Work under this Contract shall be carried out strictly in accordance with conditions of contract, specifications attached with the tender and as shown on drawings.
- 2.2 Items not covered under these specifications or due to any ambiguity or misprints, or additional works, the work shall be carried out as per specifications of the latest Central Public Works Department with up to date amendments as applicable in the Contract.
- 2.3 Works not covered under para 2.1 and 2.2 shall be carried out as per relevant Codes & Bureau of Indian Standards and in case of its absence as per British Standard Code of Practice.

3.0 Execution of Work

- 3.1 The Contractor should visit and examine the site of work and satisfy himself as to the nature of the existing roads and other means of communication and other details pertaining to the work and local conditions and facilities for obtaining his own information on all matters affecting the execution of work. No extra charge made in consequence of any misunderstanding, incorrect information on any of these points or on ground of insufficient description will be allowed.

- 3.2 The work shall be carried out in conformity with the Plumbing drawings and within the requirements of architectural, electrical, structural and other specialized services drawings.
- 3.3 The Contractor shall make provision for hangers, sleeves, structural openings and other requirements well in advance to prevent hold up of progress of the construction schedule and avoid coordination gaps between different trades. All supports to the civil structure shall be provided with dash fasteners.

4.0 Contractor's Rates

- 4.1 Rates quoted by the contractor shall be inclusive of cost of materials, labour, supervision, erection, tools, plant, scaffolding, service connections, transport to site, taxes, octroi and levies, breakage, wastage and all such expenses as may be necessary and required to completely do all the items of work and put them in a proper working condition.
- 4.2 Rates quoted are for all heights and depths and in all positions as may be required for this work.
- 4.3 All rates quoted must be for complete items inclusive of all such accessories, fixtures and fixing arrangements, nuts, bolts, hangers, as are a standard part of the particular items except where specially mentioned otherwise.
- 4.4 All rates quoted are inclusive of cutting holes and chases in walls and floors and making good the same with cement mortar/concrete/water proofing of appropriate mix and strength as directed by the Architect/Project Manager. Contractor shall provide holes, sleeves, recesses in the concrete and masonry work as the work proceeds. All hot and cold water supply pipes crossing masonry walls shall be provided with G.I. pipe sleeves. The annular space between the pipe and sleeve shall be filled up with fire proof sealant after testing.
- 4.5 The Contractor shall furnish the Architect/Project Manager with vouchers & test certificates, on demand, to prove that the materials are as specified and of approved manufacturer's.

5.0 Cutting of Water Proofing Membrane

No walls terraces shall be cut for making and opening after water proofing has been done without written approval of Project Manager. Cutting of water proofing membrane shall be done very carefully so as other portion of water proofing is not damaged. On completion of work at such place the water proofing membrane shall be made good and ensured that the opening/cutting is made fully water proof as per specifications and details of water proofing approved by Architect/Project Manager.

6.0 Cutting of Structural Members

No structural member shall be chased or cut for plumbing works. However, if required in exceptional circumstances, the written permission of the Project Manager would be obtained before execution.

7.0 Materials

7.1 Unless otherwise specified and expressly approved in writing by the Architect/Project Manager, only materials of makes and specification as mentioned in the list of approved makes attached with the specifications shall be used.

7.2 The Contractor shall submit samples of materials proposed to be used in the works. Approved samples shall be kept in the custody of the Project Manager and all the samples shall be returned to the contractor after completion of work.

SECTION-C : SANITARY FIXTURES

1.0 Scope of Work

1.1 Work under this section shall consist of furnishing all materials and labour necessary and required to completely install all sanitary fixtures, chromium plated fittings and accessories as required as per the drawings, specifications and as given in Table-I.

1.2 Without restricting to the generality of the foregoing the sanitary fixtures shall include the following :

- a) Sanitary fixtures.
- b) Chromium plates fittings.
- c) Stainless steel kitchen sinks.
- d) Accessories e.g. towel rods, toilet paper holders, soap dish, towel rails, coat hooks etc.
- e) Connections to all kitchens, equipment, pump headers and other equipment requiring water and drainage connections.

1.3 Whether specifically mentioned or not all fixates and appliances shall be provided with all fixing devices, nuts, bolts, screws, hangers as required and to the complete satisfaction of Architect/Project Manager.

1.4 All exposed pipes within toilets and near fixtures shall be chromium plated brass or copper unless otherwise specified.

2.0 General Requirements

2.1 All fixtures and fittings of approved make & shade shall be provided with all such accessories as are required to complete the item in proper working condition whether specifically mentioned or not in the specifications, drawings. Accessories shall include proper fixing arrangement, brackets, nuts, bolts, screws and required connection pieces, WC flexible connectors etc.

2.2 Fixing screws shall be half round head chromium plated brass screws with C.P. washers where necessary.

2.3 Contractor shall furnish without any additional cost all such accessories and fixing devices that are necessary and required but not supplied along with the Plumbing Fixtures & CP Fittings by the manufacturers as a part of the original and standard supply.

2.4 All fittings and fixtures shall be fixed in a neat workmanlike manner true to level and heights shown in drawings and in accordance with manufacturer's recommendations. Care shall be taken to fix all inlet and outlet pipes at correct positions. Faulty locations shall be made good and any damage to the finished works including floor, tiling or terrace shall be made good by the contractor at his own cost.

2.5 Contractor shall seal all fixtures fixed near wall, marble and edges with an approved type of poly-sulphide sealant appropriate for its application.

3.0 Fixtures & Fittings (refer table – I)

3.1 European W.C.

3.1.1 European W.C. shall be siphonic type floor or wall mounted set flushed by means of porcelain exposed on wall matching dual flushing cistern or concealed type dual flushing cisterns (as given in drawing and table-I), which will be an integral part of the WC system. Where applicable flush pipe/bend shall be connected to the W.C. by means of a suitable rubber adapter. Wall hung W.C. shall be supported by C.I. floor mounted chair.

3.1.2 Each WC set shall be provided with a plastic seat cover with rubber buffers and chromium plated hinges.

3.1.3 Plastic seat shall be so fixed that it remains absolutely stationary in vertical position without falling down. WC shall be suitable for flushing in low volume of water.

3.1.4 Flushing cistern shall be provided with all internal flushing mechanism, 15mm dia ball cock with unbreakable polythene float and overflow pipe. Any frame work required for fixing cistern has to be provided by the contractor.

3.2 Lavatory Basin

3.2.1 Lavatory basins shall be white glazed vitreous china of size, shape and type with or without pedestal as specified in Table-I.

3.2.2 Each basin shall be provided with brackets and clips of approved and securely fixed. Placing of basins over the brackets without secure fixing shall not be accepted.

3.2.3 Each basin shall be provided with 32mm dia C.P. waste with overflow, pop-up waste or rubber plug and chain as specified in Table-I, 32 mm dia C.P. brass bottle trap with C.P. pipe to wall and flange. PVC semi rigid waste pipes in place of bottle trap shall be provided for wash basins with pedestals.

3.2.4 Each basin shall be provided with pillar tap or hot and cold mixer fitting as specified in Table – I.

3.2.5 Basins shall be fixed at proper heights as shown on drawings. If height is not specified, the rim level shall be 79cms or as directed by Architect.

3.3 Sinks

3.3.1 Sinks shall be stainless steel or any other material as specified in Table-I.

3.3.2 Each sink shall be provided with brackets of approved make and securely fixed. Counter top sinks shall be fixed with suitable brackets or clips as recommended by the manufacturer. Each sink shall be provided with 40mm dia C.P. waste with chain and plug as specified.

3.3.3 Supply fittings for sinks shall be mixing fittings or C.P. taps as specified in Table–I.

3.4 Toilet Accessories

3.4.1 Contractor shall install all chromium plated and stainless steel accessories as shown in drawings as specified in Table – I.

3.4.2 All C.P./S.S. accessories shall be fixed with C.P. brass half round head screws and cup washers in wall with rawl plugs or nylon sleeves and shall include cutting and making good as required or directed by Architect/Project Manager.

3.4.3 Recessed porcelain accessories shall be fixed in walls and set in cement mortar 1:2 (1 cement : 2 coarse sand) and fixed in relation to the tiling work as per drawings or decided by Architect/Project Manager.

3.5 Urinals

3.5.1 Urinals shall be half stall Popular colour glazed vitreous china of size, shape and type specified in Table – I.

3.5.2 Bowl urinals shall be provided with 15mm dia C.P. spreader, 32mm dia stainless steel domical waste and 40mm C.P. cast brass bottle trap with pipe and wall flange, and shall be fixed to wall by C.I. brackets and C.I. wall clips as recommended by manufacturers complete and as directed by the Architect/Project Manager.

3.5.3 Urinals shall be fixed with C.P. brass screws and shall be provided with 32mm dia domical waste leading to urinal's trap.

3.5.4 Flush pipes shall be G.I. pipes concealed in wall chase but with chromium plated bends at inlet and outlet or as shown in the drawing or as directed by the Architect/Project Manager.

3.5.5 Urinals shall be flushed by means of fully automatic battery operated no-touch flush valve with solenoid valves as specified and as approved by the Architect/Project Manager.

3.5.6 Waste pipes with bottle trap shall be uPVC Class-III (6 kg/sqcm) conforming to IS:4985. Waste pipes will be concealed in chase.

Note : Irrespective of whether shown in drawings or given elsewhere in this tender document, the sanitary fittings shall be provided as part of lump-sum in common areas/services areas/community areas and nothing extra shall be payable to the contractor or any account or misunderstanding.

SECTION-D : SOIL, WASTE, VENT AND RAINWATER PIPES AND FITTINGS
(Sewerage and Storm Water Drainage)

1.0 Scope of Work

- 1.1 Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install all soil, waste, vent and rainwater pipes and fittings as required by the drawings.
- 1.2 Without restricting to the generality of the foregoing, the soil, waste, vent pipes system shall include the following :-
- a) Vertical and horizontal soil, waste, vent pipes, and fittings, joints, clamps, connections to fixtures.
 - b) Connection of all pipes to sewer lines as shown in drawings at ground floor levels.
 - c) Drainage, channels, gratings and floor drains.
 - d) Floor and urinal traps, cleanout plugs, inlet fittings and rainwater heads/khurras.
 - e) Gully traps, first manhole under each soil, waste pipe and first road gully chamber under each rain water pipe.
 - f) Testing of all pipe lines.

2.0 General Requirements

- 2.1 All materials shall be new of the best quality conforming to specifications and subject to the approval of Project Manager and Architect.
- 2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.
- 2.3 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.
-

- 2.4 Pipes shall be securely fixed to walls and ceilings by suitable clamps at specified intervals. All cuttings required in RCC columns/beams/slabs will be done as a core cutting with the help of Hilti Core Cutting Machine.
- 2.5 Access doors for fittings and clean outs shall be so located that they are easily accessible for repair and maintenance. Any access panel required in the civil structure, false ceiling etc., if not given, shall be brought to the notice of the Architect & Project Manager in the form of shop drawings.

3.0 Piping System

- 3.1 Schedule of pipes, irrespective of what is shown elsewhere or in drawings :-

a)	uPVC pipes 75, 110 & 160mm dia (O rubber rings/cement solvent joints SWR System IS:13592 Type-B).	Vertical stacks and horizontal branches, for soil, waste and vent pipes and main headers at basement ceiling.
b)	uPVC pipes 40, 50 & 63 mm OD (Class III, 6kg/sq.cm as per IS:4985).	Waste lines for wash basin, floor drains and urinal waste.
c)	PVC pipes 75mm to 160mm OD (PVC Class III, 6kg/sqcm as per IS:4985).	Rain water pipes.
d)	CI (Class LA) pipes (IS:1536) with polyethelene wrapping.	Pipes under building floor (where specified)
e)	G.I. pipes conforming to IS:1239 (medium class) with black enamel paint on outer body.	Main headers at 1 st basement ceiling level, sump rising main.

3.2 Soil, Waste and Vent pipes

- a) The Soil & Waste Pipe System above ground has been planned as a “Two Pipe System with all soil appliances ventilated” as defined in IS:5329 having common pipes for soil and waste for W.C., W.B., kitchen sinks, showers and floor drains with a ventilating pipe for all soil appliances.

- b) Where applicable all waste water from pump rooms, floor channels etc. will be provided with a deep seal trap before connecting to the main drain or vertical stack.
- c) Vertical soil & waste stacks shall be connected to a separate horizontal drain at basement ceiling generally where applicable and shown in drawings.
- d) Toilet layouts have been so arranged that the W.C. outlets shall be “P” trap above floor wherever possible. All WC’s shall be connected to SWR pipes by means of WC connector with rubber joint.

3.3 Rain Water Pipes

- a) All open terraces shall be drained by rain water down takes.
- b) Rainwater down takes is separate and independent of the soil and waste system and will discharge into the catch basins before connecting to the Storm Water Drainage system of the complex.
- c) Rain water in open courtyards shall be collected in catch basins and connected to the storm water drain.
- d) Any dry weather flow from waste appliances e.g. waste water sumps shall be connected to sewers after traps and not in the storm water drainage system.

3.4 Balcony/Planter Drainage

Wherever required, all balconies, terraces, planters and other formal landscape areas will be drained by vertical down takes or other type of drainage system shown in drawings.

3.5 Soil Waste & Vent pipe & Fittings above ground

uPVC Pipes & Fittings

- a) Soil, waste, vent and anti-siphonage pipes shall be uPVC. All pipes 75mm dia and above shall be straight and smooth conforming to IS:13592 SWR of class B. Pipes less than 75mm OD shall be uPVC (6 kg/sq cm) conforming to IS:4985.
- b) Pipes and fittings for main vertical stacks & branches 160mm, 110mm & 75mm dia shall be Soil, Waste & Rainwater System known in the short form as SWR drainage system with injection moulded fittings with approved type of socket & ‘O’ rubber ring joints/solvent cement joints conforming to relevant IS code.

c) Joints shall be done as per the manufacturer's recommendations. The pipes and fittings must have matching dimension for perfect joints in the system. 'O' ring fittings must have sufficient gap (approx. 10mm) for thermal expansion of pipes.

d) uPVC pipes shall be clamped to the wall with approved type uPVC saddle clamps/U clamps and GI rod fixed to the angle iron support system within the shaft.

e) Proper uPVC pipe adapters shall be used for connections between cast iron pipes, traps & uPVC pipes where necessary. Such joints shall be made with pipe sealants as approved by Architect/Project Manager.

4.0 Clamps

4.1 For uPVC pipes standard uPVC clamps shall be used. For other pipes MS clamps, supports and hangers provided shall be galvanized. Factory made pre-fabricated clamps shall be preferred. Contractor may fabricate the clamps of special nature and galvanize them after fabrication but before installation. (Clamps shall be fabricated from mild steel sections) all nuts, bolts, washers and other fasteners shall be factory galvanized.

4.2 Galvanized slotted angle/channel supports on walls shall be provided wherever required. Angles/channels shall be of sizes as required. Angles/channels shall be fixed to brick walls with bolts embedded in cement concrete blocks and to RCC walls with suitable anchor fasteners.

4.3 Wherever MS clamps are required to be anchored directly to brick walls, concrete slabs, beams or columns, nothing extra shall be payable for clamping arrangement and making good with cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 mm stone aggregate 20mm nominal size) as directed by the Architect/Project Manager.

4.4 For sleeves, anchor fasteners and clamps spacing chart shall be as follows :-

Clamp and pipe support spacing

S.No	Type of Pipes & Position	Commercial Pipe Dia (Spacing in m.)							
		15/20	20/25	32/40	50	75/80	100/110	150/160	200
1.	Vertical Pipes								
1.1	GI/MS Pipes	2.4	2.4	3		3.6	4.5	5.4	5.4

1.2	SWR/Cast Iron Pipes IS:1729/3989 Water Supply Pipes IS:1536/1538/7181/8329	x x	x x	←----- 3.0m ----- -----→ ←----- 3.6m ----- -----→					
1.3	uPVC/cPVC Pipes IS:4985 for Water Supply IS:13592 for SWR	x X	x x	0.5 0.5	 	0.7 0.7	0.9 0.9	0.9 0.9	
2.	Horizontal Pipes								
2.1	G.I./MS Pipes	←-----2.0m - →		2.4m	3	3.6	4	←-----4.5m----- -→	
2.2	Cast Iron Pipes SWR Pipes IS:1729/3989 Water Supply Pipes IS:1536/1538/7181/8329			←----- 3.0m ----- -----→ 33.63.64.5					

5.0 Traps

5.1 Floor Traps

5.1.1 Floor traps where specified shall be of multi inlet or 100 x 100 mm deep seal type uPVC traps (SWR) having a minimum 50mm deep water seal as shown in drawings. The trap and waste pipes when buried below ground or in sunken slab shall be set and encased in cement concrete blocks firmly supported on firm ground or when installed on a sunken RCC structural slab. The blocks shall be in 1:2:4 mix (1 cement : 2 coarse sand : 4 stone aggregate 20mm nominal size).

5.1.2 Necessary shuttering and centering for blocks of size 30 x 30cms up to the required depth shall be provided.

5.2 Trap & Seals

5.2.1 All traps shall be self cleaning and the material and the seal depth shall be as specified below wherever the traps are not integral with the appliances :

Appliance or Ware	Material	Trap Type	Seal depth (mm)
Lavatory/wash basin	C.P. cast brass	32mm dia Bottle	75mm
Sink	C.P. cast brass	40mm dia Bottle	75mm
Floor drain	uPVC	75mm dia 'P' or 'S'	50mm
Kitchen floor drain of fabricated drain boxes	uPVC	75/100mm dia 'P' or 'S'	50mm
Urinals	uPVC	100mm dia 'P' or 'S'	50mm

6.0 Floor Gratings

Floor and urinal traps shall be provided with 100-150mm square or round C.P. grating, with rim of approved design and shape. Minimum thickness shall be 4mm. Stainless Steel Cockroach trap of appropriate size and approved make shall be provided in all toilets and kitchens.

7.0 Cleanout Plugs : Floor Clean Out Plug

Clean out plug for Soil, Waste or Rainwater pipes laid under floors shall be provided near pipe junctions bends, tees, 'Ys' and on straight runs at such intervals as required as per site conditions. Cleanout plugs shall terminate flush with the floor levels. They shall be threaded and provided with key holes for opening. Cleanout plugs shall be Cast Brass fixed by means of screwed to a PVC socket. The socket shall be cement solvent joint to the drain pipes.

8.0 Waste pipe from appliances

8.1 Waste pipe from appliances e.g. washbasins, sinks and urinals shall be uPVC class III (6 kg/sq.cm) in all toilets, kitchen, pantries and service areas as shown in drawings.

8.2 All pipes shall be fixed in gradient towards the connection to stack, trap or drain. Pipes inside all toilets shall be in chase unless otherwise shown on drawings where so required and shown on drawings.

9.0 Encasing in Cement Concrete

Encasing of pipes is required to provide stability to the line and prevent its damage during construction.

a) Concealed uPVC soil and waste pipes

Pipes in wall chases (when cut specially for the pipe) shall be encased in cement concrete 1:2:4 mix (1 cement : 2 coarse sand : 4 stone aggregate 10mm size). When pipes are running well above the structural slab, the encased pipes shall be supported with suitable cement concrete pillars of required height at intervals of 1.8m.

b) Cast Iron Drainage Pipes (Class LA) where provided

All drainage pipes except when fixed above ground or in exposed locations shall be encased in cement concrete as specified above for soil & waste pipes. The bed and encasing thickness shall however be 150mm in bed and all rounds as shown on the drawing.

10.0 a) Gully trap, Manholes and Road Gully Chambers

SWR/SWG and LA pipe interconnecting the first manhole, gully traps, first manhole and first road gully chamber is included in the scope in lump-sum rate. All piping work and manhole/chambers from the first manhole/chamber on wards shall be measured and paid separately under external sewerage and area drainage. The construction of gully traps, manholes and road gully chambers shall be as per CPWD standards and specifications as shown on drawing and as directed by the Architect/Project Manager. The number of gully traps/manholes/road gully chambers shall be provided per block as indicated in the drawings. The depth of these manholes shall be 70 cms $\pm$ 25cm depth and road gullys 60 cms $\pm$ 15 cm depth.

b) Gully Traps

Gully traps shall be of first class quality salt glazed and free from rough texture inside/outside and straight and used where shown on drawings. Gully traps shall be fixed in cement concrete 1:5:10 mix and a brick masonry chamber 30x30cms inside in cement mortar 1:5 with 15x15 cms grating inside and 30x30 cms CI sealed cover and frame weighting not less than 7.3 kgs to be constructed as per standard drawing. Where necessary, sealed cover shall be replaced with CI grating of the same size (1 cement : 5 coarse sand : 10 stone aggregate 40mm nominal size).

c) Manholes and Chambers

- i) All manholes, chambers and other such works as specified shall be constructed in brick masonry in cement mortar 1:5 (1 cement : 5 coarse sand) or as shown in drawings.
- ii) All manholes and chambers etc. shall be supported on base of cement concrete of such thickness and mix as shown in drawings. Where not specified manholes shall be constructed as follows :

(all dimensions internal clear in cms)

Size of manhole type	90x80 rect.	120x90 rect.	90 dia conical	122 dia conical	150 dia conical
Maximum depth cm	150	240	167	239	900
Average thickness of RCC slab cm	15	15	-	-	-
Size of cover and frame cm	60x45	56 dia	56 dia	56 dia	56 dia
Weight of cover and frame	38 kgs	< ----- 182 Kgs ----- >			
	C.I.	< ----- SFRC (MD) ----- >			

- iii) All manholes and chambers shall be provided with cement concrete benching in 1:2:4 mix (1 cement : 2 coarse sand : 4 stone aggregate 20mm nominal size). The benching shall have a slope of 10 cms towards the channel. The depth of the channel shall be full diameter of the pipe. Benching shall be finished with a floating coat of neat cement as per standard details.
- iv) All manholes and chambers shall be plastered with 12/15mm thick cement mortar 1:3 (1 cement : 3 coarse sand) and finished with a floating coat of neat cement inside. Manhole shall be plastered outside as above but with rough plaster mixed with water proofing compound.
- v) All manholes and chambers with depths greater than 0.8m shall be provided with 20mm square or 25mm round rods aoristic coated catch rings set in cement concrete blocks 25 x 10 x 10cms in 1:2:4 mix 30 cms vertically and staggered. Foot rests shall be coated with coal tar before embedding.

- vi) All manholes and chambers shall be provided with cast iron/steel fibre reinforced plastic (SFRC) covers and frames and embedded in reinforced cement concrete slab. Weight of cover, frame and thickness of slab shall be as shown in drawings or as specified above.
- vii) Road gullies, ramp drains, gratings in basement shall be of Steel Fibre Reinforced Concrete (SFRC) with frame unless otherwise specified.

11.0 Cutting and Making Good

Contractor shall provide all holes cut outs and chases in structural members necessary and required for the pipe work as building work proceeds. Wherever cut outs, holes are left in the original construction, they shall be made good with cement concrete 1:2:4 (1 cement : 2 coarse sand : 4 stone aggregate 20mm nominal size) or cement mortar 1:2 (1 cement : 2 coarse sand) and the surface restored to in original condition.

12.0 Sleeves / Cut-outs

Contractor shall utilize all cut out and sleeves provided during construction to prevent breaking. The annular space between the pipe and the sleeve shall be filled up with approved type of fire retardant sealant. When sleeves are misplaced or inaccurately located contractor shall make the holes in the wall or structural members at his own cost but only with the prior permission of the Architect/Project Manger and the cutting will only be done as a core cutting with the help of Hilti core cutting machine and the misplaced locations plugged properly as directed.

SECTION-E : WATER SUPPLY SYSTEM (INTERNAL)

1.0 Scope of Work

1.1 Work under this section consists of furnishing all labour, materials equipment and appliances necessary and required to completely install the water supply system as required, specified hereinafter and as shown on drawings.

1.2 Without restricting to the generality of the foregoing, the water supply system shall include the following :

- a) Distribution system for toilets & kitchens from overhead water tanks.
- b) Insulation to hot water pipes.
- c) Pipe protection and painting.
- d) Control valves and other appurtenances.
- e) All G.I. pipes and fittings of sizes as shown on drawing from overhead water tanks to the down take pipes upto ground floor to all taps, wall mixers, showers, washbasins, cistern, geyser points, kitchens and connections to all other plumbing fixtures, tanks and appliances.
- f) Inserts for R.C.C. tanks and overflow pipes and other fittings in the entire down take system.

2.0 General Requirements

2.1 All materials shall be brand new of the best and approved quality conforming to specifications.

2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.

2.3 Short or long bends shall be used on all main pipe lines as far as possible. Use of elbows shall be restricted for short connections.

2.4 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.

2.5 Pipes shall be securely fixed to walls and ceilings by suitable clamps at intervals specified.

2.6 Clamps, hangers and supports on RCC walls, columns & slabs shall be fixed only by means of expandable metal fasteners inserted by use of power drills.

2.7 All pipe clamps, supports, nuts, bolts, washers shall be galvanized MS steel throughout the building. Painted MS clamps & MS nuts, bolts & washers shall not be accepted.

2.8 Valves and other appurtenances shall be so located as to provide easy accessibility for operations, maintenance and repairs.

3.0 Water Supply System

3.1 The system has been connected to a gravity feed system from overhead tanks to all parts of the building.

3.2 Domestic water supply shall be provided with cold and hot water system only. Hot water provisions are limited to toilets only and shall be connected to a local electric hot water storage geyser. Hot water provision in kitchens shall be through solar hot water heating system.

3.3 It is important to ensure that the wholesome water supply is in no way liable to contamination. Therefore there shall be no cross connection with other lines which are likely to become sour of contamination.

3.4 The laying of the pipe lines shall be such that there is no back flow. The laid pipe lines shall be completely water tight thereby avoiding seepage and loss to property. Due protection shall be given to the laid pipe lines against damage, corrosion and protection from frost.

4.0 G.I. Pipes and Fittings

a) All pipes inside the buildings, outside the building and where specified shall be galvanized steel tubes conforming to IS:1239 of medium class.

b) Fittings shall be of malleable iron galvanized of approved make. Each fitting shall have manufacturer's trade mark stamped on it. Fittings for G.I. pipes shall include couplings, bends, tees, reducers, nipples, unions, and bushes. Fittings shall conform to IS:1879 (Part-I to X).

- c) Pipes and fittings shall be jointed with screwed joints. After cutting a pipe with a hacksaw or a cutting machine, care shall be taken to remove burr from the end of the pipe after reaming with a proper file.
- d) Pipe threaded joints will be made by applying suitable grade of pipe sealing cord/non-toxic pipe sealant used for drinking water supply. (Use of red or white lead and sutli will not be permitted for screwed joints).
- e) All pipes shall be fixed in accordance with layout and alignment shown in drawings. Care shall be taken to avoid air pockets. G.I. pipes inside toilets shall be fixed in wall chases well above the floor. No pipes shall be run under floor as far as possible.

4.1 Clamps

G.I. pipes in shafts and other locations shall be supported by galvanized MS supports/clamps of design approved by Architect/Project Manager. Pipes in wall chases shall be anchored by G.I. hooks. Pipes at ceiling level shall be supported on structural clamps fabricated from galvanized MS structural. Pipes in typical shafts shall be supported on slotted angles/channels as per standard drawings and as directed.

4.2 Unions

Contractor shall provide adequate number of unions on pipes 40mm and below to enable easy maintenance when required. Unions shall be provided near each gunmetal valve, ball valve, stop cock, or check valve and on straight runs as necessary at appropriate locations as required and as directed by the Architect/Project Manager.

4.3 Flanges

Flanged connections shall be provided on pipes 65mm and above as required or where shown in drawings generally as follows :

- a) On straight runs not exceeding 30m, near bends and at connections to main branch lines.
- b) On all valve ends.
- c) On equipment / pump connections as necessary and required and as directed by the Project Manager/Architect.

Flanged connections shall be made by the correct number and size of the bolts and made with 3mm thick insertion neoprene gaskets Bolt hole dia for flanges shall conform to match the specification for C.I. sluice valve to IS:780 and C.I. butterfly valve to IS:13095.

4.4 Painting

All pipes above ground shall be painted with one coat of primer and two coats of synthetic enamel paint of approved shade and quality. Pipes shall be painted to standard colour code specified.

4.5 Pipe protection

All pipes in chase or concealed shall be protected against corrosion by the application of two coats of bitumen paint covered with bitumen tape and a final coat of bitumen paint before covering up the pipe.

4.6 Insulation

Hot water pipes on terrace and in shafts shall be insulated with 19mm thick “Vidoflex/Kaiflex” pre-formed insulation to be installed as per manufacturer’s instruction and directions of the Architect/Project Manager.

5.0 Valves

5.1 Ball Valves

Valves up to 40mm dia shall be screwed type gun mental Ball Valves with stainless steel (304) bass, SS stem, renewable PTFE seat, Teflon seating and gland packing tested to a hydraulic pressure of 500 psig, and accompanying couplings and steel handles (to BS 5351)

5.2 Butterfly Valves

Valves 50mm dia and above shall be cast iron butterfly valve to be used for isolation. The valves shall be bubble tight, resilient seated suitable for flow in eight direction and seal in both direction with accompanying flanges and steel handle. Butterfly vlave shall be of best quality (PN 16) conforming to IS:13095.

5.3 Non-return Valve (Slim Type)

Where specified non-return valve (dual plate slim type) shall be provided through which flow can occur in one direction only. Check valve shall be C.I. dual plate slim type, spring loaded class (PN 1.6), Ductile Iron Disc, 416 SS stem, EPDM lining, Stainless Steel spring complete with 2 nos. matching flanges, rubber insertion, nuts, bolts and washer etc. Each Butterfly and Slim Type Check (NRV) Valve shall be provided with a pair of flanges screwed or welded to the main line and having the required number of galvanized nuts, bolts and washers of correct length.

5.4 Storage Overhead Tank (Accessories & Connections)

Storage tanks for water supply shall be in reinforced cement concrete. Each tank shall be provided with lockable type manhole cover fabricated from M.S. sheets. Manhole covers shall be 450-500mm dia and fully galvanized after fabrication or as approved by the Project Manager/Architect.

5.5 Outlets and Overflow

All nozzles for puddle flanges in RCC tank for inlet, outlet, overflow and scour etc. shall be provided by the contractor as given in the drawings. Further connections and accessories shall also be provided under this contract.

6.0 Testing

6.1 All pipes, fittings and valves after fixing at site, shall be tested by hydrostatic pressure of 1.5 times the working pressure or 10kg/cm² whichever is more. Pressure shall be maintained for a period of at-least thirty minutes without any drop.

6.2 A test register shall be maintained and all entries shall be signed and dated by Contractor, Architect & Project Manager.

6.3 In addition to the sectional testing carried out during the construction, Contractor shall test the entire installation after connections to the overhead tanks or pumping system or mains. He shall rectify all leakages and shall replace all defective materials in the system. Any damage done due to carelessness, open or burst pipes or failure of fittings, to the building, furniture and fixtures shall be made good by the Contractor during the defects liability period without any cost.

6.4 After commissioning of the water supply system, Contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently. Valves which do not effectively operate shall be replaced by new ones at no extra cost and the same shall be tested as above as directed by the Project Manager/Architect.

PARTICULAR SPECIFICATIONS FOR EXTERNAL WATER SUPPLY

SECTION-A : WATER SUPPLY

1.0 Scope of work

1.1 Work under this section consists of furnishing all labour, materials equipment and appliances necessary and required to completely install the water supply system as required specified hereinafter and as shown on drawings.

1.2 Without restricting to the generality of the foregoing, the water supply system shall include the following :

- a) Distribution system from main supply headers from pump room to all internal branches, fixtures and appliances.
- b) Water supply lines from tube wells and city water connections to Fire and Under Ground Water Tanks.
- c) Excavation and refilling of pipes trenches.
- d) Pipe protection and painting.
- e) Control valves, masonry chambers and other appurtenances.

2.0 General Requirements

2.1 All materials shall be brand new of the best and approved quality conforming to specifications.

2.2 Pipes and fittings shall be fixed truly vertical, horizontal or in slopes as required in a neat workmanlike manner.

2.3 Short or long bends shall be used on all main pipe lines as far as possible. Use of elbows shall be restricted for short connections.

2.4 Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in passages.

2.5 Pipes shall be securely fixed to walls and ceilings by suitable clamps at intervals specified.

2.6 Clamps, hangers and supports on RCC walls, columns & slabs shall be fixed only by means of expandable metal fasteners inserted by use of power drills.

2.7 All pipe clamps, supports, nuts, bolts, washers shall be galvanized MS steel throughout the building. Painted MS clamps & MS nuts, bolts & washers shall not be accepted.

2.8 Valves and other appurtenances shall be so located as to provide easy accessibility for operations, maintenance and repairs.

3.0 Water Supply System

3.1 **Source** : Water supply will be acquired from local municipal and captive tube wells within the site and collected in water storage tanks located underground.

3.2 It is important to ensure that wholesome water supply is in no way liable to contamination from any less satisfactory water. There shall, therefore be no cross connection whatsoever between a pipe or fitting for conveying or containing wholesome water and a pipe or fitting for conveying or containing impure water or water liable to contamination or of uncertain quality of water which has been used for any purpose.

3.3 The laying of the pipe lines shall be such that there is no possibility of backflow towards the source of supply. All pipe work shall be laid or fixed and maintained so that it remains completely water tight, thereby avoiding wastage of water, damage to property and the risk of contamination of the water conveyed.

4.0 G.I. Pipes and Fittings

a) All external pipes for external water supply shall be galvanized steel tubes conforming to IS:1239 of medium class.

b) Fittings shall be of malleable iron galvanized of approved make. Each fitting shall have manufacturer's trade mark stamped on it. Fittings for G.I. pipes shall include couplings, bends, tees, reducers, nipples, unions, and bushes. Fittings shall conform to IS:1879-Part-I to X.

- c) Pipes and fittings shall be jointed with screwed joints. After cutting a pipe with a hacksaw or a cutting machine care shall be taken to remove burr from the ends of the pipe after reaming with a proper file.
- d) Pipe threaded joints will be made by applying suitable grade of pipe sealing cord non-toxic pipe sealant used for drinking water supply (use of red or white lead and sutli will not be permitted for screwed joints).
- e) All pipes shall be fixed in accordance with layout and alignment shown in drawings. Care shall be taken to avoid air pockets. Pipes may be run under the ceiling or floors and other areas as shown on drawings.

4.1 Clamps

GI pipes in shafts, tranches and other locations shall be supported by galvanized MS clamps of design approved by Architect/Project Manager. Hanging pipes shall be supported on structural clamps fabricated from MS structurals. Pipes in typical channels/shafts shall be supported on slotted angles/channels as per standard drawings.

4.2 Unions

Contractor shall provide adequate number of unions on pipes 40mm and below to enable easy dismantling later when required. Unions shall be provided near each gunmetal valve, stop cock, or check valve and on straight runs as necessary at appropriate locations as required and/or directed by Architect/Project Manager.

4.3 Flanges

Flanged connections shall be provided on pipes 65mm and above as required or where shown in drawings generally as follows :

- a) On straight runs not exceeding 30m, near bends and at connections to main branch lines.
 - b) On all valves ends.
 - c) On equipment/pump connections as necessary and required or as directed by Architect/Project Manager.
-

Flanged connections shall be made by the correct number and size of the bolts and made with 3mm thick insertion neoprene gaskets Bolt hole dia for flanges shall conform to match the specification for C.I. sluice valve to IS:780 and C.I. butterfly valve to IS:13095.

4.4 Trenches

All water supply pipes below ground shall be laid in trenches with a minimum cover of 60cms. The width and depth of the trenches shall be as follows :

<u>Dia of Pipe</u>	<u>Width of Trench</u>	<u>Depth of Trench</u>
15mm to 50mm	30 cms	75 cms
65mm to 100 mm	45 cms	100 cms

4.5 Sand Filling

All G.I./PVC/MS pipes in trenches shall be protected with fine sand 15cms all round before filling in the trenches. Where shown in drawings main pipe lines may run along basement ceiling or in masonry trenches from the pump house to the buildings, filled-up with sand and buried in ground as per architectural/landscape details.

4.6 Painting

All pipes above ground shall be painted with one coat of primer and two coats of synthetic enamel paint of approved shade and quality. Pipes shall be painted to standard colour code specified.

4.7 Pipe Protection

All underground pipes shall be protected against corrosion by the application of two coats of bitumen paint covered with bitumen tape and a final coat of bitumen paint before covering up the pipe. All GI & MS water supply pipes below ground shall be protected against corrosion by applying one layer of 4mm thick multilayer anticorrosive polymeric mix tape applied over a coat of primer as per recommendations of the manufacturers (Pypekote or equivalent).

5.0 Valves

5.1 Ball Valves

Valves upto 40mm dia shall be screwed type Ball Valves with stainless steel balls, spindle, Teflon seating and gland packing tested to a hydraulic pressure of 500 psig, and accompanying couplings and steel handles (BS 5351).

5.2 Butterfly Valves

Valves 50mm dia and above shall be cast iron butterfly valve to be used for isolation. The valves shall be bubble tight, resilient seated suitable for flow in either direction and seal in both direction with

accompanying flanges and steel handle. Butterfly valve shall be of best quality (PN 16) conforming to IS:13095.

5.3 Non-return Valve (Slim Type)

Where specified non-return valve (dual plate slim type) shall be provided through which flow can occur in one direction only. Each Butterfly and Slim Type Check (NRV) Valve shall be provided with a pair of flanges screwed or welded to the main line and having the required number of galvanized nuts, bolts and washers of correct length.

5.4 Underground Storage Tanks (Accessories & Connections)

Storage tanks for water supply shall be in reinforced cement concrete. Each tank shall be provided with lockable type manhole cover fabricated from MS sheets. Manhole covers shall be 450-500mm dia and fully galvanized after fabrication as shown in the drawings and as approved by the Architect & Project Manager.

5.5 Outlets and Overflow

All nozzles for puddle flanges in RCC tank for inlet, outlet, overflow and scour etc. shall be provided as given in the drawings.

6.0 Testing

6.1 All pipes, fittings and valves after fixing at site, shall be tested by hydrostatic pressure of 1.5 times the working pressure or 10 kg/cm² whichever is more.

6.2 Pressure shall be maintained for a period of at least thirty minutes without any drop.

6.3 A test register shall be maintained and all entries shall be signed and dated by Contractor, Architect and Project Manager.

6.4 In addition to the sectional testing carried out during the construction, Contractor shall test the entire installation after connection to the overhead tanks or pumping system or mains. He shall rectify all leakages and shall replace all defective materials in the system. Any damage done due to carelessness, open or burst pipes or failure of fittings, to the building, furniture and fixtures shall be made good by the Contractor during the defects liability period without any cost.

6.5 After commissioning of the water supply system, Contractor shall test each valve by closing and opening it a number of times to observe if it is working efficiently. Valves which do not effectively operate shall be replaced by new ones at no extra cost and the same shall be tested as above as directed by the Project Manager/Architect.

SECTION-B : BORE WELL & MACHINERY

1.0 General Conditions

1.1 All work shall be done in a systematic manner in accordance with a programme prepared in consultation with the Architect/Project Manager. Rates quoted shall be for complete items and inclusive of all equipment, labour, scaffolding, tackles etc. required to do a complete job as shown on drawing and/or as directed by the Architect/Project Manager.

1.2 Rates shall be inclusive of all taxes, e.g. Sales Tax, Octroi, Excise Duty etc.

1.3 Approx. quantity of water required per well will be of the order of 14-18 KL/HR on 10-12 hours continuous pumping. Lower flow will be acceptable if the strata yield does not have high capacity aquifer.

1.4 No payment shall be made for the abandoned bores.

2.0 Specifications

2.1 Type of Well

Tube well shall be bored by a Down The Hammer (DTH) method / ODEX method.

2.2 Boring

Boring shall be 300mm dia to a minimum depth of 80mt. The depth may be increased as per actual site conditions and as directed by the Architect/Project Manager. The depth at which the tube well boring is to be terminated shall be as agreed upon by the Architect/Project Manager on scrutiny of the log bore strata chart. Sub-soil water shall not be tapped.

2.3 Well pipes

Housing and blank well pipes shall be heavy duty MS pipes for bore wells conforming to IS:4270-1992. Slotted pipes shall be 150mm dia stainless steel wire cage V wound filter screen conforming to IS:8110-1985. Slot size shall be as given below or shall be approved by Architect and Project Manager.

2.4 Special Fittings

Provide all special fittings e.g. blank pipes, socket rings, bail plug, centering guides, slips and top cap suitable for housing pipe.

2.5 Verticality

Well assembly shall be truly vertical as per IS:2800 and verticality certificate shall be furnished by the Contractor.

3.0 Gravel Packing

Annular space between boring and well assembly shall be packed with washed pea gravel 3 to 6mm size or as per sieve analysis.

4.0 Sanitary Sealing

The annular space between the bore and its housing pipe shall be grouted with cement concrete 1:2:4 to a depth of 2m below the ground level. Four 50mm dia gravel feeding shall be provided with caps at top. Pipes shall be G.I. to IS:1239, medium class.

5.0 Development

The well shall be developed by an air compressor of suitable capacity and pressure for the period as specified. This period may however be extended in case the development is not satisfactory.

6.0 Water Tests

The Contractor shall get the water tested for its quality from an approved Water Testing Laboratory. Tests shall be for drinking water quality as per IS:10500 for Physical, Chemical & Bacteriological parameters. (Tests shall be performed after development of the well and clear water is available in the discharge).

7.0 Bore Log

A bore log in a standard format form shall be maintained at the site and shall give the following information :

- i) Description and depth of strata.
- ii) Spring level below ground
- iii) Aquifer opposite which slotted pipes have been placed.
- iv) Rate of progress of drilling.
- v) Full particulars of final test.
- vi) Suggested depth for the tube well submersible pump.

Four copies of strata sheets yield and water quality tests shall be handed over to Architect and Project Manager on completion of the well.

8.0 Boring and installing including all materials & labour involved for the proposed 300mm dia straight tube well upto minimum 80mt. deep with DTH machine, supplying and fixing MS ERW conforming to IS:4270, housing pipes 200mm dia, 8mm wall thickness, 100mm length and 150mm dia, 6.4mm wall thickness, 20m in length of approved make. 150mm dia stainless steel wire cage V-wound filter screen having 5.15mm thickness approx. 20m length, slot size 0.75mm confirming to IS8110-1985. Bail plug 1.5m long, reducer made out of 10mm thick sheet size 200x150mm, filling and packing gravel in space between tube well and bore, sealing cap of 8 mm thick MS sheet for 200mm dia pipes. Developing of tube well with air compressor/submersible set of suitable capacity as per IS: code till the discharge is reasonable and free from sand, MS centre guides, 200 I/d clamp made of 500x200x12mm MS flat heavy with nuts and bolts, discharge pipe with isolation valves and non-return valves. Motor control centre fabricated from 14g mild steel sheet with stove enameled paint complete with all accessories e.g., motor starter, single phase preventer. LED indicating lamps, rotary switch, power cable from panel to motor and control cable from main panel in pump room to tube well panel, water sample testing of newly developed tube-well with physical analysis, chemical analysis, bacteriological analysis test. Scope of work includes providing, fixing, testing and commissioning of submersible pump (KSB, Grundfoss or equivalent make) with suitable capacity motor having approximate 300 LPM discharge (or as required) and approx. 65mt. head (or as required) etc. including identification of the potential water source and necessary test reports for the quality of water and yield results as per standard construction and drinking water practices and specifications. The quoted rate to account for all works including any other works as may be required for the completion to its entirety and for the perfect and effective functioning and proper/uninterrupted supply of water.

SECTION–C : U.G. TANKS, PUMPS & WATER TREATMENT PLANT**PUMPS****1.0 Scope of Work**

Work under this section shall consists of furnishing all labour, materials, equipment and appliances necessary and required to supply install and commission the water supply and drainage pumps as described hereinafter and shown in drawings which are for guidance only. Type of equipment material specifications, method of installation, testing and commissioning and type of control shall be in accordance with the specifications, approved shop drawings and relevant Indian Standards.

Before starting the work on pumps, the contractor shall submit 4 (four) sets of AutoCAD and colour shop drawings to the Architect through Project Manager incorporating the details as per site conditions and contractor's details for execution of this work and incorporate equipment manufacturer's details and dimensions to ensure that the pumping system functioning is perfect and as per relevant Indian Standards. The work shall be executed only on the basis of approved shop drawings.

PLUMBING PUMPS**2.0 General Requirements**

2.1 All materials shall be new of the approved quality conforming to specifications and subject to the approval of Architect and Project Manager.

2.2 All equipment shall be installed on suitable foundations, true to level and in a neat workmanlike manner.

2.3 Equipment shall be so installed as to provide sufficient clearance between the end walls and between equipment to equipment.

2.4 Piping within the pump house shall be so done as to prevent any obstruction in the movement within the pump house.

2.5 Each pumping set shall be provided with a butterfly valve on the suction and delivery side and a flap type non-return valve on the delivery side.

2.6 All pump couplings and belt guards for air compressors shall be totally enclosed with 5mm mesh.

3.0 Pumping Sets for Variable Speed Hydro Pneumatic System

3.1 Water supply pumps shall be suitable for clean filtered water. Pumps shall be single/multi-stage, monoblock vertical/horizontal, centrifugal pumps with stainless steel body, stainless steel (DIN W-Nr.1.4301) impeller secured to the shaft and retained against circumferential movement by keying, pinning or lock rings, stainless steel shaft adequately sized to withstand all stress from rotor weight, hydraulic loads, vibrations and torque coming in during operations, and mechanical seal coupled to a TEFC electric motor. Each pump should be operated to a curve required by the operating conditions.

3.2 All parts in contact with water shall be corrosion resistant stainless steel DIN-Nr.1.4401.

3.3 Each pump shall be provided with a totally enclosed fan cooled induction motor of suitable H.P. The motors shall be suitable for 400/440 volts, 3 phases, 50 cycles AC power supply and shall conform to IS:325 operating at 2900 RPM nominal speed.

3.4 Each pumping set shall be provided with 100mm dia gunmetal “Borden” type pressure gauge with gunmetal valve and connecting piping.

3.5 Pump or the whole set shall be stable on rubber vibration eliminating pads appropriate for each pump as recommended by the manufacturer and approved by Architect/Project Manager.

4.0 Pumping Sets for Water Transfer

4.1 Water supply pumps shall be suitable for clean filtered water. Pumps shall be single or multistage, monoblock horizontal/vertical centrifugal pumps with cast iron body and bronze impeller, stainless steel shaft, mechanical seal and coupled to a TEFC electric motor mounted on a common MS structural base plate. Each pump should operate up to a curve 15m below specified head or range specified.

4.2 Each pump shall be provided with a totally enclosed fan cooled induction motor of suitable HP. The motors shall be suitable for $415 \pm 10\%$ volts, 3 phases, 50 cycles AC power supply and shall conform to IS:325.

4.3 Each pumping set shall be provided with a 100mm dia gunmetal “borden” type pressure gauge with gunmetal isolation cock and connecting piping.

4.4 Pump or the whole set shall be stable on rubber vibration eliminating pads appropriate for each pump as recommended by the manufacturer and approved by Architect/Project Manager.

5.0 Drainage Sump Pumps

5.1 Basement Drainage Pumps

Submersible single stage single entry pumps with CI body and CI two vane enclosed type impeller connected to TEFC submersible motor for 415 volts, 3 phase, 50 cycles AC power supply with mechanical seal, pump connector unit with rubber diaphragm and bend, vertical discharge pipe, cable complete in all respects (pumps to be suitable to handle solids minimum 12mm size).

Two pumps shall be installed in each set (one working and one standby in sequence and also both running on heavy flow).

Each set of pumps shall include one no. electric control panel (for two pumps) with auto/manual/stop rotary selector switch for each pump, comprising of all standard provisions of incoming – outgoing, starting, single phase prevention, overload protection etc. and built in level control arrangement to work in such a way that one pump starts automatically as soon as the level in the sump rises and beyond a certain level both the pumps start. Also, when starting individually, the pumps start in sequential manner, i.e. one pump starts at one time and the other pump starts the next time. Capacity – 450 lpm (Each), Head-8m.

WATER TREATMENT PLANT

6.0 Filters for Domestic Water & Soft Water (MS Vessels)

6.1 Filter shall be designed in accordance with the code of unfired pressure vessel conforming to IS:2825.

6.2 Water filter shall be sand and gravel pressure filter with bed of filter media suitable for a rate of filtration 15cum/hr/sqm.

6.3 Filters shall be vertical type of required diameter. The shell and dished ends shall be fabricated from MS plates conforming to IS:2002 Gr. 2A suitable to withstand the working pressure. The minimum thickness of shell shall be 6mm and dished ends shall be 8mm.

6.4 Each filter shall have at-least one pressure tight manhole cover for inspection and repairs.

6.5 Each filter shall be provided with screwed or flanged connections for inlet, outlet individual drain connections and all face piping, diaphragm valves and all other connections necessary and required. Pipes shall be GI heavy class.

6.6 Each filter shall be finished inside coated with two coats of epoxy paint after thorough sand blasting or with ERP lining, 2.4mm thick food grade, outside finished with high gloss enamel paint over two coats of red oxide primer.

7.0 Filter Media

Graded aggregate, selected coarse and fine sand as per latest water treatment practice. Aggregate to be acid washed and having purity of 99.9%.

7.1 Depth of Filter

Depth of filter media shall be minimum 750-900mm deep.

7.2 Back Washing

By air scouring through air blower (minimum 36cum/sqm of filter bed area).

8.0 Chlorinator

8.1 Chemical feed and chlorination will be done by approved make of non-corrosive material by separate metering pumps mounted on a 100 litres HDPE tank.

8.2 It shall also include PVC bucket containers with lid for making solutions and all suction, delivery and injection piping and fittings. All pipes and fittings shall be corrosion resistant.

9.0 Chemical Dosing Pump

9.1 Chlorinate dosing system comprising of metering pump, 100 ltrs capacity HDPE solution tank with level gauge and lid on top.

9.2 Motor driven metering pump with mechanically activated diaphragm with oil lubricated gear mechanism. The output of the pump should be adjustable operation from 10-100%. Pump construction shall be corrosion resistant polypropylene. Dosing pump will also be of same material.

10. Level Controllers

10.1 Level controllers shall be electronic low voltage type using required number of stainless steel type probes, shrouded in PVC sheath or encapsulated in a stainless steel pipe. Level controller will be used for following applications :

Water transfer pumps, to cut off all operating pumps when :

- a) Water level is low in storage water tanks with low water level audible alarm.
-

b) To cut off pump when water in overhead water tank is full.

c) To cut in pump when water in overhead water tank is low.

10.2 Level Indicator

To indicate water level in each tank by means of neon lamps. The indicator for the water level shall be displayed on the control console panel located at engineering control room.

10.3 Sump Pump level controller & high water alarm in case water level crosses high level mark. To cut off the drainage sump pump when the sump is empty and to start when :

- a) Duty pump No. 1 at pre-determined level No. 1.
- b) Duty pump No. 2 at a higher pre-determined level No. 2.
- c) Both pump working in case of heavy flow.

11.0 Air Blower

11.1 Air blower shall be rotary type for scouring filter and assisting in back wash operation.

11.2 Air blower shall be driven by a totally enclosed fan cooled induction motor of required H.P. Blower shall be of capacity recommended by filter manufacturer and approved by the Architect/Project Manager.

12.0 Pipe & Fittings (for Headers and Connections)

12.1 Pump suction and delivery headers shall be heavy class Galvanized iron pipes with matching fittings and flanges at ends. The pipe joints shall be threaded/flanged as per manufacturer's instructions.

12.2 Vibration Eliminators

Provide on all suction and delivery lines as shown in drawings double flanged reinforced neoprene flexible pipe connectors. Connectors should be suitable for a working pressure of each pump and tested to the test pressure given in the relevant head. Length of the connectors shall be as per site requirements in accordance with manufacturer details.

12.3 Pressure Gauge

Each pumping set shall be provided with 150mm dia gunmetal "Burden" type pressure gauge with gunmetal isolation cock and connecting pipes.

13.0 Cables

13.1 Contractor shall provide all power and control cables from the motor control centre to various motors, level controllers and other control devices.

13.2 Cables shall conform to IS:1554 and Carry ISI mark.

13.3 Wiring cables shall conform to IS:694.

13.4 All power and wiring cables shall be aluminum conductor PVC insulated armoured and PVC sheathed of 1100 volts grads.

13.5 All control cables shall be copper conductor PVC insulated armoured and PVC sheathed 1100 vol. grade.

13.6 All cables shall have stranded conductors. The cables shall be in drums and bear manufacturer's name.

13.7 All cable joints shall be made in an approved manner as per standard practice.

Power wiring cabling shall be of the following sizes :

i)	Upto 5 HP Motors	3x4 sq.mm copper conductor cable
ii)	From 6 HP to 10 HP Motors	3x6 sq.mm copper conductor cable
iii)	From 12.5 HP to 15 HP Motors	2 Nos. 3x6 sq.mm copper conductor cable
iv)	From 20 HP to 25 HP Motors	2 Nos. 3x10 sq.mm Aluminum conductor cable
v)	From 30 HP to 35 HP Motors	2 Nos. 3x16 sq.mm Aluminum conductor armoured cable
vi)	From 40 HP to 50 HP Motors	2 Nos. 3x25 sq.mm Aluminum conductor armoured cable
vii)	From 60 HP to 75 HP Motors	1 No. 3x70 sq.mm Aluminum conductor armoured cable
viii)	100 HP Motors	1 No. 3x150 sq.mm Aluminum conductor armoured cable
ix)	150 HP Motors	1 No. 3x240 sq.mm Aluminum conductor armoured cable

14.0 Cables Trays

14.1 Contractor shall provide MS slotted cables trays at locations as shown in drawings and of sizes as required and approved by the Architect/Project Manager. The cable tray shall be fabricated from cold rolled MS sheets of 2mm thickness and jointed with coupler plates of the same material. Two coupler plates, each of minimum 200mm length shall be bolted on each of the two sides of the channel section with 8mm dia round headed bolts, nuts & washers and the paint on the contact surfaces between the coupler plates and the cable trays shall be scrapped and removed before installation so as to maintain proper earth continuity bond. The cable tray shall be bonded to the earth terminal on the switch bonds at both ends.

14.2 Cables trays shall be supported from the bottom of the slab at intervals of 30 cms at both ends by welding support rods with insert plates or to reinforcement bars. Cutting of holes in the slab for exposing of reinforcement bars and making good the same after welding of support rods shall be included in the scope of work and also no separate payment shall be made for clips, bolts, nuts, supports rods and any other materials required to fix the trays.

15.0 Earthing

All equipment installed by the contractor shall be suitably earthed by making proper connection by means of G.I. wires to the main earthing system.

16.0 Motor Control Centres

16.1 Switchboard cubicles of approved type shall be fabricated from 16 gauge MS sheet with dust and vermin proof construction. It shall be painted with stove enameled paint of approved make and shape. It shall be fitted with suitable etched plastic identification plates for each motor. The cubicle shall comprise of the following : (switchgear as required)

- a) Incoming main switch fuse unit of required capacity.
- b) Isolation switch fuse unit, one for each motor.
- c) Fully automatic DOL/Star Delta starters suitable for motor H.P. with push buttons one for each motor and on/off indicating neon lamps.
- d) Single phasing preventer of appropriate rating for each motor.
- e) Rotary duty selector switch.
- f) Panel type ampere meters one for each motor.
- g) Panel type voltmeter on incoming main with rotary selector switch to read voltage between phase to neutral and phase to phase.
- h) Neon phase indicating lamps and indicating lamp for each motor.
- i) Rotary switch for manual or auto operation for each pump.
- j) Fully taped separate aluminium bus bars of required capacity for normal and emergency supply where specified.
- k) The panel shall be prewired with colour coded wiring. All interconnecting wiring from incoming main to switch gear, meters and accessories within the switchboard panel.

16.2 All switchgears and accessories shall be of approved make.

16.3 Switchboard cubicles shall be floor or wall counted type as recommended by manufacturers and approved by the Architect/Project Manager.

17.0 Description of Major Items to be provided in plumbing pump room area as follows:

17.1 Pumps

Providing and fixing vertical mono-block single/multi-stage pumping set with cast iron casing, motor brackets, motor joint, stainless steel AISI 304 sleeve, impeller, shaft, mechanical seal, EPDM gaskets, connected to a TEFC induction motor suitable for 400/440 volts, 3 phase 50 cycles AC supply having IP55 protection enclosure, vibration eliminating pads etc. complete with base and frame, nuts and bolts and necessary RCC foundations as per requirement and as per instructions.

17.2 Filter

Providing and fixing vertical Down-flow Multi-grade Pressure Sand Filter in MS welded construction fabricated in accordance with IS:2825 from minimum 6mm thick MS plate on shell and minimum 8mm thick MS plate on dished ends as per applicable IS standards. The filter shall have :

- a) One no pressure tight manhole and at-least one no. pressure tight side hole for maintenance purposes.
- b) Initial charge of Filter Media.
- c) Complete under drain system and raw water distributor as per manufacturer's design.
- d) MS heavy class fabricated – epoxy coated inside, face piping comprising of connections with CI Butterfly Valves of required size for inlet, outlet, backwash inlet, backwash drain and rinse drain. Air release line with GM Ball Valve of required size. Air scours inlet connection with CI butterfly valve of required size.
- e) Pressure gauges (100mm dia bourdon type pressure gauge)/Sampling points with SS isolation cocks at inlet and outlet.
- f) All internal parts of the filtration plant shall be coated with 2mm thick food grade FRP lining after thorough sand blasting. All external surfaces of the plant including piping shall be coated with two coats of red iron oxide/zinc chromate primer followed by two coats of high gloss enamel paint.
- g) The filter shall be complete with all gaskets/fasteners of standard quality as required.

- h) The filter shall be designed to give rated output at given raw water quality and flow rate without any operational problem and should not get any loss of performance as long as the operating pressure remains within the given range. Any additional provision if required to make the item complete, the same should be included herein and nothing extra shall be paid on any account.

17.3 Air Blower

Providing and fixing low pressure centrifugal type air blower directly coupled to a TEFC induction motor of required HP, suitable for 440/440 volt, 3, phase, 50 cycles, AC supply complete in all respects. Capacity 65 cum/hr @ 5 psi pressure.

17.4 UV System

Providing and fixing ultra-violet sterilizer comprising of SS 316 housing, quartz jacket and energy efficient UV lamp working on spiral flow of water. The units to have complete electrical gear as required.

17.5 Variable Speed Pumping System (VSPS) for Domestic Water

Variable Speed Hydro pneumatic system mounted on a common base plate 150mm dia pressure gauge, G.M. Gauge, GM isolation cock and cement concrete foundation with plaster.

Providing, installing, testing and commissioning Horizontal/Vertical in line pumps with SS 316 casing, SS 316, impeller, mechanical seal, SS 316 shaft directly coupled to motor suitable for operation on $415 \pm 10\%$ volts, 3 phase 2900 rpm, TEFC motor. All electrical including the power box containing circuit breakers/fuses, complete with suction and delivery Headers in SS-316, isolation valves on suction side and isolation valves + NRV on delivery side etc. complete.

Pump mounted or wall mounted microprocessor based controller and frequency inverter integrated in a single body or as separate components with pressure sensor transmitter (one dedicated to each pump), two lined LCD display, diodes to indicate pump ready, pump running and fault and capable to communicate with other controllers through RS 485 interface. System should be capable to compensate for frictional losses at lower flows.

Quantity : 1 No.

Composite FRP pressure tank (with LDPE single piece joint less inner shell) fitted with pre-charged interchangeable bladder made of EPU suitable for direct contact with drinking water with base and inlet/outlet nozzle etc., nozzle with air/gas charging valve at top, safety valve, pressure gauge etc. The vessel shall be designed for operating pressure 12.5 kg/sq.cm, test pressure 18.75 kg/sq.cm. Capacity : 500 ltrs or as per manufacturer's recommendations and approved of Architect/Project Manager.

Power box equipped with fuses, isolators, circuit breakers, cable, wiring, earthing as required. Contractor shall include all items for smooth running of system. Incoming power to this panel shall be provided from main feeder.

Quantity : 1No.

17.6 Motor Control Panel

Providing and fixing free standing, floor mounted, fully compartmentalized cubicle, dead front, openable from front, provision of cable entry both from top and bottom, motor control centre fabricated from 2.0mm M.S. sheet and finish painted with epoxy powder coating preceded with complete pretreatment as required, etched plastic identification plates etc. and comprising of :

For water supply pumps (Raw water transfer pumps, filter feed pumps and variable speed hydro pneumatic system for domestic water supply).

Incomer Feeder

One incoming main 200 amps (ATS) TP MCCB unit with rotary handle. Aluminum bus bar in separate chamber running to the full length of the panel, fully taped of 200 amps capacity.

One 96 mm square panel type voltmeter with reading 0-500 V with rotary selector switch for reading voltage between phases.

Outgoing Feeder

2 Nos. Star Delta starter feeders of 7.5 HP capacity each comprising of incomer isolation MCB, necessary contactors, timers start stop buttons, off on trip indicating lights, auto/manual/stop selector switches, overload relays, single phase preventer, all necessary auxiliary wiring and colour coded power wiring as required. The feeder should have provision for auto operation of pumps with level controllers/other automation arrangements (For Filter Feed Pumps).

2 Nos. outgoing feeders (DOL Motor starters 3.0 HP rating) each comprising of incomer isolation MCB, fully automatic DOL starter, overload relay, single phase preventer, start/stop push buttons, auto/manual selector switches, overload relays, single phase preventer, all necessary auxiliary wiring and colour coded power wiring as required. The feeder should have provision for auto operation of pumps with level controllers/other automation arrangements (in cable alley provided separately along the length of the panel) (For Tube well pumps).

1 No. DP MCB – 16 Amps capacity (To supply power to UV Unit).

1 No. TPN MCB – 63 Amps capacity (To supply power to VS Hydro pneumatic System for Domestic Water).

1 No. DP MCB – single phase – 6 amps for chlorine doser.

Space for four sets of liquid level controllers operated through low voltage float switches to be installed in water tanks.

2 Nos. DP MCB – single phase – 6 amps (as spare).

1 No. TPN MCB – 63 Amps capacity as spare/standby for above.

Spare No – NC contacts for each starter.

G.I. strip 32 x 6 mm throughout the length of MCC.

Separate cable alley with complete terminal plates for all outgoing including the spare ones.

All spare MCBs to be housed in a separate compartment provided for the purpose and marked SPARE MCBs on the door of the compartment.

For every set of pumps there shall be one separate auto/manual switch and sequencing relay for the given set of pumps.

All internal wiring colour coded from incoming mains to various switchgear, starters, meters, indicating lamps and bus bar.

Required number of suitable brass cable glands (excluding for spare MCBs) to be provided with the panel.

17.7 Level Controller

Level Controller for Underground Tank.

One way (working between tube-well and supply tank) liquid level controllers with low voltage relays. 2-sets.

To cut off pump when water level is high in the raw water tank and start the pump when low in the raw water tank. Also the controller should operate the tube well pumps in alternate sequence i.e. the pumps should operate alternately on each stop and start operation when done automatically by the controller.

Level Controller for Overhead Tanks

One way (working between overhead tank and solenoid valve at inlet of tanks, liquid level controllers with low voltage relays. To open the solenoid valve when water level is low in the tank and close the valve at high level. – 8 sets.

Electronic two way (working between the source tank and the destination tank) liquid level indicators cum controllers (displaying at least 4 levels in each tank) with low voltage relays, stainless steel guide with SS float type sensor, (No of level sensors to be at least one for each tank as required for function of each controller).

17.8 Solenoid Valves

Providing, fixing, testing and commissioning of 50mm nominal size Solenoid Valve working on 24V & with maximum holding current of 6.2 VA operated by level controller/manually. 8 Nos.

Providing, fixing, testing and commissioning of 25mm nominal size Solenoid Valve working on 24V & with maximum holding current of 6.2 VA operated by level controller/manually. 1 No.

17.9 Piping, Valve, Cables etc.

- a) Providing and fixing ISI marked G.I. pipes confirming to IS:3589/1239 (Heavy grade) with G.I. fittings e.g. Tee, elbow reducers, unions, end cap etc., flanges & clamps, including supporting the pipes with G.I. MS supports, cutting and making good the walls etc. complete. For Suction & Delivery headers as required.
- b) Providing and fixing ISI marked G.I. pipes confirming to IS:3589/1239 (Medium grade) with G.I. fittings e.g. Tee, elbow reducers, unions end cap etc., flanges & clamps, including supporting the pipes with G.I. MS supports, cutting and making good the walls etc. complete. For general piping as required.
- c) The pipes beyond 150mm dia shall be manufactured by Electric Resistant Welded (ERW)/High Frequency Induction Welding or Hot Finished Welded process. The sulphur and phosphorus requirements in steel shall not be more than 0.05 percent each. The tubes shall be manufactured from hot rolled steel scalps/strips conforming to IS:10748. The following manufacturing tolerances shall be permitted on the tubes and sockets :

- i) Thickness : Shall not be less than 10 percent.
- ii) Weight : Shall not vary by more than 10 percent either way.

The pipes shall satisfy the following table with regard to diameter, thickness and weight of tube. Screwed tubes shall be supplied with threads as per IS:554. Each tube shall be tested for hydrostatic test for leak tightness as an in process test at the manufacturer's works. The finished pipe shall be tested for Tensile Strength, Elongation, Bend Test and Flattening Test.

- d) The pipes beyond 150mm dia shall be manufactured by Electric Resistant Welded (ERW) Electric Fusion Welding or Induction Welding process. The sulphur and phosphorus requirements in steel shall not be more than 0.05 percent each. The tubes shall be manufactured from hot rolled steel scalps/strips conforming to IS:10748 by butt welding longitudinally or spirally. The weld shall be continuous. The pipes shall conform to the Tensile Test, Hydraulic Pressure Test and Mechanical Tests as per IS:3589. The pipes shall also conform to the requirements of the Outside pipe dia as laid in IS:3589.

The tolerance on the pipe body shall not vary more than 0.75 percent of that prescribed in the above mentioned code. All pipes shall be of minimum 6mm (1/4") wall thickness. Pipes shall be supplied with bevel edging.

i) M.S./G.I. pipe upto 150mm (6") dia shall have all fittings as per IS:1239, part-II (heavy grade) while pipes above 150mm (6") dia shall be as per IS:3589 inclusive of IS marking.

ii) For M.S./G.I. pipes upto 50mm (2") dia screwed jointing shall be adopted, while for pipes above 50mm (2") dia welded or flanged connections shall be used. Only elector galvanized nuts/bolts shall be used. The different type of pipes/fittings shall conform to following :

Type of Pipe/(Dia)	Size	Grade	Ends/Fitting	Cade
M.S./G.I. pipes	Upto 50mm (2") dia	Heavy	Screwed	IS:1239 (Part-I)
M.S./G.I. Fittings	-do-	Heavy	-do-	
M.S./G.I. Pipes	Above 50mm (2") dia & upto 150mm (6") dia	Heavy	Bevel, Butt Welded, 3 layers	IS:1239 (Part-I)
M.S. Fittings	-do-	Heavy, machine formed from IS marked Heavy Grade Pipes	-do-	
Type of Pipe/(Dia)	Size	Grade	Ends/Fitting	Cade
M.S. Pipes	150mm (6") dia	6mm (1/2") wall thickness	Bevel, Butt welded, 3 layers	IS:3589
M.S. Fittings	-do-	Schedule 40	-do-	IS:3589

iii) Hangers and supports shall be capable of carrying the sum total of all concurrently acting loads. They shall be designed to provide the required supporting effects and allow pipelines movements as necessary. Hangers and components for all piping shall be approved by the Architect/Project Manager. Anchoring fasteners shall be rated to take minimum 0.4 ton load and shall be as per approved make. Hangers shall be at 3.0 M intervals. Additional supports shall be provided at bends etc. Angles for pipe supports should not be less than (40x40x6)mm (1/2"x1/2"x1/4") size. Cutting shall be by gas cutter. All cut edges and weld surfaces shall be grounded to a smooth finish.

- iv) The piping system and components shall be capable of withstanding 150 percent of the working pressure including water hammer effects and test pressure upto 12.0 kg/cm².
- v) Flanged joints shall be used for connections to vessels, equipment, flanged valves and also on suitable straight lengths of pipeline of strategic points to facilitate erection and subsequent maintenance work.
- vi) All pipe to pipe receiving edges shall be bevel finished to a clean edge by a electric grinder. A requisite gap determined by the thickness of the weld electrode shall be given between the joints before start of welding.
- vii) Weld Electrodes shall be of approved make, of grade and type as suitable for the job.
- viii) Joints shall be given a first weld in full width without burrs on the full dia of the pipe. Welding shall be carried out vertically from the surface to be welded. Weld fluxes shall not be so plastic such as to fall or drip down.
- ix) After application of first coat the weld shall be ground and then another layer of welding shall take place. The weld shall also be cleaned by grinding. Similarly, a third weld shall also be applied.
- x) All pipe cutting shall be by oxy acetylene gas welding only. The cut surface shall be cleaned and ground by a electric grinder before further welding.
- xi) For supports angle pieces shall be cut by oxy acetylene gas and cleaned by electric grinder. All cutting for bolt inserts shall be by electric drill.
- e) Providing and fixing Gun Metal Ball valve with SS 304 ball, SS stem, renewable PTFE seat, Teflon gland packing, standard bore, lever operated, screwed female threads, body and seat test pressure 500 Psig complete in all respects as required.

Supply, installation and testing cast iron wafer type Butterfly valves Class (PN 20/25) SS 304 Disc, Nitrile rubber lining (lever operated upto 150mm and gear operated for 200mm and more) complete with 2 nos. matching flanges rubber insertion, nuts, bolts and washer etc. as required.

Supply, installation and testing CI Dual plate wafer check valve, spring loaded class (PN 20/25), ductile iron disc, 416 SS stem, EPDM lining, Stainless Steel spring complete with 2 nos. matching flanges, rubber insertion, nuts, bolts and washer etc. as required.

Providing & fixing resilient rubber neoprene lined style arch vibration eliminators suitable for raw water upto pressure 20 kg/sq.cm as required.

Providing, fixing, testing and commissioning on line electronic chemical solution dosing system comprising of electronic metering pump (with both frequency and stroke length controls to control the dosage rate between 10-100% of rated maximum capacity), virgin HDPE chemical grade solution tank of required capacity, necessary injection fitting assembly, foot valve cum strainer and suction and delivery tubing etc. upto the point of injection complete in all respects as required.

For Chlorination of filtered water.

Dosing Capacity : 0-6 ltrs per hour, Dosing Head : 3.5 Kgs/cm²

Tank capacity : 100 ltrs.

Providing and fixing C.I. Bucket type simplex suction strainer with removable stainless steel perforated staining bucket, flanged ends installed outside water tanks. As required.

Providing and fixing dial type pressure gauge with ball valve and pipe at hydrant station, complete in all respects. Dial dia 100mm, calibration 0-15 kg/sq cm.

Providing and fixing pressure reducing valves as required.

PARTICULAR SPECIFICATIONS FOR EXTERNAL SEWERAGE,

DRAINAGE & RAIN WATER HARVESTING

SECTION-A : EXTERNAL SEWERAGE & DRAINAGE

1. Scope of Work

1.1 Work under this section shall consist of furnishing all labour, materials, equipment and appliances necessary and required to completely install all the drainage system as shown in the approved shop drawing. Before start of work, the contractor shall submit 4 (four) sets of AutoCAD and colour shop drawings to the Architect through Project Manager incorporating the details as per site conditions. No claim for extension of time shall be entertained because of any delay in the work due to the contractor's failure to produce shop drawings at the right time and in accordance with approved work programme. The said approval of shop drawings shall not mean that the drawings supersede the contract requirements nor does it in any way relieve the contractor of the responsibility or requirements to furnish material and perform work as required by the contract.

1.2 Without restricting to the generality of the foregoing, the drainage system shall include :

- a) Sewer lines including excavations, pipe lines, manholes, drop connections and connections to the main sewer line outside the plot area.
- b) Storm water drainage including excavation, pipe lines, manholes, catch basins, drain channels, recharging pits and overflows and connection to main drainage line outside the plot area.

2. General Requirements

2.1 All materials shall be new of the approved quality conforming to specifications and subject to the approval of the Architect/Project Manager.

2.2 Sewerage and Drainage lines and open drains shall be laid to the required gradients and profiles.

2.3 All sewerage and drainage work shall be done in accordance with the local municipal bye-laws.

2.4 Necessary approval and permission for the sewerage and drainage systems from the municipal or any other competent authority shall be taken.

2.5 Location of all manholes, etc. shall be as per the drawings. No drains or sewers shall be laid in the middle of road unless otherwise specifically shown in drawings or directed in writing.

3. Excavation

3.1 Alignment and Grade

The sewer and drainage pipes and drains shall be laid to alignment and gradient shown in drawings but subject to such modifications as per site conditions and as ordered by the Architect/Project Manager. No deviations from the lines, depths of cutting or gradients of sewers/drains shown on the plans and sections shall be permitted except by the express direction in writing of the Architect & Project Manager.

3.2 Excavation

The excavation for drain/sewer works shall be open cutting except in areas where sewers and drains have to be constructed along narrow passages or difficult ground where pipes are to be laid in tunnel.

3.3 Opening Out Trenches

In excavating the trenches, etc. the solid road metalling, pavement, kerbing, etc. and turf is to be placed on one side and preserved for reinstatement when the trenches or other excavation shall be filled-up. The surface of all trenches and holes shall be restored and maintained to the satisfaction of the Project Manager and Architect. The contractor shall grub up and clear the surface over the trenches and other excavations of all trees, stumps roots and all other encumbrances affecting execution of the work and shall remove them from the site.

3.4 Refilling

After the sewer or other work has been laid and proved to be water tight, the trench or other excavations shall be refilled. Utmost care shall be taken in doing this, so that no damage shall be caused to the sewer and other permanent work. The filling in the haunches and upto 75 cms above the crown of the sewer shall consist of the finest selected materials placed carefully in 15cms layers and flooded and consolidated. After this has been laid, the trench and other excavation shall be refilled carefully in 15 cms layers with materials taken from the excavation, each layer being watered to assist in the consolidation.

3.5 Contractor to Restore Settlement and Damages

The Contractor shall, at his own costs and charges, make good promptly during the whole period the works are in hand, any settlement that may occur in the surfaces of roads, berms, footpaths, gardens, open spaces etc. whether public or private caused by his trenches or by his other excavations and he shall be liable for any accidents caused thereby. He shall also, at his own expenses and charges, repair and make good any damage done to buildings and other property if in the opinion of the Architect/Project Manager the damage is due to his negligence.

3.6 Disposal of Surplus Soil

The Contractor shall at his own costs and charges provide places for disposal of all surplus materials not required to be used on the works. As each trench is refilled the surplus soil shall be immediately removed outside CGEWHO site, the surface properly restored and roadways and sides left clear.

3.7 Removal of Water from Sewer, Trench etc.

- a) The Contractor shall at all times during the progress of the work keep the trenches and excavations free from water which shall be disposed of by him in a manner as will neither cause injury to the public health nor to the public or private property nor to the work completed or in progress nor to the surface of any roads or streets, nor cause any interference with the use of the same by the public.
- b) If any excavation is carried out at any point or points to a greater depth than the specified cross section of the sewer and drain with its envelope, the full extra depth of the trench shall be filled with concrete by the Contractor at his own expenses.

3.8 Width of Trench

Minimum width of trenches at the bottom shall be as follows :

100mm dia pipe	55 cms
150mm dia pipe	55 cms
255-250mm dia pipe	60 cms
300mm dia pipe	75 cms

No additional payment is admissible for widths greater than specified.

4. Salt Glazed Stoneware Pipes

4.1 Stoneware pipes shall be of first class quality salt glazed and free from rough texture inside and outside and straight. All pipes shall have the manufacturers name marked on it and shall comply to IS:651.

4.2 Laying and joining of stoneware salt glazed pipes.

- a) Pipes are liable to be damaged in transit notwithstanding tests that may have been made before dispatch each pipe shall be examined carefully on arrival at site. Each pipe shall be rung with a wooden hammer or mallet and those that do not ring true and clear shall be rejected. Sound pipes shall be carefully stacked to prevent damage. All defective pipes should be segregated, marked with permanent marker in a conspicuous manner and their use in the works prevented.
 - b) All stoneware pipes should be fitted together on the surface of the ground to ensure proper fit before they are lowered. The barrels, spigots and sockets are properly cleaned and brushed.
 - c) The pipes shall be laid with sockets leading uphill and rest on solid and even foundations for the full length of the barrel. Socket holes shall be formed in the foundation sufficiently deep to allow the pipe jointer room to work right round the pipe and as short as practicable to admit the socket and allow the joint to be made.
 - d) Pipes shall be laid carefully to the alignment, levels and gradient as per drawings, specifications and as directed by Architect/Project Manager and care shall be taken to prevent any sand, earth or other matter from entering the pipes during laying. The pipes between manholes shall be laid truly in straight line. The alignment shall be done by suitable ranging rods and levels established by proper leveling instrument.
 - e) Where pipes are not bedded on concrete the trench bottom shall be left slightly high and carefully bottomed up as pipe laying proceeds so that the pipe barrels rest on firm ground. If excavation has been carried too low it shall be made up with cement concrete of the same mix as specified for pipe bedding at the Contractor's cost.
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- f) If the bottom of the trench consists of rock or very hard ground that cannot be easily excavated to a smooth surface, the pipes shall be laid on cement concrete bed to ensure even bearing.

4.3 Jointing of Pipes

- a) A gasket or tarred yarn shall be wrapped round the spigot of each pipe and the spigot shall then be placed into the socket of the pipe previously laid, the pipe shall then be adjusted and fixed in its correct position and the gasket caulked tightly home so as to fill not more than one quarter of the total length of the socket. The yarn will be moistened to avoid absorption of water from the mixed cement mortar.
- b) The remainder of the socket shall be filled with stiff mix of cement mortar (1 cement : 1 clear sharp washed sand). When the socket is filled, a fillet should be formed round the joint with a trowel forming an angle of 45 degrees with the barrel of the pipe. The mortar shall be mixed as needed for immediate use and no mortar shall be beaten up and used after it has begun to set.
- c) After the joint has been made any extraneous materials shall be removed from inside of the joint with a suitable scraper of “badger”. The newly made joints shall be protected until set from the sun, drying winds, rain or dust. Sacking or other materials which can be kept damp shall be used. The joints shall be exposed and space shall be left all round the pipes for inspection by the Architect and Project Manager. Inside of the sewer must be left absolutely clear in bore and free from cement mortar or other obstructions throughout its entire length, and shall efficiently drain and discharge. Depths of yarn and cement mortar paste for different sizes of pipe joints are given below :

Internal (dia of pipe (mm)	Depth of Socket (mm)	Depth of yarn	Depth of mortar
100	50	22	28
150	60	28	28
250	65	32	32

4.4 Testing

- a) All lengths of the sewer and drain shall be fully tested for water tightness by means of water pressure maintained for not less than 30 minutes. Testing shall be carried out from manhole to manhole. All pipes shall be subjected to a test pressure of at least 1.5 meter head of water. The test pressure shall, however, not exceed 6 meter head at

any point. The pipes shall be plugged preferably with standard design plugs with rubber plugs on both ends. The upper ends shall, however, be connected to a pipe for filling with water and getting the required head.

b) Sewer lines shall be tested for straightness by :

- Inserting a smooth ball of dia 12mm less than the internal diameter of the pipe. In the absence of obstructions such as yarn or mortar projecting at the joints the ball should roll down the invert of the pipe and emerge at the lower end,
- Means of a mirror at one and a lamp at the other end. If the pipe line is straight the full circle of light will be seen otherwise obstruction or deviation will be apparent.

c) The contractor shall give a smoke test to the drains and sewer at his own expense and charges.

d) A test register shall be maintained by the contractor and jointly signed and dated by Contractor, Architect and Project Manager.

5. DWC CORFIT PIPES :

5.1 Materials : Corfit DWC* Pipes are manufactured using HDPE polymer. These pipes are resistant to various types of gases & chemicals which are generated due to putrefaction of various ingredients flowing in the system.

Corfit DWC* Pipes are manufactured as per IS 16098 (Part-2), have a smooth internal surface and corrugated external surface. The corrugated external surface provides greater stiffness, withstands soil movement & takes higher loads (static & dynamic), whereas the internal surface helps in smooth flow of sewerage.

Corfit DWC* Pipes are available in SN 4 and SN 8 stiffness classes with sizes from 100 mm to 1,000 mm ID. These pipes have a standard length of 6 metre and are available with rubber ring jointing.

5.2 Handling Recommendations

To avoid damage to the pipe and fittings adhere to the following handling recommendations:

- 100 mm to 400 mm pipes can be moved by labourers (handheld)
- 500 mm to 800 mm pipes can be moved using a backhoe with a nylon sling
- 1000 mm pipes a sling at two points spaced at an approximate distance of 10ft should be used
- Contractor assistance is required to unload pipe
- Do not use a loading boom or forklift directly on or inside the pipe

5.3 Installation of DWC Pipe

5.3.1 Trench Preparation: Sewer Trench width depends on the soil condition, type of side protection and the working space required at the bottom of the trench for smooth installations. Considering all the above factors, minimum trench width

as per IS 16098 Part 2 is -

S. No.	Pipe dia meter (mm)	Trench width (mtr)
1	75 to 200	0.60
2	250	0.70
3	300	0.80
4	400	0.90
5	600	1.20
6	800	1.30
7	900	1.60
8	1000	1.80

5.3.2 Excavation

- Sewer trenches should be in straight lines as much as possible
- Instead of conventional manholes, DWC* fittings such as tees and bends should be used at ransitions
- Excavated spoils should not be deposited in the proximity to prevent the collapse of the side of the trenches
- The sides of the trench should be supported by shoring (wherever necessary) to ensure proper and speedy excavations and concurrently ensuring necessary protection to contiguous structures
- Dewatering: Sewer installations in trenches should be adequately dewatered for the placement of the pipe at proper gradient till the pipe is integrated through socket and spigot joint with the already laid segment.

5.3.3 Bedding

- For maximum combined loading (Wheel Load + Backfill), any form of cement, concrete tructural bedding would not be necessary
- For maintenance of sewer slopes the initial backfill should be enveloped with sand or gravel (as computed through structural design of buried flexible conduit) over a single BFS (Brick Flat Soling)

5.3.4 Laying

- For shallow trenches, place the pipe manually on the initial backfill envelop, directly
- For deep trenches with shoring / mild steel sheet piling
 - a) Make the trench reasonably free from ground water and other liquids
 - b) Place the pipe on the top level cross-struts of the timber shoring / mild steel sheet piling framework
 - c) Dismantle one / two cross struts and lower layer of the cross-struts and re-fix the struts immediately
 - d) In the same manner, reach up to the initial back filling and place the pipe at proper slope
 - e) Ensure anchorage, if any, after laying

5.3.5 Jointing Procedure

DWC* pipes are manufactured with built in socket / bell.

- Clean the surface of the spigot socket using a cloth
- Insert the rubber ring on the spigot end in between first corrugated valley
- Carefully insert the spigot end into the socket end of pipe in the following steps

5.3.6 Back Filling of Trenches

- The material for initial backfill envelope should be as per the structural design of the flexible uried conduit
- It can be the same material that was removed during excavation or it can be fine sand / coarse sand / gravel depending on the over burden and superimposed load, but it should not be concrete which invariably induces undesired rigidity in the system
- The remaining portion of backfilling should be the material that was removed during excavation
- These materials should consist of clean earth and should not be from large clod or stone above 75 mm, ashes, refuse and other injurious materials
- Backfilling should start only after ensuring the water tightness test of joints for the concerned sewer segments. However, partial filling may be done while the joints are open.

6. Gully Traps

Gully traps shall be of the same quality as described for stoneware pipes in clause 4.1 above and used where shown on drawings. Gully traps shall be fixed in cement concrete 1:5:10 mix and a brick masonry chamber 30x30cms inside in cement mortar 1:5 with 15x15 cms grating inside and 30x30 cms CI sealed cover and frame weighting not less than 7.3 kgs to be constructed as per standard drawing. Where necessary, sealed cover shall be replaced with C.I. grating of the same size (1 cement : 5 coarse sand : 10 stone aggregate 40mm nominal size).

7. Reinforced Cement Concrete Pipes

7.1 All underground storm water drainage pipes and sewer lines where specified (other than those specified cast iron) shall be centrifugally spun S & S RCC pipes of specified class. Pipes shall be true and straight with uniform bore, throughout. Cracked, warped pipes shall not be used on the work. All pipes shall be tested by the manufacturer and the Contractor shall produce the test certificates.

7.2 Laying

R.C.C. spun pipes shall be laid on cement concrete bed or cradles as specified and shown on the detailed drawings. The cradles may be precast and sufficiently cured to prevent cracks and breakage in handling. The invert of the cradles shall be left 12mm below the invert level of the pipe properly placed on the soil to prevent any disturbance. The pipe shall then be placed on the bed concrete or cradles and set for the line and gradient by means of sight rails and bonding rods etc.

7.3 Jointing

After setting out the pipes the socket shall be centered over the spigot and filled in with tarred gaskin, so that sufficient space is left on either side of the collar to receive the mortar. The space shall then be filled with cement mortar 1:2 (1 cement : 2 fine sand) and caulked by means of proper tools. All joints shall be finished at an angle of 45° to the longitudinal axis of the pipe on both sides of the collars neatly.

7.4 Testing

All pipes shall be tested to a hydraulic test of 1.5 m head for at least 30 minutes at the highest point in the section under test. Test shall also be carried out similar to those for stoneware pipes given above the smoke test shall be carried out by the Contractor. A test register shall be maintained which shall be signed and dated by Contractor, Architect and Project Manager.

7. Cement Concrete for Pipe Support

a) Wherever specified or shown in drawings, all pipes shall be supported in bed all round or hauches. The thickness and mix of the concrete shall be as per drawing. Width of the bedding shall be the width of the trench as specified.

b) Cement concrete for bed, all around shall be laid as follows :

	Upto 1.5m depth	Upto 3.0m depth	Beyond 3.0m depth
Mix of concrete (no sub soil water)	1:4:8	1:4:8	1:4:8

Stone Ware Pipes	All Round	Upto Haunches	All Round
RCC Pipes	All Round	Upto Haunches	Upto Haunches
Under sub-soil water and under buildings mix of concrete	1:3:6	1:3:6	1:3:6
RCC pipes or SW pipes	All Round	All Round	All Round
Under the building	1:3:6	1:3:6	1:3:6

c) R.C.C. pipes or C.I. pipes will be supported on situ cradles as shown in the drawings.

d) Pipes in loose soil or above ground shall be supported on brick masonry pillars as shown in drawings.

8. Manholes and Chambers

8.1 All manholes, chambers and other such works as specified shall be constructed in brick masonry in cement mortar 1:5 (1 cement : 5 coarse sand) or as shown in drawings.

8.2 All manholes and chambers etc. shall be supported on base of cement concrete of such thickness and mix as shown in drawings. Where not specified manholes shall be constructed as follows :

(all dimensions internal clear in cms)

Size of manhole type	90x80 rect.	120x90 rect.	90 dia conical	122 dia conical	150 dia conical
Maximum depth cm	150	240	167	239	900
Average thickness of RCC slab cm	15	15	-	-	-
Size of cover and frame cm	60x45	56 dia	56 dia	56 dia	56 dia
Weight of cover and frame	38 kgs	< ----- 182 Kgs ----- >			
	C.I.	< ----- SFRC (MD) ----- >			

- 8.3 All manholes and chambers shall be provided with cement concrete benching in 1:2:4 mix (1 cement : 2 coarse sand : 4 stone aggregate 20mm nominal size). The benching shall have a slope of 10 cms towards the channel. The depth of the channel shall be full diameter of the pipe. Benching shall be finished with a floating coat of neat cement as per standard details.
- 8.4 All manholes and chambers shall be plastered with 12/15mm thick cement mortar 1:3 (1 cement : 3 coarse sand) and finished with a floating coat of neat cement inside. Manhole shall be plastered outside as above but with rough plaster mixed with water proofing compound.
- 8.5 All manholes and chambers with depths greater than 0.8m shall be provided with 20mm square or 25mm round rods aoristic coated catch rings set in cement concrete blocks 25 x 10 x 10cms in 1:2:4 mix 30 cms vertically and staggered. Foot rests shall be coated with coal tar before embedding.
- 8.6 All manholes and chambers shall be provided with cast iron/steel fibre reinforced plastic (SFRC) covers and frames and embedded in reinforced cement concrete slab. Weight of cover, frame and thickness of slab shall be as shown in drawings or as specified above.
- 8.7 Road gullies, ramp drains, gratings in basement shall be of Steel Fiber Reinforced Concrete (SFRC) with frame unless otherwise specified.

9. Making Connections

Contractor shall connect the sewer line of the building to the main manhole by providing holes, channels etc.

13. Electro-Mechanical Works

Following are the brief scope of work involved in Electrical and its associated works.

- Indoor HT panels will be installed as a replacement for the existing HT panels in the Existing Electrical Room. Newly proposed Outdoor HT Panel will be installed for the Fountains.
- 2 Nos Package type Substation. (For Fountains) including all documentation, Laisioning with the SEB for the release HT connection. The requisite fees would be paid by the client.
- 2 Nos. 415 V LT Prime Rated Diesel Generating Set and its entire associated works near for garden area & convention hall, additionally 2 Nos. DG sets for Fountains.
- Main LT & DG Synchronisation/AMF Panels with Switchgears of type tested assembly (As per IEC 61439) and all other LT Panels with Switchgears be Non type tested assembly for Garden area & convention hall & Fountains.

- LDB's, PDB's complete with MCCB & MCB.
 - Earthing system.
 - HT and LT power cables with required numbers of glands, lugs, termination kits, jointing kits, etc as required for interconnection between various electrical equipments along with cable markers.
 - Complete cable carrier system - cable trays, supports, brackets, clamps etc as well as DWC pipes and all other installation materials as required for laying of power and control cables.
 - External Landscape & Façade Lighting for Conventional Hall / Main Garden Entrance, Sheesh Mahal, Jal Mahal and Rani Mahal.
 - HVAC for Convention Hall with AC Package units complete with ducting, Grills etc.
 - CCTV (For garden & parking area) & Digital Music System (For Garden Area)
 - Fire Alarm & Detection and Wet Riser Fire Fighting with Ring Main, external yard hydrants, complete with pump room with Main, and Jockey Pump set with piping with accessories complete as required.
 - EV Charging Sockets as per LEED EV Policy requirements.
 - Electrical system related miscellaneous items namely rubber mats, danger boards, first aid charts, first aid boxes, insulated hand gloves, shock treatment chart, etc.
- (a) All the required approvals from statutory bodies and related all the required coordination charges, professional charges, etc. shall be in the scope.
- (b) Execution of electrical works shall be based on the final shop drawings prepared by contractor and approved by consultant. Its contractor responsibility to check the interferences with other services before issuing the final shop drawing for review of Consultant.
- (c) All services necessary for the erection, testing and commissioning and all instruments/services required for carrying out performance testing of all items of the work covered under this specification shall be arranged by the bidder.
- (d) The work shall be carried out as per directives and norms of following documents.
- Indian Electricity Rules 2005 & Indian Electricity Act, 2003 amended up to date.
 - Technical Specifications and list of preferred makes attached.
 - Relevant BIS standards as modified up to date.
 - Sound Engineering Practice as approved by the Engineer-in-charge.

- Any additional item of work, if taken up subsequently, shall also confirm to the relevant specifications mentioned above.
- (e) All the equipment's shall be delivered with (i) Manufacturer's Test Certificate, (ii) Manufacturer's Technical Catalogues and Installation / Instruction (O&M) Manuals.
- (f) Inspection before Dispatch: All routine tests shall be conducted before dispatch of equipment's. No equipment shall be dispatched out from the manufactures premises before such tests are conducted and test result recorded. These test certificates shall be given along with the supply of equipment's. The Engineer-in-charge shall, if he so desires, inspect and witness the pre-delivery tests. For this purpose, the agency shall give 15-day advance notice. Agency shall arrange for inspection of the department. Department shall bear expenses of its officials for inspection as far as travelling, boarding and / lodging is concerned. However, the inspection shall be done at the discretion of the department without any cost implication, but ROUTINE TEST & TYPE TEST Certificates shall have to be submitted for equipment's. Prior to dispatch, all equipment's shall be adequately protected & insured for the whole period of transit, storage and erection against corrosion and incidental damages etc. from the effect of vermin, sunlight, rain, heat and humid climate.
- (g) Procedure for approval of materials, Shop floor drawings and Commencement of Work:
 - Within the time specified in table of milestone, the contractor shall submit following documents for approval:
 - List of makes & Model numbers of all items of equipment's and accessories each sub-Head of work.
 - Catalogues of the equipment's to be supplied.
 - Shop floor drawings of each packages/ Sub work separately for approval.
 - It is the responsibility of the tenderer to get the makes, models and shop floor drawings approved by the department before placing of order.

17.1 INTERNAL ELECTRICAL INSTALLATION

GENERAL SCOPE OF WORK:

The specifications given below pertain to the internal electrical installation work to be carried out in the following locations / buildings: -

- Proposed Conventional Hall, Toilet Block, Shopping Complex, Ticket & information Kisok or as per direction of Engineer -in-charge complete as required.

- Dismantling of old wiring complete with conduits, MS boxes, switches & sockets, wiring, fitting at Jal Mahal, Rani Mahal, Restaurant etc as per direction of Engineer -in-charge complete as required.
- Rewiring in Existing Sheesh Mahal, Jal Mahal and Rani Mahal, Bar, Restaurant or as per direction of Engineer -in-charge complete as required. (Rewiring to done after dismantling the existing wiring)

The scope of works also covers the design, preparation of layout plans, drawings of schemes and obtaining approval of the same from Engineer-in charge.

- (h) All internal electrical works shall be carried out with PVC conduit. All switches, sockets, AC Starter, telephone socket, Data sockets, stepped type (2 modules) fan regulators, bell push and accessories along with matching mounting boxes shall be of modular type.
- (i) All mounting boxes for plate type accessories shall be of metallic construction and of the same make as that of the plate type switches and accessories.
- (j) The wires used for the point wiring and power wiring shall be of 650/1100 Volts grade FRLS PVC insulated multi stranded copper conductor single core cables.
- (k) All lighting fixtures to be used in for specific areas of the various buildings of project should comply with the specifications mentioned for that area. LM 79 & LM 80 test report from NABL accredited lab should be submitted by the agency for each type of luminaries. Colour temperature may be 3000 to 6000K as per site requirement.
- (l) Lighting Design should be carried out as per National Lighting Code 2010/ NBC 2016 / ECBC guidelines. Wherever range of illumination for space is mentioned, higher side of Lux level must be taken for design purpose.
- (m) Arrangement of luminaries in various areas of buildings shall be done on the basis of National Lighting code 2010 and NBC 2016.
- (n) Only BLDC type ceiling fans of size 1400/ 1200 mm shall be used. Optimum size and number of ceiling fans for rooms of different sizes shall be as per provision laid down in NBC 2016.
- (o) Wiring with Cat 6A for LAN points, Wi-Fi points and CCTV points shall be terminated in suitable size of G.I. Junction box and RJ-45 socket. All the other end of wiring shall be terminated in Patch panel including rack of each floor and in the server/services room. The wiring shall be suitably tagged/marked mentioning the location of each point. The fiber optic cable shall be used for inter-connection of networking switches. The patch panels patch chords and layer 2 and layer 3 switches are in scope of work.
- (p) Wiring for CCTV in MS conduit shall be provided as per the design and is to be terminated in G.I. Junction box.

- (q) Details of the light fittings to be installed different areas are given as below. However, this is the minimum requirement. As per design requirement, different fittings can be added.
- (r) The specifications of different type of fittings to be used and proposed area to be installed are as follows. However below mentioned fittings shall not be limited to the areas proposed. The fittings can be added/ altered as per the decision of Engineer in Charge.

S. No.	Specifications Of Different Type of Fittings	Area to be used
1.	Supplying, installation, Testing & Commissioning of LED Recessed/ surface Down lighter (Round/ square/ Rectangular) SMD type of following body material with PMMA and prismatic diffuser and construction as per IS :10322 with driver as per the requirement with Driver efficiency >85%, Operating voltage AC 140-270 Volt, frequency 50/60 hz, Operating temp range -15 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80 , UGR (Unified Glare Rating) < 19, Flicker free (flicker should be below 5%), life time (LED, Driver & electrical circuitary), of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends ,CCT 3000°K/ 4000°K/ 5700°K/ 6000°K/ 6500°K (As per ANSI Bin),SDCM (Standard Deviation Color Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be confirming to relevant BIS standards and trade mark certificate (T.C.).Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing Complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5-year OEM warranty. System lumen efficacy ≥105 and <120 lm/Watt output. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C)- Powder coated die cast /Extruded aluminium Body including trim. (i) 12-15 Watts (ii) 18 Watts	
2.	Supplying, installation, Testing & Commissioning of LED surface mounted Batten light of following body	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	material and construction as per IS : 10322 with driver (Replaceable) as per the requirement with Driver efficiency >85% ,Operating voltage AC 140-270 Volt, freq 50/60 hz, Operating temp range -15 deg to 40 deg centigrade, internal surge protection of 2.5 KV with Short & Open circuit protection ,THD < 10% , P. F.≥0.95, IP20, CRI >80,Flicker free, (flicker should be below 5 %), life time (LED, Driver & electrical circuitry), of minimum 50000 Burning Hours with , 70% of initial Lumen maintained till life ends, CCT 3000°K / 4000°K / 5700°K /6000°K/6500°K (As per ANSI Bin), SDCM(Standard Deviation Colour Matching) <3, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard and trade mark certificate (T.C.). Manufactures Word Mark/ Name Engraved/ Embossing/ Screen printing on housing. complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required with Minimum 5-year OEM warranty. System lumen efficacy ≥105 <120 lm/Watt output. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above 90°C).- Powder coated die cast / Extruded aluminium Body (Thickness ≥ 1.20 mm)- 40 Watt	
3.	Supplying, Installation, Testing & Commissioning of SMD 2x2 LED, IP 20, 34W Recess mounted direct and indirect luminaire with System efficacy of 105lm/W and system lumen output 3570 lumen, operating in an ambient temperature of 0°C to 45°C at 50Hz frequency. Luminaire shall have CRCA deep drawn powder coated housing in white with unique floating spherical High efficiency translucent PMMA diffuser for direct & indirect lighting with dual drivers. EMC/PCT package of wattage of 0.5-1 W The LEDs used should be with CCT of 5700 K and CRI of Minimum 80, with MacAdam CCT binning <3 mounted on 1.6mm FR4 with 35-micron cu layer. LED Driver shall be Isolated type, Constant Current topology driver with proper heat sink for heat dissipation suitable to operate in input voltage range of 150V to 270V (nominal rated voltage – 240V) with	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	3KV internal surge protection, Power factor of minimum 0.95, driver efficacy of minimum 85% and total harmonic distortion (THD) of less than or equal to 5% should be integral to the luminaire.	
4.	Supplying, Installation, Testing & Commissioning of mirror light integrated IP20 Batten Led fixture 600 mm 10 W with Surface Mounted with aluminium housing and Polycarbonate diffuser, minimum system efficacy of 100lm/W with P.F.>0.95 with THD<20%, CCT6500 K, CRI 80, Surge Protection 2 Kv, IP20.The LED with Useful life of 50000 Hrs at L70. The Input voltage range shall be 150V to 270V including making suitable arrangement for fixing including connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor etc as required complete as reqd.	
5.	Supplying, Installation, Testing & Commissioning single phase 220-240V 50 Hz AC supply of 4-watt LED bed side light Aluminium finishing having minimum system lumen output of 230 lumens including connections etc. as reqd.	
6.	Supply, Installation, Testing and Commissioning of IP65 Bulkhead led fixture 10 W Wall Mounted with minimum system lumen efficacy of 100 lm/W with Pressure Die Cast Aluminium housing, Polycarbonate Opal Diffuser and P.F.>0.95 with THD, including making suitable arrangement for fixing, connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor complete as reqd.	
7.	Chandelier- Supply, installation, testing & Commissioning of Main Chandelier of the following specifications Mounting System Surface Application Area Indoor (Dry Rated) Height 950MM (3.1 feet) Diameter 950MM (3.1 feet) Lamp Type E27 complete as per specification. complete in all respect and to the entire satisfaction of Engineer In charge/Project Manager.	
8.	Wall Light- Supply, installation, testing & Commissioning of Wall Light of the following	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	specifications:= Overall Dimensions: Dimensions: L 50 x W 15 x H 14 cm Colour : Brass Antique Finish Ball Wall Lamp with Off White Shade No. of Bulb Holders: 01 Recommended Bulb: LED Only Material: Aluminium complete , complete in all respect and to the entire satisfaction of Engineer In charge/Project Manager .	
9.	Hanging Light- Supply, installation, testing & Commissioning of VINTAGE STYLE METAL AND GLASS HANGING LIGHT of the following specifications Height 210MM (8.3 inches) Diameter 265MM (10.4 inches) Lamp Type E27 complete, per specification. complete in all respect and to the entire satisfaction of Engineer In charge/Project Manager.	
10.	Table Lamp- Supply, installation, testing & Commissioning of SQUISIT BLUE FLORAL PATTERN CERAMIC TABLE LAMP Table Lamp Material Ceramic Body Finish Blue and White Mounting System Surface Application Area Indoor (Dry Rated) IP Rating IP 20 Height 520MM (1.9 feet.) Width (1 feet) 320 Diameter 330MM (1.08 feet.) Voltage 110-220 Lamp Type E27 as per specification .complete in all respect and to the entire satisfaction of Engineer In charge/Project Manager .	
11.	Mirror /Spot /Picture Lights- Supply, installation, testing & Commissioning of Vogue Brass Led Mirror Light - Light Source: LED Colour of LED: Warm White Colour Temperature:3000K Adjustable Yes Wattage : 20 Watts Material: Metal & Acrylic Body Colour Antique Brass Size : Height 2" X Width 16.5" as per specification .complete in all respect and to the entire satisfaction of Engineer In charge/Project Manager .	

S. No.	Specifications Of Different Type of Fittings	Area to be used
12.	Decorative Fan- Supply, Installation, Testing and Commissioning of decorative Undelight Premium Ceiling Fan with Remote 1300MM Antique Brass Colour Antique Brass Voltage 220-240 V Wattage 80 W Weight of the product/Item 8.6 kg Net Quantity 1 Unit Sweep Size 1300MM Motor Speed 250RPM Air Delivery 270CMM Approx Dimension LxWxH (cm) 50.9x36.6x32	
13.	BLDC Fans- Supply, Installation, Testing and Commissioning of following sweep, BEE 5 star rated, ceiling fan with Brush Less Direct Current (BLDC) Motor, class of insulation: B, 3 Nos blades, 30 cm long down rod, 2 Nos canopies, shackle kit, safety rope, copper winding, Power Factor Nost less than 0.9, Service Value (CMM/W) minimum 6.85, Air delivery minimum 215 CMM, 350 RPM (tolerance as per IS : 374- 2019), THD less than 10%, remote or electronic regulator unit for speed control and all remaining accessories including safety pin, nut bolts, washers, temperature rise=75 degree C (max.), insulation resistance more than 2 mega ohm, suitable for 230 V, 50 Hz, single phase AC Supply, earthing etc. complete as required.- 1200mm, service value ≥ 6.0 CM/Min/Watt, air delivery 210 CM/Min (Minimum)	
14.	Air Ventilating Fan-Supplying, Installation, Testing & Commissioning of 250 mm sweep fresh air ventilating fan with aerodynamically designed & balanced blades suitable for operation on 230 v single phase AC supply complete connection with 3 x 1.5 sq.mm. PVC insulated FRLS PVC sheathed copper conductor etc as required as reqd. with all accessories as required	
15.	Wall Bracket Fan- Supplying, Installation, Testing & Commissioning of Air Circulator Fan, Class of Insulation for fan and regulator :Class I Rated Voltage :230V AC Speed Control Mechanism :Pull Cord Or String Based Control, Number of Blades :3 ,Material of Blade :ABS Blade Colour: White	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	Fan Guard Material :Powder Coated Metal Wire Number of Speed Steps:3, Type of Fan Mounting: Bracket Mounted Fan For Wall Mounting :Oscillating, Type of Fan Motor :Non-Capacitor Type Fan Size (Mm) :450.Minimum Air Delivery (cubic mtr/hr)-7500	

- Contractor has to submit LM79/LM80 reports to the engineer in charge before placing the order. All the technical data sheets to be got approved from Engineer in charge.
- All LED fixtures provided under the contract shall be guaranteed for a period of 5 years from the date of completion. The contractor shall submit warranty/guarantee of material against manufacturing defects for a period of five years for LED fittings duly signed by not below the rank of Regional Manager / director / Owner of proprietor of the OEM.
- Minimum size of copper conductor for power wiring shall be 4 Sq mm and for light and fan points wiring shall be 1.5 sq mm.
- The size of DBs at one location shall be same irrespective of number of circuits connected from the DBs.
- The wiring and conduit route plan/drawings shall be submitted by the contractor and shall be got approved from the Engineer-in-charge.
- To facilitate drawing of wires, 18 SWG GI fish wire shall be provided in recessed conduit. Conduits laid for other services, like fire alarm, PA system etc., where wiring is not done along IEI works, fish wire shall be invariably drawn.
- The connection between incoming switch / isolator and bus bar shall be made with suitable size of thimble and cable.
- Power supply to DBs located in lift machine room if provided as per design at suitable location as approved by Engineer-in-charge shall be done using suitable XLPE insulated armoured cable. Supply of cable shall be in the scope of work.
- Size of distribution board shall be as per number of light / power circuits and same shall be got approved from Engineer in Charge before installation. All distribution boards shall be double door type. RCBO of suitable rating shall be provided as main incomer in all DBs.
- MCCB, if used as incomer then it should have earth fault protection and time delay. Earth leakage modules are not acceptable.
- Inside the lift shaft there shall be arrangement of one light point at each floor level and one light point at overhead, one light point in lift pit. All light points shall be in

group controlled and wired with 2.5 sqmm FRLS copper conductor cable. 15amp power plug and 5amp power plug shall be provided at each floor. Wiring of this power plugs shall be done with 4sqmm FRLS copper wires. LED Bulkhead fittings of suitable rating to provide minimum 100 lux shall be connected with each point of lift shaft.

- All Electrical panels /MCCBs /MCB DBs /MCBs should be provided as per the specification and makes given under the Substation Subhead.
- While laying conduits for fire alarm system, sufficient junction outlets are to be provided as per the direction of the Engineer-in-Charge for detectors as required.
- After completing the work, necessary test results as envisaged in local bylaws & Indian Electricity Rules shall be recorded and submitted to the department.
- RCBO of 300 mA sensitivity of suitable rating shall be provided as Incomer of each Distribution board.
- For accommodating various size of cables incoming to the building, medium class G.I. pipe of suitable size shall be provided.
- Provision is to be taken into consideration during designing:
- Tentative power requirement (5Amp & 15 Amp):- As per the design and functional requirement and as directed by Engineer In charge/Project Manager.
- Also, Geysers of required capacity shall be provided as per the design and functional requirement and as directed by Engineer In charge/Project Manager.
- LED Exit signages with 2 hours battery back with bicoloured LED status indicator & should be visible from 40 mtrs, at every 6.00 m in corridor and at all conspicuous locations to indicate Exit, staircase location, toilet location, handicapped toilet location, lift location etc. as per NBC norms.
- All Cables in Electrical Room, Panel room, LV rooms, Shafts shall be laid on cable trays and approx. 25% capacity of all such cable trays shall remain unused as future provision.
- Such cable tray in Substation room, Electrical Room, Panel Rooms, area shall be hot dipped GI as per direction of E-in-C. Proper factory-made TEE, Bend, elbows, cross, joints and other accessories shall be used.
- Cable trays above false ceiling on all other places shall be Perforated Hot Dipped Galvanised Iron (galvanisation thickness i.e average mass of Zinc coating shall not be less than 65 microns for 2 mm thick & 50 microns for 1.6 mm thick as per IS standard) with perforation not more than 17.5%, in convenient sections, joined with connectors, suspended from the ceiling with G.I. suspenders including G.I. bolts & nuts, etc. as required.

- The rupturing capacity of the MCB's shall not be less than 10KA, higher capacity shall be provided if required in the detailed design. The MCB's shall have ISI mark and rupturing capacity of the MCCB's shall be as per design of fault level.
- Make of MCB/MCCB shall be the same as the make of MCB DB (in that particular DB).
- Earthing: All earthing shall be done with copper plate / GI plate earthing as per CPWD specifications. Earthing system comprising of earth electrode, earth conductor, earth bus, protective conductor etc.
- All LT and HT cables laid outside the building portion in open area shall be either laid in ground with Sand cushioning and brick protection or in RCC trench or in DWC pipes or in cable tray as per Specification and direction of Engineer-in-Charge.

Handing Over:

- All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.
- Contractor shall also handover, to the Engineer-in-Charge, all Test Certificates, Reports, maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

- The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.
- The form of warranty shall be as approved by the Engineer-in-Charge.
- The warranty of all the components shall be valid for a period of Five year from the date of handing over.
- The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.
- The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

17.2 EXTERNAL, LANDSCAPE & FACADE LIGHTING SCOPE OF WORK

- The specifications given below pertain to the External, Landscape Lighting & Facade Lighting work to be carried out as detailed below: -

- Dismantling all the existing Light luminaries/fittings (within the Garden area/ outside installed on ground, poles on buildings etc) with all accessories complete with foundation, wiring / cables, pipes/ conduits, iron cage etc, shifting, loading and storage at designated location within premises and handing over the same to competent authority as per the instruction of Engineer-in- charge.
 - Dismantling of pole / street light standard/ strut embedded in brick ballast / cement concrete foundation etc. as required. (Approx 300 poles complete with cables all accessories etc) and per the instruction of Engineer-in- charge.
 - Supplying Installing Testing & Commissioning of new external and landscape lighting for the parking and garden areas, utilizing LED post tops on ornamental or decorative poles, bollards, spike lights, bush lights, mini floodlights, and flexible lights
- External & Landscape Lighting
 - The scope of this work consists of planning, designing and SITC of LED External lighting with decorative/ ornamental poles single arm & double arms and octagonal at least 1 meter of arm, Landscape lighting consisting of Bollards, post top light spike/ bush lights, mini flood lights, etc. along roads, pathways, gardens, plantation, trees & around the parking area etc.
 - Exact quantity shall be determined as per the requirement of NBC 2016 and as per direction of E-in-C but not less than detailed below.
 - Appropriate size of aluminium armoured XPLE cables shall be as per IS specifications and shall be laid with appropriate size GI wire required for earthing of every streetlight and bollard fittings.
 - Cable laying shall be done in appropriate size DWC pipes, which is laid below ground at required depth below finished floor level including trenching, refilling of earth, compaction etc.
 - The scope of work is inclusive of RCC foundation of appropriate size with J bolts. The drawings of each and every item, layout drawings, foundations, poles shall be submitted for approval from Engineer-In-charge.
 - For External lighting 4 mtr decorative poles with single and double arm & LED type post top lantern shall be provided around the parking area, along the road, periphery wall, octagonal poles with street lighting for periphery of the garden wall at the spacing of 12-16 mtrs.
 - 5 mtr pole along with LED streetlights to be provided along the roads for motel area at the spacing of 21-28 mtrs. Illumination to be maintained as per NBC 2016.
 - The cable entering and exiting provision using appropriate size of DWC pipe in the foundation of pole. RCC foundation (1:2:4 with 12mm reinforcement) as per

manufactures designs and recommendations and suitable size cable entry pipes. (Design & drawing must be got approved from Engineer-in-Charge).

- Landscape Lighting

- The scope of this work consists of planning, designing and SITC of LED Landscape lighting for Garden Area including pathways, plantation, trees & Internal open area, along the periphery of the wall etc. Exact quantity shall be determined as per the requirement of NBC 2016 and as per direction of E-in-C but not less than detailed below.

- (a) Flexi lights- for external surface of water bodies.
- (b) Bollards along pathways
- (c) Bush/ spike lights for planters
- (d) Mini flood light for trees
- (e) Steps light

- Appropriate size of copper flexible cables for flexi lights, Bush/ spike lights for planters and aluminium armoured XPLE cables for balance fittings shall be as per IS specifications and shall be laid with appropriate size GI wire required for earthing of every streetlight and bollard fittings.
- Cable laying shall be done in appropriate size DWC pipes, which is laid below ground at required depth below finished floor level including trenching, refilling of earth, compaction etc.

- Street light control panel

- The panel shall be outdoor type (Weather Proof & Water Proof) external lighting feeder pillar of suitable size not less than 30 cm and upto 45 cm deep made out of M.S. sheet 2mm thick (14 SWG) duly compartmentalized, double door with locking arrangement (IP-54), duly fixed on MS angle iron frame work of size 50mm x 50mm x 6mm, 90 cm long legs out of which 45 cm duly grouted in cement concrete 1:2:4 (1 cement : 2 sand : 4 stone aggregate 20mm) and having following accessories mounted inside the cubical panel i/c connection, inter connection with aluminium thimbles, earthing with two nos. earth studs duly painted with one coat of red oxide & two coats of superior quality enamel paint of approved shade complete etc. as reqd.
- The panel shall have incoming MCCB, Busbar section with insulated bus bars, metering section with ammeter, voltmeter, LED indicating lamps, cable alley etc and MCB/MCCBs as outgoings.
- Street/compound lighting control section shall be provided with individual astronomical timer in outgoings required to feed street lighting for automatic operation.

- There should be separate controls for External/Landscape light. Earthing/loop earthing etc shall be done as per CPWD specifications.
- Distribution of electric power to street / compound lighting etc. and gate lights shall be with FRLS XLPE insulated and PVC sheathed aluminium conductor armoured UG cable of 1100 having minimum size of 4 C X 6 Sqmm XLPE cable Aluminium conductor
- The cables shall be laid in DWC pipe in ground, pipe, closed or open duct, cable trays or on surface of wall etc. depending upon the site conditions and as per direction of Engineer-In-charge. Tagging of cables on both ends of each circuit of street, compound lighting and gate lights shall be done.
- All lights of street, compound and gate shall be controlled by astronomical time switch. There shall be arrangement of bypass switch so that in case of failure of time switch, the lights can be operated after bypassing the same.
- Earthing of Street / compound lighting shall be carried out as per CPWD General Specifications Part-I (Internal)-2023 and CPWD General Specifications Part-II (External)-2023.
- Following are specification & Minimum Quantities of the poles and various fittings to be used for External & landscape lighting fittings.

Table 0-5: Specifications and Areas of Application for Various Types of Outdoor Lighting Fixtures and Poles

S. No.	Specifications Of Different Type of Fittings	Area to be used
	BOLLARDS	
	Supply, Installation, Testing and Commissioning of 800 mm long 11 W LED IP 65 Bollard , Housing made of extruded aluminium for excellent heat dissipation ,Weather-proof and rust-free luminaire with pure polyester powder coating, Symmetric glare-free light distribution with a polycarbonate diffuser, High-efficacy LEDs for optimum energy consumption, Potted driver and accessories pre-wired up to terminal block, having base plate with holes for direct mounting complete with all accessories including preparation of finished CC foundation with suitable size HDPE pipe for cable entry and exit, electrical connections for incoming and outgoing cables etc complete as per requirement at site (The rate must include junction box/terminal box suitable for incoming and outgoing cables i/c termination and other accessories and suitable earthing system). Lumen Efficacy of LED>110Lm/W @ 4000 K color temperature, PF ≥0.95, THD ≤10%, Input Voltage Range 140-280 V, 3 KV Inbuilt Surge Protection,50,000 Hrs LED life with L70 criteria.	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	NEON FLEX STRIP LIGHT	
	Supply, Installation, Testing & Commissioning of 16mm X 16mm of 5 meters length Mono Color CCT: 3000 K of 70 W Flexible and encapsulated LED Strip light with non-integral driver. The luminaires shall be made of Silicon extrusion with high-efficiency, high grade appearance, soft bend flexibility & Option of Top bend, the same shall be so designed. The luminaire shall have silicon glue between optical cover & LED chamber to ensure proper IP67 protection. Brand name shall be embossed / printed on each an every light fixtures. CCT 3000 K and shall be complete with all necessary accessories required for proper working of fixture including weatherproof connection cables, waterproof connectors etc. as required. The non-integral driver shall be installed in suitable Junction Boxes IP 66/67 “weatherproof”, for outdoor installation along with IP 67 Gland & lugs Cable Termination complete as required.	
	BUSH LIGHTS	
	Supply installation, testing & commissioning of 9W LED BUSH LIGHT having Graphite grey powder coated integral aluminium housing. The Die-cast aluminium housing comprises Warm White (WW) COB LED and reflector. COB LED housing covered with die- cast aluminium ring with weatherproof gasket and toughened glass. LED Used shall be COB type CCT up to 3000K ± 250 K, IP65. Luminaire is wired with inbuilt driver with 5kV surge protection and should be constant current type with operating Voltage Range of 140 to 280V AC, PF>90, 50Hz. Adjustable mounting bracket with spike should be provided for easy to focus the object. 2 nos., Ø8mm holes should also be provided on adjustable mounting bracket for surface mounting. Luminaire shall be complete with all necessary accessories required for proper working of fixture including weather Area to be used proof connection cables, waterproof connectors etc. as required.	
	MINI FLOOD LIGHT	
	Supply installation, testing & commissioning of 4000K Circular Mini Flood Light with Integral driver. The luminaires shall be made of Extruded aluminium housing powder coated with toughened glass in Dark Gray colour. The complete luminaire has IP65 & IK06 protection, and it comprises of high purity integrated poly carbonate Lens. The LEDs shall have minimum CRI ≥ 70 (White LED) & shall have SDCM ≤ 5 . The luminaire shall have wattage 40W and shall	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	deliver 3600 lumens. Beam angle of the Luminaire shall be 30 deg. Fixture shall operating temperature range of 0°C to 45°C. Input Voltage Range of 140 - 280V AC. The luminaire shall have declared life of 50,000 burning hours at L70. Luminaire and Driver must be made in India with same brand. The successful bidder must submit the NABL accreditation certificate for Luminaire manufacturer along with technical bid. LM80, RoHS compliance issued by LED luminaire manufacturer, BIS certificate for LED Luminaire. Brand name shall be embossed / engraved on each an every light fixtures. Luminaire, Driver and controller should be with same make and shall be complete with all necessary accessories required for proper working of fixture including weatherproof connection cables, waterproof connectors etc. as required.	
	LED STEP LIGHTS	
	Supply installation, testing & commissioning of 7 W LED STEP LIGHT having non-corrosive cast aluminium body. Low power White LEDs (WH) covered with heat resistant frosted glass fixed to the housing with frame protection grill. LED Used shall be COB type CCT up to 5700K, IP54. An operating Voltage Range of 140 to 280V AC, PF>90,50Hz. LED driver should be constant current type. The luminaire should have loop in loop out provision for power complete i/c termination as reqd complete i/c all civil job associated with it.	
	STREET LIGHT FITTINGS	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	Supplying of Street light LED fixture powder coated pressure die cast aluminium body with driver as per the requirement with Driver efficiency >85%, Input voltage: 140-270 Volt AC, freq 50/60 hz, Operating temp range -15 deg to 50 deg centigrade, internal surge protection of 5 KV L,N,E as per IEC 61000-4-5, Driver efficiency >85%,THD < 10% as per IEC 61000-3-2 , P. F.≥0.95, IP-66,IK-10, CRI >80, under voltage and over voltage protection, EMI-EMC As per CISPR -15, lenses for beam angle as per IESNA type I/II/III as per the width of the road and the project requirement., suitable to fit in up to 65mm dia pipe, life time (LED,Driver & electrical circuitary) of minimum 50000 Burning Hours with 70% of initial Lumen maintained till life ends as per LM80 extrapolation IES TM- 21-11 report, CCT 3000°K / 4000°K / 5700°K /6000°K/6500°K (As per ANSI Bin), SDCM(Standard Deviation Color Matching) <5, Maximum power consumption should not more than the specified rating and Fixture shall be of relevant BIS standard complete in all respect i/c connections with 1.5 sq mm FRLS, PVC insulated copper conductor single core cable and earthing etc. as required System lumen efficacy ≥105 <120 lm/Watt output. Shape size and CCT shall be as approved by Engineer-in-Charge as per requirement. (Thermal management: heat sink of aluminium housing such that LED junction temperature shall not rise above- 45 W	
	POST TOP FIXTURES	
	Supply, Installation, Testing and Commissioning of 60W LED Posttop with crown design. Fixture should be Dust and waterproof with IP66 made up of Aluminium diecast housing with & duly powder coated with pure grey polyester powder, Approx dimensions should be 625 mm width & 1045 mm height (+/- 25mm) Polycarbonate Fresnel/street optic lens that reduces glare, Uniform and wide light distribution with lens/diffuser, Metal clad PCBs, High performing integral driver. luminaire should be dry sky certified. Efficacy of LED>120Lm/W @ 5700 K colour temperature, IK 07 Rating,	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	PF ≥ 0.95 , THD $\leq 10\%$, Input Voltage Range 140-280 V, 4 KV Inbuilt Surge Protection and 10 KV External, complete as per requirement at site.	
	Supply, Installation, Testing and Commissioning of 60 W LED Postop Dust and waterproof with IP66 made up of Aluminium diecast heritage look ,approx. size of the fixture should be 475mm width x 750mm Lenth (+/- 25mm) duly powder coated with pure grey polyester powder, Polycarbonate Fresnel/street optic lens that reduces glare, Uniform and wide light distribution with lens/diffuser, Metal clad PCBs, High performing integral driver. luminaire should be dry sky certified. Efficacy of LED $>120\text{Lm/W}$ @ 5700 K color temperature, IK 07 Rating, PF ≥ 0.95 , THD $\leq 10\%$, Input Voltage Range 140-280 V, 4 KV Inbuilt Surge Protection and 10 KV External, complete as per requirement at site.	
	Supply, Installation, Testing and Commissioning of 60W LED Hanging Postop Dust and waterproof with IP66 made up of Aluminium diecast decorative crown. Approximate size of the fixture should be 625 mm width 800 mm height (+/- 25 mm) duly powder coated with pure grey polyester powder, Polycarbonate Fresnel/street optic lens that reduces glare, Uniform and wide light distribution with lens/diffuser, Metal clad PCBs, High performing integral driver. luminaire should be dry sky certified. Efficacy of LED $>120\text{Lm/W}$ @ 5700 K colour temperature, IK 07 Rating, PF ≥ 0.95 , THD $\leq 10\%$, Input Voltage Range 140-280 V, 4 KV Inbuilt Surge Protection and 10 KV External, complete as per requirement at site.	
	ORNAMANTEL POLES	
	Supply and erection of Ornamental pole of 4 mtr. height made out of galvanized Mild Steel tubes having 1000mmx114mmx4mm dia at Bottom and 3000mmx75mmx4mm dia at top fitted with decorative cast aluminium embellishment at middle and Decorative cast aluminium embellishment at bottom of dia 175 mm at middle & 305 mm at bottom. Pole should have a locked & non theft arrangement service window containing 6 Amp MCB & 4 way 25 Amp connector , pole should be with base plate of 250x250x12mm including cost of nut and bolts of 500 mm x 16 mm Jtype , earthing studs, and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, over a bed of PCC 1 :5: 10 of required dimensions for poles of as per manufacturers	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	specifications complete in all respects and as per directions of Engineer-in-charge. The Poles should be primer coated and painted with polyurethane paint.	
	ORNAMANTEL POLES (Single Arm Bracket)	
	Supply and erection of Ornamental pole of 4 mtr. height made out of galvanized Mild Steel tubes having 1000mmx114mmx4mm dia at Bottom and 3000mmx75mmx4mm dia at top fitted with decorative cast aluminium embellishment at middle and Decorative cast aluminium embellishments at bottom of dia 175 mm at middle & 305 mm at bottom. Pole should have a locked & non theft arrangement service window containing 6 Amp MCB & 4 way 25 Amp connector , pole should be with base plate of 250x250x12mm including cost of nut and bolts of 500 mm x 16 mm Jtype , earthing studs, and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, anchor bolts etc. over a bed of PCC 1 :5: 10 of required dimensions for poles of as per manufacturers specifications complete in all respects and as per directions of Engineer-in-charge. The Poles should be primer coated and painted with polyurethane paint i/c Supply and erection Single Arm Decorative Ornamental Single arm bracket made out of Galvanised steel tubes with extruded aluminium. Curve designe, suitable for drop down luminaires. The brackets are primer coated and painted with polyurethane paint.	
	ORNAMANTEL POLES (Single Arm Bracket)	
	Supply and erection of Ornamental pole of 5 mtr. height made of Galvanised steel tubes having bottom part of the pole (1000mmx114mmx4mm) and upper part is (4000mm x 75mm x 3mm) made out of mild steel galvanised tubes. The bottom and middle part of the poles shall have cast aluminium. embellishments and are fitted and sealed by grub screws, Decorative cast aluminium embellishments at bottom of dia 175 mm at middle & 305 mm at bottom. Pole should have a locked & non theft arrangement service window containing 6 Amp MCB & 4 way 25 Amp connector , pole should be with base plate of 250x250x12mm including cost of nut and bolts of 500 mm x 16 mm Jtype , end cover and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, anchor bolts etc. over a bed of PCC 1 :5: 10 of required dimensions for poles of as per manufacturers specifications complete in all respects and as per directions of Engineer-in-charge. The Poles should be primer coated and painted with polyurethane paint i/c Supply and erection Single Arm Decorative Ornamental Single arm bracket made out of Galvanised steel tubes with extruded aluminium. Curve designed, suitable for drop down luminaires. The brackets are primer coated and painted with polyurethane paint.	
	ORNAMANTEL POLES (Double Arm Bracket)	
	Supply and erection of Ornamental pole of 4 mtr. height made out of galvanized Mild Steel tubes having 1000mmx114mmx4mm dia at Bottom and 3000mmx75mmx4mm dia at top fitted with decorative cast aluminium embellishment at middle and Decorative cast aluminium embellishments at bottom of dia 175 mm at middle & 305 mm at bottom. Pole should have a locked & non theft arrangement service window containing 6 Amp MCB & 4 way 25 Amp connector , pole should be with base plate of 250x250x12mm including cost of nut and bolts of 500 mm x 16 mm Jtype , earthing studs, and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, anchor bolts etc. over a bed of PCC 1 :5: 10 of required dimensions for poles of as per manufacturers specifications complete in all respects and as per directions of Engineer-in-charge. The Poles should be primer coated and painted with polyurethane paint i/c Supply and erection of Double arm bracket made out of Galvanised steel tubes with extruded aluminium. Curve designed, suitable for drop down luminaires. The brackets are primer coated and painted with polyurethane paint.	
	OCTAGONAL POLE (Periphery of Garden Wall)	
	Supply and erection of Hot Dip Galvanized octagonal pole of 3mm thickness, with base plate including cost of nut and bolts , earthing studs, Integral Cable termination arrangement 5 mm thick Bakelite base plate on suitable welded MS/GI bracket 32 A four way connector 2 no 10 A SP MCB , end cover and all accessories as supplied by the manufacture including Providing RCC foundation of M25 grade (1 Cement:1 Stone	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	aggregate: 2 Coarse sand) i/c excavation, steel reinforcement (Fe 500) @80 kg/cum of concrete contents, concrete cover 50mm, anchor bolts etc. over a bed of PCC 1:5:10 of required dimensions for octagonal poles of various heights as per following specifications complete in all respects and as per directions of Engineer-in-charge	
	4-Metre-Long pole with top dia 65 mm and bottom dia 130 mm with base plate of size 225 x 225 x12 mm	
	Supply and erection of GI bracket made of 32 mm dia medium class GI pipe, having 15 deg angle from horizontal, suitable for fixing on top of Street Light pole 60 cm long with 20 cm high suitable size pole cap .	
	B.S.E.N. 10025 High Masts	
	Supply, installation, testing and commissioning of 12.5 mtr. long High Mast manufactured from B.S.E.N. 10025 or equivalent grade material in, 2 (two) section hot dip, galvanized inside and outside in single dip, suitable for wind velocity as per IS 875 Part-3 suitable for 6 nos. luminaire loading fully motorized (power tool) with starter & cable complete along with standard accessories supplied by the manufacturer with 3 nos. steel wire rope double drum system and twin dome aviation light with LED without foundation but including cost of set of foundation nut and bolts, installation at site complete in all respect upto entire satisfaction of Engineer -in-Charge Thickness of Top and Bottom Section = 3 mm (minimum) Top Dia = 150 mm and Bottom Dia = 360mm Thickness of Galvanization - Top = 65 micron (minimum) and Bottom = 85 micron (minimum)"Feeder Pillar for LED fitting and cast aluminium control gear box shall be as per manufacture instruction. Foundation of the high mast structure shall be as per manufacture design. Feeder panel of 10 KW.	
	Supply, installation, testing and commissioning of 200W SMD LED Floodlight fixture with System efficacy of 125 lm/W (25000 lumens). Luminaire shall be made up of LM6/ADC12 Alloy, non-corrosive, pure polyester power coated die cast Aluminium housing with PC lens. Luminaire should be of dimension 319mm x 247 mm x 97mm height $\pm$ 5mm height and the approximate weight should be within the 6.0Kg $\pm$ 0.5Kg. All external hardware must be of SS304 grade. LM 80-08 compliant LEDs of EMC/ceramic package of wattage of 5W from reputed makes such as Nichia/Cree/ Bridgelux/ Lumiled/ Osram/Seoul should be provided. LEDs used in the product shall comply with EN 62471 for Photo-biological safety and	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	certificate for the same from manufacturer shall be provided. Maximum LENS dome top temperature shall be less than 95°C at 45°C ambient temperature. Luminaire shall be with IP66 and IK07 protection. It should be capable to operating under ambient temperature range of -10°C to +45°C. The LED shall be compliant with LM80-08 standard with L70 life of 50000 Hrs tested at maximum current (Complete LM 80 test report for LED should be submitted for 10000 hrs of testing). The LEDs used should be with CCT of 5700 K, CRI of Minimum 70 and SDCM < 5. LEDs must be driven at max 70% of the rated current. MCPCB with Aluminium core and copper thickness of 35 micron to be used for LED mounting. LED Driver shall be silicone potted, Integrated type, Isolated, Constant Current with range 140-280V AC. Driver Efficiency > 85% & 4 KV internal surge protection with additional 10KV SPD mounted inside the luminaire and firmly fixed to the housing, Power factor greater than 0.95 and total harmonic distortion (THD) of less than 10% should be integral to the luminaire. LED Driver must have short circuit, open circuit, Auto cut-off protection for low and high input voltage. Individual drivers should be provided with individual modules along with ventilated enclosure to hide the wirings. Driver must be with Aluminium casing.	

- Any other area specifically not mentioned above shall be given with LED luminaires of required numbers design as per directions of Engineer-in-charge.

FACADE LIGHTING

- The Scope of Work of the project includes the following major components: -
 - Creative Lighting Concept, Planning & Design
 - The lighting design should create an overall aesthetic look of the heritage structure and highlight the features and architectural details.
 - The use of cost-effective LED light fixtures is encouraged. All lights and control gear should be high quality, A-grade, long life equipment.
 - Control System & Cabling Design
 - Design of the control system and system integration to provide dimming of various fixtures in order to balance light levels to create an aesthetic look. It should be possible to program and save various schemes as pre-sets which can be easily recalled from a touch interface.
 - A single point of control should be provided for the entire installation

using industry standard protocols like DMX/DALI/WiFi/KiNet, etc for a third-Party integration and control if & when required.

- Design of the cabling to include power and data cables for least intrusive installation so that it does not mar the beauty of the recently restored building.

2 Supply, Installation, and Testing, commissioning, and programming Facade lighting fixtures according to the Client requirement in coordination with consultant/architect, following the below steps:

- Review Requirements:
 - Obtain detailed requirements and standards from the consultant/architect.
 - Understand the desired lighting scenes and themes for each area.
- Planning:
 - Develop a plan outlining the sequence of testing and commissioning.
 - Identify all DMX-controlled lighting fixtures and their locations.
 - Plan the different lighting scenes and themes that need to be designed.
- Installation Verification:
 - Ensure all lighting fixtures are installed correctly and securely.
 - Check the wiring and connections for DMX controllers and fixtures.
- Programming DMX Controllers:
 - Set up DMX controllers and configure them according to the lighting design plan.
 - Program the controllers to create multiple lighting scenes and themes.
 - Ensure each fixture responds correctly to DMX signals.
- Testing and Commissioning:
 - Test each lighting fixture individually to ensure proper operation.
 - Verify that the programmed scenes and themes are executed correctly.
 - Adjust programming as needed to meet the design specifications.
- Approval Process:
 - Present the programmed lighting scenes and themes to the consultant/architect for approval.
 - Make any required adjustments based on feedback.
- Documentation and Training:
 - Document the programming and commissioning process.
 - Provide training to relevant personnel on how to operate and maintain the lighting system.
- Final Verification:
 - Conduct a final walkthrough with the consultant/architect to ensure

all requirements are met.

- Obtain final approval and sign-off.
- Following are specification & Minimum Quantities of the poles and various fittings to be used for External & landscape lighting fittings.

Table 0-6: Specifications and Installation Requirements of Various RGBW LED Lighting Fixtures and Control Equipment for Facade and Indoor Lighting Applications

S. No.	Specifications Of Different Type of Fittings	Area to be used
	Supply installation, testing & commissioning of Colour changing RGBW surface mounted Linear Wall Washer 36W± 10%, Narrow/Medium/Wide/Elliptical beam luminaire suitable for outdoor applications of Facade Lighting, depending on design by the contractor and site requirement. Luminaires should be enabled with high power LEDs, should consists of anti-aging and anti-UV high optical efficiency temperature-resistant lenses, suitable for architectural lighting as per design requirement. The luminaire should have options for various beam angles i.e. from 8° to 80°, actual will depend on the design by the contractor and site requirement. Power consumption should be 36W at steady state full intensity, Luminaire luminous flux range of 1300± 15% Lumens. The connectivity should be of a daisy chain topology, allowing easy installation to form long run lengths. The same shall include installation clamps, suitable control cables UV and weatherproof, other required accessories & hardware. Light fixture should be standard DMX512 protocol compatible, the DMX decoder function should be inbuilt, and each light fixture should be individually addressable & should be able to operate with any standard DMX512 equipment. Color rendering index CRI ≥ 80 for white LEDS's and power factor of complete luminaire ≥ 0.90, at full intensity. Luminaire should be provided with suitable integral/separate non-integral power supply unit. The life of Luminaire shall be 50000hrs L70B50 at 35deg C. The luminaire shall be extruded Aluminum with Electrostatically applied polyester powder coating, silicon gasket and clear tempered glass, minimum dimension of 1000 mm x 38 mm x 90 mm (with bracket) ± 10% and minimum weight of 1.5kg± 10%. The Luminaire shall have tilting adjustability ±95° Ingress Protection ≥ IP 66. Impact resistance level ≥ IK 06. Adequate heat sink with proper thermal management shall be provided. All Led should be discreet LED and not 4in1. Operating Temperature: -10°C to +45°C, Operating Humidity: 10%-90% The LED Luminaires and external drivers if used should be BIS certified.	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	Supply installation, testing & commissioning of Colour changing RGBW surface mounted Linear Wall Washer 50W± 10%, Narrow/Medium/Wide/Elliptical beam luminaire suitable for outdoor applications of Facade Lighting, depending on design by the contractor and site requirement. Luminaires should be enabled with high power LEDs, should consist of anti-aging and anti-UV high optical efficiency temperature-resistant lenses, suitable for architectural lighting as per design requirement. The luminaire should have options for various beam angles i.e. from 15° to 60°, actual will depend on the design by the contractor and site requirement. Power consumption should be maximum 50W at steady state full intensity, Luminaire luminous flux range of 1890± 10% Lumens. The connectivity should be of a daisy chain topology, allowing easy installation to form long run lengths. The same shall include installation clamps, suitable control cables UV and weatherproof, and other required accessories & hardware. Light fixture should be standard DMX512 protocol compatible, the DMX decoder function should be inbuilt, and each light fixture should be individually addressable & should be able to operate with any standard DMX512 equipment. Color rendering index CRI ≥ 80 for white LEDS's and power factor of complete luminaire ≥ 0.90, at full intensity. Luminaire should be provided with suitable integral/separate non-integral power supply unit. The life of Luminaire shall be 50000hrs L70B50 at 35deg C. The luminaire shall be extruded Aluminum with Electrostatically applied polyester powder coating, silicon gasket and clear tempered glass, minimum dimension of 1000 mm x 105 mm x 45 mm (with bracket) ± 10% and minimum weight of 3.5kg± 10%. The Luminaire shall have tilting adjustability ±95°. Ingress Protection ≥ IP 66. Impact resistance level ≥ IK 06. Adequate heat sink with proper thermal management shall be provided. All Led should be discreet LED and not 4in1. Operating Temperature: -10°C to +45°C, Operating Humidity: 10%-90% The LED Luminaires and external drivers if used should be BIS certified.	
	Supply installation, testing & commissioning of LED indoor surface downlighter suitable for general lighting. Luminaire should have pressure die-cast Al housing with diffused optics. The luminaire should have CRI > 80 and CCT of 4000K/6500K. The luminaire shall be compliant with IP20, IK02 classification. The fixture should have a minimum system efficacy of 110 lumen/Watt and a minimum system lumen output of 2150 lumens and maximum system wattage of 18 Watts. The luminaire shall be designed so as to ensure lumen depreciation	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	of up to 30% over 30k burning hours @ design ambient temp 45 deg C. The electronic driver used shall have a power factor >0.95 , THD <10%. The fixture housing should be available in colors aluminium and grey.	
	Supply installation, testing & commissioning of Colour changing RGBW surface mounted Edge Lighting luminaire 10W suitable for outdoor applications of Facade Lighting, depending on design by the contractor and site requirement. Luminaires should be enabled with high power LEDs, should consists of anti-aging and anti-UV high optical efficiency temperature-resistant lenses, suitable for architectural lighting as per design requirement. The fixtures should have Unique 3x90° optical distribution with -5° to +85° tilting angle. Power consumption should be between 10W at steady state full intensity, Luminaire luminous flux 102 Lumens. The connectivity should be of a daisy chain topology, allowing easy installation to form long run lengths. The same shall include installation clamps, suitable control cables UV and weatherproof, other required accessories & hardware. Light fixture should be standard DMX512 protocol compatible, the DMX decoder function should be inbuilt, and each light fixture should be individually addressable & should be able to operate with any standard DMX512 equipment. Color rendering index CRI ≥ 80 for white LEDS's and power factor of complete luminaire ≥ 0.90, at full intensity. Luminaire should be provided with suitable integral/separate non-integral power supply unit. The life of Luminaire shall be 50000hrs L70B50 at 35deg C. Housing should be made of Die-cast aluminum with Anti-aging and anti-UV PC lenses, electrostatically applied polyester powder coating Ingress Protection $\geq IP 66$. Impact resistance level $\geq IK 06$. Adequate heat sink with proper thermal management shall be provided. Operating Temperature: -10°C to +45°C, Operating Humidity: 10%-90%	
	Supply installation, testing & commissioning of Colour changing RGBW surface mounted circular shaped RGBW 40W$\pm$10% Floodlight Luminaire Narrow/Medium/Wide beam luminaire suitable for outdoor applications of Façade Lighting, depending on design by the contractor and site requirement. Luminaires should be enabled with high power LEDs, should consist of anti-aging and anti-UV high optical efficiency temperature resistant lenses, suitable for architectural lighting as per design requirement. Power consumption should be 40W at steady state full intensity, Luminaire luminous flux range of 1870lm $\pm$10%. The connectivity should be of a daisy chain topology, allowing easy installation to form long run lengths. The same shall include	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	installation clamps, suitable control cables UV and weatherproof, other required accessories & hardware Light fixture should be standard DMX512 protocol compatible, the DMX decoder function should be inbuilt, and each light fixture should be individually addressable & should be able to operate with any standard DMX512 equipment. Color rendering index CRI ≥ 80 for white LEDs's and power factor of complete luminaire ≥ 0.90, at full intensity. Luminaire should be provided with suitable integral power supply unit. Lumen maintenance of at least L70@50,000 burning hours at 35°C. The housing made of Die-cast aluminum alloy and shall have electrostatically applied polyester powder coating finish. The luminaire bracket shall be made of cold-rolled steel & shall be so designed that the luminaire can be tilted to $\pm 90^\circ$. The bracket shall have locking mechanism to fix & secure the desired tilt angle. The luminaire shall have silicon gasket between optical cover & LED chamber to ensure proper IP66 protection. The luminaire must have a breather gland. The nominal weight of the luminaire shall be 1.8Kg ($\pm 10\%$). Ingress Protection $\geq$ IP 66. Impact resistance level $\geq$ IK 06. Adequate heat sink with proper thermal management shall be provided. Operating Temperature: -10°C to $+45^\circ\text{C}$, Operating Humidity: 10%- 90%. THD should be less than 20%. Housing to have adjustable base bracket for angle adjustment so that the light direction can be adjusted to illuminate desired structural elements. Connectors if used should be IP67 male/female connectors for loop through wiring.	
	Supply installation, testing & commissioning of Colour changing RGBW surface mounted circular shaped RGBW 80W$\pm 10\%$ Floodlight Luminaire Narrow/Medium/Wide beam luminaire suitable for outdoor applications of Façade Lighting, depending on design by the contractor and site requirement. Luminaires should be enabled with high power LEDs, should consists of anti-aging and anti-UV high optical-efficiency temperature resistant lenses, suitable for architectural lighting as per design requirement. Power consumption should be 80W at steady state full intensity, Luminaire luminous flux range of 4170lm$\pm 10\%$. The connectivity should be of a daisy chain topology, allowing easy installation to form long run lengths. The same shall include installation clamps, suitable control cables UV and weatherproof, other required accessories & hardware Light fixture should be standard DMX512 protocol compatible, the DMX decoder function should be inbuilt, and each light fixture	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	should be individually addressable & should be able to operate with any standard DMX512 equipment. Color rendering index CRI ≥ 80 for white LEDS's and power factor of complete luminaire ≥ 0.90, at full intensity. Luminaire should be provided with suitable integral/separate non-integral power supply unit. Lumen maintenance of at least L70@50,000 burning hours at 35°C. The housing made of Die-cast aluminum alloy and shall have electrostatically applied polyester powder coating finish. The luminaire bracket shall be made of cold-rolled steel & shall be so designed that the luminaire can be tilted to $\pm 90^\circ$. The bracket shall have locking mechanism to fix & secure the desired tilt angle. The luminaire shall have silicon gasket between optical cover & LED chamber to ensure proper IP66 protection. The luminaire must have a breather gland. The nominal weight of the luminaire shall be 6.0KG ($\pm 10\%$). Ingress Protection $\geq$ IP 66. Impact resistance level $\geq$ IK 06. Adequate heat sink with proper thermal management shall be provided. Operating Temperature: -10°C to $+45^\circ\text{C}$, Operating Humidity: 10%- 90%. THD should be less than 20%. Housing to have adjustable base bracket for angle adjustment so that the light direction can be adjusted to illuminate desired structural elements. Connectors if used should be IP67 male/female connectors for loop through wiring. The LED Luminaires and external drivers if used should be BIS certified.	
	Supply installation, testing & commissioning of exterior RGB/RGBW Flexible and encapsulated LED Strip light of 5 mtr standard length with 10-15 Watt per meter. Minimum System lumens of minimum 430-470 lumens/meter and System Lumen Efficacy $> 30\text{lm/w} \pm 5\%$. Luminaire light beam spread - 110°. Light fixture should be standard DMX512 protocol compatible, the DMX decoder function should be inbuilt, and each light fixture should be individually addressable & should be able to operate with any standard DMX512 equipment. The Strip should have IP 68 protection and is offered IP 67 rated connector to join the LED Strips in continuity. The luminaire must be offered with Aluminum channel for mounting the strip lights. The product should be complete with all accessories and Driver. The non-integral driver shall be installed in suitable Junction Boxes IP 66/67 "weatherproof", for outdoor installation along with IP 67 Gland & lugs Cable Termination complete as required.	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	The luminaire shall be supplied with necessary connectors for connecting lead/jump cables & Connectors if used should be IP67 male/female connectors for loop through wiring. Operating Temperature: -10°C to +45°C, Operating Humidity: 10%- 90%. THD should be less than 15%. Housing to have adjustable base bracket for angle adjustment so that the light direction can be adjusted to illuminate desired structural elements.	
	Supply installation, testing & commissioning of Compact master Content Program Controller (DMX controller) with capability to control minimum 8 DMX512 universes or equivalent, playback scenes and animations stored in its SD card, and it can be used for offline scenes scheduling, setting brightness, white balance and playback speed adjustments. It should be able to amplify the DMX signal in cascaded connection & support automatic playback scheduling. It should support power-on startup and scheduled timing start along with capability of unattended operation and remote scene triggering if needed. The Content Program Controller shall have integrated LCD display & support IR remote control. The dimensions of the Content Program Controller shall be approximately 278X193X66 mm (±10%). It should be housed in aluminum casing. The Input voltage shall be 12VDC & shall have 2 RJ45 ports on Input side. The IEC classification shall be Class III. It should operate on DM512 protocol. The output shall have 8 X 3P lockable terminals. The power consumption shall be 8W (±10%). The Content Program Controller shall have one SD card slot for maximum 32GB card & the SD card being used shall be FAT32 format. The Content Program Controller shall come with 220-240V to 12V DC power supply. The IP rating of content program controller shall be IP20 & shall comply to CE, CQC certifications.	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	Supply installation, testing & commissioning of RDM-6Wall Splitter or equivalent, should be able to provide 6-output DMX/RDM splitter with DMX/RDM pass-through supporting bi-directional communications for discovery, addressing and DMX control of Ethernet/DMX products. This unit takes the incoming DMX/RDM signal and splits the signal into six separate output channels allowing for expanding the number of devices controlled from 32 to 6x32. The output terminals are electronically isolated from the input & RDM-through port and share a common ground reference. All six output ports have an independent output driver to boost the DMX/RDM signal. Surface or DIN-rail mountable, Isolated DMX/RDM Input/Outputs, Automatic switching between DMX and RDM mode for auto-discovery, Environment-IP20, Interior applications, Finish/Color- Polycarbonate, Certification: CE Certified.	
	Supply installation, testing & commissioning of Addressing Kit shall automatically write address to a whole group of interconnecting luminaires within minutes. It shall be Miniature industrial design, compact size and touch screen. It can be powered by a power bank with a Micro-B type USB port for on-site programming and testing after installation. The housing shall be extruded Aluminum with black finish weighing approx. 0.2Kg with temperature range -10°C to 40°C, input voltage of 6-24V DC and humidity range of 10 to 90% (no condensation). The product shall be compact in size, compatible with multiple types DMX512 chips, with Built-in test animation effects, SD card slot to store animation and scenes. The addressing kit shall support standard RDM protocol, searching for RDM luminaires and static detection, Color-pick functions, and can be powered by Micro-B type USB power supply.	
	Supply installation testing and commissioning of DMX cable (single pair) having one 22AWG pair stranded (7x30) tinned copper conductors, Datalene (FHDPE) insulation, twisted pairs, overall Beldfoil shield (100% coverage) plus tinned copper braid, PVC jacket Cable. Beldon / Krystal or equivalent	
	WEATHERPROOF BOX FOR FAÇADE LIGHTING CONTROL	
	Supply installation testing and commissioning of double door with locking arrangement (IP-54), duly fixed on MS angle iron frame work of size 50mm x 50mm x 6mm, 90 cm long legs out of which 45	

S. No.	Specifications Of Different Type of Fittings	Area to be used
	cm duly grouted in cement concrete 1:2:4 (1 cement : 2 sand : 4 stone aggregate 20mm) (Size can vary as per site requirement) Outdoor feeder piler with MCB of suitable size having provision of the front operated panel, fabricated out of 2 mm thick steel, powder coated hinged double door in front ,dust and vermin proof, suitable for 415 v, 50 Hz AC supply, 100 AMP copper bus bar TPN , and interconnections ,Incomer : 63 A 4P MCB, 10 KA, Outgoing -32 AMP TPN MCB 10 nos , with proper ventilation , provision for controller & other accessories required for Facade in separate compartment complete as per site requirements and as per final instruction as given by E.I.C / Consultants.	

S. No.	Details of Material	Preferred Make
1	FRLS Copper Wire/Telephone Cable	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
2	Aluminium and copper XLPE Power cables Armoured / unarmoured	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
3	Cat 6A cable	Molex/Belden/Legrand/Panduit/Comscope
4	Modular Switch, Socket, Telephone socket/ Cable TV Socket/Data Outlet socket/Fan regulator/USB Sockets/GI Boxes etc (Wiring accessories) and accessories	Legrand: ARTEOR Honeywell: ORNA Panasonic: EUROPA Schneider: ZENCELO Wipro: (Northwest- Artisa) (Duly ISI Marked)
5	PVC conduit with accessories	Finolex/Supreme/BEC/NIC/Polycab/AKG (Min. 2mm thick and ISI marked)
6	MS conduit with accessories	AKG/NIC/BEC/RMCON (Note: - The accessories shall be same that of conduit pipe & will comply to IS/4768 Part 2 2003
7	DWC-HDPE underground cable duct	REX/Duraline/Duraplast/Tirupati (Duly ISI Marked)
8	Distribution Board	Legard (Ekinox)/ Hager (Novello+)/ Schneider (Acti9H)/ Siemens (Betagard)/ Lauritz Knudsen (Exora)/ABB (Itus)
9	Protection Device (MCB / RCCB/Isolators/RCBO/Time Switch)	Legard (DX3)/ Hager (NCN)/ Schneider (Acti9N)/ Siemens (Betagard)/ Lauritz Knudsen (Exora)/ABB (SB200)
10	300 mm Exhaust Fan / 250 mm dia fresh air fan	Usha/Havells / Khaitan/Crompton/Orient
11	Ceiling Fan (BEE rated star)	Usha/Havells / Khaitan/Crompton/Orient

S. No.	Details of Material	Preferred Make
12	LED Fittings (Indoor)	Phillips/Wipro/Trilux/LT
13	LED Fittings Outdoor Landscape / External Lighting	Phillips/Wipro/Trilux/LT/Keslec/Jaquar
14	Electric Water Heater	Racold / Crompton/Usha /Havells
15	Hand Drier	EURONICS/Jaquar/Dolphy
16	Facade Lighting	Phillips/Wipro/Ligman/LbT
17	Controllers for Facade Lighting	Phillips/Wipro/Ligman/Iguzzini/Lbt/enttec
18	Junction Boxes	Hensel/OBO
19	GI Pole (Ornamental)	Twinkle/Lustre/ Keslec/ K- lite/ Crompton
20	GI pole Octagonal	Bajaj / Valmount / Crompton /Transrail
21	LT Panel/Feeder Pillar (Non TTA)	Kalyani Switchgear/ ADLEC/ Tricolite/ Milestone / Ambit Switchgear India Pvt. Ltd.
22	Current & Potential Transformers	Automatic Electric/Kappa/L&T/C&S
23	DOL/Star Delta Starter	Legrand/L&T/Seimens/Schneider
24	Digital Indicating Measuring Instruments/Multifunction Meters/Digital Energy Meter	L&T/Conzerv/Automatic Electgric ABB/C&S Neptune
25	Selector Switch	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider
26	Indication Lamp & Pash button/Relay/Timer	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/ Schneider/Indoasian
27	Cable Glands/ Lugs/ Thimble	Comet/Jaisons/Braco/Dowells
28	GI/ MS Perforated Cable Tray	OBO/Indiana/PILCO/APEX/LEGRAND
29	Under floor raceways	Legrand/Honeywell/OBO
30	Any other item	To be approved from Engineer in Charge

17.3 SUB STATION & POWER DISTRIBUTION

SCOPE OF WORK

- The scope of work covers the following:

For Fountains:

- Determine the power requirement based on the tentative load schedule provided below.
- Supply Installation commissioning of Outdoor HT Panel as per specifications detailed below including all documentation, Laisioning with the SEB for the release HT connection. The requisite fees would be paid by the client.
- Supply Installation commissioning of 2 nos package substations and Main LT distribution cum Synchronization/AMF panel, cables and associated work etc as per specifications detailed below.

For The Proposed Convention Hall Toilet Block, Ticket & Information Kisok, Shops, External Lighting, Facade Lighting Etc

- Dismantling the existing HT/LT panel in the Electrical room.
- Supply Installation commissioning of indoor HT Panel as per specifications detailed below.
- Dismantling of existing LT Panels (i/c disconnection of incomer & outgoing feeders, earthing etc) shifting, leading and storage at designated location from Electrical room for installation of the Main LT Panel and also making temporary arrangement so that supply to all the load being fed from existing panel is continued and not disturbed as per direction of Engineer -in-charge complete as required.(Material required for temporary connection to be arranged by contractor only, no extra claim shall be entertained for the same.)
- Supply Installation commissioning of new Main LT distribution cum Synchronization/AMF panel & other distribution panels, cables and associated etc as per specifications detailed below: -

- The Tentative Load of the Fountains

Sr No	Water Body No	Pump Details	Light Details	Total Connected Load in KVA
1	WB1	1)7.5 hp x 1 + VFD 2)10 hp x 1 + VFD 3)10 hp x 1 + VFD 4) Sand Filter, Pump, 2 hp x 1	54 W RGB - 36	46.5

2	WB2	1) 5 hp x 2 + VFD 2) 3 hp x 2 + VFD 3) Sand Filter, Pump 2 hp x 1	21 W RGB, - 36	27.5
3	WB3 & WB4 & Cascading from WB 2	2 hp x 6 + 2 hp x 1 Sand Filter 2 hp x 1	21 W RGB, - 76	29.5
		5 hp x 2	36 W white - 4	15
4	Water Feature 5 WB6	5 hp x 2 10 hp x 1 + VFD	36 W white - 4	15
		5 hp x 4 + VFD Sand Filter, 2 hp x 1	54 W RGB - 22	47.5
5	WB 7	2 hp x 1 Sand Filter, 1 hp x 1	21 W RGB light - 9 Sol valve - 9	6.5
6	Water Feature 8	5 hp x 2	36 W white - 4	15
	WB 9	1) 2 hp x 6 + VFD 2) 2 hp x 6 + VFD 1 hp x 6 + VFD Sand Filter 2 hp x 1	21 W RGB - 72	60.5
7	Water Feature 10	5 hp x 2	36 W white - 4	15
	WB 11 & 12	2 hp x 7 Sand Filter 2 hp x 1	21 W RGB - 28	28.5
8	WB 13 ,	Pumps: 1 hp - 24, 1.5 hp 8 5 hp - 12, 7.5 hp - 8 Sand Filter 7.5 hp - 2 2D Jet - 16	Lights: 54 W - 260 Speaker 250 W - 16 Subwoofer 500 W - 4	295
9	Water Feature 15	5 hp x 2	36 W white - 4	15
	WB 16	1 hp x 12 Sand Filter 2 hp x 1	21 W RGB = 40	32.5
10	Water Feature 17	5 hp x 2	36 W white - 4	15
	WB 18	2 hp x 6 Sand Filter 2 hp x 1	36 W white light - 60 & Solenoid valve - 60	27.5
11	WB 19	1 hp x 16 Sand Filter 2 hp x 1	21 W RGB - 32	41.5
12	WB 20	1 hp x 21 Sand Filter 2 hp x 1	21 W RGB - 42	53.5
13	WB 21	1 hp x 16 Sand Filter 2 hp x 1	21 W RGB - 32	41.5
14	WB 22	1 hp x 21 Sand Filter 2 hp x 1	21 W RGB - 42	53.5
15	WB 24	5 hp x 1 + VFD Sand Filter 2 hp x 1	54 W RGB - 4	11.5
16	WB 25	5 hp x 1 + VFD Sand Filter 2 hp x 1	54 W RGB - 4	11.5

	Power Requirement for DG & Mains		
	Maximum Demand		904.5
	Add 20% Future expansion		1085
	Rating @ 85% Loading in kVA		1277
	Proposed Capacity to be installed in kVA		1260
	Proposed Capacity to be installed in kVA - 2 X 630 KVA		

- The above provided Electrical load calculation is preliminary. The actual Electrical load calculation must be performed by the bidder. If the calculated Electrical demand load exceeds the afore mentioned figure, the equipment rating shall be determined based on the actual calculation. Conversely, if the calculated Electrical demand load is less than the afore mentioned figure, the equipment capacity shall remain unchanged as per the initial calculation.
- The complete load for musical fountains shall be derived by the successful bidder as per the general engineering practices and equipment loading at 85%. The design of sub-station equipment has to be submitted by the contractor and shall be got approved by the department before execution
- The following are under the scope:
 - (i) Supply, installation, testing and commissioning of the following as per specifications detailed below: -
 - GO switch
 - HT outdoor Panel consisting of 1No Incomer & 2 nos Outgoing breaker.
 - Two 11 KV/433V package substations must be considered to cater to the total load of the Fountains. The package substation includes a high-voltage LBS & VCB (HT RMU), oil-type transformer, low-voltage panel (LT Panel), and APFC panel, which is fully equipped.
 - LT side of Package substation shall be connected to Synchronisation Panel with suitable size LT XLPE insulated Aluminium armoured cables laid on cable tray/ DWC pipes as per site requirements.
 - Totally Type Tested (TTA) as per IEC 61439 1&2 Main LT distribution cum Synchronization/AMF panel (Designed for outdoor applications) suitable for 2 nos Transformer supply & 2 nos DG set supply and outgoings including spares.
 - L.T. Cables: Various sizes of L.T. cables for feeding power to various services/ Fountain Panels shall be designed and laid between Synchronisation panel and various services/ Fountain Panels in DWC pipes.

- (ii) 11 KV cable including end termination shall be laid underground at a depth of 1200 mm below RFL.
- (iii) The service connection cables from substation to individual fountains shall be laid in sufficient size DWC pipe, complete as required.
- (iv) HT side system shall be in compliance with SEB requirements; contractor must ensure the same.
- (v) Earthing: Earthing work for Body and Neutral earthing of all HT and LT equipment and transformer shall be done in accordance with provision laid down in local by-laws, IE Rules.

HT Panels & Package Sub Stations

- All equipment and material shall be designed manufactured and tested in accordance with the latest applicable IEC standards. The 11KV Package Substation Design must be as per IEC 61330/62271-202.
- The main components of a prefabricated package substation are Transformer, High-voltage switchgear-control gear, Low-voltage switchgear-control gear and corresponding interconnections (cable, flexible bus bars) & auxiliary equipment. The components shall be enclosed, by either common enclosure or by an assembly of enclosure. All the components shall comply with their relevant IEC standards.
- Package Sub-station consisting of 2-way 11KV SF6 insulated Switchgear with 630A at 11KV vacuum Circuit Breaker + 11kV/433V, 630 KVA, DYn11 Transformer + LT 415V, 800A ACB incoming with all connection, accessories, fitting & auxiliary equipment in an enclosure to supply Low-voltage energy from high-voltage system as detailed in this specification. The complete unit shall be installed on a substation plinth (base) as Outdoor substation.
- The prefabricated-package substation shall be designed for a) Compactness, b) fast installation, c) maintenance free operation, d) safety for worker/operator & public.
- The Switchgear and component thereof shall be capable of withstanding the mechanical and thermal stresses of short circuit listed in ratings and requirements clause without any damage or deterioration of the materials.
- For continuous operation at specified ratings temperature rise of the various switchgear components shall be limited to permissible values stipulated in the relevant standard and / or this specification.
- The Enclosure of High Voltage switchgear-control gear, Low Voltage switchgear-control gear & Transformer of the package substation shall be designed for use under normal outdoor service condition as mentioned. The enclosure should take minimum space for the installation including the space required for approaching various doors & equipment inside.

Outdoor Enclosure:

- The enclosure shall be made of Sheet Steel tropicalized to local weather conditions.
- The metal base shall ensure rigidity for easy transport & installation.
- The metal base shall ensure rigidity for easy transport & installation.
- The protection degree of the Enclosure shall be IP54 for LT & HT switchgear compartment & IP23 for Transformer compartment.
- Proper / adequate ventilation aperture shall be provided for natural ventilation by way of Louvers etc. The H.V. & L.V. outgoing of the transformer are to be connected to Vacuum Circuit Breaker of 11kV RMU & incomer of the Low Voltage Switchgear by means of Aluminium Cables / Flexible Busbars.

Internal Fault:

- Failure within the package substation due either to a defect, an exceptional service condition or mal operation may initiate an internal arc. Such an event may lead to the risk of injury, if persons are present. It is desirable that the highest practicable degree of protection to persons shall be provided. The Design for Internal arc fault shall be tested for 20KA as per IEC 61330/62271-200.

Covers & Doors:

- Covers & doors are part of the enclosure. When they are closed, they shall provide the degree of protection specified for the enclosure. Ventilation openings shall be so arranged or shielded that same degree of protection as specified for enclosure is obtained. Additional wire mesh may be used with proper Danger board for safety of the operator. All covers, doors or roof shall be provided with locking facility, or it shall not be possible to open or remove them before doors used for normal operation have been opened. The doors shall open outward at an angle of at least 90 degrees & be equipped with a device able to maintain them in an open position.

Earthing:

- All metallic components shall be earthed to a common earthing point. It shall be terminated by an adequate terminal intended for connection to the earth system of the installation, by way of flexible jumpers/strips & Lug arrangement. The continuity of the earth system shall be ensured taking into account the thermal & mechanical stresses caused by the current it may have to carry. The components to be connected to the earth system shall include:
 - a) The enclosure of Package substation,
 - b) The enclosure of High voltage switchgear & control gear from the terminal provided for the purpose,

- c) The metal screen & the high voltage cable earth conductor,
- d) The transformer tank or metal frame of transformer,
- e) The frame &/or enclosure of low voltage switchgear.

Switchgear:

- 11 kV, 630A, 21kA/3 sec, 2 Way, indoor, Non-Extensible SF-6 insulated RMU, comprising 1 No. Fixed Manual Load Break switch & 1 No. fixed Manual Vacuum Circuit Breaker in stainless steel tank- with Operating handle Voltage presence indicator (VPIS) & manometer integrated earthing switch Self powered IDMT Relay.

11kV/433V, 500kVA Oil Type Transformer:

- 630 KVA, 11/0.433 kV, Dyn11, 3 Phase, 50hz, Mineral oil filled hermetically sealed transformer with copper winding, +5% to 5% @ 2.5% with off Load tap changer having class-A insulation & temperature rise in oil/winding of 40/45 deg. C [Max.] along with standard fittings & accessories as per IS:1180
- Losses shall be as per 1180 Energy Efficiency Level 1(2021) Amendment no.-4

LT Panel

- 433V LT Indoor panel with 800 Amps Aluminium Bus bars (100% for Phase and 50% for Neutral), Fabrication using 1.5/2mm CRCA sheet steel, Ingress protection IP2X/4X, complete with internal wiring.
- Earthing arrangement shall be provided for earthing each cable, PVC cable gland, neutral busbar, chassis and framework of the cubicle with separate earthing terminals at two ends. The main earthing terminals shall be suitably marked. The earthing terminals shall be of adequate size, protected against corrosion, and readily accessible. These shall be identified by means of sign marked in a legible manner on or adjacent to terminals.
- Neutral bus bar strip shall be connected to Earthing terminal with help of GI strip of suitable capacity & nut-bolt arrangement.

APFC Panel

- 200 KVAR MPP Standard duty type @440 V - 01 Set

Outdoor HT Panel Specifications

11 KV HT VCB Outdoor Panel Board (1 Incoming & 2 Outgoings)

Supply, Installation, Testing & Commissioning of Vacuum Circuit Breaker Outdoor IP-55 Panel Board shall be metal clad floor mounting complete as per specification and as described. (as per IS/IEC 62271-1 (2007)). Panel should be Internal Arc Type tested 11KV 26.3KA for 0.1 Sec.

800 A Vacuum circuit breaker with short circuit fault level of 25 kA for 3 sec at 11 KV rated, totally enclosed, air insulated metal clad housing, floor mounting, horizontal isolation, vermin proof, fully interlocked horizontal drawout type having isolation features and control devices complete with the following.

Vaccum Circuit Breaker:

11KV, **TP 800A, 25kA/3Sec.** HORIZONTAL ISOLATION, HORIZONTAL DRAWOUT TYPE VCB FITTED WITH 230V AC MOTOR, SHUNT TRIP COIL 24VDC-03 Nos ((1 INCOMING & 2 OUTGOINGS))

CLOSING COIL-**24V DC**, AUXILLARY CONTACT 4NO+4NC

MECHNAICAL OPERATION COUNTER

Busbar Size : (Suitable For 800A) - 01 Set

CURRENT TRANSFORMER:

CTR: 60A-30A/5A-5A - 03 Nos

Core 1: METERING: 7.5VA, CL-1.0

Core 2 : PROTECTION: 7.5VA, 5P10

STR -25KA for 1 Sec.

POTENTIAL TRANSFORMER:

RESIN CAST, 1-Φ, **DRAWOUT PT WITH FUSES.** - 03 Nos

PTR : 11KV/√3:110V/√3

CLAA OF ACCURACY: **1.0, BURDEN-100VA.**

1.2 cont 1.9 for 8 Hrs

METERS:

DIGITAL AMMETER WITH INBUILD SELECTOR SWITCH, CL-1.0 - 01 No

DIGITAL VOLTMETER WITH INBUILD SELECTOR SWITCH, CL-1.0 - 01 No

DIGITAL MFM METER WITH COMMUNICATION PORT RS-485, CL-1.0 - 03 Nos

INDICATING LAMPS & ANNUNCIATION:

PHASE INDICATING LAMPS- RED/YELLOW - 06 Nos

PHASE INDICATING LAMPS- BLUE - 03 Nos

BREAKER - (ON-RED), (OFF-GREEN) - 06 Nos

SPRING CHARGED - BLUE - 03 Nos

AUTO TRIP INDICATING LAMPS- AMBER - 03 Nos

BREAKER IN SERVICE/BREAKER IN TEST - CLEAR - 06 Nos

HOOTER - 03 Nos

06 WINDOW ANNUNCIATOR - 03 Nos

CONTROL SWITCHES & ACCESS. :

TNC SWITCH- SPRING CHARGE TYPE - 03 Nos

EMERGENCY PUSH BUTTON - 03 Nos

AUTO/MANUAL SELECTOR SWITCH - 03 Nos

AUX. CONTACTOR WITH 2NO+2NC CONT. - 06 Nos

AUX RELAY, 2C/O - 12 Nos

CONTROL MCB'S - 30 Nos

SPACE HEATER- 100WATT - 09 Nos

THERMOSTAT- 1C/O - 03 Nos

PANEL LAMPS WITH TOGGLE SWITCH - 03 Nos

SINGLE PHASE FIVE PIN PLUG & SOCKET - 03 Nos

POWER PACK, (230V AC TO 24V DC) 2x12V; 7AH Batteries - 03 Nos

PROTECTION RELAYS:

NUMERICAL MP BASED RELAY (50/50N/51/51N/95) - 03 Nos

MASTER TRIP RELAY (86) - 03 Nos

TRAFO PROTECTION-WTI/BUCH-TRIP (63x) - 06 Nos

CRCA ENCLOSURE WITH POWDER COATING: IP55 - 03 Nos

800A ALUMINIUM BUSBAR & OTHER ACCESS. - 03 Nos

- For The Proposed Convention Hall Toilet Block, Ticket & Information Kisok, Shops, External Lighting, Facade Lighting Etc

Table 0-7: Detailed Load Distribution for Mains and DG Set — Including Connected Loads, Demand Factors, and Maximum Demand Calculations

Sr No	Type of Load	LOAD ON MAINS			LOAD ON DG SET		
		Total Connected Load in KW	Demand Factor	Demand Load	Connected Load on DG Set in KW	Demand Factor	Demand Load on DG Set in KW
1	Convention Hall						
	* Lighting Load	8	0.9	7.20	8.00	0.9	7.20
	* Power Load	13	0.8	10.40	13	0.8	10.40
	HVAC 56 TR @ 1.5 KW/TR	84	1	84.00	84	1	84.00
	** External Flood lights, Street Light, Façade Lighting /Motel (External Lighting)	5	0.9	4.50	5	0.9	4.50
	EV Charging station @ 7.4 KW @ 2 Nos	14.8	0.9	13.32			
	30 KW @ 1 nos	30	0.9	27.00			
2	Yadvindra Garden						
	*Ticket Kiosk	2	1	2.00	2	1	2.00
	*Toilet Block	3	1	3.00	3	1	3.00
	*Security Block	6.29	1	6.29	6.29	1	6.29
	*Shops @ 11 Nos	26.28	0.8	21.02		0.8	
	**Parking Area	13	0.9	11.70	13	0.9	11.70
	**Landscape Lighting (Garden Artea)	35	0.9	31.50	35	0.9	31.50
	High Mast 2 nos @ 7.5 KW each	15	0.9	13.50			
3	EV Charging						
	3.3 KW @ 3 nos	9.9	0.75	7.43			
	7.4 KW @ 5 nos	37	0.75	27.75			
4	Plumbing System Load						
1	Domestic Water Transfer Pump to	9.33	0.6	5.60	11.19	0.6	6.71

	OHT (1+1) @ 10 HP- 4 Hr Running						
3	Irrigation water pump at Central UGT (1+1) @ 10 HP- 8 Hr Running	9.33	0.6	5.60	11.19	0.6	6.71
4	Sump pumps in UGT pump room (1+1) @ 3 HP	2.80	0.25	0.70	3.36	0.25	0.84
5	Channel water Pumps (1+1) @ 15 HP - 12 Hr Running	13.99	0.6	8.39	16.79	0.6	10.07
6	Channel return pumps (1+1) @ 60 HP - 12 Hr Running	55.95	0.6	33.57	67.14	0.6	40.28
7	Sump pumps channel water return tank pump room (1+1)@ 7.5 HP	6.99	0.25	1.75	8.39	0.25	2.10
10	Irrigation water pump at STP treated water tank (1+1) @ 5 HP - 08 Hr Running	4.66	0.6	2.80	5.60	0.6	3.36
11	Sewage Traetment plant capacity 0.149 MLD	20.00	0.8	16.00	20.00	0.8	16.00
	Add Extra for unforeseen load			20.00			20.00
	Total Connected Load (A)			365			267
	Diversity (K1) @ 1.1						
	Maximum Demand Load in kW (A/K1)						242
	Existing distribution transformer of (2x500 kva) at site is sufficient to meet the mains supply demand						
	Diesel Generator Back Up Power Requirement						
	Maximum Demand in kW						242

	Maximum Demand @ 0.85 P. F in KVA						285
	Prime rating of DG Set @ 85% Loading in kVA						336
	Proposed Capacity to be installed in kVA						400
	Actual loading on DG Set						84%
	Proposed DG Set capacity 2x 200 KVA.						

- **SYNCHRONISATION AND LT ELECTRICAL PANELS**

- The scope of this section comprises of design, fabrication, supply, Installation, testing & commissioning for the following locations-

- **Main LT distribution cum Synchronization/AMF panel type tested assembly**

The scope of work also includes

- (a) Dismantling of Existing LT Panels: The dismantling of existing LT Panels is required. This includes the disconnection of incoming and outgoing feeders, as well as the earthing of the panels.
- (b) Shifting, Leading, and Storage: The dismantled LT Panels will be shifted, led, and stored at a designated location from the Electrical room for the installation of the Main LT Panel.
- (c) Temporary Arrangements: Temporary arrangements will be made to ensure that the supply to all the loads being fed from the existing panel is continued and not disturbed. This will be in accordance with the directions of the Engineer-in-charge.
- (d) Material Required: The contractor will be responsible for arranging the material required for temporary connections. No additional claims will be entertained for this material.

- **Main LT distribution cum Synchronization/AMF panel type tested assembly. (For Fountains) suitable for outdoor applications.**

- **Distribution Panels for: -**

- (a) Convention Hall

- (b) Ticket Kiosk/Toilet Block/Security Block
- (c) Meter Board Panel for Shops
- (d) Non- Essential Load (Direct from Transformer)
- (e) Panel For Plumbing (For Domestic/Raw/ Irrigation Water/ (For Domestic/Raw/ Irrigation Water)

Construction Features

- (i) **Main LT distribution cum Synchronization/AMF shall be Fully Type Tested Assemblies (TTA)/design verified conforming to IEC 61439-1&2 & other panels shall be non-TTA type.** All the panels shall be built up from compartments housing circuit breakers, control gear, relays, busbars, controls and other items of equipment. Inbuilt gas suppression-based panel flooding system shall be there in all TTA/Design Verified panels.
- (ii) All the TTA/ design verified Panels must be supplied as per OEM type tested design as per 61439-1&2. In all the drawings Switchgear OEM has to evaluate the design and sign the Drawings.
- (iii) All Switch Boards shall be Modular in construction. It should provide flexibility of expansion from both sides of panels.
- (iv) The degree of Ingress Protection for Main LV Switchboards shall be minimum IP 42 for indoor application and IP54 for outdoor application which shall not degrade with time.
- (v) Electrical panel (TTA) shall be tested IK09 for mechanical impact in accordance with IEC 62262 with Front glass door in all the compartments.
- (vi) All busbars shall be Electrolytic high conductivity TP & N (Full Size) Aluminium conductor busbars as specified in technical specification.
- (vii) In TTA panel all the Bolts and nuts must be of stainless steel only, with suitable two-sided plate washer and Spring washer.
- (viii) In case of any contradiction between specification and Drawings, the decision of Engineer-In-charge shall be final and binding for the contractor.
- (ix) Non-magnetic gland plates of not less than 3.2mm thick with bracing of suitable size shall be provided at the top and bottom of the LV main switchboards for the termination of incoming and outgoing power cables or busbars.
- (x) All live accessible parts shall be shrouded, and all equipment shall be finger touch proof. SMC/DMC shrouds and busbar supports suitably spaced shall be used. Hinged doors with padlocking facility shall be

provided on all outgoing feeders with switch handles lockable in OFF condition.

- (xi) Earthing all components, frames, glands etc to be common internal earth bar of appropriate size with Cu busbar as per the type test report and OEM recommendations.
- (xii) All switch gears or DOL starters feeding motors shall have separate suitable electronic overload relay shall be provided with reset button. ALL the starters (DOL/Star delta) shall be designed as per the TYPE -2 coordination table of OEM.

Air Circuit Breakers (ACB)

- (i) The ACB shall conform to the requirements of IEC 60947-2 / IS 13947. The circuit breaker shall be suitable for 415 + 10% 50 Hz supply system. Air Circuit Breakers shall be moulded housing, raw out type and shall be provided with a trip free manual operating mechanism or as indicated in drawings and bill of quantities with mechanical "ON" "OFF" "TRIP" indications.
- (ii) The ACB shall be 3/4 pole with modular construction, draw out, manually or electrically operated version as specified and shall be capable of providing short circuit, overload and earth fault protection through microprocessor-based control unit sensing the true RMS value to ensure accurate measurement meeting the EMI/EMC requirement as per standard.
- (iii) The circuit breakers shall be for continuous rating and service short Circuit Breaking capacity shall be as specified on the single line diagram and shall be equal to the short circuit withstand values.
- (iv) Circuit breakers shall be designed to 'close' and 'trip' without opening the circuit breaker compartment door. The operating handle and the mechanical trip push button shall be at the front of the breakers panel and integral with the breaker.
- (v) The ACB shall be provided with a door interlock. The contacts shall be of silver-plated copper with a feature of contact wear inspection, indicating the life of the contacts. The ACB shall have double insulation (Class-II) with moving and fixed contacts totally enclosed for enhanced safety and in accessibility to live parts. All electrical closing breaker shall be with electrical motor wound stored energy spring closing mechanism with mechanical indicator to provide ON/OFF status to the ACB.

Moulded Case Circuit Breaker (MCCB)

- (i) MCCB shall be Current Limiting and comprise of Quick Make - break switching mechanism, preferably Double Break Contact system, arc extinguishing device and the tripping unit shall be contained in a compact, high strength, heat resistant, flame retardant, insulating moulded case with high withstand capability against thermal and mechanical stresses. All MCCB's shall be capable of defined Variable overload adjustment. All MCCB's upto 250 Amps shall have thermal magnetic releases and above 250 amps shall have microprocessor-based release with adjustable magnetic short circuit pickup. Wherever MCCB with earth fault protection mentioned in BOQ, the protection shall be an integral part of the release with adjustable magnetic short circuit and earth fault protection with time delay.
- (ii) The trip command shall override all other commands. MCCB shall employ maintenance free double break contact system to minimize the let thru' energies and capable of achieving discrimination upto full short circuit capacity of downstream MCCB. The manufacturer shall provide both discrimination tables and let thru energy curves.
- (iii) The breaking capacity of MCCB's shall be as asked for in the schedule of quantities. The breaking capacities specified shall be ICU=ICS i.e. type-2. Coordination as per IEC-60947-2, 1989/IS 13947-2, 1993.
- (iv) The MCCB's shall be provided with rotary handle operating mechanism. The handle position shall give positive indication of 'ON', 'OFF' or 'Tripped' thus qualifying to Disconnection as per the IS/IEC indicating the true position of all the contacts. In case of 4 pole MCCB the neutral shall be defined and capable of offering protection.

Earthing

- (i) Earthing shall be provided as per IS:3043-1987.

Painting

- (i) All sheet steel work shall undergo a process of degreasing, pickling in acid, cold rinsing, phosphating, passivating (seven tank processing) and then painted with electrostatic paint (Powder coating). The shade of colour of panel inside/outside shall be RAL-7032 of IS Code No.5.

Labels

- (i) Engraved PVC labels shall be provided on all incoming and outgoing feeder. Circuit diagram showing the arrangements of the circuit inside the distribution panels shall be pasted on inside of the panel door and covered with transparent plastic sheet.

Meters

- (i) All voltmeters and indicating lamps shall be through MCB's&Meters and indicating instruments shall be digital electronic type.
- (ii) All CT's connection for meters shall be through Test Terminal Block (TTB).
- (iii) CT ratio and burdens shall be as specified on the Single line diagram.

DG CONTROLLER FUNCTION

- (i) The auto synchronizing cum LT panel shall have DG controller with following general requirements for AMF start, auto synchronizing and Auto Load sharing functions.

AMF Function

In the case of failure of normal power supply of individual substations

- (i) Generator to start after a prefixed time of three second on any of the following conditions
- (ii) Total absence of voltage.
- (iii) Failure of one or two phases.
- (iv) Under voltage below 375 volts.
- (v) Overvoltage of more than 6%.
- (vi) All the three phases available at the normal supply breaker.
- (vii) 375-415 volts available at the normal supply breaker.
- (viii) Generator to over run for the three minutes and stop automatically.
- (ix) All auxiliaries to stop automatically.
- (x) Generator to be ready for the next operation automatically.

Auto Synchronising &Auto Load Sharing Function

- (i) In auto mode Master GENERATOR set (Selected by DG controller) shall start through cranking relay & close its ACB / NIC after verifying frequency and voltage. However, the transfer of load shall take place only when the generator output reaches 90% of its rated voltage and frequency.
- (ii) As load increases beyond 90% (settable from 80 to 100%) of ratings of DG set which is running, other generator will start and synchronize on the same bus. Required no of DG sets as per demand shall run, synchronized automatically and shall feed the loads accordingly
- (iii) As the load increases or decreases, accordingly switching ON and OFF the generator on the synchronizing bus shall continue with the help of DG controller. If any time only one Generator coming and the load is increased suddenly more than the available capacity, then noncritical load shall drop out from the bus automatically through DG controller and same shall come on automatically if other Generator shall start and synchronize on the same bus.
- (iv) Auto Synchronizing system shall verify the phase angle of all the sets and compensate for ACB closing time by initiating closing of the breaker ahead of the actual predictable synchronism hereby ensuring a phase difference

of zero degree. The breaker closing command shall not be given at a phase angle difference of + 4% in any circumstances.

- (v) The synchronizing system shall operate the generator ISOCHRONOUS mode by setting Droop to Zero. The system shall have a direct analogue interface with the AVR & Governor for direct bias control. No motorized potentiometers shall be acceptable.

-Failure of any synchronizing module shall not disturb the synchronizing of other generator.

-Failure of any one DG controller shall not affect the synchronizing system which shall be independent of each other.

- (vi) System shall also monitor the slip frequency and the Beat Voltage of the machine or system.
- (vii) NIC of First generator shall remain in Ckt. In the event of shutting OFF of First Set, NIC of any other generator shall close first before tripping NIC of first set. It shall be possible to alter sequence of generator starting through, manual selection or through, Man Machine interface.
- (viii) Active and reactive power shall be made equal on all the machines automatically with the help of active load balancing System through Governor Control. In event of set failing to Synchronize, Alarm from annunciator shall invite attention of operator for manual intervention.

Summary of Functions

The following functions shall be performed by the controller for Synchronizing the generating sets.

- (i) Automatic starting of generating sets.
- (ii) Automatic Synchronization of all available generating sets.
- (iii) Automatic load sharing between generators, active as well as reactive load sharing.
- (iv) Starting & stopping of generators as per load requirement.
- (v) Monitoring of engine & alternator condition and protections.
- (vi) Complete load management as per requirement.

Battery Charger

- (i) The battery charger shall be Float cum Boost type IGBT controlled. The charger shall have selector switch for Auto Float – Boost / Manual Float /

Manual Boost Mode of operation. During Auto Float – Boost Mode, Automatic Changeover shall take place from Float Mode to Boost mode and Vice-Versa. This means that when the Batteries are fully charged the charging shall automatically change from Boost charge to trickle charge.

- (ii) The battery charger shall be housed in sheet steel cubicle of Angle Iron frame work with sheet steel panels of 1.6 mm thickness. Louvers shall be provided in the cabinet for the ventilation. The cubicle shall be painted in Siemens Grey shade RAL7032 of IS-5. Four wheels shall be provided at the base.
- (iii) The D.C output voltage of Float / Boost charger shall be stabilized within + 2% for AC input variation of 230 V + 10%, frequency variation of 50 Hz + 5% and DC load variation of 0-100%. The voltage regulation shall be achieved by a constant voltage regulator having fast response IGBT control. The ripple content will be within 3% of DC output nominal voltage.
- (iv) There shall be provision to select Auto Float / Manual Float / Manual Boost modes. During Auto Float Mode the battery charging shall automatically changeover from Boost Mode to Float Mode and Vice Versa. During Manual Float / Boost modes it shall be possible to set the output volts by separate potentiometers.
- (v) The battery charger shall have automatic output current limiting feature.

Panel Flooding System:

- (i) Linear heat sensing polymer tube with Inert clean Agent panel flooding system shall be provided for fire suppression for the Electrical Panels. Each compartment of LT panels and HT panels like incomers, outgoings, cable alley, bus bar chambers etc. shall be provided with heat sensing polymer tube. The system shall be of direct flooding type with Novec 1230 or equal and approved extinguishant as per E&M Technical Specification.
- (ii) Each panel us provided with inert gas cylinder of sufficient capacity as per the desired requirement based on the size of panels after the detailed designing.
- (iii) The fire suppression system shall be provided in all important panels like Main LT Panel, HT Panel, Emergency panel.

Earthing:

All metallic components shall be earthed to a common earthing point. It shall be terminated by an adequate terminal intended for connection to the earth system of the installation, by way of flexible jumpers/strips & Lug arrangement. The continuity of the earth system shall be ensured taking

into account the thermal & mechanical stresses caused by the current it may have to carry. The components to be connected to the earth system shall include:

- (i) The enclosure of High voltage switchgear & control gear from the terminal provided for the purpose.
- (ii) The enclosure of Panel body.
- (iii) The metal screen & the high voltage cable earth conductor,
- (iv) The transformers,
- (v) The LT and HT cables (as per the laid length).
- (vi) The frame &/or enclosure of low voltage switchgear,

Minimum earthing requirements subjected to specifications:

- (i) HT Panel Body earthing – 2 Nos. (Copper plate)
- (ii) LT Panel Body earthing 2 Nos. (looped)
- (iii) Transformers body earthing - 2 Nos. (Copper Plate)
- (iv) Transformer Neutral earth 2 Nos. (Copper Plate)
- (v) DG set body - 2 Nos. (looped)
- (vi) DG set Neutral earthing - 2 Nos. (each)
- (vii) Synchronization Panel Body earthing - 2 Nos

Installation:

- (i) The installation work shall cover assembly of panels lining up, grouting the units etc. in the case of multi panels switch boards after connecting up the bus bar all joints shall be insulated with HV insulation tape or with approved insulation compound. A common earth bar shall be run preferably at the back of the switch indications & metering connections and wirings shall be completed. All relay instruments and meters shall be mounted and connected with appropriate wiring. Calibration checks of units as necessary and required by the licensee like CTs, VTs energy meters etc. shall be completed before pre-commission checks are undertaken.

TESTING AND COMMISSIONING

- (i) Procedure for testing and commissioning of relay shall be in general

accordance with good practice.

- (ii) Commissioning checks and tests shall include in addition to checking of all small wiring connections, relays calibration and setting tests by secondary injection method and primary injection method. Primary injection test will be preferred for operation of relay through CTs. Before panel board is commissioned, provision of the safety namely fire extinguishers, rubber mats and danger board shall be ensured. In addition, all routine megger tests shall be performed. Checks and test shall include following.
- (iii) Operation checks and lubrication of all moving parts.
- (iv) Interlock function checks.
- (v) Continuity checks of wiring, fuses etc. as reqd
- (vi) Insulation tests.
- (vii) Trip test and protection gear tests.
- (viii) The complete panel shall be tested with 5000V megger for insulation between poles and poles to earth. Insulation test of secondary of CTs and VT to earth shall be conducted using 500V megger.
- (ix) Any other tests as may be required by the Licensee / Inspector shall be conducted.
- (x) Where specified, the entire switch board shall withstand high voltage test after installation.
- (xi) Any other test required by the consignee / inspecting officer.

TESTING

- (i) As already specified all cables before laying shall be tested with a 500 V Megger (for 1.1 KV grade), or with a 2,500/5,000 V Megger (for cables of higher voltages). The cable cores shall be tested for continuity, cross phasing, insulation resistance to earth/sheath/armour and insulation resistance between conductors.
- (ii) All cables shall be subjected to above mentioned tests during laying, before covering the cables by, protective covers and back filling and also before the jointing operations are carried out.

CABLES

HT CABLES (E)

GENERAL:

- (i) The cables shall be supplied, inspected, laid, tested and commissioned in

accordance with Drawings. Specifications, Indian Standard Specifications IS: 7098 - part-II, IS: 1255-1983 and cable manufacturer's instructions. The cables shall be of reputed make.

- (ii) The HV cables shall be selected based on short circuit current rating and current carrying capacity. The higher size among size as derived based on mentioned parameter shall be selected.
- (iii) The recommendations of the cable manufacturer with regard to jointing and sealing shall be strictly followed. The installation of cables shall be done by an approved, qualified and experienced person in this trade.

MATERIAL:

- (i) The H.T. cables shall be 11KV, Aluminium conductor CROSS LINKED POLYETHYLENE (UE) steel tape armoured cable laid underground and or in masonry trenches as shown on Drawings. The conductor shall be made of Electrical purity Aluminium wires and stranded together and compacted. The cable shall be of 3 Core type. The insulation shall be of high-quality cross-linked polyethylene applied by extrusion process. Both conductor and the insulator are provided with shielding made of Semi Conducting compound. Armouring is applied over inner sheath and shall be of flat steel strips. The outer sheath shall be of heat resisting (PVC) compound. This shall be of black colour.

INSPECTION:

- (i) All cables shall be inspected upon receipt at site and checked for any damage during transit.

JOINTS IN CABLES:

- (i) The contractor shall take care to see that all the cables received at site are apportioned to various locations in such a manner as to ensure maximum utilisation and avoidance of jointing cable. This apportioning shall be got approved by the Owner/Consultant before the cables are cut to lengths. Where joints are unavoidable, the location of such joints shall be got approved by the Owner/Consultants.

Jointing Boxes for Cables:

- (i) Cable joint boxes shall be of appropriate size, suitable for Aluminium conductor XLPE insulated cables of 11KV ratings.

Jointing Cables:

- (i) All cable joints shall be made in suitable, approved cable joint boxes.

Jointing of cables in the joint boxes and the filling in of compound shall be done in accordance with the best practice in trade, in accordance with manufacturer's instructions and in an approved manner. All straight T-joints shall be done in epoxy mould boxes with TROPOLIN / M-SEAL epoxy resin or approved equal. All terminal ends of conductors shall be heavily soldered upto at least 50mm length.

- (ii) All cables shall be jointed colour to colour and tested for continuity and insulation resistance before jointing commences. The seals of cables must not be removed until preparations for jointing are completed. Joints shall be finished on the same day as commenced and sufficient protection for the weather shall be arranged. Joints shall be made by means of suitable solder for conductors, the conductors being firmly butted into the connections or thimbles or ferrules and the whole soldered with proper solder and soldering flux or resin. The conductors shall be efficiently insulated with high voltage insulating tape and use of spreaders of approved size and pattern. The joints shall be completely filled with epoxy compound being topped as necessary to ensure that the box is properly filled.

Cable Terminations:

- (i) Cable termination shall be done in terminal cable box using cable glands and the cable ends sealed with sealing compound.
- (ii) Cable gland shall be Earthed with suitable branded Cu. Flexible tape.

Bonding of Cables:

- (i) Where a cable enters any piece of apparatus, it shall be connected to the casing by means of an approved type of armoured clamp and gland. The clamps must grip the armouring firmly to the gland or casing, so that in the event of ground movement no undue stress is passed into the cable conductors.

Laying of Cables:

- (i) H.T. cables shall be laid either buried directly underground or in Masonry/Concrete trenches/ RCC Hume Pipes. The cable buried underground shall be at minimum depth of 1.2 mtr from the ground level.
- (ii) LT cable shall be buried at depth not less than 0.8 Mtr from the ground level, subjective to the depth recommended by OEM for laying of DWC pipes.
- (iii) The excavation and backfilling of the cable trench is included in the scope

of contractor. The route is required to be approved from the Engineer In Charge and requirements like rock cutting, Horizontal directional drilling etc shall be included in the scope of the agency.

Protection of Cables:

- (iv) The cable shall be protected by using DWC pipes of strength not more than for the length of the cable. The size of cable shall be suitable to accommodate required number of runs. Also at least 50% spacing in each pipe shall not be used and be kept spare for future laying.
- (v) Cables under road crossings and any surfaces subjected to heavy traffic shall be protected by running them through NP2 class Hume pipes of suitable size.

Cable Route Markers

- (i) Wherever more the cable is laid HT cable route markers shall be provided at appropriate spacing required by the specifications/NBC. The design of route markers shall be approved by the Engineer-in-Charge.

LT POWER & CONTROL CABLES

SCOPE

- (i) This specification covers the supply & installation of LT power & control cables.
- (ii) The cable of sizes shall be selected by considering the voltage drop and current carrying capacity. The higher size among size as derived based on mentioned parameter shall be selected.
- (iii) While deciding upon the cable sizes, de-rating factors for the type of cable and depth of laying, grouping, ambient temperature, ground temperature, and soil resistivity shall be taken into account.
- (iv) In the design / selection of the cables, the consideration of the power distribution losses as defined in the ECBC shall be complied with, subject to the condition that the voltage drop permissible shall not be more than 8 volts.
- (v) Cables shall be tested at works and supplied in accordance with drawings, specifications, relevant Indian Standard Specifications and cable manufacturer's instructions. The cables shall be delivered at site in original drums with manufacturer's name clearly written on the drum.

MATERIAL

- (i) The LT power cables shall be XLPE insulated, Aluminum conductor

- armoured cable conforming to IS: 7098 (Part - I).
- (ii) The LT control cable shall be PVC insulated copper conducted armoured stranded cable.

TESTS

SHOP TESTS:

- (i) The cables shall be subjected to shop tests in accordance with relevant standards to prove the design and general qualities of the cables as below (as per IS 10810):
- (ii) Routine tests on each drum of cables.
- (iii) Acceptance tests on drums chosen at random for acceptance of the lot.
- (iv) Type tests on each type of cable, inclusive of measurement of armour DC resistance of power cables.

TEST CERTIFICATES

- (i) Test certificates of all the tests carried out at the works shall be furnished for approval of the Engineer-in-charge before the cables are dispatched from the manufacturer's works to the site.
- (ii) Tests reports shall be complete with all details and shall also contain IS specified limit values wherever applicable to facilitate review.

DRAWINGS, DATA AND MANUALS

Drawings, data and manuals shall be submitted for the following:-

- (i) Manufacturer's catalogues giving cable construction details and characteristics.
- (ii) Cable current ratings for different types of installation inclusive of derating factors for ambient temperatures, grouping etc.
- (iii) Write up on manufacturer's recommended method of splicing, jointing, termination etc of the cables.

DESIGN CRITERIA

- (i) The cables will be used for connection of power circuits of the electrical system.
- (ii) Cables will be generally laid in soft soil, surface or in RCC Hume/GI pipes/ cable tray/ sand cushioning with brick protection
- (iii) For continuous operation at specified rating, maximum conductor temperature shall be limited to the permissible value as per relevant standard and (or this specification).
- (iv) The insulation and sheath materials shall be tough enough to withstand mechanical stresses during handling.
- (v) Armouring shall be single round/flat wire of galvanised steel.
- (vi) Core identification for multi core cable shall be provided by colour coding.

SPECIFIC REQUIREMENTS

- (i) Drum length & tolerance: the cables shall be supplied in wooden drums, each containing minimum 500 meters length of cable. Allowable tolerance on individual drum length is $\pm 5\%$.
- (ii) Cable identification: cable identification shall be provided by embossing on the outer sheath the following at regular intervals of 2/3 meters.
 - a. Manufacturer's name or brand name or trademark.
 - b. Type of cable and voltage grade.

INSPECTION

- (i) All cables shall be inspected upon receipt at site and checked by the Engineer-in-charge for any damage during transit.

LAYING OF CABLES

- (i) The cable laying including necessary jointing etc. shall be carried out in accordance with the specifications given herein. For details not covered in these specifications, IS: 1255 - 1967 shall be followed.
- (ii) No straight through joints shall be permitted in the L.V. system.

CABLE IDENTIFICATION TAGS

- (i) Wherever more than one cable is laid/run side by side, marker tags (pre-approved), inscribed with cable identification details shall be permanently attached to all the cables in the manholes/pull pits/joint pits/entry pits in buildings/open ducts etc. These shall also be attached to various cables laid direct in ground at suitable intervals, as decided by the Engineer-in-Charge, before the trenches are filled up.

TERMINATION/JOINTING

- (i) Heat shrinkable ferrule-based joints shall be provided for HT cables and Brass double compression glands shall be provided for LT cable terminals.
- (ii) Jointing work shall be carried out only by licensed/experienced cable jointers.
- (iii) At the very preliminary stages of laying of cables, a proper jointing position should be selected.
- (iv) Sufficient surplus cable loops (Minimum 3.0 MD) shall be left on each side of joints, as mentioned above.
- (v) Joints shall be staggered by 2 to 3 m, when two or more cables are laid together, in the same trench.
- (vi) All Cable glands shall be earthed with suitable Copper earth clips.
- (vii) Jointing pits shall be of sufficient dimensions to allow easy and comfortable working at site. The sides of the pit shall be well protected from loose earth falling into it. It shall also be covered by a tarpaulin to prevent dust and other foreign matter on the exposed joints and jointing materials.
- (viii) Sufficient ventilation shall be provided, during jointing operations, to disperse fumes given by fluxing.
- (ix) Jointing materials and accessories like conductor, ferrules, solder, flux, insulating and protective tapes, filling compound, jointing boxes etc. of right quality and correct sizes, conforming to relevant Indian Standards, wherever they exist, shall be used. The design of the joint box and the composition of the filling compound shall be such as to provide an effective sealing against entry of moisture in addition to affording proper electrical characteristic to joints. Where special type of splicing connector kits, or epoxy resin spliced joints are specified, materials pre-approved for such applications shall only be used and instructions of the manufacturer/supplier of such materials shall be followed.
- (x) Insulation resistance of cables to be jointed shall be measured with 500 V Megger upto 1.1 KV grade and with 2,500/5,000 V Megger for cables of higher voltage. Unless the insulation resistance values are satisfactory, jointing shall not be done.
- (xi) Before jointing is commenced, all safety precautions like isolation, discharging, earthing etc., Shall be taken to ensure that the cable would not be inadvertently charged from live supply. Metallic armour and external metallic bonding shall be connected to earth. Where "Permit to work" system is in vogue, prescribed safety procedures shall be complied

with.

- (xii) Cores of the cables must be properly identified before jointing.
- (xiii) Whenever Aluminum conductor is exposed to outside atmosphere, a highly tenacious oxide film is formed which makes the soldering of Aluminum conductor difficult. This oxide film should be removed, using appropriate type of flux.
- (xiv) The clamps for the armour shall be clean and tight.
- (xv) Where a cable is to be jointed with the existing cable, the sequence should be so arranged as to avoid misplacement of cores while jointing.
- (xvi) Cable termination shall be done in terminal cable box, using double Brass compression glands, and the cable ends sealed with sealing compound. The cable boxes of transformers shall be filled with bituminous compound of reputed make. For all LV cable terminations/joints, Contractor shall provide for brass/copper thimbles, insulation tape, etc. of pre-approved makes.

TESTING

- (i) As already specified all cables before laying shall be tested with a 500 V Megger (for 1.1 KV grade), or with a 2,500/5,000 V Megger (for cables of higher voltages). The cable cores shall be tested for continuity, cross phasing, insulation resistance to earth/sheath/armour and insulation resistance between conductors.
- (ii) All cables shall be subjected to above mentioned tests during laying, before covering the cables by, protective covers and back filling and also before the jointing operations are carried out.

Further items required for the substation:

- (i) Required Bus connections / cabling for interconnection between HT panel, transformer and LT Panel, connections, inter connections, loop earthing of all equipments from the common earth bus, as required. The connection between Aluminium and copper shall be done using bi-metallic joints.
- (ii) Providing suitable size cement concrete foundation for the Transformer, DG set, Feeder Pillars etc
- (iii) Checked plate of appropriate thickness and size shall be used to cover the cable trench, located inside Panel rooms etc.

Handing Over:

1. All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.
2. Contractor shall also handover, to the Engineer-in-Charge, all Test Certificates, Reports, maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

1. The contractor shall submit a warranty for all equipment, materials and

accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

2. The form of warranty shall be as approved by the Engineer-in-Charge.
3. The warranty of all the components shall be valid for a period of Five year from the date of handing over.
4. The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.
5. The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

- **Power Distribution System**

- The outgoing and incoming details of the panel shall be derived after the detailed design of electrical power distribution of the work. The tentative /proposed power distribution scheme is mentioned below. However, contractor needs to prepare the SLD as per the requirement and get it approved from Engineer in Charge.
- The Minimum tentative requirement of the various Panels for the work is described and the scope of work includes fabrication, design, supply, testing & commissioning for the following locations-

- For Musical Fountains:
- For The Proposed Convention Hall Toilet Block, Ticket & Information Kisok, External Lighting, Facade Lighting Etc (Existing Electrical Room)
- For Shops, EV charging Stations, Fire Pump Room Panels, High Masts Etc.

NOTE:

- The Main LT distribution cum Synchronization/AMF panel shall be designed to have multiple incomers from Transformers and DG sets.
- The bus bar shall be interconnected using suitable capacity bus coupler. There shall be mechanical interlocking between the incomer and bus couplers.
- Any interconnection, protection relays, CT, PT, ACBs, MCBs, MCCBs, ATS, Control cables etc. required to design all the electrical panels shall also be in the scope of contractor.
- Cabling, conduiting, piping etc. from outgoing in main LT Point till the designated location shall be in the scope of contractor. Nothing extra shall be paid whatsoever.

Table 0-8: List of Electrical Materials with Preferred Makes for Substations, Panels, Cables, and Associated Equipment

S. No.	Details of Material	Preferred Make
1	Package Sub stations	Sudhir Power Limited/ ABB / Siemens / Kirloskar / Crompton
2	HT Panel 11 KV /VCB Panel	Sudhir/ABB /Schneider /Siemens
3	LT Bus Dust / Bus trunking / Rising Mains / accessories	Schneider / Legrand / C&S / L&T
4	TTA Panel (Fully Type Tested IEC 61439-1&2)	L&T (Terra) / Siemens (Sivacon) / Schneider (Blokset) / ABB (MNS) / Legrand (XL3-DO)
5	Non TTA Panel	Tricolite / CMKL / Adlec (Legrand) / Power Associates / Kalyani Switchgears / ASPL
	LT Panel/ Feeder Pillar (Non TTA)	Kalyani Switchgear/ ADLEC/ Tricolite/ Milestone / Ambit Switchgear India Pvt. Ltd.
7	Protective relays, Contractor	SIEMENS/Legrand/ABB/L&T/Schneider
8	CT/PT	KAPPA/AE/SIEMENS/L&T
9	ACB	Siemens (3WL) / Schneider Electric (Easypact MVS /Masterpact NW)/ ABB (E-MAX2)/ Legrand DMX3 /Hager (.)
10	MCCB	L&T D Sine / Schneider Compact NSX / Legrand DPX3 / Siemens 3VA / ABB T-Max/ Hager (....)
11	MCB	L&T/Schneider/Siemens/ABB
12	ATS	Caterpillar/ Siemens /ASCO /Russ electric
13	Voltmeter/Ammeter/Multi-function meter	SIEMENS / SCHNEIDER ELECTRIC/ Enercon / L&T/ Legrand / ABB / Neptune
14	11 KV/1.1 KV XPLE cables	KEI / LAPP CABLE / Polycab / Havells / Finolex
15	11 KV cables jointing kit	3M /Raychem / Jaison
16	Cable Lugs/Glands	Comet / Dowells/ Jaison / HMI / Raychem / Braco

S. No.	Details of Material	Preferred Make
	Aluminium and copper XLPE Power cables Armoured / unarmoured	Finolex/KEI/Polycab/RR Kabel/Havells (Duly ISI Marked)
17	11 KV CT/ PT	AE / Crompton Greaves / Kappa /BHEL /Alstom/ Gilbert
18	DWC Pipe	Rex /Duralin/Duroplast/Triputi
22	Current Transformers	Automatic Electric/Kappa/L&T/C&S
23	Potential Transformers	Automatic Electric/Kappa/L&T/C&S
24	DOL/Star Delta Starter	Legrand/L&T/Seimens/Schneider
25	Digital Indicating Measuring Instruments/Multifunction Meters/Digital Energy Meter	L&T/Conzerv/Automatic Electgric ABB/C&S Neptune
26	Selector Switch	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/Schneider
27	Indication Lamp & Pash button/Relay/Timer	L&T/Kaycee/Siemens/ABB/C&S Automatic Electric/Kappa/Schneider/Indoasian
28	APFC Relays	L&T/Siemens/Schneider/ABB/Automatic Electric/Kappa
29	Cable Glands/ Lugs/ Thimble	Comet/Jaisons/Braco/Dowells
30	GI/ MS Perforated Cable Tray	OBO/Indiana/PILCO/APEX/LEG RAND
31	Under floor raceways	Legrand/Honeywell/OBO
32	Rising Mains with Tap off boxes, End feed unit and all accessories	Legrand / L&T / Schneider / C & S
33	Any other item	To be approved from Engineer in Charge

17.4 DG SET

SCOPE OF WORK

- The detailed scope shall be designing the capacity of DG set and then supply, installation, testing and commissioning of the same as per direction of Engineer In charge:
 - For Fountains:

2 nos DG sets as 100% backup power for Muscial Fountains as per Load details mentionesd at....

1. FOR THE PROPOSED CONVENTION HALL TOILET BLOCK, TICKET & INFORMATION KISOK, SHOPS, EXTERNAL LIGHTING, FACADE LIGHTING etc

2 nos DG sets as 100% backup power for the above buildings except shops, EV charging stations and High Masts and as per Load details mentionesd at....

2. Dismantling the existing 125 KVA DG Set and Installing the same exclusiuvly for Motel i/c necessary foundation, change overs cabling etc and making necessary modifications at existing Electrical Panels if necessary complete as reqd as per direction of Engineer In charge

1. The provided Electrical load calculation is preliminary. The actual Electrical load calculation must be performed by the bidder. If the calculated Electrical demand load exceeds the afore mentioned figure, the equipment rating shall be determined based on the actual calculation. Conversely, if the calculated Electrical demand load is less than the afore mentioned figure, the equipment capacity shall remain unchanged as per the initial calculation.
2. The complete load for musical fountains shall be derived by the successful bidder as per the general engineering practices and equipment loading at 85%.
3. The DG sets should deliver the given capacity at 0.8 powerfactor developing 415 volts 3phase 4wire output with the engine and alternator mounted on common bed plate complete and all accessories required. The DG Sets shall be capable of delivering desired KVA at 0.8 P. F. for the load after meeting it down requirement for auxiliaries etc.and after accounting for de-rating due to various factors (temperature, altitude), site conditions.

Work covered by this contract include design, manufacture, supply, transportation, delivery, installation and commissioning of automatic start direct coupled Diesel Generator Sets suitable for continuous round the clock operation at upto rated output with permissible overload with associated works. Items included (but not limited to) in the contract are abstract below.

- (i) Diesel engines directly coupled with alternators mounted on a rigid fabricated base frame with resilient anti vibration mountings.
- (ii) DG cooling system.
- (iii) Silencer to provide 25 DBA insertion loss
- (iv) Electric starting equipment including batteries and battery chargers.
- (v) Fuel supply system.
- (vi) Acoustic Enclosure as per C.P.C.B. Norms latest.
- (vii) Clearance/Approval of the complete installation from CPCB/State Pollution control Board, central Electricity Authority (CEA)/Local Bodies and Other licensing authorities, wherever required.
- (viii) D.G. Control Panels.

Engine

- (i) The diesel engine shall be indoor-type, four stroke, multi-cylinder, 1500RPM with 2% speed variation for operation between 10% and 100% load, Turbo charged inner cooled, compression ignition with residential type Governor Fuel system complete with its self-contained lubricating system.
- (ii) Engine mounted radiator designed to dissipate the generated heat effectively shall be used.
- (iii) High speed diesel oil shall be used as fuel for the engine.
- (iv) The engine shall be de-rated in accordance with the tables given in BS649 to suit site conditions.
- (v) The engine shall be directly coupled to the generator.
- (vi) The noise level limitations shall be as per latest CPCB norms.
- (vii) The engine shall be capable of taking 10% overload for one hour in every 12 hours
- (viii) The engine shall be capable of producing the desired nominal output at site referred generator terminals and with machine operating under ambient conditions as special the specific requirements.

- (ix) The Engine to be fitted with silencer to provide min 25 DBA insertion loss.

Alternator With Accessories:

The Alternator shall have the following characteristics

- (i) Type - Brushless, rotating field design alternator rated for 415 volts / 50 complying to IS 4722- 1992, BS 5000 Part- III and IEC 34 amended upto date.
- (ii) Excitation system - Self Excited
- (iii) Speed - 1500 RPM
- (iv) Net Site Output - Rated continuous at ambient conditions and as per Schedule of quantities.
- (v) Voltage Regulation - Within 0.5% of the rated voltage
- (vi) Overload duration - 10% for 1 hour in every Capacity 12 Hours of Continuous use.
- (vii) Harmonics - Less than 3%.
- (viii) The Alternator shall be capable of delivering the rated output at rated power factor.
- (ix) The Alternator shall be capable of withstanding without damage a three-phase short circuit at its terminals when operating at rated KVA and PF and at 5% over voltage with fire excitation for 3 seconds.
- (x) The alternator shall be capable of withstanding without damage
 - a) 50% overload for 15 seconds.
 - b) 10% overload for one hour every twelve hours.
- (xi) The line and neutral leads of phase windings of the Alternators shall be in suitable terminal boxes.
- (xii) The Alternator winding shall have class of insulation H class with temperature rise limited to Class H insulation.

Drawing Submission:

1. The following drawings shall be submitted for approval for DG set:
 - a) Foundation drawing with loading data:
 - b) Schematic drawings:

c) All control & indication circuit drawings :

Test Certificates

1. Copies of all documents of routine and type test certificates of the equipments shall be furnished to the HTC along with the supply of equipments and these are as below.
 - a) Routine Test Certificates.
 - b) Engine separately
 - c) Alternator Separately
 - The inspection & testing shall be carried out as per clause no. 1.15 of CPWD General Specifications for electrical works Part –VII (DG Set).

Table 0-9: List of Preferred Makes for DG Set Components and Electrical Accessories

S. No.	Details of Material	Preferred Make
1.	Diesel engine	Cummins/ caterpillar/ perkins/ kirloskar (koel)/ greaves (cg)
2.	Alternator	Stamford/ loreysomers/ mecaltte/ greaves (cg)/ kirloskar (koel)
3	Acb	L&t(upower)/siemens(3wl)/schneider (masterpact nw)/ abb
4	Digital panel meters / electronic load manager	Conzerv / krykard / enercon/ neptune
5	Mccb	L&t d sine / schneider compact nsx / legrand dpx ³ / siemens 3vl
6	Indicating lamp (led type)/ push buttons	Siemens /l&t /teknica
7	Power cables copper /aluminium armoured /unarmoured	Finolex/ lapp kabel/ kei/ rr kabel/ polycab / havells (all shall be isi marked) /
8	Selector switch	L&t/ ge/ kaycee /ae / imp/ rass control /salzer.
9	Ct's	Ae /kappa /l&t/c&s.
10	G.I. pipe	Tata / jindal (hissar) / sail
11	Batteries	Exide (power-safe)/cummins plus/ panasonic/ned/global yuasa/amar raja.
12	M.s pipes	Tata/jindal(hissar)/sail
13	Ats	L&t / schneider/ legrand/ abb/ siemens

S. No.	Details of Material	Preferred Make
14	Any other item	Approved by engineer-in-charge

FIRE-FIGHTING SYSTEM WET RISER, HYDRANTS, SPRINKERS SYSTEM

SCOPE OF WORK

The scope of work covers the supply, installation, erection testing, commissioning of followings:

- a) Internal hydrant system.
- b) External hydrant system.
- c) Related piping with all accessories.
- d) All type of valves, connections, headers.
- e) Hydrant valves, hose reel, hose pipes, Fire hose cabinets etc.
- f) Electrical and diesel operated Firefighting pumps with all accessories.
- g) Electrical works, Panels, cables and earthing.
- h) Automatic sprinkler system with accessories.
- i) Fire extinguishers.
- j) Exit Sign Board
- k) All other allied and necessary equipment and accessories to complete the system up to the satisfaction of engineer-in-charge and for proper functioning of the entire system.
- l) Portable fire extinguishers, Sand buckets and first aid boxes etc.

ADDITIONAL CONDITION AND SPECIFICATION FOR FIRE FIGHTING SYSTEM

The scope of fire-fighting system installation in all the building to be constructed shall be as per NBC 2016.

Planning, Design & preparation of Drawings, obtaining approvals from the department, NOC from Fire department, Supply, installation, testing and commissioning of Fire Fighting system and fire extinguishers etc. as per the requirement of NBC 2016 with amendments, updated BIS codes, Fire byelaws of Govt. of Haryana, for the buildings as described in the details of specifications. After completion of work getting fire clearance if required from the local bodies, Chief Fire Officer etc.

Condition for designing

Design and preparation of working drawings for internal fire protection. The system drawings should clearly show Down comer system, fire extinguishers, Terrace tank, ring main etc. in line with the statutory requirements. Size all equipment required and prepare detailed specifications, obtain necessary NOC/permissions from the statutory / local fire authority / bodies etc. as required. Check and approve detailed drawings and data sheet of suppliers/ manufacturers and incorporation of modification of any working / architectural /structural drawings.

Indicative Fire Fighting System requirement to be provided in the building shall be as given below. Final design shall be made by the contractor as per NBC 2016 which shall be not on lesser provision of below mentioned requirement.

Main Components of the Fire-Fighting System Wet Riser, Hydrants, Sprinklers System

- (i) Supplying, installation, testing and commissioning of Electric driven Main Fire Pump suitable for automatic operation complete in all respects, as required.
- (ii) Supplying, installation, testing and commissioning of diesel engine driven main fire pump suitable for automatic operation complete in all respects, as required: (Diesel Driven Pump)
- (iii) Supplying, installation, testing and commissioning of electric driven pressurisation pump suitable for automatic operation complete in all respects, as required: (Jockey Pump)
- (iv) Control panel & cables & termination
- (v) Ring main piping, piping & accessories (sluice valve, butterfly valve, strainer, pressure switch & gauges, air vessels etc.
- (vi) Internal & external hydrant system & automatic sprinkler system.
- (vii) As per NBC 2016 Fire rated doors having 2 hrs. rating for 1000 deg. Centigrade shall be provided at all Fire shafts.

Fire extinguishers to be provided in the building shall be as follows:

- (i) The work shall be executed as per the provisions given in NBC- 2016 & local byelaws whichever is higher. Nothing extra shall be payable to contractor on this account.
- (ii) The selection, installation and maintenance of Fire extinguishers shall be as per IS 2169:2010 up to the recent revisions/amendments if any. Sufficient no. of fire sand buckets shall also be provided as per NBC 2016.
- (iii) The Fire-extinguisher for substation shall be of ABC and CO2 type of 22.5

kg with MS powder coated trolley.

- (iv) K type fire extinguishers shall be provided in Kitchen And near DG set fuel tank.
- (v) CO2 and ABC fire extinguishers of capacity 4.5 Kg/ 6 Kg shall be provided near Lift, Electrical shafts and corridors, Electrical Panel rooms etc. (Quantity as per NBC 2016/Fire Services of Himachal Pradesh Govt. norms).

TECHNICAL SPECIFICATIONS

FIRE PUMPS

SCOPE

This chapter covers the general requirements of water pumps for main fire pump, jockey pump and terrace pump.

TYPE

Pumps conforming to IS 12469 shall be exclusively used for Fire-fighting purposes. The pumps shall be centrifugal type direct driven with a 3 phase, 415 V + 10%, 50 Hz, A.C. motor. The standby fire pump shall be driven by diesel engine. The pumps may be either of horizontal split casing (HSC) type with operating speed not exceeding 1500 rpm, or solid casing with operating speed not exceeding 3000 rpm as specified in the tender documents.

RATING

The main fire pump and terrace pump shall be suitable for continuous operation in the system. The jockey pump shall be suitable for intermittent operation to build up pressure in the system on account of leakage. The head and discharge requirements shall be as specified in the tender documents. The head shall be suitable for the system and shall take into consideration the pressure drops across the various components in the water circuit as well as the frictional losses.

The rated discharge of Electric Driven and Diesel Engine Driven pump shall be as specified in Table given in Annexure-A. Pump shall be capable of discharging not less than 150 percent of the rated discharge at a head of not less than 65 percent of the rated head. The shut off head shall not exceed 120 percent of the rated head in the case of horizontal Pumps.

MATERIAL AND CONSTRUCTION

The centrifugal pumps shall conform to IS 1520.

- (i) The pump casing shall be of heavy section close grained cast iron and designed to withstand 1.5 times the working pressure. The casing shall be provided with shaft seal arrangement as well as flanges for suction and delivery pipe connections as required.
- (ii) The impeller shall be of bronze, brass or stainless steel. This shall be shrouded type with machined collars. Wear rings, where fitted to the impeller, shall be of the same material as the impeller. The impeller surface shall be smooth finished for minimum frictional loss. The impeller shall be secured to the shaft by a key.
- (iii) The shaft shall be of stainless steel and shall be accurately machined. The shaft shall be balanced to avoid vibrations at any speed within the operating range of the pump.
- (iv) The shaft sleeve and wearing ring etc. shall be of bronze, brass or stainless steel.
- (v) The bearings shall be ball or roller type suitable for the duty involved. These shall be grease lubricated and shall be provided with grease nipples/cups. The bearings shall be effectively sealed against leakage of lubricant or entry of dust or water.
- (vi) The shaft seal shall be mechanical type, so as to allow minimum leakage. A drip well shall be provided beneath the seal.
- (vii) The pumps shall be directly coupled to the motor/diesel engine shaft through a flexible coupling protected by a coupling guard.
- (viii) The pump and motor/diesel engine shall be mounted on a common

robust bed plate fabricated from mild steel section. The bed plate shall have rigid, flat and true surfaces to receive the pump and motor/diesel engine mounting feet. The pump will be perfectly aligned with the motor/engine so as to avoid any vibration during operation at all variations of load.

ACCESSORIES

Each pump shall be provided with the following accessories: -

- a) Sluice valves on suction and delivery.
- b) Reducers, as may be required to match the sizes of the connected pipe work.
- c) Non-return valve at the delivery.
- d) Pressure gauge at delivery side between pump and the non-return valve.
- e) Flexible coupling/connections shall be provided between Pump sets and Valves on suction and delivery sides of all the pump sets.

Note:

- a) No butterfly valves shall be installed inside the pump room.
- b) The size of the non-return valve and cut off (Sluice valve) shall not be less than the size of the initial delivery pipe.

INSTALLATION

The pump and motor/engine assembly shall be mounted and arranged for ease of maintenance and to prevent transmission of vibration and noise to the building structure or to the pipe work.

(i) The pump and motor/engine assembly shall be installed on suitable RCC foundation. The length and width of the foundation shall be such that 100 mm space is left all around the base frame. The height of foundation shall be so decided that the total weight of foundation block is 1.5 times the operating weight of the pump assembly. The foundation shall be isolated from the floor by vibration isolating pads. Angle iron frame of size 35 mm x 35 mm x 3 mm shall be provided on the top edges of the foundation.

(ii) More than one pump and motor assembly shall not be installed on a single base or cement concrete block.

(iii) The suction/discharge pipe shall be independently supported and their weight shall not be transferred to the pump. It should be possible to disconnect any pump for repairs without disturbing the connecting pipe line.

(iv) A minimum clearance of 1 m around the main pumps shall be provided. For jockey pump-clearance of 75 cm shall be adequate.

(v) Sufficient space is to be left in front for the radiator of diesel engine for free discharge of hot air. Arrangement for discharging hot air to outside the pump house shall be provided so that hot air does not stagnate in the pump house.

DIESEL ENGINE FOR FIRE PUMP

SCOPE

This chapter covers the details of requirements of a diesel engine for main fire pump to act as standby.

GENERAL

The diesel engine shall be suitable for automatic operation complete with necessary automatic starting gear, battery system and shall be complete with all accessories. Both engine and pump shall be assembled on a common bed plate, fabricated from mild steel channel.

DRIVE

The pump shall be only direct driven by means of a flexible coupling. The coupling between the engine and the pump shall allow each unit to be removed without disturbing the other. Coupling guard shall be provided. The speed shall be 1500 RPM.

DIESEL ENGINE

Environment conditions-

The engine shall be suitable to operate under the conditions of environment at site.

Engine Rating-

The engine shall be multi cylinder/vertical 4 stroke cycle, water cooled, developing suitable HP at the operating speed specified to drive the fire pump. Continuous capacity available for the load shall be exclusive of the power requirement of auxiliaries of the diesel engine, and after correction for altitude, ambient temperature and humidity for specified environment conditions. The engine rating shall be suitable to drive the pump at 150 percent of its rated discharge with at least 65 percent of rated head or 20% in excess of the maximum brake horsepower required to drive the pump at its duty point, whichever is higher. The engine shall have 10% overload capacity for one hour in any period of 12 hours continuous run.

The engine shall be:

- (i) Naturally aspirated, supercharged or turbo-charged and rather air or water cooled.
- (ii) Provided with an in-built tachometer to indicate rpm of the engine.
- (iii) Suitable for cold starting for which suitable heaters shall be provided in lubricating oil.
- (iv) Able to develop full load within 15 seconds from the receipt of the signal to start.
- (v) The diesel engine shall conform to BS 649/ IS 1601/ IS 10002, amended up to date.

Engine Accessories-

The engine shall be complete with following accessories:

- (i) Fly wheel dynamically balanced
- (ii) Direct coupling for pump and coupling guard
- (iii) Radiator with hoses, fan, water pump, drive arrangement and guard (iv) Air cleaner dry type
- (iv) Fuel service tank with necessary pipe work
- (v) Fuel filter
- (vi) Pump for lubricating oil and lub. oil filter
- (vii) Electric starting battery 12 V/24 V with 2 Nos. batteries
- (viii) Exhaust silencer with necessary pipe work
- (ix) Governor
- (x) Instrument panel housing all the gauges, including Tachometer, hour meter and starting switch with key (for manual starting)
- (xi) Necessary safety controls
- (xii) Winterisation arrangement
- (xiii) Hand operated semi rotary pump for filling the service tank
- (xiv) A standard kit of tools (this shall be kept on hand at all times)

Cooling System-

The engine shall be radiator water cooled. The radiator assembly shall be mounted on the engine. The radiator fan shall be driven by the engine as its auxiliary with multiple fan belts. When half the belts are broken, the

remaining belts shall be capable of driving the fan. Cooling water shall be circulated by means of an auxiliary pump of suitable capacity driven by the engine in a closed circuit.

Fuel System-

The fuel system shall be gravity fed from the fuel tank to the engine driven fuel pump. The engine fuel tank shall be mounted either adjacent to the engine or suitably wall mounted on brackets. The fuel filter shall be suitably located to permit easy servicing.

The fuel tank shall be of welded steel construction (3mm thick) and of capacity sufficient to allow the engine to run on full load for at least 8 hours. The tank shall be complete with necessary floor mounted supports, level indicator (protected against mechanical injury) inlet, outlet, overflow connections and drain plug and piping to the engine fuel tank. The outlet should be so located as to avoid entry of any sediments into the fuel line to the engine.

Any valve in the fuel feed pipe between the fuel tank and the engine shall be placed adjacent to the tank and it shall be locked in the open position.

All fuel tubing to the engine shall be with M.S.'C' class pipe with flexible hose connections where required. Pipe joints shall not be soldered and plastic tubing shall not be used.

The following shall be provided:

- i) A sludge and sediment trap shall be provided.
- ii) An inspection and cleaning hole
- iii) Means to enable the entire fuel system to be bled of air (Air relief cocks are not allowed; screwed plugs are permitted)

Lubricating Oil System-

Forced feed lubricating Oil system shall be employed for positive lubrication. Necessary lubricating oil filters shall be provided, located suitably for convenient servicing.

Starting System-

The starting system shall comprise of necessary batteries 12 Volts/ 24 Volts, starter motor of adequate capacity and axle type gear to match with the toothed ring on the fly wheel. Suitable protection to protect starting motor from excessively long cranking runs shall be suitably integrated with engine protection system.

The capacity of the battery shall be suitable for meeting the needs of the starting system.

The battery capacity shall be adequate for 10 consecutive starts without recharging with cold engine under full compression.

Three attempt starting facility shall be provided. If the engine fails to start after third attempt, the engine shall be locked out and suitable audio-visual alarm shall be given to indicate engine failure. The starter motor used for automatic starting may also be used for manual starting provided there are separate batteries for manual starting.

The scope shall cover all cabling, terminals, initial charging etc.

Exhaust System-

The exhaust system shall be complete with residential grade silencer suitable for outdoor installation and silencer piping shall be extended up to 1 m, outside pump house duly insulated with 50 mm thick glass wool and 1.0 mm thick aluminium sheet cladding.

Retrofitted emission-control equipment shall be used having a minimum specified PM-capturing efficiency of at least 70%, type approved by one of the five CPCB recognized labs. (Recommendations of National Clean Air Program 2019 launched by Ministry of Environment, Forest and Climate Change)

Engine shut down mechanism-

This shall be manually operated and shall return automatically to the starting position after use.

Governing System-

The engine shall be provided with an adjustable governor to control the engine speed within 5% of its rated speed under all conditions of load up to full load. The governor shall be set to maintain rated pump speed at maximum pump load.

Engine Instrumentation –

Engine instrumentation shall include the following: -

- a) Lub.oil pressure gauge
 - b) Lub.oil temperature gauge
 - c) Water temperature gauge
-

- d) Tachometer
- e) Hour meter

The instrumentation panel shall be suitably mounted on the engine.

Engine protection devices –

Following engine protection and automatic shutdown facilities shall be provided: -

Low lub. oil pressure.

High cooling water temperature.

High lub. oil temperature.

Over speed shut down

Pipe work-

All pipe lines with fittings and accessories required shall be provided for fuel oil, lub.oil and exhaust systems.

Anti-vibration mounting-

Suitable vibration mounting duly approved by engineer-in-charge shall be employed for mounting the unit so as to minimize transmission of vibration to the structure.

Battery Charger-

Battery of diesel engine operated fire pump shall have separate charger from emergency power supply circuit. Necessary float and boost charger shall be incorporated in the control section of power and control panel with manual selection of boost charge, to keep the battery under trim condition. Voltmeter to indicate the state of charge of the batteries shall be provided. Where separate batteries are provided for automatic and manual starting, the charging equipment shall be capable of trickle charging both the batteries simultaneously. Equipment shall be provided to enable the state of charge of the batteries to be determined.

The engine installation shall be approved by the representative of engine manufacturer (who shall carry out after sales service under AMC).

The following spare parts shall be supplied with the engine and kept on hand:

- a) Two sets of fuel filters, elements and seals;
- b) Two sets of lubricating oil filters, elements and seals;
- c) Two sets of belts(where used);
- d) One complete set of engine-joints, gaskets and hoses;
- e) Two injector nozzles;
- f) One complete set of piston rings for each cylinder; and
- g) One inlet valve and one exhaust valve).

Pipe, Fittings, Valves, Supports and Other Accessories:

Pipes, Fittings & Supports:

General:

All materials shall be new of the best quality conforming to the specifications and subject to the approval of the Engineer-in-Charge.

Pipes and fittings shall be fixed truly vertical, horizontal as required in a neat workman like manner.

Pipes shall be fixed in a manner as to provide easy accessibility for repair and maintenance and shall not cause obstruction in shafts, passages etc.

Pipes shall be securely fixed to walls and ceilings by suitable clamps at intervals specified. Only approved type of anchor fasteners shall be used for RCC ceilings and walls.

Valves and other appurtenances shall be so located that they are easily accessible for operations, repairs and maintenance

Pipes and fittings of following types (depending upon the description of item) and ISI marked only shall be used:

Type of Pipe / (dia)	Size	Grade	Ends/Fitting	Code
MS/ Galvanised Pipes	Up to 50 mm dia	Heavy grade	Screwed	IS: 1239 (Part I)
MS/ Galvanised Fittings	- do -	Heavy grade	MS/Galvanised Forged, Screwed ends	IS: 1239 (Part II)
MS/ Galvanised Pipes	65 mm & above dia and up to 150 mm dia	Heavy grade	Bevel, Butt Welded, 3 layers forms/screwed for Galvanised	IS: 1239 (Part I)

Type of Pipe / (dia)	Size	Grade	Ends/Fitting	Code
MS/ Galvanised Fittings	-do-	Heavy, machine formed from IS marked heavy grade pipes	-do-	IS: 1239 (Part III)
MS/Galvanised Pipes	Above 150 mm dia	6.0 mm wall thickness up to 200 mm 8.0 mm wall thickness up to 300 mm	Bevel, Butt welded, 3 layers for MS/ screwed for Galvanised	IS: 3589
MS/ Galvanised Fittings	-do-	Schedule 40	-do-	IS: 3589

For MS/Galvanised pipes up to and including 50 mm dia screwed jointing shall be adopted, while for pipes 65 mm and above welded connections shall be used for MS and screwed connection for Galvanised. Only Electro Galvanised nuts /bolts shall be used.

The piping system and components shall be capable of withstanding 150% of the working pressure including water hammer effects and test pressure up to 16 kg/cm².

Flanged joints shall be used for connections to vessels, equipment, flanged valves and also on suitable straight lengths of pipeline of strategic points to facilitate erection and subsequent maintenance work.

Flange thickness shall be as per table below IS: 6392 – 1971. Table – 17/18.

250 mm dia :	26 mm;
200 mm dia :	24 mm;
150 mm dia :	22 mm;
125 mm dia :	22 mm;
100 mm dia :	20 mm;
80 mm dia :	20 mm;
65 mm dia :	18 mm.

M.S./GI Fittings for pipes above 65 mm or and up to 150 mm dia shall be fabricated from seamless pipe pieces of minimum 5 mm wall thickness. For tees and other fittings where seamless sections are not available, the fittings shall be fabricated from Electric resistant welded pipes as given in the approved makes.

However Galvanised fitting will be screwed. The fittings shall have a minimum 5 mm wall thickness. The fittings shall with stand pressure of up to 21 kg/cm².

Fittings below 50 mm or shall be M.S./ Galvanised Forged Screwed ends. The fittings shall be threaded at both ends. The fittings shall withstand pressure of up to 21kg/cm².

For tapings of 50 mm/40mm/32mm/25mm from headers, half socket connections with one side threading shall be employed. The half socket shall be welded at the centre of the header, either on the side or on the top.

Wherever two horizontal headers are to run side by side, the two headers shall be located at different levels, if possible, so as to avoid unnecessary bends at tapping off from the headers. Accordingly, the supports shall also be staggered to support pipes at two levels.

Down comer pipe size shall be of 100 mm dia.

Where wet riser/down comers are not to be provided but hose reel and terrace tanks are to be provided, pipe of size 65 mm diameter shall be provided in between the pump and hose reel.

Fire service inlet and fire service connection shall be with pipe size not less than 150 mm diameter.

ANTI-CORROSIVE PROTECTION ON UNDER GROUND PIPE

Corrosion protection tape shall be wrapped on M. S. Pipes to be buried in ground. This corrosion protection tape shall comprise of coal tar/asphalt component supported on fabric of organic or inorganic fibre and minimum 4 mm. thick and conform to requirement of IS: 10221-Code of practice for coating and wrapping of underground mild steel pipe line. Before application of corrosion protection tape all foreign matter on pipe shall be removed with the help of wire brush and suitable primer shall be applied over the pipe thereafter. The primer shall be allowed to dry until the solvent evaporates and the surface becomes tacky. Both primer and tape shall be furnished by the same manufacturer. Corrosion protection tape shall then be wound around the pipe in spiral fashion and bounded completely to the pipe. There shall be no air pocket or bubble beneath the tape. The overlaps shall be 15 mm. and 250 mm. shall be left uncoated on either end of pipe to permit installation and welding. This area shall be coated in situ after the pipe line is installed. The tapes shall be wrapped in accordance with the manufacturer's recommendations. If application is done in cold weather, the surface of the pipe shall be pre- heated until it is warm to touch and traces of moisture are removed and then primer shall be applied and allowed to dry.

Pipe Support:

All pipe clamps and support shall be mild steel.

Pipe shall be hung by means of expandable anchor fastener of approved make and design (Dash Fasteners or equivalent). The hangers and clamps shall be fastened by means of galvanised nut and bolts. The size/diameter of the anchor fastener and the clamp shall be suitable to carry the weight of water filled pipe and dead load normally encountered.

Hangers and supports shall be capable of carrying the sum total of all concurrently acting loads. They shall be designed to provide the required supporting effects and allow pipelines movements as necessary. All guides, anchor, braces, dampeners, expansion joints and structural steel to be attached to the building/structure, trenches etc. shall be provided by the contractor. Hangers and components for all piping shall be approved by the Client/engineer. Anchoring fasteners shall be rated to take minimum 2 tons load and shall be of approved make.

While all piping shall have clevis type hanger supports from the ceiling with fasteners, for pipe headers of 100 mm dia and above, additional wall/column mounted supports shall be taken. Clevis type hanger supports shall be at 3.0 m intervals and at every turn, at both ends. MS angle supports at wall and columns shall be at 18 m intervals. The angles shall be cut by gas cutter and evened out by grinder. All welding to angles shall also be cleaned by grinder. Angles shall not be less than 40 x 40 x 6 mm size.

For fixing clevis hanger and angle support, only dash fasteners shall be used. Exposing of steel reinforcement and welding to them shall not be permitted except in exceptionable circumstances.

Pipes in vertical shafts shall have MS angle brackets at alternate floor level. The bracket shall be mounted behind the pipe. A baseplate of 50 wide x 6 mm thick shall be welded to the bracket. The baseplate shall be fixed to the wall by means of fasteners GI U clamps shall be used to fix the pipe to the bracket.

Each riser shall also be anchored to the floor slab with MS angles mounted on the slab. The angles shall be 40 x 40 x 5 size, one mounted before the pipes and the other after the pipes. Extra cleat pipe pieces shall be welded to the pipes at this point which shall be welded to the angle iron support.

Wherever angle type supports are being used, profiled packing materials or wood or materials as approved by the Engineer shall be used. The packing materials shall be at least 25 mm thick and tight fitted with the pipe.

Hose Reel:

Wall mounting the swinging type first aid hose reel with drum shall conform to IS: 884-1985.

The rubber tubing shall be 20 mm dia high pressure rubber hose 36.0 m long as per IS : 444 with gunmetal shut off nozzle having 6.5 mm dia orifice and

control valve, shut off valve of approved make. The wall mounted bracket shall be fixed by means of fasteners. The hose reel shall have a gun metal nozzle.

The hose reel shall be connected directly to the riser by means of 25 mm dia MS pipe with threaded bends, union & one no. ball valve.

The drum can swing up to 180 degree.

Hose Cabinets:

Hose cabinet shall be fabricated from 16 gauge MS powder coated sheet of fully welded construction with hinged single/double door partially glazed door with suitable locking arrangement, stove enamelled fire red paint with 'Fire Hose' written on it prominently. Glass panes shall be 4 mm thick.

The hydrant cabinet shall hold double headed hydrant, 2 nos. Hoses and 1 no. branch pipe.

The cabinet shall have two pipe studs of 200 mm dia in MS with base which shall be fixed to the back of the cabinet and shall be used to hold the RRL hose.

RRL Hoses:

The hoses for the internal and external hydrant system should be rubber impregnated woven jacketed type conforming to IS:636 Type-A. Each fire hose shall be provided with quick coupling, branch pipes, nozzles, spanners etc.

Hose pipes of all types shall be capable of withstanding an internal water pressure of not less than 35 Kg/Sq.cm without bursting. It must also withstand a pressure of 21 Kg/Sq.cm without undue leakage or sweating.

Each hose shall be fitted with instantaneous spring lock type couplings at both ends. Hose shall be fixed to the coupling ends by copper rivets and the joint shall be reinforced by 1.5 mm galvanised mild steel wires and leather bands.

Branch Pipes and Nozzle:

Stainless steel Standard Branch Pipe shall be used conforming to IS : 903 with Stainless steel nozzle of 20 mm (nominal internal dia) to fit standard instantaneous type 63mm dia hose coupling. Suitable spanners of approved design shall be provided in adequate numbers for easy assembly and dismantling of various components like branch pipes, nozzles, quick coupling ends.

Hydrant Valve:

Stainless steel Hydrant valve shall be of oblique pattern provided as per IS: 5290 complete with hand wheel, quick coupling connection, spring and blank cap and chain.

The hydrant shall have flanged inlet of 100 mm dia and 63 mm female instantaneous type outlet. The hydrant shall have a rubber plug with chain fixed to the main body of the Hydrant.

Pressure Switch:

The pressure switches shall be employed for starting and shutting down operation of pumps automatically, dictated by lines pressure. The Pressure switch shall be diaphragm type, it shall be suitable for line pressures up to 15 kg/cm².

The switch shall be suitable for consistent and repeated operations without change in values.

The enclosure shall be of aluminium and pressure element and wetted parts shall be of stainless steel. The switch shall be snap acting type with 1 no. N O/NC-contact.

Air Vessel:

The air vessels shall be provided to compensate for slight loss of pressure in the system and to provide an air cushion for counter acting pressure surges whenever the pumping set comes into operation. It shall be normally partly full of water, the remaining being filled with air, which will be under compression when the system is in normal operation.

Air vessel shall be fabricated from MS plate conforming to IS : 2002 grade 2A having 8 mm thickness shell with 10 mm thick dished ends and suitable supporting legs. It shall be provided with a 80 mm dia/100 mm dia flanged connections from pump, one 25 mm drain with ball valve and 15 mm sockets for pressure gauge and pressure switches. The air vessel shall be hydraulically tested to 20 kg/cm² pressure for 30 minutes.

The pressure vessel shall be provided for hydrant and sprinkler system. The pressure switches shall be mounted on the drain end of each air vessel. The air vessel shall also be provided with safety valve mounted at the top. The pressure vessel shall be supplied of size 250 mm dia x 1200 mm height.

Fire Department Connections:

Fire Brigade Inlet (2 / 4 Way) to Hydrant Ring/Hydrant Riser:

Gun Metal four way fire brigade tank filling connection having 63 mm dia instantaneous type inlet and 150 mm dia flange outlet conforming to IS : 904 with blank cap and chain with necessary 150 mm dia MS (heavy duty pipe) and flanges, nuts and bolts etc.

The inlet assembly shall be in glass fronted wall box and size of wall box shall be adequate to allow hose to be connected to the inlets, even if the door cannot be opened and the glass has to be broken.

Each box shall have fall of 25 mm toward the front at its base and shall be glassed with wired glass with "FIRE SUPPLY TO TANK" painted on the inner face of the glass in 50 mm size block letter.

Each such box shall be provided with a steel hammer with chain for breaking the glass.

Tank Filling Connection:

Gun Metal four way fire brigade tank filling connection having 63 mm dia instantaneous type inlet and 150 mm dia flange outlet conforming to IS : 904 with blank cap and chain with necessary 150 mm dia MS (heavy duty pipe) and flanges, nuts and bolts etc.

The inlet assembly shall be in glass fronted wall box and size of wall box shall be adequate to allow hose to be connected to the inlets, even if the door cannot be opened and the glass has to be broken.

Each box shall have fall of 25 mm toward the front at its base and shall be glassed with wired glass with “FIRE SUPPLY TO TANK” painted on the inner face of the glass in 50 mm size block letter.

Each such box shall be provided with a steel hammer with chain for breaking the glass.

The inlets shall be provided with ABS quality plastic blank caps with chain.

Valves:

- Sluice Valves: Sluice valve of 65 NB and above shall be flanged valve with cast iron body. The spindle, wall seat and wedge nuts shall be of bronze. They shall generally have non-rising spindle and shall be of the particular duty and design called for. All sluice valves will be provided with supervisory switch. The valves shall be supplied with suitable flanges, non-corrosive bolts and asbestos fibre gasket. Sluice valves shall conform to Indian Standard IS: 14846: 2000 and IS: 2906. Sluice valves for water works purposes suitable for seat test pressure of 16 Kg/Sq.cm.

- Butterfly Valve: The butterfly valve shall be suitable for water works and tested to minimum of 15 Kg/Sq.cm pressure. The body shall be of cast iron to IS : 210 in circular shape and of high strength to take the water pressure of 10 Kg/Sq.cm. The disc shall be heavy duty cast iron with anti-corrosive epoxy or nickel coating. The valve seat shall be of high grade elastomer or nitrile rubber. The valve in its closed position shall have complete contact between the seat and disc throughout the perimeter. The elastomer rubber shall have a long life and shall not give away on continuous applied water pressure. The shaft shall be EN 8 grade carbon steel. Butterfly valve shall be of best quality conforming to IS : 13095 of class specified. The valves shall be supplied with manual gear operated opening/closing by lever. The valves shall be supplied with supervisory switch.

- **Gun Metal Valves:** Gun metal valves shall be used for smaller dia pipes, and for threaded connection. The valves shall bear certification as per IS: 778-1984 and shall be rated to 15 Kg/Sq.cm pressure. The body and bonnet shall be of gun metal to IS: 318. The steam gland and gland nut shall be forged brass to IS: 319. The hand wheel shall be of cast iron to IS: 210. The hand wheel shall be of high-quality finish to avoid hand abrasions. Movement shall also be easy. The spindle shall non rising type. All valves shall be approved by the Authority Representative before they are allowed to be used on the work.

- **Non-Return Valve:** Non-return valves shall be cast iron dual plate type. An arrow mark in the direction of flow shall be marked on the body of the valve. The valve shall bear IS: 5312 certifications. The valve shall be of cast iron body and cover. The internal flap in the direction of water shall be of cast iron and hinged by a hinge pin of high tensile brass or stainless steel. Cast iron part shall be as per IS: 210. The gasket shall be of high-quality rubber and flap seat ring of leaded gunmetal. At high pressure of water flow the flapper shall sit tightly to the seat. The valve shall be capable of handling pressure up to 15 Kg/Sq.cm.

- **Air Valves:** Provide 25 mm dia screwed inlet cast iron single acting air valves, on all high points in the system as shown on the drawing.

Drain Valve:

Provide 50 mm dia between steel pipe to IS : 1239 (heavy duty) with 50 mm gunmetal full way valve for draining any water in the system in low pockets.

Drain valves shall be provided at low points of all water riser and mains to ensure that all sections of pipe works and plant can be drained.

Foot Valve:

Foot valves of water supply system shall be heavy duty construction with integrated flanges connection and have cast iron body, all bronze trims with stainless steel spring and stainless steel strainer.

The flow area on strainer shall be at least three times of Pipe size.

Pressure Gauge:

Pressure gauge shall be provided near all connections to hydrant system and isolation valves of sprinkler system and where required. Pressure gauge shall be stainless steel 100 mm dia gunmetal Burden type with a scale range from 0 to 15 Kg/cm² and shall be constructed as per IS 3624. Each pressure gauge shall have a siphon tube connection with ball valve, tapping and connecting pipe and nipple. The gauge shall be installed at appropriate level and height for easy readability

Branch Pipe:

Gun Metal Standard Branch Pipe shall be used conforming to IS : 903 with gun metal nozzle of 20 mm (nominal internal dia) to fit standard instantaneous type 63mm dia hose coupling.

Fire Man's Axe:

Fire man's axe for firefighting purpose shall be used conforming to IS:926 – 1985

Painting:

All hydrant pipes shall be finished with post office red colour paint. All M.S. pipes shall first be cleaned thoroughly before application of primer coat. After application of 2 coats of Red oxide primer, two coats of enamel paint shall be applied. Wherever required all pipe headers shall be worded indicating the direction of the pipe and its purpose such as "TO RISER NO 1" etc.

Testing:

All piping shall be tested to hydrostatic test pressure of at least one and a half times the maximum operating pressure, but not less than 10 kgf/sq.cm for a period not less than 24 hours.

Rectify all leakages, make adjustments and retest as required and directed.

AUTOMATIC SPRINKLER SYSTEM

SCOPE

This covers the general requirement of selection, design, installation, testing commissioning and maintenance of automatic sprinkler system for fire fighting buildings used for other than industrial and storage purpose.

References: For additional information regarding definitions, planning, design, hydraulic calculations, tables etc. following documents are to be referred to.

IS: 15105:- Design and Installation of Fixed Automatic Sprinkler, Fire Extinguisher Systems- Code of Practice.

IS: 9972:- Specification for Automatic Sprinkler Heads for Fire Protection Service.

2 GENERAL SPECIFICATION

a) The sprinkler heads are to be fixed into heavy duty (C Class) steel pipes, conforming to IS:1239. The size of pipe will vary from 25 mm to 150mm to suit the hydraulics of the system and in conformity with the guide lines laid down under IS : 15105-2002. The System shall conform to above code for the installation of sprinkler systems in general for 'Moderate Hazard' category-in respect of design,

density and spacing of sprinkler heads for basement and parking areas. Whereas “Light Hazard” category is to be used for residential apartment floors. Some important points of the system are mentioned below.

b) The entire system shall be capable of withstanding an test pressure of 15 Kg / Sq.cm. or the 1.5 times of operating pressure whichever is higher. All pipe fittings shall be malleable cast iron or Ductile iron. Pipe of 40mm dia and less shall have screwed joints.

c) Reduction in pipe sizes shall not be made by use of bushings. All piping shall be done by means of V groove welding, screwed & flanged jointing as per codes.

d) Pipe hanger and clamps: Sprinkler system piping attached to structural members of the building, suitable type of hangers of steel bars or angles painted with zinc chromate and synthetic enamel paint of approved shade to protect from corrosive conditions. Due care shall be taken that sprinklers are not applied with paint at the time of applying paint to piping and fittings.

e) Sprinkler System Test Pipe: A test pipe of 25 mm dia in size with a drain valve to test alarm device shall be provided.

f) All control, drain, test and alarm valves shall be provided with signs to identify their purposes, functions, direction of flow the satisfaction of the Engg-in-charge.

g) Testing: Before connecting sprinkler risers for testing, all piping and devices under pressure including yard piping and fire hydrant connections shall be tested hydrostatically for strength and leakage with pressure not less than 15 Kg/Sq.cm or 1.5 times the working pressure whichever is higher for 24 hours.

3QUARTZOID BULB AUTOMATIC SPRINKLER

- a) Sprinkler heads shall be made of gun metal / quartzoid bulb sufficiently strong, in compression to withstand any pressure, surge or hammer likely to occur in the system. The yoke & body shall be made of high-quality gun metal with arms streamlined to ensure minimum interference with the spread of water. The deflector of suitable design shall be fitted to give even distribution of water over the area commanded by the sprinkler.
- b) The sprinkler heads shall have current certification of underwriter’s laboratory (UL) and Factory Manual (FM) approved. The certificate of acceptance shall be obtained from local fire authorities prior to the procurement of sprinkler heads.
- c) The bulb shall contain a liquid having a freezing point below any natural climatic figure and a high coefficient of expansion. The temperature rating of the sprinkler shall be stamped on the deflector. The colour of the liquid filled

in the bulb shall be according to the temperature rating as per international standard.

- d) The sprinklers shall have 15mm nominal size of the orifice for light / ordinary hazard and the orifice size shall be marked on the body or the deflector of the sprinkler.

4 OPERATING TEMPERATURE

- a) The Operating temperature, at which the quartzoid bulb of the sprinkler head shall actuate, shall be 68 degree C or as specifically mentioned.

5 FLOW REQUIREMENTS

- a) Moderate hazard: The density of water discharge shall be at least 5 lit/min/sqm over an assumed area of operation covering 360 sq.m. The flow requirement for sprinkler system shall be 1800 lpm at not less than 2 bar pressure at installation valve.
- b) Light hazard: The density of water discharge shall be at least 2.25 lit/min/sqm over an assumed area of operation covering 84 sqm. The flow requirement for sprinkler system shall be 225 lpm at not less than 2.2 bar pressure at installation valve.

6 PIPE & FITTINGS FOR SPRINKLER SYSTEM

- a) Pipes must be of Heavy grade M.S. pipe conforming to IS 1239. The pipes, fittings and installation shall be hydraulically tested to a pressure of 15 Kg/Sq.cm. or 1.5 times the working pressure whichever is higher.
- b) Fittings for M.S. pipes shall be of MS (IS 1239) or malleable iron (IS 1879) or Ductile Iron. The fitting of 40mm dia and less shall be screwed only.
- c) All bolt holes & flanges shall be drilled. The drilling of each flange shall be in accordance with the relevant Indian Standard.
- d) Flanges shall be faced & shall have jointing of rubber insertions or asbestos compound.
- e) All installation pipe work above ground shall be installed at a slope not less than 1:500 for horizontal run of pipes towards the installation control valve for drainage purpose.
- f) The necessary MS sleeve of suitable dia and length shall be kept in RCC beams, walls and other structural members during the casting, for the passing of sprinkler piping.

7 ORIFICE PLATES

- a) For restricting pressure at lower levels in the sprinkler system, orifice plates of appropriate sizes shall be fitted at different floor levels, at the branching points from Riser Main.
- b) The Diameter of such orifice shall not be less than 50% of the dia of pipe into which it is to be fitted, which shall not be less than 50mm dia. These orifice plates must be of stainless steel with plain central hole without burrs, and the thickness shall be 6 mm for pipe size up to 150 mm dia pipes and 9 mm for above 150 mm dia pipe size.

8 PIPES FOR DRAINAGE

- a) Sprinkler pipes shall be so installed that the system can be thoroughly drained. As far as possible all pipes shall be arranged to drain to the installation drain valve as shown in the drawing for ordinary hazard system.
- b) In the case of basement & other areas where sprinkler pipe-work is below the installation drain valve & in other trapped points in the system, auxiliary valves of the following sizes shall be provided.
 - i) 20 mm valves for pipes up to 50mm dia.
 - ii) 25 mm valves for 80mm dia pipe.
 - iii) 50 mm valves for pipes larger than 80mm dia.

9 PIPE PROTECTION

All pipes & fittings above ground and in exposed locations shall be painted with two coat of zinc chromate primer and two or more coats of synthetic enamel of fire red color paint.

10 SYSTEM DESIGN

The entire piping for sprinkler installation shall be designed to make it a hydraulically balanced system to fulfill the various requirements of IS: 15105. The guidelines given in the IS: 15105 is minimum prescribed.

11 Components of sprinkler system

Following types of valves are used in the installations.

- a) Stop valve
- b) Test Valve.
- c) Drain Valve.
- d) Flushing Valve.
- e) Check Valve.
- f) Pre action Valves.
- g) Subsidiary Valves.
- a) Alarm Device.

b) Pressure Gauges.

12 The location of above valves shall be as under.

- a) Main Stop Valve: - Only one main stop valve shall be provided immediately after main alarm valve at a location which is readily accessible.
- b) Test Valve: For testing hydraulic alarm or electric alarm by drawing water from downstream side, test valve shall be connected with downstream of the water flow alarm.
- c) Drain Valve: - For drainage of system, drain valve 50 mm. dia shall be provided downstream of installation valve/stop valve or any subsidiary stop valve.
- d) A common valve can perform the functions of test drain. The outlet shall be connected with a 50mm dia G. I. drain pipe along with riser pipes.
- e) Flushing Valve -: If the water used for sprinkler is not portable. Flushing valves shall be provided at the end of a distribution pipe. The valve size shall be same as distribution pipe. Valve outlet shall be fitted a brass plug and extended to not more than 3 m. above floor
- f) Check Valve: - Check valve shall be provided where more than one water supply is available and same shall be fitted on each water supply pipe.
- g) Subsidiary Stop Valve: - Subsidiary stop valve which shall be of the same dia. as the pipe line in which they are fitted shall be provided to control water supply to sprinklers of highly sensitive areas like computer rooms.
- h) The main stop valve shall be placed in the vicinity of the main entrance of the protected area at an easily accessible place. The valve shall be secured open by a pad locked and protected against damage. A location plate shall be fixed near the valve bearing the following words in raised letters: SPRINKLER

STOP VALVE

- i) Alarm valve shall be fitted on the main supply pipe immediately after the main control valve and before any connection is taken off to supply any part of the installation.
- j) Pressure Gauges: - Pressure gauges shall be provided at each of the following points.
 - i) Immediately downstream of the alarm valve.
 - ii) Immediately up stream of the main stop valve.
- k) Stop cock shall be provided before pressure gauges for removal without interruption of water supply of the installation. Pressure gauges shall be per IS: 3624.

SPRINKLER ANNUNCIATION PANEL AND ALARM

Electrically operated alarm shall be provided for indication of operation of sprinkler an area. Water flow switches shall be installed in main distribution pipes which shall be wired to sprinkler annunciation panel. In the event of operation of a sprinkler, the flow switch will operate and give signal to the annunciation panel to indicate operation of sprinkler in the area. This will initiate an electrically operated alarm. The system shall be independent of fire alarm system.

Construction Details

The Panel shall be fabricated out of not less than 1.6 mm thick CRCA sheet and powder coated after 9 tank treatment process and shall be totally enclosed damp and vermin proof. Suitable knockout shall be provided for the entry cables. The panel shall be designed such that the equipment for power supply to battery charging are housed in independent compartments. Sealed maintenances free batteries shall also be accommodated inside the panel.

Indicating lamps control switches, buttons and fuses shall be suitably located the front and properly labelled.

The indicating lamps shall be LED type of following colours. The flow switch operation conditions shall be indicated by twin lamps.

- a) Red to indicate flow switch operation.
- b) Amber to indicate fault condition.
- c) Green to indicate healthy condition.

The test buttons to test the indication lamps shall be provided.

The panel shall be solid state type or microprocessor type as indicated in the tender.

The primary function of the panel shall be to respond automatically to the operation of one or more flow switches to give alarm and to indicate area/areas where the device has activated. The operation of one or more flow switches shall result' simultaneous alarm given by the following: -

- a) External alarm hooter(s).
- b) A visible indication on panel.
- c) Audible alarm on panel itself (common for all zones.)

The panel shall indicate the fault within the system and immediate fault warning shall be given by an audible and visible signal on the panel in case of open circuit short circuit and earth fault in cable between flow switch and annunciation panel.

The panel shall be complete with mimic diagram for the areas covered by different flow switches. The layout of mimic diagram shall be got approved from Engineer-in- Charge.

Battery backup with trickle cum boost charger shall be provided for operation of the system. Indication of mains failure and low battery voltage shall be provided. The batteries shall be sealed maintenance free. The capacity of the battery shall be 12 Volt 2 Nos. 24 AH each. All standard accessories shall be provided.

INSTALLATION

The installation shall be carried out as per good practices. Following additional Points are to be taken care for sprinkler installations.

- a) For fixing sprinkler heads, 15 mm. dia. M.S. Socket is to be screwed to range pipes at the locations as' per drawings. Dead plug shall be fixed in the socket.
- b) If sprinkler head is to be provided away from range pipe, M.S. Pipe nipple of suitable size be used to extend the sprinkler head and socket is welded at desired location.
- c) After completion of the entire work, pressure testing of entire pipe work shall be carried out for 24 hrs. at a pressure of 15 kg/cm². The drop of pressure up to 0.5 kg/cm² shall be accepted.
- d) The lines shall be flushed before completion of building work so that any foreign matter which might have entered the system is taken out. The pressurization pump (Jockey pump) be operated and valves opened at different locations.
- e) During occupation of the building, sprinkler heads shall be provided in place of dead plugs. Teflon tape shall be used on threaded portion. The sprinkler heads shall be properly tightened in the socket.
- f) When all sprinklers heads are installed, pressure is built up in the system by pressurization pump slowly and in case no leak is found, desired pressure is developed and maintained. In case any leak is detected, the same shall be attended before pressurizing the system further.

APPROVAL BY LOCAL BODIES

It shall be the responsibility of the contractor to obtain the approval of the system

from the Authorities on relevant drawings before actual installation at site and to get the complete installation inspected and passed by the concerned authorities, as may be necessary as per local bye laws.

IS Codes For Design, Manufacture, Erection, Testing and Trail Operation of Piping Valves etc.:

The following codes and standards and their subsequent modifications shall apply for the design, manufacture, shop testing, erection, fabrication at site, resting and trial operation of piping, valves and specialties requirements:

IS: 554: Dimensions for pipe threads where pressure tight joints are required on the threads.

IS: 638: Sheet rubber jointing and rubber insertion jointing.

IS: 778: Copper alloy gate, globe and check valve for water work purposes.

IS: 14846: Sluice valves for water –works purposes (50 mm to 1200 mm).

IS: 901: Couplings, double male and double female, instantaneous pattern for fire fighting.

IS: 1239: Mild steel tubes, tubular and other wrought (Part I & II) steel fittings.

IS: 884: Swinging type wall mounted hose reel with drum.

IS: 388: Hose tubing.

IS: 4038: Foot valves for water-works purposes.

IS: 5290: landing Valves.

IS: 10221: Anti-corrosion treatment for underground MS pipes.

IS: 5312: Swing check type reflux (non-return) valves.

Fire Extinguishers:

Without restricting to the generality of the foregoing the work shall inter-alia consist of the following:

Installation of fully charged and tested fire extinguishing hand appliances CO2 and dry chemical powder type as required by these specifications and drawings.

Portable Fire Appliances Requirement, Type and Location as per Fire Authority:

Portable Fire appliances as mentioned below: -

ABC Dry Powder fire extinguisher IS: 15683 – 2006 -6 Kg & 9 kg capacity.

CO2 Gas Fire extinguisher IS 15683 – 2006 – 4.5 Kg capacity.

CO2 Water type Fire extinguisher IS 2878 – 9 litre capacity and

K type Fire extinguisher – for kitchen

Fire bucket IS: 2546 4 Nos. shall be installed at following places:-

Electric meter Rooms.

Sub-station.

Pump Rooms.

Hand appliances shall be installed in readily accessible locations with the appliance brackets fixed to wall by suitable anchor fasteners or by means of floor mounted supports.

Each appliance shall be provided with an inspection card indicating the date of inspection, testing, change of charge and other relevant data.

All appliances shall be fixed in a true workman like manner truly vertical and at correct locations. Identical type of extinguishers shall be of same make and shall have similar method of operation.

Handing Over:

All commissioning and testing shall be done by the contractor to the complete satisfaction of the Engineer-in-Charge, and the job handed over to the Engineer-in-Charge, or his authorized representative.

Contractor shall also handover, to the Engineer-in-Charge, all maintenance & operation manuals and all other items as per the terms of the contract.

Guarantee:

The contractor shall submit a warranty for all equipment, materials and accessories supplied by him against manufacturing defects, malfunctioning or under capacity functioning.

The form of warranty shall be as approved by the Engineer-in-Charge.

The warranty of all the components shall be valid for a period of Five year (in DLP) from the date of handing over.

The warranty shall expressly include replacement of all defective or under capacity equipment. Engineer-in-Charge may allow repair of certain equipment if the same is found to meet the requirement for efficient functioning of the system.

The warranty shall include replacement of any equipment found to have capacity lesser than the rated capacity as accepted in the contract. The replacement equipment shall be approved by the Engineer-in-Charge.

Gas Suppression System (of Electrical panels):

Inbuilt gas suppression-based panel flooding system shall be there in all TTA/Design Verified panels, HT panel & synchronisation panel.

The Protected Area should be without openings to ensure the required concentration of the gas is available to extinguish the fire. The openings in prescribed Panels for the cables, pipes and ducts, and similar utility services etc. should be sealed so as to avoid leakage of the gas from the Protected Area.

All such appliances, equipment such as circuit breakers, monitoring equipment, Bus bar compartments, cable alley chambers etc. in the Protected Area, which are likely to disperse the gas released should stop working at the time of release of gas. Hence all the power point circuits which feed to such systems which need to run even in case of fire, should be fed from a separate DB with facility to trip the supply on activation of fire alarm signal from the Protected Area.

Work shall be executed as per CPWD specifications Part VIII- Gas based Fire extinguishing system-2013 with up to date amendments.

Table 12-1: List of Materials and Their Preferred Makes for Firefighting and Plumbing Installations

S. No.	Details of Material	Preferred Make
1	Pipes(MS/ GI)	Tata/Jindal(Hissar)/SAIL
2	Terrace Pump	Grundfos/ Kirloskar / Mather & Platt / KSB
3	Electric Motors	Siemens / Kirloskar /Crompton /ABB/ Bharat Bijlee
4	Anti-Vibration Mounting	As per OEM / OEA
5	Gate Valve/ NRV/ Ball Valves/ Check Valves	Leader / Zoloto/ Sant/ Kirloskar /Advance/Audco

S. No.	Details of Material	Preferred Make
6	First Aid Hose Reel	Dunlop / Jyoti / Padmini / New age/ Superex/Omex
7	Fire Hydrant valves / Branch Pipe / Hose Coupling / Drum of Hose Reel	Padmini / New Age / Omex / Minimax / Superex
8	Fire Hose Pipe	Padmini / New Age / Omex / Jayshree / Superex
9	Sluice & non return valves	Leader / Zoloto/ Sant/ Kirloskar /Advance/Audco
10	Pressure switch	Indfoss/ Honeywell /Johnson /Stefa /Switzer/SystemSensor/Danfoss
11	Pressure Gauges	Fiebig/ H-Guru/ Bell/Wika/Metzar/Bostobell/Star Scientific
12	Mechanical Seal	Durametallic/Sealol
13	Enamel Painting of pipes etc.	Asian/GoodlasNerolac/ICI / Berger/Salimar/Nerolac
14	Paint Primer	Asian/JensonNicholson/ Berger/Salimar/ Nerolac
15	Fasteners.	Hilti / Fischer/OBO
16	Weld Rods	Advani/ Mangalam /Esab
17	Ball Valves	Leader/Kirloskar/Advance/Audco/ Zoloto/Hammer /Sant/
18	Butterfly Valve	Leader/Kirloskar/Advance/Audco/ Zoloto/Hammer
19	RRL Hose	Padmini / New Age / Omex / Minimax / Superex
20	Rubber Gaskets	C I C / Varuna /Any ISI mark
21	Branch pipe	Padmini/Newage/Omex/minimax/Superex
22	Strainer	Kirlosker/Advance/Audco/Zoloto/Grandprix/ Leader/ Emerald/Hammer
23	Wafer type Non Return Valves	Leader/Kirloskar/Advance/Audco/ Zoloto/Hammer
24	Installation Control Valve	Tyco/ HD /Viking./CD/ Spray safe/Grommell
25	Passive Fire Protection Materials	Promat/ Hilti / 3M
26	First Aid Hose Drum	Padmini / New Age / Omex / Minimax / Superex
27	Flow Switch	System Sensor/Switzer/Honeywell
28	Electrical Pump Panels	As per EI Work Make list

S. No.	Details of Material	Preferred Make
29	Any other item	To be approved by engineer in Charge

FIRE ALARM SYSTEM

SCOPE OF WORK

The scope of work includes design, planning, supply, installation, testing and commissioning, handing over and taking relevant NOC from the local bodies as applicable.

- Manual Operated Fire Alarm system complete with manual addressable call points & hooters, strobe, addressable fire alarm panel, Fire survival cable recessed in ceiling/wall/ surface as required.
- Manual fire alarm system shall be provided in substation, Pump House and all the areas required as per NBC 2016.
- For Conventional Hall area individual Addressable fire alarm panel with minimum 2 loops shall be provided. In dining area, LPG/PNG gas detectors shall be provided. Gas detectors shall be integrated with addressable fire alarm panel with help of monitor module/ relay module.

Condition for designing

- Design and preparation of working drawings for Addressable Manual fire alarm system. The system drawings should clearly show Main fire alarm panel, Manual call point, strobes, hooters, gas detectors /heat detectors in line with the statutory requirements. Size all equipment required and prepare detailed specifications, obtain necessary NOC/permissions from the statutory / local fire authority / bodies etc. as required. Check and approve detailed drawings and data sheet of suppliers/ manufacturers and incorporation of modification of any working / architectural /structural drawings.

TECHNICAL SPECIFICATIONS

1.0. Manual Call Points

1.1. Scope

This section covers the requirements of manual call points (MCP) used in addressable fire alarm systems.

1.2. Constructional Requirements:-

1.2.1 It is used to trigger a fire alarm manually, and should be suitable for connection to the system loop technology. The alarm is raised by breaking the glass with the alarm carrying on until a replacement glass panel is fitted or alarm

to be made silent from control panel. Suitable arrangement like scratching by a diamond bit shall be incorporated in the frangible element.

1.2.2 A micro switch within the units is held “off” by the edge of the glass when glass is broken the switch is released and a signal is transmitted to control panel where the alarm is raised. The glass shall be plastic coated to eliminate the damage of splinters causing injury.

1.2.3 For testing without breaking the glass a test key, should be available so as to lower or remove the glass to release the micro switch. Full functional test is achieved accordingly.

1.2.4 Facility for reset/adjustment of manual call point alarm triggering.

1.2.5 The unit shall be made out of polycarbonate ABS blend with flame retardant & self-extinguishing properties or cast aluminium or ASA plastic or as per manufacturer design and applicable standards.

1.2.6 It shall preferably contain an integrated short circuit isolator which should ensure that a fault is localized and that the loop continues to function fully in the event of a wire break or a short circuit.

1.2.7 The call box shall have suitable provision to knock out of termination of a 20mm conduit. This shall also have suitable provision for being fixed on surface or semi recessed in wall.

1.2.8 The word 'FIRE' shall appear embossed in red colour on the front.

1.2.9 Acknowledgement LED displays –red for triggered alarm indication (flashing) and / or maintenance evacuation.

1.2.10 Protective category shall be IP54 for indoors & IP65 for outdoors applications.

1.1. Intelligent Addressable Monitor Module:

(i) The module shall be suitable to monitor the polling of up to minimum four potential free contacts by using a single or multiple housing and designed for surface or flush mounting.

(ii) The operating mode can be selected and is assigned separately for each input the addressing of the module and the setting of parameters should be carried out using PC software or IBMS software, via the fire alarm control panel.

(iii) The module should contain an integrated short circuit isolator which ensures that the fault is localized and the loop continues to function fully in the event of a wire break or a short circuit.

(iv) The module should be minimum IP 40 protection category when housed in a case or as per manufacturer design.

(v) The module should be with soft addressing to be set with a PC via fire alarm

panel at the time of programming.

(vi) The module should have integrated buzzer for signalling maintenance alarms.

(vii) An LED shall be provided that shall flash under normal condition indicate that module is operational.

2.0 Intelligent Addressable Relay / Control Module:

(viii) Relay module may contain up to four relays each with a potential free changeover contact.

(ix) Each relay contact should be FAIL/ SAFE programmable, means it should be possible to program each contact to operate in three conditions viz. NO FIRE CONDITION, FIRE CONDITION AND LOOP POWER FAILURE CONDITION.

(x) Both the addressing of the module and setting of parameters to be carried out using PC software via the fire alarm control panel.

(xi) The module contains a short circuit isolator, which ensures that the fault is localized and that the loop continues to function fully in the event of a wire break or a short circuit.

(xii) The module should be minimum with IP 40 protection category when housed in a case or as per manufacture design.

(xiii) It should have integrated buzzer for signalling maintenance alarms.

(xiv) Its housing have is designed for surface or flush mounting.

1.2. Isolator Module:

(i) The module shall limit the number of module of detectors that may be rendered inoperative by a short circuit on the loop segment.

(ii) At least one isolator module shall be provided for each floor or protected zone of the building for every 20 devices in loop.

(iii) If a wire short circuit occurs, the isolator module shall automatically open circuit (disconnect) the loop. When the short circuit condition is corrected, the module shall automatically reconnect the isolated section.

(iv) The module shall not require any address setting and its operation shall be automatic. It shall not be necessary to replace or reset an isolator module after its normal operation.

(v) It shall give information on the control panel in the form of audio- visual alarm enunciations along with list of detectors which have become non-functional.

2.0. Addressable Fire Alarm Control Panel

2.1. Scope

This section covers the requirements of main fire alarm, control panel, repeater panel, graphical management system, response indicator etc. used in addressable fire alarm system. The control panel shall be of minimum 2 loop. All hardware components, convertors, relays and software components required for the same shall be included in the scope of contractor.

2.2. Functional Requirement.

2.2.1 General

- (i) In the event of fire alarm but not in a fault condition, the exact location shall be shown on the Main Fire Alarm Panel (MFAP).
- (ii) Local sounder should sound automatically.
- (iii) Complete information shall be printed with time and date of occurrence.
- (iv) Pressurization fans of lift shafts shall automatically be switched ON if required as per NBC 2016.
- (v) The panel shall have the facility to process the input signals and control the output functions either directly or through interface modules as per the requirements.
- (vi) The panels shall have necessary interface units for addressable detectors alarm output modules for external actuations through fail safe programmable relays.
- (vii) The processor shall interact with the other modules through a common bus.
- (viii) The system shall store all basic information and job specific data in memory.
- (ix) Different password shall protect any change to system operations.
- (x) The design of the panel hardware and software shall incorporate the capability to accept additional input from fire protection system such as sprinkler and water flow switch etc.
- (xi) The panel shall have an extra loop card to serve as standby in case of burn out or malfunctioning of any operating loop cards.
- (xii) The panel shall be totally enclosed, dust and vermin proof.

2.3. Addressable Fire Alarm Control Panel (FACP)

2.3.1 The addressable Fire Alarm Control Panel (FACP) shall function as a network panel & also as a fully standalone panel. FACP shall have its own microprocessor, software and memory. In the event of failure of panel or communication breakdown between the networked panels the FACP shall automatically operate on stand-alone mode without sacrificing any functions (The networking should be peer to peer). Information of all panel in the network should

be available on all individual panels.

2.3.2 The panel should be modular microprocessor based in nature and should be expandable up to 4 loops and each loop shall contain a minimum of 192 addressable devices.

2.3.3 FACP shall supervise detection circuits and shall generate an alarm in case of abnormal conditions.

2.3.4 FACP shall provide general purpose inputs for monitoring such functions as low battery on AC power failure. FACP shall provide tamper protection and command able outputs, which can operate relays or logic level devices.

2.3.5 Smoke detectors shall be powered using the FACP based smoke detection circuits FACP shall provide control for resetting smoke detectors, fault isolation and sensor loop operations. It shall be possible to mix different fire devices within same FACP to optimize field wiring.

2.3.6 It shall be possible for the panel to have a loop length with different modules offering 1.5 km length of devices from the panel.

2.3.7 FACP shall provide monitoring and control of one floor or area or for multiple floors or areas. FACP shall meet the following requirements to assure the integrity and reliability of the system:

2.3.8 The FACP shall have proper listing and / or approval from the following recognized agencies:

(i) National Fire Protection Association (NFPA) -USA. This will cover the following approval:

- (a) UL (Under writers Laboratories Inc.)
- (b) ULC (Under writers Laboratories Canada)
- (c) FM (Factory Mutual)
- (d) CSFM (California State Fire Marshal)
- (ii) EN (European)

This will cover the following approval:

- (a) LPCB (Loss Prevention Council Board)
- (b) VDS (Vertauen Durch Sicherheit)
- (c) BRE

FACP shall be NFPA/EN listed independently and as per relevant IS Code as a Fire Alarm Control Panel.

2.3.9 The FACP should have integrated power distribution module and fixed cabling done internally to guarantee a clear and tidy cable feed

2.3.10 The panel should have an LCD display with minimum 300 characters and keypad. The Display should enable a flexible design of the operating menu with variable keys and message windows fixed keys should be used for standard operating steps e.g. for fire alarm securities supervisory trouble and other events. The current status of the system should be displayed by LED's interfaces (RS232/RS485) enable the connection to a PC.

2.3.11 The panel should have a 230V AC power supply unit in plug in design with rack and panel connector and 24VDC /6Amp. single output power supply. The module should be protected against over voltage and reverse polarity. The output voltage is monitored and regulated externally.

2.3.12 LCD display at the FACP shall be provided to indicate point of alarm or trouble. In Such systems means for manually scanning the points in trouble shall be provided and a trouble and alarm LED shall be used to indicate that there are points in alarm / trouble. The alarm /trouble LED shall only get switched off when all alarm / trouble are cleared from the loop.

2.3.13 It shall be possible to command test, reset and alarm silence from the FACP.

2.3.14 FACP switches shall allow authorized personnel to accomplish the following, independent of the central console.

- (i) Acknowledge a general alarm condition.
- (ii) Silence the local audible alarm.
- (iii) It shall be possible to silence the alarm indicating devices (hooters).
- (iv) Reset all zones (logical Point Group) / points, after all initiating devices have returned to normal.
- (v) Perform a complete operational test of the memory with a visual indication.
- (vi) Test all panel LED's for proper operation without causing a change in the condition of any zone (Logical Point Group).
- (vii) Walk test –The system shall provide both a basic and advanced walk test for testing the entire fire alarm system including testing of all devices, detectors module etc. in the complete system.

2.3.15 Software zones/loops shall be circuited and protected by fault isolators such that in the event of a zone/ loop short –circuit, smoke and thermal sensors shall be located and shall report alarm and fault isolator unit after every 20 detector or devices in a loop isolates the part.

2.3.16 Monitoring modules shall be provided to monitor and address contact-type input devices. The monitor module shall be housed in the FACP supervised by FACP.

2.3.17 The FACP shall have drift compensation facility to compensate for environment. When a detector accumulates dust in the chamber and reaches an unacceptable level but still below the allowed limit, the control panel shall indicate maintenance alert warning and the same shall be mirrored to IBMS system to alert. When the detector accumulates dust in the chamber above the allowed limit, the control panel shall indicate a maintenance urgent warning.

2.3.18 The FACP should be NFPA/EN listed approved to provide the sensitivity measurement and documentation required.

2.3.19 FACP shall be backed up with its built in UPS power with batteries which can be installed in the same rack. Further the control panel shall be backed up from power outlets of central UPS supply of the building.

2.3.20 The display on FACP shall provide indication for AC power, system alarm, system trouble/security alarm, display trouble and signal silence to this would mean that in the event of change of any detector/zone sequence alterations, the operator can initiate these by use of the LCD & alpha –numeric keys on the FACP panel to reconfigure the above parameters.

2.3.21 Power supply unit of FACP shall have following characters:

- (i) The main power supply shall be 230V AC $\pm 10\%$ 50Hz $\pm 3\%$ and shall in turn provide all necessary power of FACP.
- (ii) It shall provide a separate battery control module with charger. The battery should last for 24 hours minimum in normal operation upon power failure & 30 minutes in alarm condition.
- (iii) For ease of service, all wiring terminal blocks shall be plug-in type.
- (iv) The fire alarm panels shall have a possibility of being interlinked by direct connectivity or an optical cable link between the various locations and should further have connectivity to the main control centre.

2.3.22 Each loop shall have minimum 192 detectors/devices.

2.3.23 There shall be minimum 20% spare capacity in the looping system for future expansions. The firm has to intimate the maximum number of devices/detectors can be connected in one loop based on the manufacturer design . Some devices need external supply and some devices supported by loop power.

2.3.24 The length of loop shall not exceed more than 3000 meter for wire size 1.5sq mm. as per manufacturer recommendations.

2.3.25 Each loop should not be divided into more than 8 fire zones.

3.0. Addressable Intelligent Sounders And Silencing Switches

3.1. SCOPE

This section covers the requirements of sounders and silencing switches used in fire alarm systems. The sounders shall be provided with strobe at every location.

3.2. Type of Sounders:

3.2.1 Panel Sounders

3.2.2 Addressable Loop Fire Alarm Sounders.

3.3. Functional requirements:

3.3.1 Panel Sounder shall be provided in specified fire alarm panel, repeater panel if any so as to draw attention of the caretaking personnel in a building to a fault in the FAS wiring and a fire condition in the protected premises.

3.3.2 Fire alarm sounder of low intensity type shall be installed to signal to the occupants of the building to evacuate in the event of a fire.

3.3.3 Fire alarm sounders cum strobe of high intensity types shall be installed to draw the attention of the fire fighting personnel towards the main location of fire in the premises where a fire has erupted. The strobe should have a light intensity of 15cd. To 100cd.

3.3.4 Fire alarm sounders shall not be used for any purpose other than for fire operations.

3.3.5 Silencing facility shall be provided only for panel sounders and not for fire alarm sounders.

3.3.6 It shall be designed Suitable for ceiling mounted or wall mounted.

3.4. Operation of sounders and silencing:

3.4.1 Panel sounders shall be actuated automatically from the control panel.

3.4.2 Panel sounders shall be actuated automatically as soon as fire alarm signal is initiated from any trigger device connected to them. These shall also be sounded when there is a fault alarm signal within their areas of control.

3.4.3 A silencing switch shall be provided in the panel. Operation of this switch shall mute the audio output from the panel sounder in this panel and in its repeater panel, if any. Silencing switch shall also be provided in repeater panel which when actuated shall mute the audio output in the panel only.

3.4.4 Fire alarm sounders in a zone affected by a fire shall be actuated automatically as soon as fire alarm signal is initiated from any trigger device in that zone. All other fire alarm sounders shall be actuated only automatically from the fire alarm panel.

3.5. Specification Requirements:

3.5.1 Sounders

(i) The frequency of sound from sounders shall lie in the 500-1000 Hz band.

The sound level shall be at least 65dB (A) or 5dB (a) above or any other noise likely persists for a period longer than 30 second at any part of the building sounders with a level greater than 120 dB (A) shall not be provided.

(ii) The sound shall be continuous although the frequencies and amplitude may vary and of the same characteristics from the fire alarm sounders in a building. Coded fire alarm signalling from sounders shall not be provided which may cause hearing damage.

(iii) 'Fault alarm' and 'Fire alarm' in a panel sounder shall be distinctly different.

(iv) The sounder shall be with IP 54 protection category.

(v) It shall conform to EN/NFPA/Indian standards.

(vi) The volume of sounders can be adjusted from the fire detectors control panel. Minimum three volume setting from fire alarm control panel shall be available.

(vii) The strobe cum hooter are two wire devices that offer tone choices of either continuous horn or temporal tone when constant voltage from fire alarm control panel is applied. Each tone has minimum three volume levels that can be selected for installation.

(viii) The strobe cum hooter installed at entrance of building should have three tones programmable from the fire detector control panel so that at least one of these tones can be selected to comply with at least 110dB (A) frequency range of 440Hz to 2850 Hz. The Volume should be adjustable from control panel.

(ix) The strobe should have a light intensity from 15 cd to 110 cd.

3.6. Installation Requirements:

3.6.1 Low intensity fire alarm sounders may be installed on surface of ceilings, suspended from ceiling or recessed in flush with the ceiling, depending on the construction of the sounder and ceiling height.

3.6.2 These shall be installed at a height not lower than 2.4 mtrs. except when recessed in a false ceiling of lower height. In such cases the sounders shall be recessed at false ceiling level.

3.6.3 When installed flush with a false ceiling these shall match the ceiling surface. Necessary provisions such as wooden boxing or frame work to accommodate the sounders shall be made in the ceiling in advance.

3.6.4 High intensity sounders shall be mounted on substantial supports. Provisions for terminating the electrical wiring cables shall be such as not to permit entry of rain water through the wiring conduits or cable runs.

4.0. Power Supply Equipment and Wiring

4.1. SCOPE

This section covers the requirements of power supply equipment for the addressable Fire Alarm System (AFAS) and the wiring for the system.

4.2. Main Supply

Power supply at 230 + 10% V, 50Hz, AC single phase shall be tapped from UPS supply power points, terminating directly into the incoming switches of the C&I panel. Earth wire shall also be provided with the power supply. Rectification of the input AC supply into DC and further stabilization of the voltage as may be necessary shall form part of the FAS equipment.

4.3. Stand by battery supply

4.3.1 Standby battery shall be provided with Fire Alarm Control Panel.

4.3.2 Battery supply shall be arranged to automatically feed the FAS in the event of variation of input A.C. voltage beyond pre-set values on high and low sides.

4.3.3 The battery shall be sealed completely maintenance free. The battery shall be conforming to relevant Indian/International Standard. The normal voltage shall be suitable for the AFAS. The Capacity of the battery shall be suitable to feed the fire alarm panel and other addressable loop elements for a period of 24 hours upon a normal power failure and after which sufficient battery shall remain to provide full load operation for at least 30 minutes in line with IS 2189.

4.3.4 Installation:

Battery shall be located in the main fire alarm panel.

4.4. Battery Charger

4.4.1 The power supply in the fire alarm panel shall be in-built automatic battery charger suitable to charge the batteries as per the requirements of relevant standard.

4.4.2 The charger shall be complete with necessary voltmeter, ammeter, indicating lamps, fuses etc.

4.4.3 It shall have protection from overloads and short circuits on both AC & DC sides.

4.4.4 It shall have protection to prevent discharge through the charger.

4.5. Wiring for FAS/AFAS

4.5.1 Circuit Design:

(i) The loop element (Manual Call Points, Monitor Modules Control Modules, Loop Sounders) wiring in AFAS shall be closed circuit loop type (Class A type), so that if the communication fails from one side, it is restored automatically from the

other side.

- (ii) The design of the system wiring shall match the control and indicating equipment in the system.

4.5.2 Wiring Materials:

- (i) The wiring shall be 2x1.5 sq.mm fire survival armoured cable, 600/1000V rated with annealed copper conductor having glass mica fire barrier tape covered by an extruded layer of Cross Linkable Ethylene Propylene Rubber (EPR) insulation and LSZH inner bedding, steel wire armouring & LSZH outer sheath.
- (ii) The strand of cables shall not be cut to accommodate & connect to the terminals. The terminals shall have sufficient cross sectional area to take all the strands.

4.5.3 Installation requirements:

- (i) The electrical work connected with FAS shall be carried out in conformity with CPWD general specification for electrical works Part-I (Internal) 2023, and part-II (external) 2023, both amended up to date.
- (ii) In no case the FAS equipment or connections be mounted in or on boxes, cover plates or blanks carrying the accessories or connections of any other service.
- (iii) FAS wiring shall be exclusive to the FAS and be physically separated from wiring for any other service in the building.
- (iv) Wiring for different circuit voltages in a FAS shall be in separate conduits.
- (v) To minimize possible disruption due to fire or other causes, fire alarm circuits should be separated as much as possible from each other. Where practicable, the different fire alarm circuit shall be run through different routes.
- (vi) The metal body of all control and indicating panels shall be loop earthed using 2.5 sq.mm copper wires and bonded to the earthing system in the building.

5.0. Inspection, Testing And Commissioning

5.1. Scope

This section covers the requirements for testing and commissioning of all types of fire alarm systems/ intelligent addressable fire alarm system.

5.2. Testing before supply

5.2.1 MCP, control and indicating panels, sounders equipment and battery unit with charger etc. shall be tested at the manufacturer's works to indicate satisfaction to the contract specifications, and test certificates be furnished with the supply at site of work by the contractor.

5.2.2 In case of imported fire alarm components such as main fire alarm panel, Repeater panel, Manual Call points, Monitor and Control modules, Response

Indicators, etc.; individual certificate with individual number confirming to the relevant international standard shall be provided by the contractor at the time of supply at site of work.

5.3. Testing after installation :

Following tests shall be conducted in a completed FAS/AFAS/intelligent addressable FAS installation, in the presence of the Engineer-in-Charge and the test certificate shall be furnished for the following test.

- (i) Continuity test.
- (ii) Test for insulation resistance of the wiring and the control and indication panels.
- (iii) Test for system operation. In the case of AFAS (See note below), this test for fire conditions shall be conducted using a test fire at normal floor level. The number of locations for such a test shall be minimum 1% of the total number of detectors in an installation subject to a minimum of two and maximum of five. The system operation for fault conditions shall be conducted by introducing faults such as open circuit, short circuit, removal of detector, open/short circuit in a sounder circuit etc.

5.4. Inspection by local bodies

It shall be the responsibility of the contractor to get the installation inspected and passed by the local authorities concerned, as may be required by the local bye-laws, including payment of necessary inspection fee and an 'No Objection Certificate' (N.O.C) shall be obtained from the authority.

NOTE: The testing at manufacturer's factory and at site after installation shall be done as per the directions of Engineer-In-charge as required by CPWD specifications.

The specification covers design, supplying, installing, testing and commissioning putting into operation of Addressable Fire Alarm System for along for all the various building.

- The work shall be executed as per CPWD General Specifications for Electrical Work Part VI – Fire alarm system 2018 as amended up to date and Part I Internal 2023 as amended up to date, relevant I.E. Rules, BIS/IEC and shall comply with latest requirements of NFPA/IS standards and as per directions of Engineer-in-Charge. These additional specifications are to be read in conjunction with above and in case of variations; specification given in these additional conditions shall apply.
- The tenderer should in his own interest visit the site and familiarize himself with the site conditions before tendering.

- No T&P shall be issued by the Department and nothing extra shall be paid on account of this.

Table 12-2: Preferred Makes for Fire Alarm System Components and Accessories

S. No.	Details of Material	Preferred Make
1	Addressable Manual call Box / Sounders/ Strobes / Hooters	NOTIFIER / BOSCH / GAMEWELL(USA) Fenwell / Detnov(SPAIN)
2	Analog Addressable Main Fire Alarm Control Panel with battery charger	NOTIFIER / BOSCH / GAMEWELL(USA) Fenwell / Detnov(SPAIN)
3	Addressable Input Module	NOTIFIER / BOSCH / GAMEWELL(USA) Fenwell / Detnov(SPAIN)
4	Addressable Output Module	NOTIFIER / BOSCH / GAMEWELL(USA) Fenwell / Detnov(SPAIN)
5	Addressable Fault Isolator	NOTIFIER / BOSCH / GAMEWELL(USA) Fenwell / Detnov(SPAIN)
6	Fire survival cable	LAPP KABEL / PIRELLI / BELDEN RAMCRO / DRAKA / POLYCAB /
7	Any other material	To be approved by engineer in charge

TECHNICAL SPECIFICATION FOR PACKAGE AIR CONDITIONER UNITS

Scope

- This part involves design, supply, installation, testing and commissioning of Air Conditioning System for Conventional Hall as per design calculation & as per guidelines issued by ASHRAE, ISHRAE, BIS, NBC 2016, and the requirement of Client and additional specifications.
- The total Cooling (TR) requirement for the Convention Hall load is based on standard practice and for area of 6189.69 sqft shall not be less than be 56 TR.
- Scope of work includes design, capacity selection, model selection, supply, installation, testing and commissioning of all the components of AC Package Units:

Scope of works also includes the following:

- (i) Preparation of heat load calculation of AC area and selection of the indoor and outdoor units and all equipment of AC Package Units system considering de rating of equipment at design condition in consultation with the Client/Consultant as per design data and approval of the same from Engineer in charge.
- (ii) Preparation of equipment and piping layout, their location and approval of the same from Engineer in Charge.
- (iii) Planning and designing duct layout showing the location of the grills for supply & return.

- (iv) Providing Ducts (should be factory fabricated complete with insulation etc) and providing VCD flexible connection complete as reqd.
- (v) Planning and designing of plumbing, piping etc.
- (vi) Designing of LT Panel and control panel and its cabling network from Conventional Hall Panel to various equipment.
- (vii) Outdoor stands for AC Package Units.
- (viii) Submission of the data sheet and catalogue of the various equipment's in support of their design.
- (ix) All the design, drawings, data sheets, catalogue has to be get approved from Engineer in charge before supplying the material at site.
- (x) Ventilation of the service area like sub-station etc., toilets and Non-AC area shall be provided as per NBC guidelines.
- (xi)

Package Air Conditioning Unit shall be delivered with air cooled condenser. The package air conditioning unit shall include all the items required for reliable, safe and unattended trouble-free operation consisting of:-

- a) Inner evaporator unit/air cooler unit with moisture separator.
- b) An outer compressor and condenser unit.
- c) Installation Manual for routing of the refrigerant piping.
- d) Operation and Maintenance Manual from OEM.
- e) Manufacturer's certificate on the packaged air conditioner.

Applicable Codes And Standards

The equipment shall also conform to the latest editions as on bid due date of all national/ international standards and codes (along with all addenda), mentioned below. In particular the equipment rating, manufacturing and testing shall conform to latest editions of guiding standards. Nothing in this specification shall be construed to relieve the vendor of his responsibility.

General Function and Description

General Function

Package Air Conditioning Units are intended for heat removal from operating equipment, cooling, dehumidification, filtration of Convention Hall.

Ozone-safe/ eco-friendly refrigerant is to be used in the Air Conditioning Units. During operation the refrigerant is compressed in compressor from evaporation pressure up to condensation pressure.

Air cooled package air conditioner (PAC) units having scroll compressor are envisaged to cater to the air conditioning load.

The packaged indoor evaporative units shall be kept in AHU room where as condensing unit shall be kept outside the AHU Room /Passage area / Roof. Outlet of all the package units shall be collected in a common plenum chamber through flexible canvas connection & volume control dampers. The conditioned air is then distributed to various AC areas through duct along with diffuser (with volume control damper) running above false ceiling. The return air from all these areas shall be collected above false ceiling & shall be taken back to the AHU room.

- The PACs shall consist of: -
 - Scroll compressors suitable for refrigerant R-410A / R 32/ R407C with drive motor, air-cooled condenser with integrally groove copper tubes and propeller fan, DIDW blower, cooling coil, filter, inter connecting refrigerant piping, insulation, vibration isolator, inbuilt – microprocessor-based controller and accessories.
 - Vibration isolation pads.
 - First charge of refrigerant and oil.

Terminal points

Mechanical

- Packaged air-conditioner outlet flange connections

Electrical

- The terminal point of 380V. 3 phase power supply for each PAC's will be up to the PAC's incoming.
- Control & Instrumentation

Compressor

The compressor shall be hermetic / semi-hermetic scroll type. The same shall be suitable for R410A/ R32/ R407c refrigerant. The compressor shall be mounted on anti-vibration spring/rubber pads and shall be positioned in such a way that it is freely accessible with sufficient space all around for easy maintenance. Safety controls like High- and Low-pressure cut-out overload and single phasing protection for the motors shall be provided. A crankcase heater shall also be provided, if considered necessary by the vendor.

Evaporator and Condenser

Air cooled condenser with adequate area shall be provided. The condensing unit shall be complete with multi-pass heads and shall be fitted with the following:

Fan with drive motor, hot gas inlet and liquid outlet connection with shut off valve for liquid, drain plug, air vent and test valve.

Air Handling Fan & filter

The air handling fan shall be of the centrifugal type and with forward curved blades. This shall be driven by means of a three-phase induction motor through V belt drive. The fan static pressure shall be selected for passing air through high efficiency filters

Cooling Coil

The cooling coil shall be of direct expansion type and shall be made of heavy gauge copper with aluminium fins/blue fins. The fins shall be bonded to the copper tubes under hydraulic pressure. A distributor shall be provided for feeding the refrigerant to different sections of the coil. Rows shall be staggered in the directions of airflow. The velocity of air across coil shall not exceed 2.5 m/s.

Refrigerant Piping

The refrigerant piping shall be heavy gauge copper. The piping shall be completely factory assembled, pressure tested, dehydrated and initially charged with refrigerant gas and compressor oil. The line accessories shall include liquid line shutoff valve dehydrator, strainer, flow indicator and distributor etc.

Cabinet

All the equipment, except local control panel, mentioned above shall be provided within a heavy gauge sheet metal cabinet, of floor/ wall mounted type. This shall be given two coats of anti-corrosive and rust proof paint, finished with two coats of final paint. Painting shall be as per manufacturers standard .. The interior of the cabinet shall be provided with thermal and acoustic insulation of minimum 25mm thick. The insulating material shall be fire proof.

The front and back side of the cabinets shall be easily removable providing maintenance to all the interior parts.

All the electric wires within the cabinet shall run in flexible conduits and carry identification tags. The bottom side of the panel shall be specially ribbed to take care of the transportation.

Each packaged air conditioner shall be provided with required number of neoprene rubber isolating pads. Suitable drain connection with drain pipe shall be provided for removal of condensate collected in the tray under the cooling coil.

Electrical Requirement

Voltage of mains supply of Package air conditioners shall be 380V, 50Hz AC supply.

Deviations of voltage +/- 10 %.

Deviations of frequency +/- 3 %.

Combined frequency and voltage deviation not exceeding ± 10 %.

REFRIGERANT PIPING

All refrigerant piping for the air conditioning system shall be as per table given below with copper fittings and silver soldered joints. The refrigerant piping arrangements shall be in accordance with good practice within the air conditioning industry, and are to include charging connection, suction line insulation and all other items normally forming part of proper refrigerant circuits.

All joints in copper piping shall be sweat joints using low temperature brazing and or silver solder. Before joining any copper pipe or fittings, its interiors shall thoroughly cleaned by passing a clean cloth via wire or cable through its entire length. The piping shall be continuously kept clean of dirt etc. while constructing the joints. Subsequently, it shall be thoroughly blown out using nitrogen.

After the refrigerant piping installation has been completed, the refrigerant piping system shall be pressure tested using nitrogen at pressure of 20 Kg. per Sq. cm and 10 Kg. per sq. cm. (low side). Pressure shall be maintained in the system for 24 hours. The system shall then be evacuated to minimum vacuum if 700 mm hg. and held for 24 hours.

The air-conditioning system supplier shall design sizes and erect proper interconnections of the complete refrigerant circuit.

The thickness of copper piping shall not be less than mentioned below:

	Pipe size in mm (OD)	Thickness in mm	Insulation Thickness
1	6.4 mm	1.2 mm	19 mm
2	9.5 mm	1.2 mm	19 mm
3	12.7 mm	1.2 mm	19 mm
4	15.86 mm	1.2 mm	19 mm
5	19 mm	1.2 mm	19 mm
6	22.2 mm	1.2 mm	19 mm
7	25.4 mm	1.2 mm	19 mm

8	28.58 mm	1.2 mm	19 mm
9	31.8 mm	1.62 mm	19 mm
10	34.9 mm	1.62 mm	19 mm
11	38.1 mm	1.62 mm	19 mm
12	41.27 mm	1.62 mm	19 mm

The suction line pipe size and the liquid line pipe size shall be selected according to the manufacturers specified outside diameter. All refrigerant pipes shall be properly supported and anchored to the building structure using steel hangers, anchors, brackets and supports which shall be fixed to the building structure by means of inserts or expansion shields of adequate size and number to support the load imposed thereon.

PIPE INSULATION

Refrigerant pipe Insulation

The whole of the liquid and suction refrigerant lines including all fittings, valves and strainer bodies, etc. shall be insulated suitable size indicated in table with elastomeric nitrile rubber.

Drain pipe Insulation

Drain pipes carrying condensate water shall be insulated with 6 mm thick elastomeric nitrile rubber insulation.

For Proper drainage of condensate. U Trap shall be provided in the drain piping (wherever required). All pipe supports shall be of prefabricated & pre painted slotted angle supports, properly installed with clamps etc.

FACTORY FABRICATED DUCTS

The ducting shall be fabricated from coils. The thickness of the sheet for rectangular ducts for GSS / Aluminium shall be as follows:

Maximum size of Duct	Minimum sheet thickness	
	GSS	Aluminium
750 mm and below	0.63	0.80
751 mm to 1500 mm	0.80	1.00
1501 mm to 2250 mm	1.00	1.50
2251 mm and above	1.25	1.80

The maximum length of each duct piece shall not exceed 1200 mm. Cut sheets shall not be used other than elbows or for ducts having a size bigger than factory available sheet size. All ducting shall be with duct mate type flanges and no C & SS joints will be acceptable.

The slip-on flanges shall be with roll formed GI sections. The corner pieces shall be suitable for inserting into the hollow web of the slip-on flange. The slip-on flange shall be fixed by clinching or by pop riveting to have a rigid joint. The spacing shall not exceed 150mm. Self-tapping screws are not acceptable. Recessed groove shall be provided in the slip-on flanges and corner plates for the proper seating of gaskets.

The corner piece shall be secured by electro galvanized carriage bolts with flange nuts. The gaskets shall be of self-adhesive, microcellular, cross linked polyethylene foam type. The gaskets shall be non-toxic, permanently semi-soft and formulated for HVAC/ Pharmaceutical/ Clean room/ Food grade applications.

The ducts shall be of medium pressure type having a pressure of 2000 Pascal's (Class II ducts) and the leakage shall be as per SMACNA/DW 143 standards. The ducts shall be provided with cross breaking having a span not exceeding 400 mm. The slip-on flange shall have thickness of 0.6 mm for ducts up to a maximum size of 500 mm; 0.8 mm for ducts having a size between 501 mm and 750 mm; 1.0 mm for ducts having a size of 751 mm to 900 mm; 1.25

mm for ducts having a size of 901 mm to 1200 mm and 1.5 mm for ducts having sizes higher than 1201 mm. The width of the flange shall be 29 mm for ducts having a maximum size of 750 mm and 39 mm for higher sizes.

The duct section shall reach right up to the end of the slip-on flange. After installation of the slip-on flange and corner plates, sealant shall be applied only at the interface of the duct corner edge. Care shall be taken to ensure that corners completely clear the duct edges and the corner piece shall not sit on the duct corner edge.

The gaskets shall be 10 mm wide and 4.5 mm thick for ducts having a pressure class up to 500 Pascal. For a pressure class above 501 Pascal, gaskets shall be 15 mm wide and 6 mm thick shall be used. Care shall be taken to ensure that gasket is properly seated in the groove of the slip-on flange and corner plates in such a way that the gasket commences midway between the corner.

The gasket shall be applied in one piece and joined at the starting point with a butt joint. The gasket shall cut over the corners in an arc, protruding slightly into the air stream at the corners. The carriage bolt shall be tightened using a ratchet or a spanner. Longer duct lengths shall be aligned by passing a wire through the small round holes on the corner plates. Cleats shall be inserted over the slip-on flanges on all the sides using a special crimping tool.

The spacing between the cleats shall not exceed 150 mm. The ducts shall be bolted directly on the top corner pieces with threaded rods anchored to the ceiling using a bracket having a slot for minor lateral adjustments. Wherever specified slotted channel/ angle iron supports shall be provided.

The support rod shall be galvanized and fully threaded having a minimum diameter of 10 mm for duct size up to 750 mm and 12 mm for sizes above 751 mm. The anchor fasteners shall also be the same size of the rods. Wherever support rods require joints the smallest rod length shall not be less than 300 mm.

The galvanized steel slotted rail shall have a thickness of 1.6 mm for ducts of size up to 750 mm and 2.4 mm for sizes above 751 mm but below 1500 mm. For sizes above 1501 mm 40 x 40 x 5 mm angles shall be used. The spacing between supports shall not exceed 2000 mm for ducts having a maximum size of 1500 mm and 1200 mm for higher sizes. Additional supports for bends, elbow, collars etc. shall be used as required.

FLEXIBLE DUCTS

Where specified in the tender, flexible ducts shall be used for connecting the supply diffuser and exhaust diffuser plenum to the ducting. A double lamination of tough polyester shall encapsulate a steel helix to form an air tight inner core. The double layer core shall be wrapped in a thick blanket of fibreglass insulation and sheathed in a rugged and durable tri-directionally reinforced metalized polyester jacket. The ducts shall be complete with accessories such as saddle straps for supports and worm drive clips for termination to the rigid metallic duct collars.

Single skin aluminium flexible ducts shall be made of a triple lamination of aluminium foil, polyester and metalized polyester film permanently bonded to a coated spring steel wire helix. The PVC flexible ducts shall be fire retardant type. PVC flexible ducts shall be used for connecting the toilet exhaust plenums to the ducts or connecting the exhaust ducts in the case of laboratories. The ducts shall have pressure rating of 1500 Pa.

Acoustic lining shall be provided inside the ducts as per requirement with 15 mm thick open cell nitrile rubber insulation material having acoustic properties. The insulation shall be wrapped with RP tissue and the same shall be secured to the ducting using GI bolts and nuts, plate and bitumen washers with 24 G perforated aluminium sheet having at least 60% perforations. Alternatively pop up type saddled clamps may also be used. The clamps shall be fixed to the ducts by adhesive.

DUCT INSULATION

Supply air ducting exposed to atmosphere or in the non-air-conditioned area shall be insulated with 15mm thick closed cell synthetic foam insulation with thermal conductivity not more than 0.032W/mk. Ducts running in the return air path shall be insulated with 15 mm thick insulation with the insulation type similar to supply air ducting. All the ducts shall be covered with factory laminated 26G aluminium foil. The surface of the duct shall be cleaned with a wire brush to remove dirt and dust and the insulation stuck to the ducting using water based adhesive as per recommendation of the OEM.

The duct surface shall be cleaned and thick coat of bituminous primer applied. When the insulation is till tacky, a blanket of insulation material is applied, so that it sticks to the ducts completely. All the joints shall be sealed with 75 mm wide self-adhesive aluminium tape as recommended by the OEM. To further ensure that the insulation is laid tightly on the duct, nylon packing strap shall be wrapped around the duct at a spacing of not less than 600 mm along the length of the duct. The insulation shall be finished with black paint having matt finish.

Acoustic lining shall be provided inside the ducts as per requirement with 15 mm thick open cell nitrile rubber insulation material having acoustic properties. The insulation shall be wrapped with RP tissue and the same shall be secured to the ducting using GI bolts and nuts, plate and bitumen washers with 24 G perforated aluminium sheet having at least 60% perforations. Alternatively pop up type saddled clamps may also be used. The clamps shall be fixed to the ducts by adhesive.

S. No.	Details of Material	Preferred Make
1	AC Package Units	Blue Star/ Voltas/ Hitachi/LG
4	Nitrile rubber insulation	Thermoflex/ A-Flex/ K-Flex/ Armaflex
5	Inline Fans	KRUGER / COMEFRI / NICOTRA / HUMIDIN
6	Duct Attenuators / Acoustic Louvers	CARYAIRE / AIRFLOW / TRISTAR / AIR MASTER/COSMOS/DYNACRAFT
7	Flexible control cable and Wires	KEI/ Finolex/ Havells/ Polycab (Dully ISI Marked)
8	Armoured/Unarmoured Power Cable	Finolex/ Polycab/ Havells/ KEI (Dully ISI Marked)
9	Cable Tray	OBO/ INDIANA/ PILCO/ APEX/LEGRAND
10	Copper Pipe	Max flow / Rajco / Mandev
11	Y Joints	Toshiba/Daikin/Mitsubishi (ELECTRIC)/ O General
12	GI Sheets	SAIL / TATA / JINDAL
13	Extruded Aluminium Grilles / Diffuser	RUSKIN - TITUS / SYSTEMAIRE / AIR-MASTER/COSMOS/CARYAIRE/DYNACRAFT

S. No.	Details of Material	Preferred Make
14	Combined fire/smoke Dampers	RUSKIN - TITUS / SYSTEMAIRE / AIR-MASTER/COSMOS/CARYAIRE/DYNACRAFT
15	Ventilation / Exhaust Air Grilles	RUSKIN - TITUS / SYSTEMAIRE / AIR-MASTER/COSMOS/CARYAIRE/DYNACRAFT
16	Factory fabricated duct	TECHNOFAB / ROLASTAR / ZECO / ECODECT / DUCTOFAB / WAVES/ NU AIR(NUTECH)
17	Fire Sealant	HILTI / BIRLA -3M
18	Fresh / Exhaust Air Louvers with Bird Screen	RUSKIN - TITUS / SYSTEMAIRE / AIR-MASTER/COSMOS/CARYAIRE/DYNACRAFT
19	Collar/ Grill Damper (Aluminium)	RUSKIN - TITUS / SYSTEMAIRE / AIR-MASTER/COSMOS/CARYAIRE/DYNACRAFT
20	ELECTRICALS & ASSOCIATED WORKS	As per the make list of IEI work
21	Any other item	To be approved by Engineer in Charge

LIFTS

SCOPE OF WORK

- The Scope of work includes SITC (Supply, Installation, Testing, Commissioning) and then handing over to client and to liaison and pursue the local bodies for getting required certificates for functioning of regenerative drive type lifts in complete for the following lifts. The building wise lift details are as below:
- Rang Mahal Ground + First Floor 05 Passenger Lift)
- Elevator Types: Passanger Elevator- 5 Persons / 340 Kgs / P – Passengers
- Travel – 10 Mtrs Approx

GENERAL

The equipment and installation covered by specifications and drawings shall conform to codes of practice and highest standards of workmanship and materials. This work shall be done in accordance with the provisions of the Lifts Act, and subsequent provisions, as also any state or local Act in force and latest Indian Standard 14665, 15330.

The Electrical wiring shall strictly comply with IS:732 and the entire installation shall be in accordance with the Indian Electricity Act 2003 and Indian Electricity Rules 1956 as amended to-date.

The Contractor shall follow all statutory requirements as well as best trade practices in the manufacture & installation of elevators. The Contractor shall arrange to obtain the approval of the Inspectorate of Lifts for commissioning of the Lifts and getting RR number and handover for operation after satisfactory tests.

TRACTION MACHINE AND DRIVE

The motor shall be controlled by a variable voltage variable frequency (V.V.V.F.) micro-processor control system which shall control and monitor every aspect of elevator operation at all stages of the car motion cycle on real time basis.

The A.C. V.V.V.F. drive system shall control A.C. voltage and frequency concurrently with the hoist motor to regulate the elevator's actual performance to match closely the ideal speed pattern to obtain maximum efficiency of operation and provide a very smooth ride.

Frequency shall range fully between zero and rated value.

The Controller shall be provided with a self-diagnostic programme to keep downtime to a minimum possible.

The controller shall intelligently adjust door times in response to car calls, hall calls and "Door Open" button operation.

The braking of machine shall be of regenerative type.

SAFETY

In the addition to other specifications the Lifts shall be provided with safety devices as follows:

Safety gear on car so that in the event of rope breaking or loosening the car will be brought to rest immediately by means of grips on the guides.

The over speeding car shall be automatically brought to a gradual stop on guide rails and power supply to the hoist motor shall be switched off.

Car gate lock so that in the event of car gate gets opened when passengers are in the car, the elevator shall be brought to rest.

BRIEF REQUIREMENT FOR PASSENGER/ FIRE LIFTS

Table 12-3: Technical Specifications of Passenger Lift for Commercial Building

TECHNICAL SPECIFICATION	
I PRODUCT DETAILS	
Building Type	Commercial Building
Number of Units	1
Lift Designation	-
Lift Type	Passenger Lift
Rated Capacity Persons / Kgs / Class of Loading	5 Persons / 340 Kgs / P - Passengers

Rated Speed m/s	0.63
Number of stops / openings	3 / 3
Floor Designation	G+2
Access Sides Inline/Thru Type	1 (One), In Front Only
Floor Display Character (Entrance Position)	0(F),1(F),2(F)
II MACHINE AND CONTROLLER DETAILS	
Machine Location / Type	Machine Roomless - Gearless
Drive System	Micro Processor Based VVVF
Control system	Microprocessor Based Simplex Selective Collective Control
Main Power Supply	AC 3 Phase, 50 Cycles, 415 Volts ±10%
Light Power Supply	220 Volts 50Hz LNE
III SHAFT DETAILS	
Shaft Type	RCCRB - Reinforced Cement Concrete with Red Brick
Shaft Width mm X Shaft Depth mm	1750 X 1350
Overhead mm	4200
Pit Depth mm	1350
Travel Height (in Meters)	7
Shaft Reduction Channel	Not Required
Shaft Reduction Channel Weight (in Kgs)	No
Pit Ladder	Yes
IV CABIN DETAILS	
A) SIZES	
Car Width mm X Car Depth mm	950 X 1000
Car Clear Height mm	2100
Car Door Type Center/Side	Power Operated Centre Opening Sliding Door
No Of Door Panels	2 Panel
Type of Door Drive	Linear Door Drive System
Car Door (W X H) mm	700 X 2000
B) FINISHES - *SUBJECT TO AVAILABILITY	
Design Of Lift Cabin*	Stainless Steel & Decorative Laminated Steel Sheet (DLSS)
Pit Ladder	Yes
IV CABIN DETAILS	
A) SIZES	

Car Width mm X Car Depth mm	950 X 1000
Car Clear Height mm	2100
Car Door Type Center/Side	Power Operated Centre Opening Sliding Door
No Of Door Panels	2 Panel
Type of Door Drive	Linear Door Drive System
Car Door (W X H) mm	700 X 2000
B) FINISHES - *SUBJECT TO AVAILABILITY	
Design Of Lift Cabin*	Stainless Steel & Decorative Laminated Steel Sheet (DLSS)

Table 12-4: Lift Cabin, Landing Door, and Signalization Fixture Specifications

Lift Cabin Finish*	Combination Of Ss Hairline & Teak
Car Door*	Decorative Laminated Steel Sheet (DLSS)
Car Door Finish*	Teak
Ceiling Finish*	Ss Hairline Finish
Ceiling Type	Standard JLFC06
Ceiling Light	Led Lights-03
Fan	Cross Flow - Fan
Flooring Type	Pergo -Wooden-JLFL 03
Handrail Type	Ss Round Handrail JLHR01
Handrail Location	Rear Side
Car Door Sill	Aluminum
V LANDING DOORS DETAILS	
A) SIZES	
Door Type	Centre Opening Sliding Door
Door Size (W x H) mm	700 X 2000
Door Sill	Aluminum
B) FINISHES	
Landing Door Finish*	1-3-Decorative Laminated Steel Sheet (DLSS) - Teak
Landing Door Frame / Finish*	1-3-Stainless Steel - Hairline Finish
Main Landing Floor	0
Other Landing Floors	1,2
Jamb Type	Slim Frame
VI SIGNALIZATION / FIXTURES DETAILS	

A) CABIN OPERATING PANEL	
Car Operating Panel Type	Car Operating Panel - JLCP01
Number of Car Operating Panel	1
COP Faceplate Finish	Stainless Steel - Hairline Finish
Button Model	1s15 - Ea1102(Bas11c) Flat Marking Milk White Character Glow Red Braille (Square)
Car Display	Digital Display (7 Segment) -Vertical
Car Display Location	Car Operating Panel
Call Register Signal	Yes
B) LANDINGS INDICATORS	
Landing Operating Panel Type	Landing Operating Panel - JLPL (Jsm211) / JLLP02
LOP Location	Landing Display On Wall
LOP Mounting Type	Surface/Wall Mountable

Table 12-5: Lift Finishes, Signalization, and Safety Feature Specifications

B) FINISHES	
Landing Door Finish*	1-3-Decorative Laminated Steel Sheet (DLSS) - Teak
Landing Door Frame / Finish*	1-3-Stainless Steel - Hairline Finish
Main Landing Floor	0
Other Landing Floors	1,2
Jamb Type	Slim Frame
VI SIGNALIZATION / FIXTURES DETAILS	
A) CABIN OPERATING PANEL	
Car Operating Panel Type	Car Operating Panel - JLCP01
Number of Car Operating Panel	1
COP Faceplate Finish	Stainless Steel - Hairline Finish
Button Model	1s15 - Ea1102(Bas11c) Flat Marking Milk White Character Glow Red Braille (Square)
Car Display	Digital Display (7 Segment) -Vertical
Car Display Location	Car Operating Panel
Call Register Signal	Yes
B) LANDINGS INDICATORS	
Landing Operating Panel Type	Landing Operating Panel - JLPL (Jsm211) / JLLP02
LOP Location	Landing Display On Wall

LOP Mounting Type	Surface/Wall Mountable
LOP Faceplate Material	Stainless Steel - Hairline Finish
Landing Display	1-3-7SD-V
Landing Display Location	1-3-LOP
Call Register Signal	Yes
Stainless Steel Braille Button	Yes
VII SAFETY DETAILS	
Over Speed Governor	Yes
Door Protection	Infra-Red Door Screen
Counterweight Screen	Inbuilt
Over Load Indicator	Yes
Automatic Rescue Device	Yes
Battery Operated Emg Alarm Light	Yes
Two Way Intercom with Press & Speak in COP	Yes

NOTE:

The specifications are indicative and better specifications shall be installed as per the direction of Engineer in charge.

The scope of work includes SITC, handing over to client dept. and liasoning with local bodies, nothing extra will be paid in that regards. Bidders are requested to quote accordingly. Bidders are also requested to read the architectural drawings and verify the site conditions before quoting.

LIST OF PREFERRED MAKES–FOR LIFT WORKS

Sr.No.	Equipment	Preferred Make
1.	Lift	OTIS / KONE / SCHINDLER / JOHNSON / MITSUBISHI

CCTV SURVEILLANCE SYSTEM**SCOPE OF WORK**

- The scope of work includes design, supply, installation, testing and commissioning of IP based CCTV Surveillance system for areas instructed by Engineer-in-Charge.
- It shall be fully on Digital IP technology. The system proposed shall be an open platform type and shall be possible to add or connect any make open platform camera (ONVIF compliant) to installed system.

- The system shall consist of minimum following components. Additional items if required may be added as per the approved design.

Varifocal IR dome camera,

Outdoor Vari focal IR Bullet camera

Outdoor IR PTZ camera

Advanced Video Management Software with Server, storage etc.

POE/ POE+ network switches (Layer -2) with SFP/SFP+ modules

Layer 3 switch for backbone connection to server (Fibre connection to L2 switches)

LED display for 24X 7 monitoring along with required accessories to make system fully functional like Pole, Rack, junction Box, Patch panel, LIU, fibre optic cable, Cat 6A cable etc.

The POE / POE + switches from the shaft shall be connected with the distribution /L 3 core switch /server in start topology.

In order to tap from floor switches appropriate type of cable (Cat 6A for below 100 mtrs and OFC for above 100 mtrs) shall be used, the required convertors (SFP/SFP+) shall be included in the quoted rates.

The system shall be designed to keep the backup for 30 days for all the cameras and all the cameras shall record at 2 MP resolution 30 FPS with continuous recording (24/7).

The spacing between the cameras shall be so selected such that the video is clearly is seen. The system layout, location of cameras, spacing between the cameras, network architect, location of server, LED TVs shall be got approved from Engineer in charge.

The CCTV system for the Hostel block shall be accessible and controlled from the existing CCTV system of IIT campus also. The necessary software / hardware required shall be arranged by the agency.

- TECHNICAL SPECIFICATION:**

1.1 The following are the technical parameters for the Network Bullet Camera:

1.2

	1	5MP IR Dome Camera with 2.8mm Lens with Audio	
		Resolution	5 MP (2592 x 1944)
		Sensor Type and Size	1/2.8" SONY – CMOS 5MP Active Pixel Progressive Scan, Back Illuminated Image sensor (STARVIS Series)
		LENS	

	Minimum Illumination	Color - 0.01 Lux @ F1.2 (AGC ON) Monochrome - 0 Lux
	Focal Length	2.8mm
	Focus Range	0.3m to infinity
	Field of View (FOV)	HFOV – 107.6° VFOV – 57° DFOV – 127.62°
	Lens Mount	M12
	Focus	Fixed focus
	Aperture (F#)	F 1.6 / F 2.0
	Iris Type	Fixed
	IR Range	Up to 50m
	IR Led Wavelength	850nm
	IR Switching	Auto/ Manual
	AUDIO INTERFACE	
	Audio IN	1
	Audio OUT	1
	Two-way Audio	Supported
	Audio Compression	G.726 and G.711μ
	Alarm In	Yes
	Alarm Out	Yes
	HARDWARE SPECIFICATIONS	
	SD Card	Up to 512GB
	Camera Adjustment Angle	Pan: 0° to 330° Tilt: 0° to 75° Rotate: 0° to 180°
	Available Resolutions	2592 x 1944, 2592 x 1520, 2048 x 1536, 1920 x 1080, 720p, D1, VGA, 2CIF, CIF
	Max Resolution	2592 x 1944
	Bitrate	128 kbps-16Mbps
	Bitrate Type	CBR, VBR
	Video Compression	H.265, H.264, MJPEG
	Frame Rate	1/15s -1/100000s
	Adaptive Streaming	Profile S and G
	Edge Recording	Yes
	Alarm Recording	Pre and Post
	Motion Recording	Yes
	Time Triggered	Yes
	WDR	True WDR (120dB)
	SNR	73Db
	Storage	NAS, SD Card
	Certifications	BIS, CE, IP67, FCC Part-15 Subpart – B, ONVIF S G & T, IK10, UL, NEMA 4X**, STQC Certified with OWASP ASVS 4.0 L2
2	5MP IR Bullet Camera with 2.8mm Lens with Audio	
	Resolution	5 MP (2592 x 1944)

	Sensor Type and Size	1/2.8" SONY – CMOS 5MP Active Pixel Progressive Scan, Back Illuminated Image sensor (STARVIS Series)
	LENS	
	Minimum Illumination	Color - 0.01 Lux @ F1.2 (AGC ON) Monochrome - 0 Lux
	Focal Length	2.8mm
	Focus Range	0.3m to infinity
	Field of View (FOV)	HFOV – 107.6° VFOV – 57° DFOV – 127.62°
	Lens Mount	M12
	Focus	Fixed focus
	Aperture (F#)	F 1.6 / F 2.0
	Iris Type	Fixed
	IR Range	Up to 50m
	IR Led Wavelength	850nm
	IR Switching	Auto/ Manual
	AUDIO INTERFACE	
	Audio IN	1
	Audio OUT	1
	Two-way Audio	Supported
	Audio Compression	G.726 and G.711μ
	Alarm In	Yes
	Alarm Out	Yes
	HARDWARE SPECIFICATIONS	
	SD Card	Up to 512GB
	Camera Adjustment Angle	Pan: 0° to 360° Tilt: 0° to 90° Rotate: 0° to 360°
	Available Resolutions	2592 x 1944, 2592 x 1520, 2048 x 1536, 1920 x 1080, 720p, D1, VGA, 2CIF, CIF
	Max Resolution	2592 x 1944
	Bitrate	128 kbps-16Mbps
	Bitrate Type	CBR, VBR
	Video Compression	H.265, H.264, MJPEG
	Frame Rate	1/15s -1/100000s
	Adaptive Streaming	Both S and G
	Edge Recording	Yes
	Alarm Recording	Pre and Post
	Motion Recording	Yes
	Time Triggered	Yes
	WDR	True WDR (120dB)
	SNR	71dB
	Storage	NAS, SD Card

		Certifications	BIS, CE, IP67, FCC Part-15 Subpart – B, ONVIF S G & T, IK10, UL, NEMA 4X**, STQC Certified with OWASP ASVS 4.0 L2
3	2MP Pan-Tilt-Zoom Camera with 38x Optical Zoom		
		Image Sensor	1/2.8" SONY - CMOS 2MP Active Pixel Progressive Scan, Back Illuminated Image sensor
		Minimum Illumination	Color: 0.03lux@F1.69, 0Lux with IR
		Shutter Speed	1/15s to 1/10000s
		Day and Night	Yes
		Wide Dynamic Range	120dB
		Optical Zoom	38x
		Digital Zoom	16x
		LAN	
		Focal Length	4.4 mm – 169.4 mm
		Zoom Speed	Approximately 6s from wide to tele at Max Speed
		Aperture Range	F 1.6 – F4.9
		PAN & TILT	
		Pan Range	360°
		Pan Speed	Pan manual speed: 1°to 240°/s, pan preset speed: 240°/s
		Tilt Range	-15°-90° (Auto Flip)
		Tilt Speed	Tilt manual speed: 1° to 200°/s tilt preset speed: 200°/s
		Presets	300
		Preset Accuracy	0.16°
		Scan	8
		Pattern	4 Pattern Scans, Record Time Over 10 Minutes for Each Scan
		Power Off Memory	Yes
		ILLUMINATOR	
		IR LED	9
		IR Range	Up to 300m
		IR irradiance Angle	Adjustable by Zoom
		COMPRESSION STANDARD	
		Video Compression	H.265/H.264/M-JPEG
		Video Bitrate	128kbps-16Mbps
		Audio Compression	G.726 ,G.711 a-law and u-law
		Audio Bitrate	128kbps-16Mbps
		Storage	NAS, SD Card
		Certifications	BIS,CE, FCC Part-15 Subpart – B(Class-A),ONVIF S,G & T, IP67, IK10,NEMA4X,NDAA Compliant, Essential Requirement (ER) by STQC, Delhi
3	64 Channel NVR with 4 SATA Port		
		VIDEO	

	Input	64 IP Channels
	Output	HDMI (2.0) – 1 Port (Main)
	Compression	H.265/H.264/ Motion JPEG
	AUDIO	
	Input	1 Channel, RCA Port(2.0Vp-p), Range (-2dBu to 22dBu)
	Output	1 Channel, RCA Port Mono, Unbalanced output, (2.0Vp-p), Range (-2dBu to 22dBu)
	Compression	G.711μ
	Two-way Audio	Yes
	STORAGE	
	SATA Interface	4 SATA III (10TB per port)
	NAS	2 NAS (CIFS, NFS)
	USB	1 TB USB Drive
	RAID	RAID-0, RAID-1, RAID-5, RAID-10
	INTERFACES	
	Network Interface	2 Ports x Ethernet (RJ-45) 10/100/1000Mbps
	USB	3 Ports (1x USB 3.0, 2x USB2.0)
	LED	System Status LED, Power LED
	Alarm Input	2
	Alarm Output	1
	SYSTEM INTERFACE	
	Processor	ARM Cortex A17 Quad-Core
	RAM	4GB
	Flash	2GB
	Control Mode	Mouse, Web Client and Mobile Client
	LIU	
	12 Port fiber LIU, Fully loaded which have sufficient slots to accommodate 24/12 Duplex LC/SC Ports ,Should have fiber management provision inside with splice tray and other accessories, Should be rack mountable 1U,Should have Splice holder for minimum 24 Fiber cores ,Should be made of Cold Rolled Steel ,Material Should steel: 1.5 mm with powder-coated. LIU should have rack mount with channel with uppersheet openable for fiber management.	
	Network Switches	
7a	Switch should be Web Managed, Should have 8 port 1000BASE-T with 4 Port 1000BASE-T PoE PoE power budget 160 Watt or higher, Maximum Per port PoE Power 30 Watt IEEE 802.3 10BASE-T Ethernet, IEEE 802.3u 100BASE-TX Ethernet, IEEE 802.3ab 1000BASE-T Ethernet, IEEE 802.3az IEEE support, IEEE 802.3x flow control, IEEE 802.3z 1000BASE-X, IEEE 802.1p CoS, IEEE 802.3af PoE, IEEE 802.3at PoE Plus, IEEE 802.1Q VLAN Tagging, Minimum 8 VLAN support Port based VLAN, IEEE 802.3ad link aggregation should be MAC based Switching Capacity 16 Gbps, Packet buffer 192KB, MAC address support 4K Jumbo frame support 9K, Should support loop detection, Should support Broadcast storm control QoS Support (WRR and strict priority) Port based QoS 20 Multicast group	

		or higher, Maximum power consumption 72W, Operating temperature 0°C to 40°C Storage Temperature -40°C to 70°C Certification: CE, FCC, C-Tick, , LVD EN60950-1, ROHS compliant. Should be built-in IEEE 802.3az Energy Efficient Ethernet (EEE)
7b		Layer-2 POE plus Gigabit Ethernet 1RU chassis with 24 PoE 10/100/1000 BaseT ports and 4 Gigabit SFP ports. Includes an internal AC power supply 370W (at least or higher power budget) with a power cord, manuals access card, and RJ-45 to DB-9 adaptor. The Access Switch should have 4 ports of 1 G SFP. The Access Switch should provide non-blocking switch fabric capacity of 56 Gbps or more. L-2 switch should provide wire-speed packet forwarding of 41 Mpps or more. L-2 Switch should support min 16K MAC addresses and min 4000 active VLANs.
8	Media Converter	
		Suitable upto 2 km. Compliant with 802.3u & 802.3x.
9		6 core Single Mode Optical Fiber Cable.
10		Single mode SFP-1000-T Base for Fiber connectivity of Same make as of quoted switch.
11		SC to LC cable.
13		5-meter pole to mount cameras complete with foundation and other accessories
14	65-inch LED Display	
	DISPLAY PANEL	
	SCREEN SIZE	165 cm
	PANEL TECHNOLOGY	IPS PANEL, D-LED
	ASPECT RATIO	0.672916667
	RESOLUTION	(3840*2160)UHD
	BRIGHTNESS	400 Nits
	VIEWING ANGLE	178° (H/V)
	RESPONSE TIME	8ms
	CONTRAST RATIO	50.00069444
	OPERATION HOURS	24x7
	CONNECTION TERMINAL	
	RF IN	1*Side
	AV IN	1 mini *Side
	USB INPUT (2.0 SUPPORT)	USB 2.0x1; USB 3.0x1

	HDMI INPUT	3*Side
	HDCP 2.2	Yes
	SPDIF OUT	YES,optical
	RJ-45	1*Side
	USB DEVICE SUPPORT	USB Supported HDD
	SUPPORTED FORMATS	PICTURE FORMAT:BMP/PNG/GIF/HEIF VIDEO FORMAT: MPEG1/2/4/XVID/H.263/H.264/H.265/Generic/WMV/VC1/V P9/RM/AVS/Sorenson/Motion JPEG H.265/H.264/H.263/MPEG1/MPEG2/MPEG4/AV1 FORMAT:PCM/AMR/LPCM/RA/MPEG1/2/4/AAC/WMA/AC 4/EAC3/MS11/MS12/FLAC/VORBIS/Dolby TrueHD/DTS WMA/FLAC
	AUDIO	
	AUDIO OUTPUT POWER (RMS)	10+10W
	MAIN FEATURES	
	HOTEL MODE	Yes, Basic
	CEC	Yes, Basic
	SOUND OUT(ARC)	Yes
	DOLBY AUDIO	Yes
	HDR10	Yes, HDR10/HLG
	BLUETOOTH	Yes
	INTERNET LINK	Yes
	WIFI TYPE(STANDARD)	802.11a/b/g/n/ac 2.4G/5G 2T2R, Build-in
	WIFI BAND TYPE	2.4GHz/5GHz
15	5 Mtr HDMI cable Connectors at both ends	
16	PC Client	
	PC Client Intel i7 processor with clock speed- minimum 3.0GHz, RAM8 GB & Expandable. Window 10 or Window 2016 Server or Unix based Edition .Minimum 1TB . LAN Interface 10/100/1000 Mbps Ethernet.).. Mouse Optical. USB port at front and Software of cameras.	
17	Rack	
	22U Equipment Rack with provision for housing all control equipment with front & rear door, Blower for cooling and proper locking arrangements	
18	9U outdoor IPV5 rated rack with 2 side FAN with 3 socket PDU with 15 AMP DP for power surge safty. With pole mount accessories.	

PREFERRED MAKE LIST

Table 12-6: Preferred Makes for Surveillance, Networking, and Related Equipment

S. No.	Item Description	Preferred Make
1.	Dome /Bullet /PTZ camera	Pelco / Bosch / Sony / Mobotix / Axis / Avigilon
2.	VMS / Server / Storage	Pelco / Bosch / Axis / Avigilon / Dell /HP /IBM
3.	Network POE switch /L2 /L3 switch/ Core switch / Transceiver (Fiber Module)	Cisco / Allied Telesis / HP / Juniper / Alcatel / Extreme
4.	Hard Disk	Seagate / Toshiba / WD
5.	LED Display	Sony / Samsung / LG
6.	OFC cable/ CAT 6A cable and all its accessories	Molex/ Legrand / Commscope /Panduit / Belden / Systimax
7.	Rack	Valrack / Rittal / Molex / Tyco
8.	All other items not covered above	As per approval of Engineer-in-charge

14. Tile Flooring**14.1 Tiles - General**

- The Contractor shall not place an order for any tiles unless a sample has been submitted to and approved in writing by the Authority. Tiles delivered to site shall be of the same standard and quality as the approved sample.
- Ceramic tiles shall be supplied by one of the following manufacturers, or equal and approved:
 - H&R Johnson Tiles Ltd
 - Kajaria Ceramics Ltd.
 - Bajaj Tiles.
 - Nitco Ltd.
 - Orient Bell Ltd.
 - Regent Granito India Ltd.
 - Somany Ceramics Ltd.
 - Asian Granito India Ltd.
- Tiles listed in Finishes Schedules are as manufactured by H&R Johnson Tiles Ltd; however, alternatives of similar colours to those scheduled may be submitted for approval.

- The flooring for laboratory and battery rooms shall be in acid resistant vitrified tiles and the make, quality and colour shall be got approved by the Authority's Engineer.
- Dewatering building, washrooms and staircases shall be provided with antiskid tiles.

14.2 Ceramic Floor Tiles

Ceramic floor tiles shall be glazed or unglazed, as detailed on the Drawings, and shall comply with BS 6431. Spacer tiles shall generally be used, but round edge tiles shall be used on step nosing's. Tiles shall be of the low water absorption type, i.e. Group A1 or Group B1.

14.3 Ceramic Skirting Tiles

Ceramic skirting tiles shall be of the same type and from the same manufacturer as the floor tiles. Metric cove tiles with round tops shall be fixed where the wall finish is other than tiling, and square top cove tiles shall be fixed to meet wall tiling. Internal and external corners of skirting shall have proprietary corner tiles.

14.4 Laying and Grouting of Floor and Skirting Tiles

- Ceramic floor and skirting tiles shall be fixed and grouted in accordance with the manufacturer's requirements. Grout shall be coloured as directed using proprietary colour mix.
- Tiling in wet areas such as kitchens, pantries, toilets and the like shall be bedded on and infilled with approved proprietary waterproof epoxy tiling grout, incorporating an anti-fungicide additive.
- Where tiles abut sanitary fittings, gullies, pipes etc., joints shall be sealed with an approved silicone sealant.
- Finished tiling shall be true to level or shall fall smoothly to gullies without any discernible irregularity, and joint lines shall be true to line without discernible deviations.

14.5 Expansion Joints in Floor and Wall Finishes

Expansion joints in floor and wall finishes shall be as detailed on the Drawings. Joint components shall be neatly and accurately aligned to ensure that joints can expand and contract freely without damaging adjacent finishes.

14.6 Glazed Ceramic Wall Tiles

Glazed ceramic wall tiles shall comply with the relevant Indian standard; spacer tiles shall be used. Tiles shall be of the low water absorption type, i.e. Group A1 or B1.

Edges and external angles shall have appropriate round edge tiles.

14.7 Acid Resistant Tiles

Chemical Buildings, Laboratories, Battery Room etc. shall be provided with acid resistant tiles of suitable grade as approved by Authority.

14.8 Fixing and Grouting of Wall Tiles

- Fixing and grouting of wall tiles shall be executed in accordance with the manufacturer's recommendations.
- Tiling in wet areas such as kitchens, pantries, toilets and the like shall be bedded on and infilled with approved proprietary waterproof epoxy tiling grout, incorporating an anti-fungicide additive.
- Particular care shall be taken to keep all courses perfectly horizontal, all perpends truly vertical and joint widths consistent.

Where tiling abuts wood or metal frames, or other tiling at angles, and around pipes etc., it shall be carefully cut, ground smooth and fitted to form a close neat joint. Tiling shall be continuous behind sanitary fittings. Where pipes pass through walls, or sanitary fittings, cupboards, kitchen units and the like abut tiling, the joints shall be sealed with an approved silicone sealant.

15. Terrazzo Tile Flooring

15.1.1 Terrazzo Tiles

Terrazzo tiles shall generally conform to IS 1237-Edition 2.3. Requirements and methods of testing of tiles are described in Appendix B. Unless otherwise specified, the tiles shall be supplied with initial grinding and grouting of wearing layer.

The size of tiles shall be as given in below table or as shown in the drawings or as required by the Engineer-in-Charge. Half tiles for use with the full tiles shall be such as to make two half tiles when joined together, match with the dimensions of one full tile.

Table 12-7: Minimum Thickness Requirements for Stone Slabs Based on Nominal Length and Breadth

Length Nominal	Breadth Nominal	Thickness not less than
200 mm	200 mm	20 mm
250 mm	250 mm	22 mm
300 mm	300 mm	25 mm

15.1.2 Tolerance:

Tolerances on length and breadth shall be plus or minus one millimetre, and tolerance on thickness shall be plus 5 mm. The variation of dimensions in any one delivery of tiles shall not exceed 1 mm on length and breadth and 3 mm on thickness.

- The tiles shall be manufactured in a factory under pressure process subjected to hydraulic pressure of not less than 140 kg per square centimetre and shall be given the initial grinding with machine and grouting of the wearing layer before delivery to site. The wearing layer shall be free from projections, depressions, cracks, holes, cavities and other blemishes. The edges of wearing layer may be rounded.

- The proportion of cement to aggregate in the backing of tiles shall be not leaner than 1:3 by weight. Where colouring material is used in the wearing layer, it shall not exceed 10 per cent by weight of cement used in the mix.
- The finished thickness of the upper layer shall not be less than 5 mm for size of marble chips ranging from the smallest up to 6 mm and also, not less than 5 mm for size of marble chips ranging from the smallest up to 12 mm, and not less than 6 mm for size of marble chips varying from the smallest up to 20 mm.

15.1.3 Laying

- Base concrete or RCC slab on which the tiles are to be laid shall be cleaned, wetted and mopped. The bedding for the tiles shall be with cement mortar of specified proportion and in conformity with provisions in relevant para of chapter on 'Mortar'.
- Cement mortar 1:4 (1 Cement : 4 coarse sand) bedding shall be used. Average thickness of the bedding mortar shall be 20 mm and the thickness at any place shall not be less than 10 mm.
- Cement mortar bedding shall be spread, tamped and corrected to proper levels and allowed to harden for a day before the tiles are set. If cement mortar is laid in bedding the terrazo tiles, these shall be set immediately after laying the mortar. Over this bedding neat grey cement slurry of honey like consistency shall be spread at the rate of 4.4 kg of cement per square metre over such an area as would accommodate about twenty tiles. Tiles shall be washed clean and shall be fixed in this grout one after another, each tile being gently tapped with a wooden mallet till it is properly bedded, and in level with the adjoining tiles. The joints shall be kept as thin as possible not exceeding 1 mm and in straight lines or to suit the required pattern. The joints shall be properly cleaned before filling with cement grout of matching colour.
- The surface of the flooring during laying shall be frequently checked with a straight edge of length at least 2 metre, so as to obtain a true surface with the required slope.
- Where full tiles or half tiles cannot be fixed, tiles shall be cut (sawn) from full tiles to the required size and their edges rubbed smooth to ensure a straight and true joint.
- Tiles which are fixed in the floor adjoining the wall shall enter not less than 12 mm under the plaster, skirting or dado. The junction between wall plaster and tile work shall be finished neatly and without waviness.
- After the tiles have been laid, surplus cement grout that may have come out of the joints shall be cleared off.

15.1.4 Curing, Polishing and Finishing

- The day after the tiles are laid all joints shall be cleaned of the grey cement grout with a wire brush or trowel to a depth of 5 mm and all dust and loose mortar removed and cleaned. Joints shall then be grouted with grey or white cement mixed with or without pigment to match the shape of the topping of the wearing layer of the tiles. The same

cement slurry shall be applied to the entire surface of the tiles in a thin coat with a view to protect the surface from abrasive damage and fill the pin holes that may exist on the surface

- The floor shall then be kept wet for a minimum period of 7 days. The surface shall thereafter be grounded evenly with machine fitted with coarse grade grit block (No. 60). Water shall be used profusely during grinding. After grinding the surface shall be thoroughly washed to remove all grinding mud, cleaned and mopped. It shall then be covered with a thin coat of grey or white cement, mixed with or without pigment to match the colour of the topping of the wearing surface in order to fill any pin hole that appear. The surface shall be again cured. The second grinding shall then be carried out with machine fitted with fine grade grit block (No. 120).
- The final grinding with machine fitted with the finest grade grit blocks (No. 320) shall be carried out the day after the second grinding described in the preceding para or before handing over the floor, as ordered by the Engineer-in-Charge.

16. Granite/ Limestone Cobble Stones

Cobble stones shall be free from flaws, injurious veins, cavities and similar imperfections that would impair its structural integrity and adversely affect its strength and appearance. Cobble stones shall be rectangular or square and of specified dimensions. The tolerance in length and breadth shall be ± 2 mm and thickness ± 1 mm. The bottom face may be rough but the top surface shall be fine dressed and joint faces shall be dressed back square with the top surface for at least 50 mm, without hollowness or spalling off. The dimensions of the blocks shall be as specified. The tolerances shall be allowed ± 5 mm for facing blocks. The edges of the blocks shall be dressed according to IS: 1129.

- 16.1.1 Dressing of stone:** Every stone shall be cut to required size and fine chisel dressed to give a smooth and even surface on all sides to the full depth. A straight edge laid along the sides of the stone shall be fully in contact with it. Chisel dressing shall also be done on top surface to remove any waviness. The sides and top surface to granite slabs shall be machine rubbed or table rubbed with bourse sand before using. All angles and edges of slabs shall be true square and free from chippings.
- 16.1.2** The thickness of stone shall be 100 mm. The allowable tolerance shall be 2 mm. allowable.
- 16.1.3 Bedding:** Bedding of Cobble stones shall be with cement mortar 1:4 (1 cement : 4 coarse sand) of average thickness 25 mm. thick as given in description of item. Minimum thickness at any place shall not be less than 10 mm.
- 16.1.4 Laying:** The surface of sub grade shall be cleared wetted and mopped. Mortar of specified mix and thickness shall then be spread on an area sufficient to receive one granite slab, The stones shall be washed clean before laying. It shall be laid on top pressed and tapped gently to bring it in level with other slabs. It shall then be lifted and laid a side. The top surface of the mortar shall then be corrected by adding

fresh mortar at hollows, or depressions. The mortar shall then be allowed to harden it over this surface cement slurry of honey like consistency at 4.4 Kg. Of cement per sq. meter. The edges of stones already paved shall be buttered with gray cement. 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 joints shall be as fine as possible: Surplus cement on the surface of the slabs shall be removed. The slab fixed in the floor adjoining the walls shall enter not less 10 mm. under the plaster skirting or dado. The junction between the walls and floors shall be finished neatly. The finished surface shall be true to level and slopes as directed.

16.1.5 Curing: The floor shall be cured for minimum period of seven days.

16.1.6 Polishing and finishing: Unevenness at the meeting edges of slab shall be removed by fine chiselling. Finishing etc. shall be done as per relevant specifications of item no. Kota stone flooring except that cement slurry with/or without pigments shall not be applied on the surface before each polishing.

17. GRANITE FLOORING

17.1 Granite Slabs for Flooring

The slabs shall be of selected quality, hard, sound, dense and homogeneous in texture free from cracks, decay, weathering and flaws. They shall be hand or machine cut to the requisite thickness. They shall be of the colour indicated in the drawings or as instructed by the Authority.

Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving plain surface.



18. FACTORY MADE CEMENT CONCRETE INTERLOCKING PAVER BLOCK

12.1.1.1.1 BASE

Interlocking paver block to be fixed on the bed 50 mm or specified otherwise thick of coarse sand of approved specification and filling the joints with the sand of approved type and quality or as specified and as directed by Authority.

12.1.1.1.2 INTERLOCKING PAVER BLOCK

Factory made precast paver block of M-30 or otherwise specified grade to be used. Paver blocks to be of approved brand and manufacturer and of approved quality. Minimum strength as prescribed by manufacturer and as per direction of Authority.



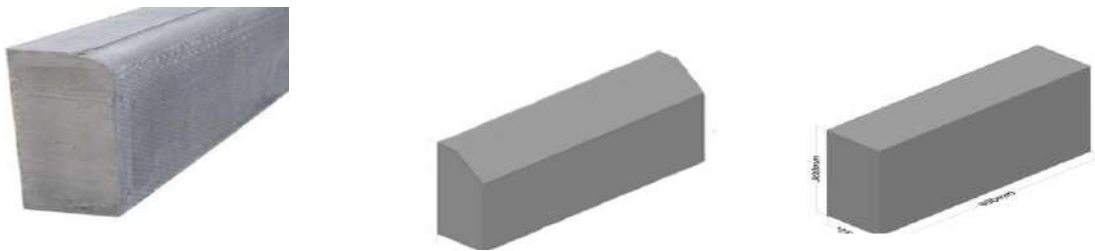
19. KERB STONE (PRECAST)

12.1.1.1.3 Laying

Trenches shall first be made along the edge of the wearing course of the road to receive the kerb stones of cement concrete of specified grade. The bed of the trenches shall be compacted manually with steel rammers to a firm and even surface and then the stones shall be set in cement mortar of specified proportion.

Precast Kerb slab casted with the cement concrete of M-40 grade (specification refer chapter RCC) of size specified in item made of approved brand and manufacturer to be used. Wherever specified all joints shall be filled with mortar 1:3 (1 cement: 3 coarse sand) and pointed with mortar 1:2 (1 cement: 2 fine sand) which shall be cured for 7 days.

The necessary drainage openings of specified sizes shall be made through the kerb as per drawings or as directed by the Engineer-in-Charge for connecting to storm water drains.



20. THERMOPLASTIC PAINT

12.1.1.1.4 Painting Road Markings

GENERAL

The thermoplastic material shall be homogenously composed of aggregate, pigment, resins and glass reflectorizing beads.

- i. The thermoplastic compound shall be screeded/extruded on to the pavement surface in a molten state by suitable machine capable of controlled preparation and laying with surface application of glass beads at a specific rate. Upon cooling to ambient pavement temperature, it shall produce an adherent pavement marking of specified thickness and width and capable of resisting deformation by traffic.

- ii. The thermoplastic material shall conform to ASTM D36/BS-3262-(Part I).
- iii. The material shall meet the requirements of these specifications for a period of one year. The thermoplastic material must also melt uniformly with no evidence of skins or un-melted particles for the one year storage period. Any material not meeting the above requirements shall be replaced by the manufacturer/supplier/Contractor.

21. HORTICULTURE ITEMS – Horticultural Development Work:

General:

All kind of soil:

- **Loose & soft soil-** Any soil which generally yields to the application of pickaxes and shovels, phawaras, rakes or any such ordinary excavating implement or organic soil, gravel, silt, sand turf loam, clay, peat, etc. falls under this category.
- **Dense & hard soil-** Any soil which generally requires close application of pickaxes or jumpers or scarifies to loosen it, stiff clay and cobble stone etc., fall under this category
- **Hard murrum-** The hard murrum shall be disintegrated rocks, which contain silicone Material and natural mixture of clay of calcareous origin. The size of hard murrum will not be more than 20 mm
- **Black cotton soil-** Soil which generally possesses typical characteristics of shrinkage and swelling due to moisture movement through it with atmospheric changes and soil which has its grains in the form of platelet or sheet is termed as Black Cotton Soil. It easily yields to the application of pick axes and shovels, phawaras, rakes or any such ordinary excavating implement. This soil type will have very low bearing capacity and will be blackish in colour.
- For workmanship for earthwork and excavation, relevant specifications of safety from IS: 3764 shall be followed. The depth of the excavation shall be as per the item description.

Garden Soil Filling

The good quality garden soil shall be obtained from outside which can be useful for all plants. Laying of soil shall be done in proper slope as per mention in drawing including watering, compacting and dressing etc. complete, as directed.

22. Kota stone flooring

22.1.1 Kota Stone Slabs

The slabs shall be of selected quality, hard, sound, dense and homogeneous in texture free from cracks, decay, weathering and flaws. They shall be hand or machine cut to the requisite thickness. They shall be of the colour indicated in the drawings or as instructed by the Engineer-in-Charge.

Each slab shall be cut to the required size and shape and fine chisel dressed at all the edges. The sides thus dressed shall have a full contact if a straight edge is laid along. The

sides shall be table rubbed with coarse sand before paving. All angles and edges of the slabs shall be true square and free from chippings and giving plain surface.

22.1.2 Preparation of Surface

The joints shall be raked out to a depth of at least 15 mm in masonry walls. In case of concrete walls, the surface shall be hacked and roughened with wire brushes. The surface shall be cleaned thoroughly, washed with water and kept wet before laying is commenced. The floor shall be cut uniformly to the requisite depth so that the skirting face shall have the projection from the finished face of wall as shown in drawings or as required by the Engineer-in-Charge. In no case the skirting should project by more than thickness of stone.

22.1.3 Laying

The risers of steps, skirting and wall surface shall be in grey or white cement admixed with or without pigment to match the shade of the stone, as specified in the description of the item, with the line of the slab at such a distance from the wall that the average width of the gap shall be 12 mm and at no place the width shall be less than 10 mm, if necessary, the slabs shall be held in position by temporary M.S. hooks fixed into the wall at suitable intervals. The skirting or riser face shall be checked for plane and plumb and corrected. The joints shall thus be left to harden then the rear of the skirting or riser slab shall be packed with cement mortar 1:3 (1 cement: 3 coarse sand) or other mix as specified in the description of the item. The fixing hooks shall be removed after the mortar filling the gap has acquired sufficient strength.

The joints shall be as fine as possible but not more than 1 mm. The top line of skirting and risers shall be truly horizontal and joints truly vertical, except where otherwise indicated.

The risers and skirting slab shall be matched as shown in drawings or as instructed by the Engineer-in-Charge. Except that the joints of the slabs shall be set in grey cement mixed with pigment to match the shade of the slabs.

22.1.4 Curing, Polishing and Finishing

The surface shall be left dry for air-curing for duration of 12 to 18 hours depending on atmospheric temperature conditions. It shall then be cured by allowing water to stand in pools over it for a period of not less than 4 days. The grinding and polishing may be commenced not before 2 days from the time of completion of laying for manual grinding and not before 7 days for machine grinding. For polishing by machines, the surface shall be watered and ground evenly with machine fitted with special rapid cutting grit blocks (carborundum stone) of coarse grade (No. 60) till the marble chips are evenly exposed and the floor is smooth. After the first grinding, the surface shall be thoroughly washed to remove all grinding mud and covered with a grout of cement and colouring matter in same mix and proportion as the topping in order to fill any pin holes that appear. The surface shall be allowed to dry for 24 hours and wet cured for 4 days and then rubbed with machine fitted with fine grit blocks (No. 120). Curing shall be done by ponding of water between

panels formed with fine sand. The surface is cleaned and repaired as before and allowed to cure again for 3 to 5 days. Finally the third grinding shall be done with machine fitted with mere fine grade grit blocks (No. 320) to get even and smooth surface without pin holes. The finished surface should show the marble chips evenly exposed.

Where use of machine for polishing is not feasible or possible, rubbing and polishing shall be done by hand, in the same manner as specified for machine polishing except that carborundum stone of coarse grade (No. 60) shall be used for the 1st rubbing, stone of medium grade (No. 80) for second rubbing and stone of fine grade (No. 120) for final rubbing polishing.

After the final polish either by machine or by hand, oxalic acid shall be dusted over the surface @ 33 gm per square metre sprinkled with water and rubbed hard with a nemdah block (Pad of Woollen rags). The following day, the floor shall be wiped with a moist rag and dried with a soft cloth and finished clean.

Curing shall be done by suitable means such as laying moist sawdust or ponding water.

23. Square Gazebo with thatch Roof

The Square Gazebo with Bamboo Roof offers a comfortable and shaded outdoor space, perfect for group gatherings. Its portable design allows easy transport and assembly at different locations. Constructed mainly from bamboo, the gazebo features a square frame accommodating seating and a central table. The bamboo roof utilizes natural insulation to shield from sunlight and heat, ensuring a cool interior during summer. Inside, three benches line the sides, complemented by a central, portable table for dining or activities. Key features include easy disassembly and reassembly for transport, robust weather protection, and straightforward assembly with bamboo joints and eco-friendly fasteners. The gazebo's bamboo construction promotes sustainability, providing a cool and refreshing atmosphere while respecting environmental concerns.

- **Bamboo:** Select species suitable for structural use, such as *Bambusa vulgaris* or *Dendrocalamus asper*. Typically, bamboo culms with a diameter of 4-6 inches (10-15 cm) are used for structural components. Bamboo should be properly treated to enhance durability and resistance to pests and weather.
- **Treatment methods:** Heat Treatment- Heating bamboo culms to a specific temperature to reduce moisture content and increase strength. Chemical Treatment - Application of preservatives to protect against decay and insect infestation.
- **Thatch:** Common types include palm leaf thatch or grass thatch (e.g., alang-alang). Thatch thickness varies but typically ranges from 1-2 inches (2.5-5 cm). Thatch may be treated with fire retardants or fungicides to improve durability and fire resistance.
- **Other Materials: Fasteners:** Use bamboo nails or screws to fasten bamboo components together, avoiding metal fasteners that can cause corrosion.
- **Adhesives:** Natural adhesives like bamboo resin or synthetic adhesives suitable for bamboo can be used sparingly for additional structural integrity.

24. Bamboo Cottage with Elevated M S Structure

The Bamboo Cottage with Elevated M S Structure seamlessly integrates natural bamboo and sturdy steel, ensuring durability and comfort across diverse environments. This innovative design combines bamboo's inherent strength, flexibility, and eco-friendly benefits with a supportive mild steel foundation. Featuring a spacious 15 feet by 15 feet footprint, it offers versatile single-room layouts customizable to specific needs. Roofing options include bamboo or thatched styles, providing both natural insulation and aesthetic charm. The structure's robust construction merges bamboo's durability with steel's stability, ensuring long-term resilience and sustainability. Designed for comfort, its natural ambiance is complemented by easy assembly, requiring skilled integration of bamboo and steel components. Regular maintenance ensures longevity and safety, underscoring its suitability for eco-conscious living or recreational use in diverse settings.

- **Structure: Main Structure Material:** **A. Bamboo Species:** Typically *Bambusa vulgaris* or *Dendrocalamus asper*, treated for durability. Bamboo treated with preservatives to enhance resistance to pests and weather. **B. Foundation and Support Structure:** Mild Steel (M S), providing robust stability and structural integrity. Mild steel beams and columns, engineered to support the weight of the bamboo structure. Anti-corrosion coating applied to steel components to prolong lifespan.
- **Dimensions & Height:** Footprint: 15 feet by 15 feet (4.5 meters by 4.5 meters), offering approximately 225 square feet of interior space. Customizable but typically elevated above ground level for ventilation and protection against moisture.
- **Layout and Interior Design:** Room Layout: Single-room configuration adaptable to various uses such as living quarters or recreational space. Options available for interior partitioning or additional features based on specific requirements.
- **Thatched Roof:** Palm leaves or grass thatch, offering traditional insulation and visual charm.
- **Construction and Assembly:** Assembly Process: Requires skilled labor for integration of bamboo and steel components. Bamboo joints secured with eco-friendly adhesives or traditional lashing methods. Minimal use of metal fasteners to avoid corrosion, with emphasis on sustainable assembly practices.
- **Maintenance:** Regular inspection of bamboo for signs of wear or damage, ensuring structural integrity. Periodic inspection and maintenance of mild steel components to prevent corrosion and maintain structural stability.
- **Sustainability and Environmental Considerations:** Bamboo's renewable nature and minimal environmental impact align with sustainable building practices. Natural insulation provided by bamboo and thatched roofing reduces reliance on artificial heating and cooling.

- **Longevity and Safety:** Designed to withstand varying weather conditions and environmental stressors for long-term use. Construction adheres to local building codes and safety regulations to ensure occupant safety.

25. GI CHAIN LINK MESH WITH MS SQUARE PIPE

GI (Galvanized Iron) chain link mesh with MS (Mild Steel) square pipes is a robust fencing solution ideal for security and boundary applications. This system combines galvanized iron mesh and mild steel pipes to ensure durability, strength, and resistance to weathering and corrosion.

The GI chain link mesh is made from galvanized iron wire, coated with zinc to prevent rust and corrosion. The mesh typically has openings ranging from 1.5 to 3 inches, catering to various security needs, and is available in wire diameters from 2 mm to 5 mm. The mesh is galvanized with a coating of 100-120 GSM, enhancing its longevity and durability.

The MS square pipes, known for their strength and versatility, provide sturdy support for the mesh. These pipes have a square cross-section, commonly sized at 2x2 inches, and are typically 20 feet in length, though customization is possible. To protect against rust and corrosion, these pipes are often painted or galvanized.

This combination of materials makes the fencing solution durable and strong, suitable for a range of applications, including perimeter fencing for residential, commercial, and industrial properties, security enclosures for parks and sports facilities, animal enclosures, and temporary construction site fencing. The ease of assembly and installation further enhances its practicality for various fencing needs.

- **Length and Height:** The fencing measures 1000 meters in length and 10 feet in height. Conforms to IS 1668:1972, which sets the standards for general dimensions and tolerances in construction.
- **Wire Diameter:** Utilizes 3 mm diameter wires with a mesh box size of 2x2 inches. Meets IS 280:2006, specifying the standard for mild steel wire for general engineering purposes, ensuring the wire diameter and mesh size provide adequate strength and stability.
- **Wire Quality:** Made from galvanized steel with a 100-120 GSM (grams per square meter) coating. Adheres to IS 4826:1979, which specifies the requirements for hot-dipped galvanized coatings on steel wire. The specified GSM coating ensures enhanced durability and resistance to rust.
- **Support Structure:** Supported by 296 mild steel (MS) square pipes, each measuring 2x2 inches in cross-section and 20 feet in length. Conforms to IS 1239 (Part 1):2004, which covers mild steel tubes, tubulars, and other wrought steel fittings. The dimensions and quality of the MS square pipes ensure robust structural support.

This fencing configuration provides a reliable and long-lasting solution suitable for diverse security and enclosure needs. It meets Indian Standards (IS) for strength,

corrosion resistance, and structural integrity, ensuring compliance with recognized engineering and construction benchmarks.

26. Twin Dustbins with Canopy

The twin dustbins with canopy are designed for durability and functionality, using high-quality SS 304 grade stainless steel. Each bin has a capacity of 40 liters, providing ample space for waste collection while maintaining a sleek, modern appearance. The bins are fabricated from 0.8 mm thick stainless steel sheets and supported by 38 mm diameter pipes, ensuring structural integrity and longevity.

Manufactured using Jindal raw materials, the dustbins undergo precision laser cutting for accurate fabrication and perforation, resulting in a high-quality finish. The matt finish enhances the bins' aesthetic appeal and makes them resistant to fingerprints and stains. The canopy protects the bins from direct sunlight and rain, ensuring hygiene and extending the lifespan of the collected waste.

These twin dustbins are a reliable and stylish solution for waste management in parks, commercial areas, and public spaces. Their robust construction and elegant design make them an ideal choice for maintaining cleanliness and promoting a sanitary environment.

- **Material Specifications:** Stainless Steel (SS) 304 Grade, known for its corrosion resistance, durability, and ease of cleaning. It adheres to IS 6911:2017, which specifies the requirements for stainless steel plate, sheet, and strip for industrial use. The sheet thickness is 0.8 mm, Ensures the structural integrity and robustness of the dustbins, in line with IS 5522:1992, which covers the general requirements for stainless steel sheets and strips. 38 mm, provides sturdy support for the dustbins and canopy, ensuring stability and longevity.
- **Manufacturer:** Jindal: Known for producing high-quality stainless steel raw materials.
- **Cutting and Perforation:** Laser Cutting: Ensures precise fabrication and perforation, enhancing the quality and consistency of the finished product. This method is preferred for its accuracy and clean edges, in accordance with IS 4592:2006, which specifies safety requirements for cutting tools and processes.
- **Design and Finish:** Capacity, 40 Litters per Bin: Sufficient for daily waste collection needs in various settings such as parks, commercial areas, and public spaces. It's a Matt Finished, Provides an aesthetically pleasing and modern look while being resistant to fingerprints and stains. The matt finish also enhances the visibility of the perforations and a design detail, complying with IS 6911:2017 for surface finish standards.
- **Additional Features:** Canopy: Protects the bins from direct sunlight and rain, extending the lifespan of the waste collected and maintaining hygiene.
- **Benefits:** The use of SS 304 grade material ensures long-lasting performance and resistance to environmental factors. Easy to clean and maintain, promoting a sanitary

environment. The sleek design and matt finish make these dustbins suitable for any modern public or commercial space.

27. Floating Platform and Walkway with Accessories

The project encompasses the design, fabrication, transportation, and installation of a 9m x 3m floating platform and a 6m x 1.5m floating walkway, including bollards, stainless steel railings, and polypropylene (PP) ropes. Each component adheres to relevant Indian Standards (IS) to ensure safety, durability, and performance. The floating structures are made from high-density polyethylene (HDPE) and marine-grade aluminium or treated timber, ensuring buoyancy and structural integrity. Mild steel square pipes and galvanized steel are used for robust support. Fabrication processes comply with IS codes for welding and material specifications, while transportation follows guidelines for handling and protecting materials. On-site assembly adheres to IS standards for excavation, anchoring, and general construction practices. Quality assurance involves inspection and load testing as per IS codes. This rigorous adherence to IS codes guarantees the highest standards of engineering and construction throughout the project, ensuring reliable and durable floating structures.

- **Floating Platform (9m x 3m) & Materials:** Design adheres to IS 4651 (Part 1)-1989, which covers guidelines for ports and harbours - planning and layout. High-density polyethylene (HDPE) or equivalent, buoyancy calculated as per IS 1825-1983. Marine-grade aluminium or treated timber as per IS 550 (Part 1)-2003. Steel or aluminium frame designed as per IS 800:2007 for general construction in steel.
- **Floating Walkway (6m x 1.5m) & Materials:** IS Code Compliance: Follows IS 4651 (Part 3)-1974 for load considerations. HDPE floats designed according to buoyancy and stability requirements of IS 9527 (Part 3)-1983. Decking - Same as the platform, marine-grade aluminium or treated timber.
- **Accessories:** Bollards are Designed as per IS 2762:2009 for mooring and docking, Stainless steel railings conform to IS 5522:1992 for stainless steel sheets and strips. (PP Rope) Polypropylene rope meets IS 5175:1984 for synthetic ropes.
- **Fabrication Process:** **Frame Construction:** As per IS 7215:1974, guidelines for welding and IS 813:1986 for general construction welding procedures. **Float Manufacturing:** HDPE floats are rotationally molded, adhering to IS 10146:1982 specifications for HDPE for its safe use in contact with foodstuffs, pharmaceuticals, and drinking water. **Decking Fabrication:** Deck panels are fabricated ensuring compliance with IS 4021:1995, for timber preservation and IS 277:2003 for galvanized steel for decking and supports.
- **Installation:** Ensures compliance with IS 3764:1992 for excavation work. Uses anchoring methods per IS 5249:1992 for floating structures. On-site assembly follows IS 456:2000 for general construction practices. Installation process complies with IS 8989:1978 for safety codes in construction.

- **Quality Assurance and Testing:** All materials and fabrication work are inspected as per IS 2062:2011 for hot-rolled steel. Load testing for the platform and walkway follows IS 875 (Part 2)-1987 for imposed loads.

28. 0.80 mm Decorative Laminates

Decorative laminates are essential for interior surface finishes, offering both aesthetic appeal and durability. Manufactured according to Indian Standard IS 2046: 1995, these laminates ensure top-tier quality and performance.

Technical Specifications:

- **Thickness:** The laminates have a nominal thickness of 0.80 mm, with a tolerance of ± 0.10 mm as per IS 2046.
- **Composition:** They are made of multiple layers of kraft paper impregnated with phenolic resin, and a single layer of printed or plain paper impregnated with melamine resin for the aesthetic finish. An overlay of melamine resin enhances surface wear resistance.
- **Size:** The standard sheet size is typically 2440 mm x 1220 mm (8 feet x 4 feet) with length and width tolerances of ± 5 mm.

Surface and Physical Properties:

- **Finishes:** Available in various finishes such as matte, gloss, textured, and woodgrain.
- **Abrasion and Impact Resistance:** Laminates meet the abrasion resistance criteria and must conform to the impact resistance requirements as specified in IS 2046.
- **Density:** High-pressure decorative laminates should have a density of at least 1.35 g/cm³.
- **Boiling Water Resistance:** The laminates should not show signs of delamination or deterioration when subjected to boiling water for 2 hours.
- **Ignitability:** They meet the ignitability criteria set by IS 2046, ensuring they do not propagate flames easily.
- **Adhesion:** When bonded to substrates like MDF or particleboard, the laminates should not delaminate under standard conditions.

Compliance and Quality Assurance:

- **Manufacturing:** Produced under controlled conditions to ensure uniform quality.
- **Testing:** Regular testing is conducted to ensure compliance with IS 2046 standards.
- **Certification:** Manufacturers should obtain certification from the Bureau of Indian Standards (BIS) to assure customers of product quality and adherence to standards.

Applications and Benefits:

Ideal for use in residential and commercial interiors, including furniture, cabinets, wall panels, and countertops, these laminates are suitable for high-traffic areas and demanding environments due to their high resistance to wear, impact, and boiling water.

29. Pylon Signage Boards

Overview: Pylon Signage Boards are used for various commercial and directional purposes, providing clear and durable signage solutions. This non-lit variant is designed with specific dimensions and materials to ensure visibility and longevity.

Specifications:

1. Size:

- **Height (H):** 2800 mm
- **Width (W):** 450 mm
- **Thickness (T):** 150 mm (Side View)
- **Compliance:** Adheres to IS 10748:2004, which specifies dimensions and tolerances for sheet metal used in construction.

2. Material:

- **MS Pipe:**
 - **Dimensions:** 50x25x1.5 mm
 - **Compliance:** Meets IS 1239 (Part 1):2004, covering mild steel tubes, tubulars, and other wrought steel fittings, ensuring the pipe's dimensions and quality for structural support.
- **MS Sheet:**
 - **Process:** Laser Cut for precision and clean edges.
 - **Compliance:** Adheres to IS 2062:2011, specifying requirements for hot-rolled steel for general structural use, ensuring the sheet's strength and durability.
- **Reflective Vinyl:**
 - **Grade:** Commercial grade reflective vinyl.
 - **Application:** Applied as per approved design to enhance visibility.
 - **Compliance:** Follows IS 1647:1985, which covers specifications for retro-reflective sheets used in signage, ensuring the vinyl's reflective properties meet visibility standards.

Design and Construction:

- **Structure:** The pylon board is constructed using a framework of MS pipes for structural integrity, with an MS sheet surface for the signage. Laser cutting ensures

precise and smooth edges on the sheet, enhancing the overall aesthetic and readability.

- **Reflective Vinyl:** Commercial grade reflective vinyl is applied to the surface of the MS sheet. This vinyl improves visibility, especially at night or in low-light conditions, although the board itself is non-lit.

Installation:

- **Foundation:** Ensures stability and compliance with relevant building codes.
- **Assembly:** Assembled on-site with proper anchoring to withstand environmental conditions such as wind and rain, following IS 875 (Part 3):1987 for wind loads on buildings and structures.
- **Maintenance:** Regular checks for structural integrity and reflective vinyl condition. Periodic cleaning to maintain visibility and appearance.

30. CASSETE AC

A) 3.5 TR - 4 STAR HOT AND COLD INVERETER WITH WIRLESS REMOTE

The Cassette AC features advanced inverter technology from Daikin, renowned for its energy efficiency and environmental sustainability. It is designed to provide efficient cooling in summer and effective heating in winter, offering year-round comfort in various indoor environments.

Key Specifications:

- **Capacity:**
 - **Cooling Capacity:** 3.5 TR (Tons of Refrigeration), ensuring sufficient cooling for medium to large spaces.
 - **Heating Capacity:** Provides efficient heating during colder months, enhancing indoor comfort.
- **Energy Efficiency:**
 - **Star Rating:** Certified as a 4 Star AC, complying with IS 1391 (Part 2): 2018 standards for energy efficiency labeling of room air conditioners in India.
 - **Inverter Technology:** Utilizes inverter technology to optimize compressor speed based on cooling/heating demand, reducing energy consumption and enhancing efficiency.
- **Remote Control:**
 - **Wireless Remote:** Includes a user-friendly wireless remote control for convenient operation, meeting ergonomic design standards as per IS 13252 (Part 1): 2010.
- **Environmental Compliance:**

- **Refrigerant:** Uses environmentally friendly refrigerant gases compliant with IS 14861: 2000, ensuring minimal impact on ozone depletion and global warming.
- **Installation and Safety:**
 - **Installation Guidelines:** Installation procedures adhere to IS 8148: 1976 specifications for air conditioners, ensuring safe and efficient installation.
 - **Safety Standards:** Conforms to IS 302-2-24: 2014 for safety of household and similar electrical appliances.

Benefits:

- **Energy Savings:** Inverter technology reduces energy consumption compared to conventional AC units, contributing to lower electricity bills.
- **Year-Round Comfort:** Provides effective cooling during hot summers and reliable heating in cold winters, offering versatile climate control.
- **User Convenience:** Wireless remote control simplifies operation and enhances user experience, meeting ergonomic and usability standards.

B) Description of 3 TR - 2 Star Cooling Only Cassette AC.

The 3 TR Daikin 2 Star Cassette Air Conditioner is designed for efficient cooling in commercial and large residential spaces. Rated with 2 stars for energy efficiency, it delivers reliable cooling performance. Its ceiling-mounted design ensures uniform cooling, and the use of high-quality materials adhering to IS standards guarantees durability and reliability. This makes it an ideal choice for ensuring comfortable and energy-efficient cooling in various settings.

Capacity and Performance:

- **Cooling Capacity:** 3 TR (10.5 kW) as per IS 1391 (Part 1):1992, which specifies the requirements for room air conditioners, ensuring adequate cooling performance for larger spaces.
- **Energy Efficiency:** Rated as 2 Star, conforming to the Bureau of Energy Efficiency (BEE) standards. According to IS 1391, this rating indicates moderate energy consumption.

Design and Installation:

- **Cassette Type:** The AC unit is designed to be ceiling-mounted, offering uniform air distribution throughout the room. IS 8148:2003 provides guidelines for the design and installation of such systems, ensuring they meet structural and safety requirements.
- **Dimensions and Weight:** Specific dimensions and weight should be in accordance with IS 8148, ensuring compatibility with standard ceiling grids and support structures.

Construction:

- **Materials:** The construction materials comply with IS 8148 standards for durability and resistance to environmental factors.
- **Coils and Fins:** Copper coils and aluminium fins enhance heat exchange efficiency, as recommended by IS 1391.

Electrical and Safety Features:

- **Power Supply:** Designed for standard power supply specifications, typically 230V, 50Hz, single-phase as per IS 8148.
- **Safety Standards:** Equipped with safety features like overload protection and fire-resistant materials, in line with IS 302-1:2008, which covers safety standards for electrical appliances.

Refrigerant:

- **Type:** Uses R-410A refrigerant, which is compliant with IS 1391 and environmentally safer, offering efficient cooling without ozone depletion.

Air Distribution:

- **Airflow:** The unit provides multi-directional airflow, ensuring even cooling distribution. IS 8148 specifies the performance standards for air distribution in air conditioning units.
- **Noise Levels:** Operates within permissible noise levels as per IS 1391, ensuring a quiet environment.

Maintenance and Service:

- **Filters and Cleaning:** Equipped with easy-to-clean filters, following maintenance guidelines from IS 1391.
- **Servicing:** Accessible design for regular servicing and maintenance, ensuring longevity and consistent performance.

Compliance with IS Codes:

1. **IS 1391 (Part 1):1992** - Room air conditioners specifications, ensuring performance standards for cooling capacity and energy efficiency.
2. **IS 8148:2003** - Guidelines for design, construction, and installation of air conditioning systems, ensuring safety, compatibility, and durability.
3. **IS 302-1:2008** - General safety standards for electrical appliances, ensuring the unit is equipped with necessary safety features.

31. TERRA Deck Floor (Berlin)

The TERRA Deck Floor (Berlin) is a high-quality, durable decking material designed for outdoor use, measuring 148 mm in width, 25 mm in thickness, and 2400 mm in length. Ideal for patios, gardens, walkways, and poolside areas, it combines the benefits of wood and plastic, offering longevity and minimal maintenance with a natural appearance. Its

compliance with relevant IS codes ensures it meets safety, durability, and performance standards for outdoor applications, making it a reliable and attractive choice for decking..

1. Material Composition:

- **Material:** Typically made from a composite of wood fibers and recycled plastic, offering the natural look of wood with enhanced durability and minimal maintenance.
- **IS Code Compliance:** Complies with IS 16483:2016, which specifies the requirements for wood-plastic composites for outdoor decking and related applications.

2. Dimensions:

- **Width:** 148 mm
- **Thickness:** 25 mm
- **Length:** 2400 mm
- **IS Code Compliance:** These dimensions adhere to general recommendations in IS 875 (Part 1):1987 for structural use, ensuring consistency and reliability in construction.

3. Mechanical Properties:

- **Load-Bearing Capacity:** Designed to withstand typical outdoor loading conditions as specified in IS 875 (Part 2):1987.
- **Flexural Strength and Modulus:** Must meet or exceed the values specified in IS 4020:1998 for flexural strength and modulus for plastic and wood composites.

4. Surface and Finish:

- **Texture:** Anti-slip surface texture for safety, especially in wet conditions.
- **Finish:** UV-resistant coating to prevent fading and degradation from sunlight exposure.
- **IS Code Compliance:** The surface finish should comply with IS 104:1979 for surface quality and texture requirements for plastic products.

5. Installation and Maintenance:

- **Installation:** Can be installed using standard deck installation techniques, including the use of hidden fasteners or screws for a seamless appearance.
- **Maintenance:** Requires minimal maintenance, such as periodic cleaning with water and mild detergent. Resistant to rot, mould, and insect damage.
- **IS Code Compliance:** Installation guidelines should follow IS 2524:1963, providing standards for proper installation of flooring materials.

32. 5m³ Spiral HDPE Storage Tank (PE-100)

This 5m³ spiral HDPE storage tank is designed per IS codes for durability, safety, and reliability. It features a conical bottom, flat top, and various inlet, outlet, and vent

connections. Engineered to stringent standards, it ensures safe liquid storage under specified conditions. The spiral-wound HDPE construction and epoxy-coated MS support structure provide robust performance and longevity.

Specifications:**A. Dimensions and Capacity:**

- Volume : 5 cubic meters (m³)
- Diameter : 1600 mm
- Height : 2500 mm
- Bottom Shape: Conical
- Top Shape : Flat

B. Openings:

- Manhole: 500NB (Nominal Bore) as per IS 1536:2001, facilitating access for inspection and maintenance.
- Inlet: 50NB (Nominal Bore) according to IS 1239:2004 for standard steel tubes and fittings.
- Outlet: 50NB (Nominal Bore) as per IS 1239:2004, ensuring compatibility with common piping systems.
- Air Vent: 50NB (Nominal Bore), designed in accordance with IS 3989:1984 for ventilation of tanks.
- Level Indicator: Floating type, meeting IS 554:1999 for standard dimensions of pipe threads.

C. Material of Construction (MOC):

- Material: High-Density Polyethylene (HDPE) PE-100, as specified in IS 4984:2016 for HDPE pipes.
- Manufacturing: Spiral winding technique for enhanced structural integrity.

D. Wall Thickness:

- Bottom : 10 mm
- Shell : 12 mm at the base, reducing to 8 mm at the top
- Top : 10 mm
- Compliance: Thickness and structural design adhere to IS 12701:1996, ensuring strength and durability.

E. Support Structure:

- Material: Mild Steel (MS)
-

- Coating: Epoxy coating for corrosion resistance, as per IS 13620:1993 for epoxy powder coatings.

F. Working Conditions:

- Temperature Range: 0°C to 65°C
- Pressure: Atmospheric

Compliance with IS Codes:

- IS 1536:2001: Cast Iron Pipes and Fittings for Manhole specifications.
- IS 1239:2004: Steel tubes, tubulars, and other wrought steel fittings for inlet and outlet specifications.
- IS 3989:1984: High-pressure vacuum exhausters for air vent specifications.
- IS 554:1999: Pipe threads for level indicator compatibility.
- IS 4984:2016: High-Density Polyethylene Pipes for raw material standards.
- IS 12701:1996: Rotationally moulded polyethylene water storage tanks for thickness and structural requirements.
- IS 13620:1993: Epoxy powder coatings for protective coating on MS structures.

33. The Automatic Portable Sewage Treatment Plant of Capacity 6 KLD M.B.B.R Technology**○ SCHEME OF TREATMENT****1. Sewage Collection / Bar Screen**

- **Description:** The first step in the sewage treatment process involves the collection of sewage and its initial screening to remove large debris and solid waste.
- **Specifications:**
 - **Bar Screen Design:** As per IS 6280:1971, screens should have bars spaced 10-40 mm apart to capture large solids.
 - **Construction Material:** Stainless steel or corrosion-resistant materials.
 - **Maintenance:** Regular cleaning to prevent clogging.

2. Equalization Tank for Equalizing the Domestic Sewage

- **Description:** An equalization tank is used to balance the flow and concentration of sewage, ensuring a uniform treatment process.
- **Specifications:**
 - **Design Standards:** IS 10328:1982 provides guidelines on the design and operation of equalization tanks.
 - **Volume:** Sized to handle peak flow rates with a detention time of 8-24 hours.
 - **Material:** Reinforced concrete or other durable, non-corrosive materials.

- **Aeration:** Equipped with diffusers or mechanical aerators to maintain uniform sewage composition.

3. M.B.B.R (Moving Bed Biofilm Reactor)

- **Description:** An advanced biological treatment unit that uses biofilm carriers for the biodegradation of organic matter.
- **Specifications:**
 - **Design and Operation:** IS 16231:2015 outlines the standards for biofilm reactor design and operation.
 - **Media:** Biofilm carriers with a specific surface area of 350-500 m²/m³.
 - **Retention Time:** Typically 4-6 hours for optimal treatment.
 - **Aeration:** Diffused air or mechanical aerators to ensure sufficient oxygen supply.

4. Secondary Settler

- **Description:** A secondary settling tank separates the biological sludge from the treated water.
- **Specifications:**
 - **Design:** IS 10328:1982 provides guidelines on secondary settling tank design.
 - **Surface Loading Rate:** 20-30 m³/m²/day.
 - **Detention Time:** 2-4 hours.
 - **Construction Material:** Concrete or similar durable material, with proper inlet and outlet arrangements to minimize turbulence.

5. M.G.F. (Multimedia Gravity Filter) & A.C.F. (Activated Carbon Filter)

- **Description:** These filtration units further polish the treated water, removing fine suspended particles and dissolved organic compounds.
- **Specifications:**
 - **M.G.F.:**
 - **Filter Media:** Layers of gravel, sand, and anthracite as per IS 8419:1977.
 - **Loading Rate:** 5-15 m³/m²/hour.
 - **Backwash Mechanism:** Periodic backwashing to clean the filter media.
 - **A.C.F.:**
 - **Activated Carbon:** High-grade activated carbon with a surface area of 800-1200 m²/g.
 - **Flow Rate:** 8-10 m³/m²/hour.

- **Regeneration:** Regular regeneration or replacement of carbon media.

6. Disposal of Treated Effluent and Sludge

- **Description:** Proper disposal methods ensure environmental safety and compliance with regulations.
- **Treated Effluent Disposal:**
 - **Standards:** Treated water quality should meet the standards specified in IS 10500:2012 for discharge or reuse.
 - **Disposal Methods:** Discharge to surface water bodies, irrigation, or groundwater recharge as per IS 1172:1993.
- **Sludge Disposal:**
 - **Sludge Handling:** Thickening and dewatering as per IS 7985:1985.
 - **Sludge Pump:** Pumps conforming to IS 1520:1980 for efficient sludge transfer.
 - **Manure Store:** Sludge storage facilities for converting treated sludge into manure.
 - **Disposal/Off-Site Transport:** Compliance with IS 10158:1982 for safe sludge disposal or transport.

G. Key Parameters for Treatment:

- Total Capacity of Sewage : 6 KL/Day
- Designed Capacity of Sewage : 6 KL/Day
- Type of Wastewater : Domestic Sewage
- Treatment Scheme : MBBR Reactor Type
- Initial B.O.D. : 250-300 mg/L
- P.H. : 6.5-7.5
- T.D.S. : 2500-3000 mg/L
- C.O.D. : 450-500 mg/L
- T.S.S. : 450-600 mg/L

H. Detailed Initial Parameters of the Raw Sewage

Parameter	Value	IS Code Reference
Initial Flow	6 KL/Day	IS 4764:1980
Designed Flow	6 KL/Day	IS 4764:1980
B.O.D.	250 Mg./Ltr.	IS 3025 (Part 44):1993
Detergent	50 Mg./Ltr.	IS 4955:1968
Suspended Solids	600-800 Mg./Ltr.	IS 3025 (Part 17):1984
Oil and Grease	20 Mg./Ltr.	IS 3025 (Part 39):1991
P.H.	7.5 – 8.5	IS 3025 (Part 11):1983

I. Explanation of IS Codes:

- IS 4764:1980: Method of Measurement of Water Flow in Closed Conduits.
- IS 3025 (Part 44):1993: Method of Sampling and Test (Physical and Chemical) for Water and Wastewater - BOD (Biochemical Oxygen Demand).
- IS 4955:1968: Method for Sampling and Test for Synthetic Detergents.
- IS 3025 (Part 17):1984: Methods of Sampling and Test (Physical and Chemical) for Water and Wastewater - Suspended Solids.
- IS 3025 (Part 39):1991: Method for Sampling and Test (Physical and Chemical) for Water and Wastewater - Oil and Grease.
- IS 3025 (Part 11):1983: Method of Sampling and Test (Physical and Chemical) for Water and Wastewater - pH Value.

J. Final Parameter

Parameter	Value (mg/L)	IS Code Compliance
B.O.D.	< 30	IS 2490 (Part 1): 1981 - Standards for Discharge of Effluents
C.O.D.	<100	IS 3025 (Part 58): 2006 - Methods of Sampling and Test for Water and Wastewater
Suspended Solids	< 30	IS 3025 (Part 17): 1984 - Methods of Sampling and Test for Water and Wastewater
Dissolved Solids	< 2100	IS 10500: 2012 - Drinking Water Specification
P.H	7.5	IS 3025 (Part 11): 1983 - Methods of Sampling and Test for Water and Wastewater
Oil and Grease	< 10	IS 3025 (Part 39): 1991 - Methods of Sampling and Test for Water and Wastewater

K. Waste Water Treatment Pump Non-Clog Pump

Parameter	Details	IS code Compliance
Duty	Transfer of wastewater from E/Tank	
Driving Method	Submersible type / Monoblock type	IS8034:2002 (Submersible)
Driving Machine	Electric Motor 0.50 H.P.	IS 996:2009
Material of Construction	Cast Iron	IS 210:2009
Capacity Discharge	2-3 L.P.S.	IS 1710:1989

Head	8 – 10 mtr	
No. of Units	One + One	
Type of Pump Make	K.D.S. or any equivalent	
Series of Pump	K.D.S. Series / Kirloskar / Sharp	

L. M.B.B.R. REACTOR

Parameter	Details	Relevant IS Code
Material of Construction	M.S. (Mild Steel)	IS 2062:2011
Dimensions of M.B.B.R. Reactor	1.2m (Length) x 1.2m (Width) x 2.0m (Height)	IS 5525:1969
Time of Retention	14 Hours	
Air Injection System	Twin lobe blower, 1.0 H.P., capacity 100 NM ³ /Hr	IS 3048:1998
Air Passing System	PVC Pipes	IS 4985:2000
Power Required for Blower	1.0 H.P.	
Lifting System of Sewage	Pump from E/Tank	IS 5600:1970
Effective Volume of F.A.B. Reactor	4 KL	
Capacity	4 KL	
Media	C. Fix Fills	
Number of Units	2	

Notes:

- IS 2062:2011: Specifies the requirements for steel for general structural purposes.
- IS 5525:1969: Covers general requirements for design and fabrication.
- IS 3048:1998: Pertains to the performance and construction of air blowers.
- IS 4985:2000: Specifies the requirements for unplasticized PVC pipes for potable water supplies.
- IS 5600:1970: Specifies requirements for centrifugal pumps for handling water and other fluids.

M. Tube Settler

Component	Specification
Construction Material	Mild Steel (MS)
Size	1.2m x 0.8m x 2.0mm
Length of Straight Portion	1.0 m
Length of Inclined Portion	1.0 m
Total Quantity of Tube Deck Media	1.0 m ³
Size of Each Tube	50mm x 1000mm
Material of Tube	Polyvinyl Chloride (PVC)
Function of Inclined Tubes	To reduce the velocity

Notes:

- Construction Material: Mild Steel is used as per IS 2062:2011 for structural steel.
- Size: Dimensions are specified in meters (m) for length and width, and millimetres (mm) for thickness.
- Tube Deck Media: Refers to the total volume of tube settlers used, typically measured in cubic meters (m³).
- Tube Size and Material: Tubes are PVC material, conforming to IS 10151:2002 for un-plasticized PVC pipes.
- Function of Inclined Tubes: Inclined portions are designed to reduce fluid velocity in water treatment applications.

N. MGF and AEF Filter

Component	Details
Model	FRP Model 1354
Diameter	300 mm
Length of Straight Portion	1200 mm
Plate Thickness	4 mm
Media	Sand, Pebbles
Sand Type	Fine Sand
Pebbles Sizes	25mm, 12mm, 6mm
Total Number Required	1 No.
Top & Bottom End Type	Dished
Function	To settle minute particles
Compliance with Standards	IS 10987:1992 (for FRP components), IS 8887:2004 (for Filters)

O. Standards Compliance:

- IS 10987:1992: Standard for Fibre Reinforced Plastic components.
- IS 8887:2004: Standard for Filters, ensuring quality and performance as per Indian standards.
- Total Power Requirement for System

S. No.	Description	Total H.P.	Units
1.	For Twin Lobe Blower	1.0 H.P.	1+1 No.
2.	Waste Water Transfer Pump	0.5 H.P.	1+1 No.
3.	Filter Feed Pump	0.5 H.P.	1+1 No.
4.	Chlorine Dosing Pump	0.5 H.P.	1 No.
	Total H.P.	2.5 H.P.	

34. 12 FOOT KAYAK

A 12-foot kayak is a compact and versatile watercraft designed for recreational and sometimes professional use in various water bodies. Here are the specific details typically associated with a 12-foot kayak, aligning with relevant standards where applicable:

i. Length and Dimensions:

- Length: Specifically measures 12 feet (3.66 meters), which is a standard length for recreational kayaks.
- Width: Typically ranges from 28 to 32 inches (71 to 81 cm), providing stability and manoeuvrability.

ii. Material:

- Hull Material: Usually made from high-density polyethylene (HDPE), fiberglass, or composite materials.

iii. Design and Construction:

- Shape: Features a streamlined design with a pointed bow and a wider stern for stability.
- Cockpit: Includes a seating area for one or two persons, depending on the model, with adjustable foot braces and seat.
- Reference: Design principles align with ergonomic standards ensuring comfort and safety during use.

iv. Features:

- Deck: Equipped with bungee cords or storage compartments for gear and accessories.
- Rudder or Skeg: Some models include a rudder or skeg for better tracking and manoeuvrability.
- Reference: Features comply with safety and usability standards, ensuring adequate storage and handling capabilities.

v. Weight and Capacity:

- Weight: Typically weighs between 45 to 65 pounds (20 to 29 kg), depending on materials and design.
- Capacity: Can carry up to 300 to 400 pounds (136 to 181 kg), accommodating the weight of paddlers and gear.

vi. Performance:

- Stability: Offers good initial stability for calm water and moderate waves.
- Manoeuvrability: Provides agile handling for recreational paddling and exploration.
- Reference: Performance factors are evaluated based on user experience and manufacturer specifications.

vii. Safety and Compliance:

- Buoyancy: Designed to stay afloat and stable in water, meeting safety standards.
-

- Reference: Adheres to relevant safety regulations ensuring the kayak's flotation and stability in different water conditions.

viii. Accessories:

- Paddle: Typically includes a kayak paddle suited to the length and design of the kayak.
- Personal Flotation Device (PFD): Required safety equipment for all occupants as per boating regulations.

35. Container Block / G I Portable Toilet Cabin

Material Specification for Portable Cabin

S. No.	Positions	Portable Office Cabin Materials Specification
1	Top Frame	50mm x 50mm MS Square Pipe 2mm Thick
2	Top Stiffener	40mm x 20mm MS Rectangular Pipe 2mm Thick
3	Bottom Frame	80mm x 40mm MS Rectangular Pipe 2.6mm Thick
A	Horizontal Cross Member	80mm x 40mm MS Rectangular Pipe 2.6mm Thick
B	Vertical Cross Member	50mmX50mm Specially Formed M.S Square Pipe 2mm Thick
C	Bottom Frame Coating	Bottom Frame should be painted with Black Japan kind of material.
4	Side Post (Colum)	50mm x 50mm MS Square Pipe 3mm Thick
5	Side Wall Stiffener	Specially Fabricated Corrugated Sheet 1.2mm/ Post Section-18 SWG
6	Paneling Outside	Specially G.I. Sheet-1.2mm Thick (JSW, Uttam, Asian, Essar, TATA)
7	Roof Outside	Specially G.I Sheet -1.2mm Thick properly Sloped & Watertight (JSW, Uttam, Asian, Essar, TATA)
8	Internal Wall Paneling	8mm Thick MDF OSL Plyboard Plain White & Hi lan pin. (For Office) 4mm Thick Aluminum Composite Panel (For Toilet)
9	False Ceiling	8mm Thick MDF OSL Plyboard Plain White
10	Bottom Flooring	18mm Waterproof Bison Sheet (Make: -V BOARD, EVAREST BOARD, SAHYADRI BOARD) and Vinyl Flooring 1.6 mm
11	Aluminium Windows	Double Shutter sliding Aluminium Powder Coated Windows Tinted Glass with Safety Grills. Rainwater Protection Guard. Size 3'(w) x 3'(H),
12	Door	Corrugated In 1.2mm GI Corrugated Sheet, Glass wool, handling & Bulkhead on Top of The Door.
13	Insulation	Glass Wool Density of 32 kg/cu.m, Side Wall - 25mm, Ceiling -50mm
14	Wiring	All Wiring Shall Be Concealed Type & Shall Be Of PVC Insulated F Guard Copper wire (Polycab)

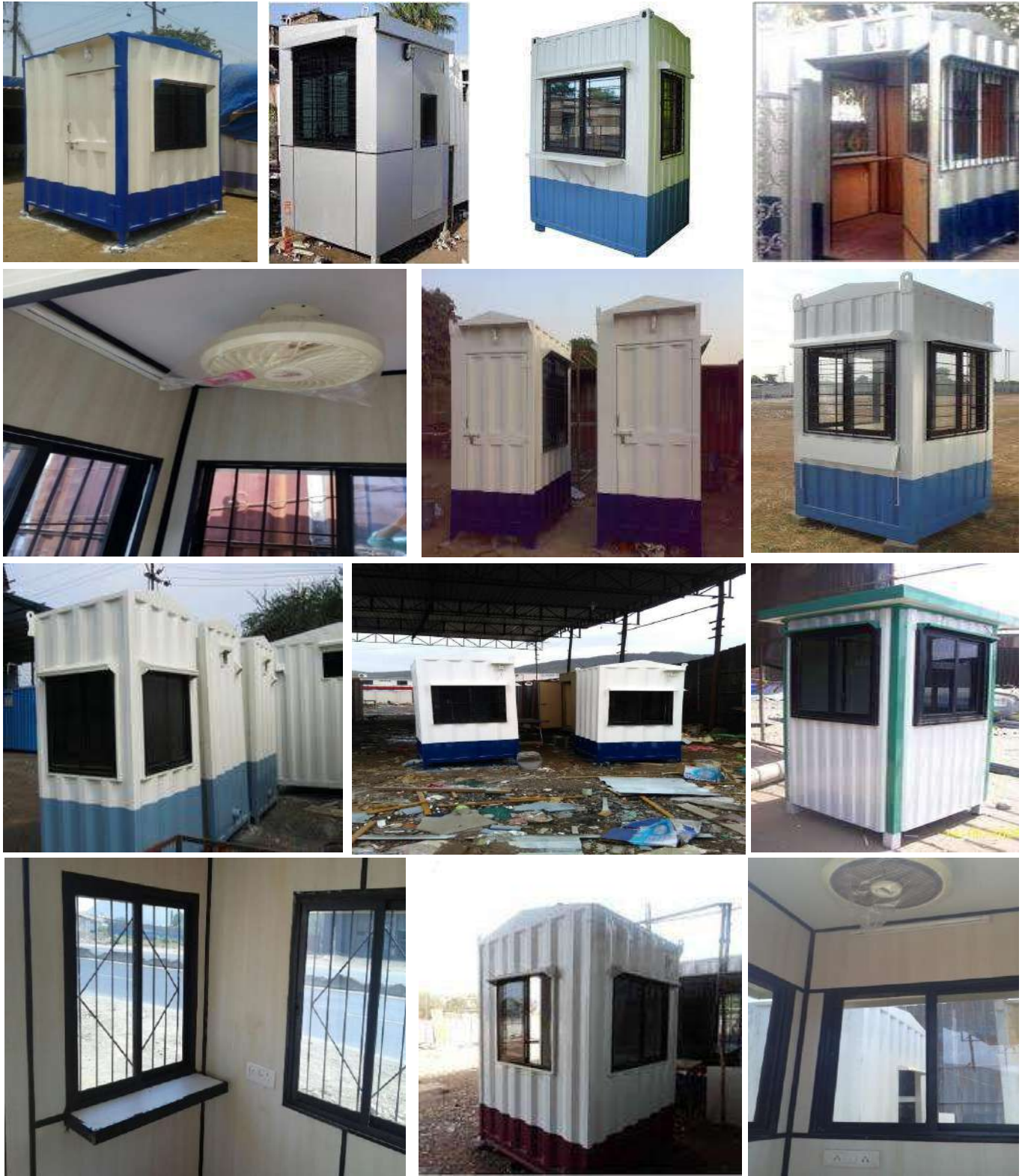
S. No.	Positions	Portable Office Cabin Materials Specification
15	ELECTRICAL MATERIAL	All Electrical Fittings in The Portable Cabin Shall Be 220-240v, AC 50 Hz , And Switch Socket Light Point, A) Tube lights: B) Fans: Cabin Ceiling Fans – C) Sockets 06 Amps socket with switch D) Main Board: (Anchor Giva)
16	Earthing	Earthing Point Shall Be Provide For SAFETY
17	Outside Painting	Phosphate Then Cabin & Painting with One Coat of Synthetic Primer With Two Coat For Epoxy Paint .
18	Legs	6 inch height, Four leg at all corners.
19	Hook	Specially Formed Hooks for Easy Lifting & Shifting.
20	Partition	40mm x 20mm MS Rectangular Pipe With 8mm MDF OSL Sheet
21	Plumbing (Concealed)	All Sanitary Pipes are of high quality UPVC Pipes.
22	Toilet Fitting	It Shall be Hindustan, Regular and Hindware
23	Wast Coupling	To Drain Extra Unwanted Floor water.
24	Ceramic Fitting	EWC with flush tank and wash basin and Urinal.

ADDITIONAL & ELECTRICAL FEATURES OF PORTABLE CABIN

PERTICULER	4x4
Ceiling / Wall Mounted Fan	N/A
Led Light/ Tube Light	5
6 Amp. Switch Socket Board (2 Switch, 2 Socket)	N/A
Main Switch Board for Point Distributing	5
External Light. (Bulkhead)	5
MCB BOX with 32Amp. Tripper	1
Main Door with Handle & Fittings	5
Window with Grill 3'-0"x3'-0"	N/A
Provision for Split A/C With Electrical Point	N/A
Urinal With Fitting & Half Partition	N/A
EWC With Cover & Fitting	5
Flush Tank with Fitting	5
Jet-spray Fitting	5
Two in one Bibcock	5
Wash Basin with tap	5
Window with Exhaust- Fan 8"x8"	5
Mirror 18"x14"	5
Soap Disk Steel	5
Towel hanger	5
Tissue Stand	5
Water Tank Provision	YES
Base Flooring Finishing with	1.6 mm PVC Vinyl Flooring

Reference Photographs





36. FRP 10-Seater Stationary Toilet with Western Seat (3x3)

The FRP 10-seater stationary toilet with western seat (3x3) is constructed using Fiber Reinforced Plastic (FRP), ensuring lightweight durability and resistance to corrosion. It measures 3 meters by 3 meters, accommodating 10 individuals comfortably. Sanitary fixtures include 10 Hindware western commodes, 2 washbasins, and 12 taps, meeting sanitation standards. Illumination is provided by 11 LED lights, with additional

amenities such as 1 towel rod, 2 soap stands, and 2 mirrors. Security features include 10 door locks and 10 door handles. Compliance with relevant Indian Standards ensures safety and quality in sanitation, electrical fittings, and structural integrity. Installation requires proper plumbing and electrical connections, with routine maintenance ensuring cleanliness and functionality for long-term use.

Material and Construction:

- **FRP Construction:** The toilet structure is made of Fiber Reinforced Plastic (FRP), known for its lightweight, durability, and resistance to corrosion and weathering.
- **Dimensions:** The toilet unit measures 3 meters by 3 meters, providing ample space for 10 seated individuals.

Sanitary Fixtures:

- **Western Commode (Hindware):** 10 pieces installed, complying with standards for sanitation and comfort (IS 2556).
- **Washbasin:** 2 units for hand washing, typically made from ceramic or stainless steel.
- **Tap:** 12 taps for water supply, meeting standards for flow rate and durability (IS 13959).
- **LED Lights:** 11 LED lights installed for illumination, meeting electrical safety and efficiency standards (IS 10322).

Additional Accessories:

- **Towel Rod:** 1 rod installed for drying hands or towels, securely mounted to withstand usage (IS 1741).
- **Soap Stand:** 2 stands for holding soap, designed to be corrosion-resistant and easy to clean.
- **Mirror:** 2 mirrors for personal grooming and hygiene, adhering to safety and quality standards (IS 2355).
- **Door Lock and Handle:** 10 sets each, ensuring secure closure and ease of access (IS 2201).

Compliance and Standards:

- The toilet unit complies with relevant Indian Standards (IS) for sanitation, construction materials, and electrical fittings to ensure safety, hygiene, and durability.
- FRP materials conform to IS 12866 standards for quality and performance in structural applications.

Installation:

- Installation involves ensuring proper plumbing, electrical connections, and secure anchoring of fixtures.
-

37. Sky Cycle

Sky cycle refers to an amusement ride found in theme or adventure parks, integrating cycling with an elevated track that suspends riders in the air. This setup creates a thrilling experience akin to bicycling but at heights above ground level. Riders pedal through the air on specially designed bicycles secured to the track with safety features like harnesses, ensuring a safe and exhilarating ride. The elevated path offers panoramic views and a sensation of flying, enhancing the excitement. Engineered with strict safety measures including harnesses and regular maintenance, sky cycles are popular worldwide for their unique blend of adventure and scenic enjoyment. They appeal to thrill-seekers and families alike, providing a controlled yet thrilling environment where the joy of cycling meets the thrill of airborne excitement.

- Height: Elevated to 20 feet above ground level, providing a thrilling perspective and scenic views.
- Tower Width: Minimum 8 feet, supporting the structure securely.
- Length: Approximately 196 meters, offering a substantial ride length.
- Installation Place: Positioned over a river, enhancing the scenic and adventurous experience.
- Structure: Supported by 5-inch M/S iron poles equipped with ladders and platforms for accessibility and maintenance.
- Foundation: Anchored with a 5-foot deep RCC foundation with a base plate system, ensuring stability and safety.
- Cycle: Includes a single-seat cycle designed for the ride, secured to the track or path for safety.
- Safety Equipment: Equipped with 2 safety harnesses, 2 pulleys, and 6 carabiners to ensure rider safety and prevent accidents.
- Paint: Utilizes Berger or Asian paints for durable and weather-resistant finishing.
- Helmets: Provides 2 helmets for rider protection during the ride.

38. Burma loops

Burma Loops consist of a course or series of challenges set at a height of approximately 20 feet above ground level. The course spans a length of about 105 meters and includes various elements such as towers and platforms connected by ropes, cables, or bridges.

Key Features:

- Tower Structure: Built with sturdy 5-inch diameter mild steel (M/S) poles, equipped with ladders and platforms for access and support.

- **Foundation:** Supported by a reinforced concrete (RCC) foundation extending 5 feet deep, incorporating a base plate system for stability.
- **Safety Measures:** Includes safety features such as 12 mm galvanized steel core wires for roof fixing, 12 mm galvanized self-belay wires, 14 mm polypropylene (PP) rope loops, safety harnesses, helmets, pulleys, and carabiners.
- **Paint and Finish:** Finished with Berger or Asian paints for aesthetic appeal and corrosion resistance.

Purpose:

Burma Loops are designed to provide a challenging and adventurous experience while ensuring participant safety through rigorous construction and safety standards. Participants navigate through the course using safety harnesses and equipment, enhancing both physical and mental agility in an engaging outdoor setting.

Specification:

- **Height:** 20 feet.
- **Tower Width:** Minimum 6 feet.
- **Length:** Approximately 105 meters.
- **M/S Iron Pole Structure:** Utilizes 5-inch diameter mild steel (M/S) poles equipped with ladder and platform for accessibility and structural support.
- **Foundation:** Extends 5 feet deep with reinforced concrete (RCC) foundation work incorporating a base plate system for stability.
- **Roof Fixing Wire:** 12 mm galvanized steel core wire for securing the roof.
- **Safety:** Includes 12 mm galvanized self-belay wire for additional safety measures.
- **Loops Rope:** Utilizes 14 mm polypropylene (PP) rope loops for structural connections.
- **Safety Harness:** Includes 2 safety harnesses for personnel protection.
- **Pulley:** Equipped with 2 pulleys for operational functionality.
- **Carabiners:** Includes 6 carabiners for securing equipment and personnel.
- **Paint Work:** Uses Berger or Asian paints for aesthetic finishing and corrosion protection.
- **Helmets:** Provides 2 helmets for personal safety during operation.

39. Water Roller

A water roller is an inflatable cylindrical structure designed for water recreation. It features a large, transparent tube made of durable TPU (Thermoplastic Polyurethane), allowing users to float and roll on water surfaces. Available in various sizes like 9x9 feet, 9x11 feet, and 9x13 feet, it offers a fun and safe activity for recreational use in pools, lakes, and other aquatic settings. Its sturdy construction and safety features

make it popular in water parks, resorts, and outdoor facilities, ensuring an enjoyable experience for users of all ages.

Technical Specifications:

- i. **Height:** 9 feet tall, providing sufficient buoyancy and visibility above the water surface.
- ii. **Width:** Specific width details are not provided; typically, water rollers have a diameter of around 9 feet.
- iii. **Material:** Constructed from TPU (Thermoplastic Polyurethane), known for its strength, flexibility, and resistance to abrasions and punctures. TPU ensures durability and longevity in water environments.
- iv. **Blower:** Includes one blower for inflation, maintaining the tube's rigidity and shape when in use.
- v. **Dimensions Options:**
 - o 9x9 feet
 - o 9x11 feet
 - o 9x13 feet

These dimensions refer to the length and diameter variations available, accommodating different user capacities and preferences for water roller sizes.

vi. Usage and Features:

- **Recreational Use:** Provides a fun and safe experience for users to roll and play on water surfaces, suitable for pools, lakes, or controlled water bodies.
- **Safety:** Designed with safety features to ensure buoyancy and stability, allowing users to safely enter and exit the roller.
- **Assembly and Maintenance:** Requires inflation using the provided blower and periodic checks for leaks or damage to maintain optimal performance and safety.

40. Valley Crossing

Valley crossing is an adventure activity that involves traversing a valley or gap using a secure rope system, typically found in adventure parks and outdoor recreation facilities. It provides participants with an exhilarating experience while emphasizing safety through specialized equipment and structural support.

Technical Specifications:

- i. **Height:** 20 feet, indicating the vertical distance participants will cross above the ground level.
 - ii. **Tower Width:** Minimum 8 feet, ensuring stability and sufficient space for operational safety.
-

iii. **Length:** Approximately 115 meters, defining the span of the crossing distance.

iv. **M/S Iron Pole Structure:**

- Pole Size: 5-inch diameter poles.
- Features: Equipped with ladders and platforms for safe ascent and descent.

v. **Foundation:**

- Depth: 5 feet below ground level.
- Type: RCC (Reinforced Cement Concrete) foundation with a base plate system, ensuring stability and load-bearing capacity.

vi. **Activity Rope:**

- Type: 12 mm static double rope, designed for durability and strength under load.

vii. **Safety Equipment:**

- Harnesses: 2 safety harnesses, essential for securing participants during the crossing.
- Pulleys: 2 pulleys, facilitating smooth movement along the rope.
- Carabiners: 6 carabiners, used for connecting safety equipment securely.

viii. **Structure Paintwork:** Berger or Asian brand, providing protective coating against environmental elements.

ix. **Helmets:** 2 helmets, ensuring head protection for participants throughout the activity.

41. Jumaring

Jumaring is a climbing activity that involves ascending vertical surfaces using specialized equipment. It's commonly used in adventure sports and training scenarios to enhance climbing skills and physical fitness.

Jumaring involves participants using specialized climbing equipment such as ascenders, ropes, and safety gear to ascend vertical surfaces like trees or artificial climbing walls. The setup typically includes sturdy ropes, secured with carabiners and supported by slings and other safety devices. Helmets are essential for participant safety. Training ensures climbers understand proper usage and safety protocols before engaging in the activity.

This activity provides a challenging and physically rewarding experience, suitable for adventure enthusiasts, team-building exercises, or skill development in climbing sports.

Specifications:

- a) Height: Minimum height requirement of 20 feet for the climbing surface.

- b) Rope: Utilizes 12 mm diameter climbing ropes, known for their strength and durability under load.
- c) Jumar / Ascender: Includes 4 jumar or ascender devices, essential for ascending ropes safely and efficiently.
- d) Gri-gri: The grigri device allows the be-layer (the person controlling the rope) to manage the climber's ascent or descent more efficiently. It automatically locks the rope in place in the event of a fall, preventing the climber from falling too far.
04 numbers of Gri-gri devices are used to adjust and secure ropes during climbing activities.
- e) Tape Sling: Includes 8 tape slings, providing additional support and flexibility in securing equipment and climbers.
- f) Carabiner: Provides 12 carabiners, crucial for attaching ropes, slings, and other climbing equipment securely.
- g) Helmet: Includes 4 helmets for safety, protecting climbers from head injuries during the activity.
- h) Installation on Tree: Requires 2 days for proper installation and setup of the climbing structure on trees or designated supports.
- i) Training: Includes 2 days of training for participants, covering safety procedures, equipment usage, and climbing techniques.

42. MS 8 MM thickness Standing & Bent over bird

These items are bird sculptures made from 8 mm thick mild steel. The standing bird sculpture measures 114 cm in height and 102 cm in width, while the bent-over bird sculpture measures 98 cm in height and 88 cm in width. The use of mild steel provides both sculptures with substantial durability and strength, making them suitable for outdoor installations or as decorative art pieces in gardens, parks, or public spaces.

Item Description:

- **Material:** MS (Mild Steel): Both standing and bent-over bird sculptures are made from mild steel with a thickness of 8 mm. Mild steel is known for its strength, durability, and ease of fabrication.

Dimensions:

- **Standing Bird:**
 - Height: 114 cm
 - Width: 102 cm
 - Thickness: 8 mm
- **Bent-over Bird:**

- Height: 98 cm
- Width: 88 cm
- Thickness: 8 mm

Technical Specifications:

- **Material:**
 - Mild Steel (MS): Chosen for its structural integrity and workability. MS is widely used in metal art due to its balance of strength and flexibility, allowing for detailed and durable sculptures.
- **Dimensions:**
 - Standing Bird: 114 cm (H) x 102 cm (W) x 8 mm (T)
 - Bent-over Bird: 98 cm (H) x 88 cm (W) x 8 mm (T)

Proof and Standards:

- **Material Quality:** According to IS 2062 (2011) standards for mild steel, which ensures the steel used is of suitable quality for structural and sculptural purposes.
- **Fabrication:** Adheres to general metal fabrication standards, ensuring precision in cutting, welding, and finishing processes to create detailed and accurate representations of birds.

Usage:

These sculptures can be used as decorative elements in various settings, including:

- **Public Parks and Gardens:** Enhancing aesthetic appeal and providing artistic focal points.
- **Private Gardens:** Adding a touch of art and nature to personal spaces.
- **Commercial Spaces:** Serving as eye-catching installations in business premises or shopping centre.

43. Cast Iron Benches

Cast iron benches are robust seating structures made from cast iron, designed for outdoor use in public and private spaces. They combine durability with classic design, offering long-lasting and weather-resistant seating solutions. These benches are commonly found in parks, gardens, and along sidewalks, providing a comfortable place for people to rest and enjoy the surroundings. The use of cast iron ensures they can withstand heavy use and harsh weather conditions, while their design often incorporates ornamental elements that enhance the aesthetic appeal of the environment.

Specifications:**a) Material Quality:**

- **Cast Iron:** The primary material used is cast iron, which should conform to IS 210:2009 (Grade FG 200). This standard specifies the grade of grey iron castings suitable for various structural and aesthetic applications.

b) Dimensions and Design:

- **Bench Dimensions:** While specific dimensions can vary based on design requirements, standard sizes typically range from 1.2 meters to 1.8 meters in length.
- **Design Specifications:** The design should adhere to ergonomic standards for seating comfort and aesthetic appeal. Reference can be made to IS 875:1987 (Part 1) for structural design loads and IS 875:1987 (Part 2) for design considerations related to live loads.

c) Load-Bearing Capacity:

- **Strength Requirements:** The bench should be designed to withstand a uniform distributed load as specified in IS 875:1987 (Part 2), ensuring safety and durability under typical usage conditions.

d) Surface Finish:

- **Coating and Protection:** Cast iron benches should have a protective coating to prevent rust and corrosion. The coating process should conform to IS 1367:2002 (Part 13) for fasteners and protective coatings, ensuring a long-lasting and aesthetically pleasing finish.

e) Assembly and Installation:

- **Installation Guidelines:** Installation should follow guidelines for secure anchoring to prevent tipping or movement, conforming to IS 875:1987 (Part 1) for structural safety.

44. Gypsum Ceiling & Partition:

Gypsum ceilings and partitions are construction elements used in residential, commercial, and industrial buildings. They are made from gypsum boards, which are versatile, lightweight, and fire-resistant materials. These components are favored for their smooth finish, ease of installation, and ability to create aesthetically pleasing and functional spaces.

Gypsum Ceiling:

- **Material:** Gypsum boards, also known as drywall or plasterboard, are made from a core of gypsum, sandwiched between two sheets of paper.
- **IS Code:** IS 2095 (Part 1): 2011 covers gypsum plaster boards, specifying requirements for manufacturing, physical properties, and testing methods.

- **Installation:** Gypsum boards are typically fixed to a framework of steel or timber using screws. Joints between boards are taped and finished with jointing compounds for a seamless look.
- **Applications:** Used to create smooth, flat ceilings that can hide wiring, ductwork, and other utilities. They also provide sound insulation and fire resistance.
- **Benefits:** Quick installation, smooth finish, lightweight, and excellent fire and sound resistance.

Gypsum wall Partition:

- **Material:** Similar to gypsum ceilings, partitions use gypsum boards mounted on a metal framework.
- **IS Code:** IS 2547 (Part 1): 1976 specifies the requirements for gypsum building plaster and IS 2095 (Part 1): 2011 applies to gypsum boards used for partitions.
- **Installation:** Gypsum boards are attached to metal studs or channels to form a non-load-bearing wall. These partitions can be single or double-layered for additional strength and insulation.
- **Applications:** Used to create temporary or permanent interior walls in offices, homes, and commercial spaces. They are ideal for creating rooms or dividing spaces without heavy construction.
- **Benefits:** Easy to install, modify, or remove. They offer good sound insulation, are lightweight, and can be finished with paint or wallpaper.

Key Specifications:

- **Thickness:** Typically ranges from 9.5 mm to 15 mm, depending on the application.
- **Dimensions:** Standard sizes are 1.2 meters by 2.4 meters or 1.2 meters by 3 meters.
- **Fire Resistance:** Gypsum boards provide fire resistance due to the water content in gypsum, which slows down the spread of fire.
- **Sound Insulation:** They offer sound insulation properties, especially when used in partitions with additional insulation materials.

Compliance:

Gypsum ceilings and partitions should be installed following the guidelines and standards set by IS 2095 and IS 2547 to ensure safety, durability, and performance. Proper installation also ensures the benefits of fire resistance, sound insulation, and aesthetic appeal is fully realized.

In summary, gypsum ceilings and partitions are essential construction elements for creating functional, aesthetically pleasing, and safe interior spaces, complying with the relevant Indian Standards for quality and performance.

45. FRP Row Boat

A 4 to 6-seater FRP (Fiber Reinforced Plastic) row boat is a small, manually-powered watercraft designed for leisure activities such as boating in lakes, rivers, and calm coastal areas. The boat is constructed using FRP, known for its durability, lightweight, and resistance to corrosion. This row boat comes equipped with all necessary accessories for safe and enjoyable rowing.

Specifications:

a) Construction Material:

- **Material:** Fiber Reinforced Plastic (FRP), As per IS 12709:1989, which specifies the standards for small FRP boats.
- **Benefits:** High strength-to-weight ratio, resistance to corrosion, low maintenance, and long-lasting durability.

b) Seating Capacity:

- **Capacity:** Accommodates 4 to 6 persons.
- **Seating Arrangement:** Ergonomically designed seats for comfort and safety during rowing.

c) Dimensions:

- **Length:** Typically around 4 to 5 meters (13 to 16 feet) in length.
- **Width:** Proportional to ensure stability and space for seating, usually around 1.5 to 2 meters (5 to 6.5 feet).
- **Height:** Designed to provide adequate freeboard for safety in calm waters.

d) Accessories:

- **Oars:** Standard-sized oars made from durable materials like aluminum or wood.
- **Rowlocks:** Secure rowlocks to hold the oars in place during rowing.
- **Safety Gear:** Includes life jackets and a first aid kit, adhering to safety regulations.
- **Drain Plug:** For easy removal of water from the boat.

e) Safety Standards:

- **Buoyancy:** Complies with IS 6612:1985, ensuring adequate buoyancy and stability.
- **Load Capacity:** Clearly marked to prevent overloading, ensuring safe operation.

f) Design Features:

- **Hull Design:** Designed for stability and smooth rowing, with a flat or slightly V-shaped hull.
- **Finish:** Smooth gel coat finish to enhance aesthetics and provide additional protection against water ingress.

46. Brick Cladding

Terracotta exterior brick cladding is a decorative and protective layer used on the exterior of buildings. Made from natural clay, it is fired at high temperatures to achieve durability and weather resistance. The terracotta cladding is made 100% of clay, which is environmentally friendly and harmless to humans and the environment. The terracotta cladding can also be recycled and reused as a new exterior wall material or as a building material. This type of cladding offers an aesthetic appeal with its natural, earthy tones and is known for its long-lasting performance and minimal maintenance needs.

Specifications:

a) Dimensions:

- **Size:** 9x3 inches (approximately 229x76 mm)
- **Thickness:** 10 mm

b) Material:

- **Type:** Terracotta, a type of clay-based ceramic
- **Quality:** Should conform to IS 13801:2013, which specifies requirements for clay tiles used as facing and cladding materials.

c) Manufacturing Process:

- **Firing:** Terracotta should be fired at temperatures between 1000-1100°C to ensure proper vitrification and durability.
- **Water Absorption:** Should comply with IS 13801:2013, indicating a maximum water absorption rate of 20% for exterior grade tiles to ensure resistance to weathering and frost.

d) Physical Properties:

- **Compressive Strength:** Should meet the minimum requirements as specified in IS 13801:2013 to ensure the material can withstand external loads and impacts.
- **Durability:** Must exhibit resistance to efflorescence, spalling, and cracking, as specified in IS 13801:2013.

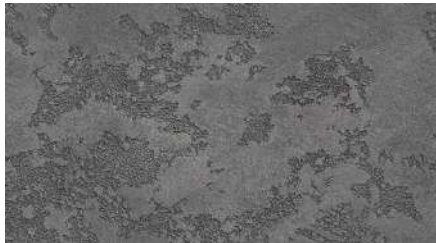
e) Installation:

- **Fixing Method:** Can be installed using adhesives or mechanical fixing systems, with consideration for thermal expansion and contraction.
- **Jointing:** Proper jointing materials should be used to ensure water-tightness and flexibility, adhering to guidelines for mortar or adhesive use as per IS 6041:1985, which provides code of practice for construction of clay facing brick walls.

f) Aesthetic and Functional Qualities:

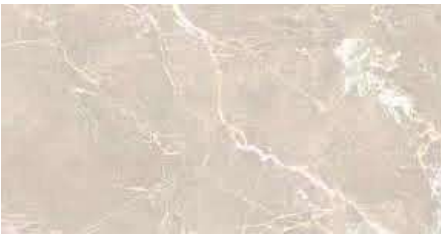
- **Appearance:** Should have uniform color, texture, and shape, with acceptable tolerances for minor imperfections as specified in IS 13801:2013.
- **Weather Resistance:** Must be resistant to UV rays, moisture, and temperature variations to maintain appearance and structural integrity over time.

47. Material Palette

Material Palette			
No	Material specification	Application	Illustration
1.	Bamboo Cladding	Entrance Gate, Boundary Wall	
2.	Decorative Plaster Cladding – stone texture	Ticket Counter	
3.	Clear reflective glass	Restaurant	
4.	Satin etched Glass	Ticket Counter, admin office , CCTV Control room , interpretation center	
5.	20-gauge corrugated aluminum sheet	Tourist area entrance gate, cycle shed, seating gazebos, retail kiosks, eco huts, bird watching tower	

Material Palette			
No	Material specification	Application	Illustration
6.	Thatch Cladding	Tourist area entrance gate, cycle shed, seating gazebos, retail kiosks, eco huts, bird watching tower	
7.	Interlocking Grass Crete pavers	Parking Area, Riverside pathway - tourist area	
8.	Chain link fencing with	Tourist area & forest area Fencing	
9.	Colored Mosaic tiles	Recreational Area Stages	
10.	Brick Cladding	CCTV Control room, Admin Area, Interpretation building 2 , Petting Zoo	

Material Palette			
No	Material specification	Application	Illustration
11.	Wood structural members Polished steel	Entrance Plaza Pergola, Elevated Board Walk, signboard	
12.	Cast iron	Street furniture, light posts, railing, birdwatching tower central support	 
13.	Shera Board	Tree Bench Cladding	
14.	Half Cut Bamboo	Tourist area entrance gate, cycle shed, seating gazebos, retail kiosks, eco huts	
15.	3" Flamed Granite strips	Cladded on ramps and steps to restaurant, interpretation centre 01 and interpretation centre 2	

Material Palette			
No	Material specification	Application	Illustration
16.	Granite cladding	Gallery interpretation vestibule Seating, centre	
17.	Cobbled Stone	Pathways, riverside deck	
18.	Riverstone cladding	Entrance tree enclosure, riverside deck	
19.	MP tile roof	Forest area entrance gate, Restaurant	
20.	Ceramic/ Vitrified matte finish anti-skid flooring tile (600MM X 600MM)	Restaurant, Toilets, Interpretation center 01 & 02, boat house	

Material Palette			
No	Material specification	Application	Illustration
21.	Uncut Natural stone	Forest Trail, Riverside walkway – forest area	
22.	Gypsum False Ceiling	Interpretation Centre	
23.	Gypsum Dry Wall	Wall partition- Interpretation Centre	
24.	M.S Container Cabin	Toilets	
25.	Tied Bamboo Pole mat	Cycle shed, seating gazebos, retail kiosks, eco huts, bird watching tower	

Material Palette

No	Material specification	Application	Illustration
26.	HDPE Floats	Floating Pontoon, River bridge	
27.	WPC Floorboards	Elevated Board Walk	
28.	Chicken Mesh	Petting Zoo	
29.	Stone Rubble	Riverside coursed rubble masonry wall	

SCHEDULE D: DRAWINGS

(See Article 12.2(g))

1. Drawings

In compliance with the obligations set forth in Article 12.2 of this Agreement, the Selected Agency shall furnish to the Authority, free of cost, all Drawings as required by the Authority which shall be informed after the Execution Date but prior to the Appointed Date.

If the Authority determines that for discharging its duties and functions under this Agreement, it requires any drawings other than those listed hereinabove, it may by notice require the Selected Agency to furnish such drawings forthwith. Upon receiving a requisition to this effect, the Selected Agency shall promptly prepare and furnish such drawings to the Authority as if such drawings formed part of this Schedule D.

Schedule of Drawings: [Note: Refer drawing volume provided separately]

SCHEDULE E: APPLICABLE PERMITS*(See Article 4.1.2(b) and 4.1.3(d))*

1.1 The Authority shall, as required under Applicable Laws, obtain the following Applicable Permits on or before the Appointed Date:

- a) Conversion of Land Use (CLU)
- b) Forest Clearance;
- c) NOC from Irrigation Department
- d) xxx

It is expressly provided that the responsibility of the Authority shall be limited to providing above Applicable Permits, subject to compliance during the Contract, if any. The Selected Agency, at its own risk and cost, shall be solely responsible for adhering to the conditions of Applicable Permits. The Selected Agency shall responsible for making its fully aware about terms and conditions of the Applicable Permits.

It is also expressly provided that CRZ Clearance/ Environmental Clearance required to exercise Optional Development Obligation shall be sole responsibility of the Selected Agency.

Any violation of the terms & conditions of the applicable permit obtained by the Authority to facilitate the Selected Agency shall be treated as Selected Agency's default and relevant provisions of default of the Contract Agreement shall be applicable for such occurrence.

Sn	Clearance Type	Nodal Agency for providing clearance	Clearance/ NoC Received (Y/N)	Approval Reference (Documentary Proof attached and Date of Approval)
1	Environmental Clearance	Ministry of Environment Forest and Climate Change (GoI)	In Process	NOC to be Received .
2	NOC	Department of Irrigation.	In process	NOC to be received
3	No Objection Certificate	2.Town and Country Planning department. Municipal Authority	Applicable	NoC to be reviewed

CLU/building permission from Town and Country Planning area:

Since the area falls within the master plan boundary of Pinjore Kalka master plan Change of land use has to be sought from the Department of Town and country planning Govt. of Haryana and Building permission from Pinjore Municipal authorities

- 1.1 The Selected Agency shall obtain all the other required Applicable Permits from the relevant local authorities, as per Applicable Laws, for construction and operation of the
- 1.2 The development and maintenance of the Project and Ancillary Facilities shall be in compliance to Form I submitted by the Authority for obtaining / CRZ Clearance. The Form I submitted for the Project is provided as Annex-I to Schedule E.

Annex-I (Schedule-E)

The Form I for _____ clearance is being enclosed separately.

Annex-II (Schedule-E)

The following list of Applicable Permits which are envisaged to be necessary for construction, operation and maintenance of the Eco-Tourism Project is indicative only. The actual Applicable Permits shall be contingent upon nature of the Project and nature of construction and operation methodology proposed by the Selected Agency.

- a) **Conversion of Land Use:** The Authority shall, as required under Applicable Laws, obtain the Conversion of Land Use (CLU) Permit for the project site on or before the Appointed Date.
- b) **License to store and serve alcohol in the Project:** Commitment to license to store and serve alcohol shall be provided at the date of signing of agreement. Actual license shall be contingent upon compliance to fire and other approvals as per extant provisions and shall be provided after completion of construction.
- c) **Other Clearances:** The following list of Applicable Permits for construction, operation and maintenance of the Eco-Tourism Project is indicative only. The actual Applicable permits will be contingent upon the nature of construction and operation envisaged by the Selected Agency.

The estimated timeframe for obtaining following approvals is 30 days, subject to the Selected Agency submitting its applications complete in all respect in a timely manner. The Authority will provide reasonable support and assistance to the Selected Agency in procuring Applicable Permits required from any Government Instrumentality for implementation and operation of the Project.

S. No.	Applicable Permits and Department
1.	Development Permit by _____PWD
2.	Building Permit by _____PWD
3.	Consent to Establish by _____Pollution Control Committee
4.	Consent to Operate by _____Pollution Control Committee
5.	Provisional Permit for Eco-friendly Tourist Projects by Tourism Dept.
6.	Operational Permit for Eco-Friendly Tourist Projects by Tourism Dept.
7.	Food License by Food Safety Commissioner, FSSAI
8.	
9.	

S. No.	Applicable Permits and Department
10.	
11.	
12.	
13	
14	
15	

SCHEDULE F: PERFORMANCE SECURITY*(See Article 9.1(a))⁶***WHEREAS:**

- (A), (the “**Selected Agency**”) and the [_____] ⁷ represented by the Secretary, Department of Tourism (“**Authority**”) and having its principal offices at
have entered into a Contract Agreement dated..... (the “**Agreement**”) whereby the Authority has agreed to the Selected Agency undertaking the development, operation, maintenance and management of the Project at in
, subject to and in accordance with the provisions of the Agreement.
- (B) The Agreement requires the Selected Agency to furnish a Performance Security to the Authority in a sum of [Rs. cr. (Rupees Crores)] (the “**Guarantee Amount**”) as security for due and faithful performance of its obligations, under and in accordance with the Agreement, during the period of 1 (one) year from the Appointed Date.
- (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 and undertakes to pay to the Authority upon occurrence of any failure or default in due and faithful performance of all or any of the Selected Agency’s obligations, under and in accordance with the provisions of the Agreement, on its mere first written demand, and without any demur, reservation, recourse, contest or protest, and without any reference to the Selected Agency, such sum or sums up to 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 a Secretary or equivalent, that the Selected Agency 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 Selected Agency is in default in due and faithful performance of its obligations during the Construction Period under the Agreement and its decision that the Selected Agency is in default shall be final, and binding on the Bank, notwithstanding any

⁶ To be read as Performance Guarantee with reference to Article 34.

⁷ The name of the authority issuing the Concession to be inserted.

differences between the Authority and the Selected Agency, or any dispute between them pending before any court, tribunal, arbitrators or any other authority or body, or by the discharge of the Selected Agency for any reason whatsoever

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 Selected Agency 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 Selected Agency 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 Selected Agency 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 Selected Agency, 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 Selected Agency 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 Selected Agency 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, no 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 after expiry of a period of [6 (six)] months from the Project COD, and provided the Selected Agency is not

in breach of this Agreement. Upon request made by the Selected Agency for release of the Performance Security along with the particulars required hereunder, duly certified by a statutory auditor of the Selected Agency, 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 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 [____]⁸ from the date hereof or until it is released earlier by the Authority pursuant to the provisions of the Agreement.

Signed and sealed this day of 201.... at

SIGNED, SEALED AND DELIVERED

For and on behalf of the BANK by:

(Signature)

(Name)

(Designation)

(Code Number)

(Address)

NOTES:

- (i) The bank guarantee should contain the name, designation and code number of the officer(s) signing the guarantee.

⁸ Number of years and months to be included.

- (ii) 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.

SCHEDULE G: PROJECT COMPLETION SCHEDULE*(See Article 10.3.5)*

1. Project Completion Schedule

During Construction Period, the Selected Agency shall comply with the requirements set forth in this Schedule G for each of the Project Milestones and Scheduled Completion Date (the **Project Completion Schedule**). Within [15 (fifteen)] days of the date of each Project Milestone, the Selected Agency shall notify the Authority of such compliance along with necessary particulars thereof.

2. Project Milestone

Sn.	Project Milestone	Timeline
1	Agency Mobilization	
2	Approval of Design and Planning Submission & Approval of Design, Drawings, Material, Operations Plan, curation for interpretation centers, S&L etc.(including concept design with details of storyline, shoot, music, color, palettes, artwork style for information, panels and concept sketches for all artistic, installations etc.), Planned Certifications, Sustainable Initiatives etc.	
3	Substructure Completion (Till Plinth Level)	
4	Superstructure Completion (Above Plinth)	
5	Finishing, Utility and Overall Project Completion Applicable after complete start including all utility connection (water, electricity, sewage connection etc.)	
6	Start of Commercial Operations	
Toilets	80	The renovation involves dismantling old fixtures and finishes, repairing masonry, and installing new floor and wall tiles. It includes replacement of sanitary and plumbing fittings, rewiring for lighting and ventilation, waterproofing, and painting. The toilet will be upgraded with modern fixtures, improved ventilation, and accessibility features. All works shall be completed with proper cleaning and commissioning, ensuring hygiene,

		functionality, and durability.

(b) Scheduled Completion Date

The Scheduled Completion Date shall occur on the _____. On or before the Scheduled Completion Date, the Selected Agency shall have completed the Project and the Project Infrastructure in accordance with this Agreement.

(c) Extension of period

Upon extension of any or all of the aforesaid Project Milestones or the Scheduled Completion 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.

SCHEDULE H: TESTS

(See Article 12.4.2 and 13.3)

1. Schedule for Tests

- 1.1. The Selected Agency shall, no later than [30 (thirty)] days prior to the likely completion of the Project, notify the Authority and the Authority of its intent to subject the Project to Tests, and no later than [7 (seven)] days prior to the actual date of Tests, furnish to the Authority and the Authority detailed inventory and particulars of all works and equipment forming part of the Project.
- 1.2. The Selected Agency shall notify the Authority of its readiness to subject the Project to Tests at any time after [7 (seven)] days from the date of such notice, and upon receipt of such notice, the Authority shall, in consultation with the Selected Agency, 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 Authority shall thereupon conduct, or cause to be conducted, any of the following Tests in accordance with Article 12 and this Schedule H.

2. Tests

- 2.1. In pursuance of the provisions of Article 12.4.2 of this Agreement, the Authority shall conduct, or cause to be conducted, the Tests specified in this Paragraph 2.

2.2. Visual and Physical Test

The Authority shall conduct a visual and physical check of the Project, to determine that all works and equipment forming part thereof conform to the provisions of this Agreement.

2.3. Trial run

The Authority shall require the Selected Agency to carry out or cause to be carried out a trial run of all equipment, facilities and systems to determine that the Project is in conformity with the provisions of this Agreement.

2.4. Tests for equipment

The Authority shall conduct or cause to be conducted Tests, in accordance with Good Industry Practice, for determining the compliance of all systems and equipment comprising the Project and described in Schedule-B.

3.1. Environmental audit:

The Authority shall carry out a check to determine conformity of the Project with the environmental requirements set forth in Applicable Laws and Applicable Permits.

3.2. Safety review:

The Authority shall carry out a safety audit of the Project to determine its compliance with the provisions of Schedule-K and this Agreement.

3. Agency for Conducting Tests

All Tests set forth in this Schedule H shall be conducted by the Authority or such other agency or person as it may specify in consultation with the Authority.

4. Inspection by the Authority

Upon successful completion of Tests, the Authority shall submit an Inspection Report in accordance with the provisions of Article 12.

5. Tests during Construction

Without prejudice to the provisions of this Schedule H, tests during Construction Period shall be conducted in accordance with the provisions of Article 13.3.1.

SCHEDULE I: FORMAT FOR COMPLETION CERTIFICATE*(See Article 14.2.2(a))***To whom it may concern**

In consideration of the requirements of conditions of **Error! Reference source not found.** of the Agreement and the Selected Agency's application for a Provisional Certificate/Completion Certificate, the Authority hereby grants the Provisional Certificate/Completion Certificate

[This Provisional Certificate has been issued pending completion of the Punch List as described in Annex I to the Provisional Certificate]

This Provisional Certificate/Completion Certificate is issued on the understanding that the conditions of the Agreement have been met except for minor outstanding work that does not affect the use and safety of the [Project/Project Infrastructure] and their intended use as certified by Authority through its letter dated [●].

Provisional Certificate/Completion Certificate does not relieve the Selected Agency of any requirements or obligations within the Agreement.

Signed this Day of, 20 at

AGREED, ACCEPTED AND SIGNED

SIGNED, SEALED AND DELIVERED

For and on behalf of
of

For and on behalf

Selected Agency by:
(Signature)

Authority by:
(Signature)

(Name)

(Name)

(Designation)

(Designation)

(Address)

(Address)

SCHEDULE J: MAINTENANCE REQUIREMENTS

(See Article 17.2)

1. Maintenance Requirements

- 1.1. The Selected Agency shall, at all times, operate and maintain the Project in accordance with the provisions of the Agreement, Applicable Laws, Applicable Permits and Good Industry Practice. In particular, the Selected Agency shall, at all times during the Operation Period, conform to the Maintenance Requirements set forth in this Schedule J.
- 1.2. The Selected Agency shall repair or rectify any defect or deficiency set forth in clause 2 of this Schedule J within the time limit specified therein and any failure in this behalf shall constitute a breach of the Agreement.

2. Repair/rectification of defects and deficiencies

- 2.1. The obligations of the Selected Agency in respect of Maintenance Requirements shall include repair and rectification of the defects and deficiencies in the Project within reasonable time limit in accordance with Good Industry Practices.
- 2.2. The Selected Agency shall at all times maintain an adequate inventory of spares and consumables to meet the Maintenance Requirements.

3. Other defects and deficiencies

In respect of any defect or deficiency, the Selected Agency shall undertake repair or rectification in accordance with Good Industry Practice.

4. Extension of time limit

Notwithstanding anything to the contrary specified in this Schedule J, if the nature and extent of any defect or deficiency justifies more time for its repair or rectification, the Selected Agency shall be entitled to additional time in conformity with Good industry Practice.

5. Emergency repairs/restoration

Notwithstanding anything to the contrary contained in this Schedule J, if any defect, deficiency or deterioration in the Project poses a hazard to safety or risk of damage to property, the Selected Agency shall promptly take all reasonable measures for eliminating or minimizing such danger.

6. Inspection by the Selected Agency

The Selected Agency shall, through its engineer, undertake a periodic (at least weekly) visual inspection of the Project and maintain a record thereof in a register. Such record shall be kept in safe custody of the Selected Agency and shall be open to inspection by the Authority and the Authority at any time during office hours.

7. Transfer Requirements

All defects and deficiencies shall be repaired and rectified by the Selected Agency so that the Project conforms to the Maintenance Requirements on the Transfer Date.

Annex-I (Schedule J)

Maintenance & Performance Standards

[To be based on Clause 6.9 of the RFP and Standards committed by the selected bidder as part of the bid proposal]

SCHEDULE K: SAFETY REQUIREMENTS

(See Article 18.1)

1. Guiding principles

- 1.1. Safety Requirements aim at reduction in injuries, loss of life and damage to property resulting from accidents on or about the Project, irrespective of the person(s) at fault.
- 1.2. Safety Requirements apply to all phases of construction, development, operation and maintenance with emphasis on identification of factors associated with accidents, consideration of the same, and implementation of appropriate remedial measures.
- 1.3. Safety Requirements include measures associated with safe movement, safety management, safety equipment, fire safety, enforcement and emergency response, with particular reference to the Safety Guidelines specified in Annex - 1 of this Schedule K.

2. Obligations of the Selected Agency

The Selected Agency shall abide by the following:

- (a) Applicable Laws and Applicable Permits;
- (b) provisions of this Agreement;
- (c) relevant Standards/Guidelines contained in nationally accepted codes; and
- (d) Good Industry Practice.

3. Safety measures during Operation Period

- 3.1. The Selected Agency shall develop, implement and administer a safety programme for the Project and Project Infrastructure, staff, Users and other persons, which shall include correction of safety violations and deficiencies, and all other actions necessary to provide a safe environment in accordance with this Agreement.
- 3.2. The Selected Agency shall keep a copy of every FIR recorded by the Police with respect to any accident occurring on or about the Project. In addition, the Selected Agency shall also collect data for all cases of accidents not recorded by the Police. The information so collected shall be summarised and submitted to the Authority at the conclusion of every quarter.
- 3.3. The Selected Agency shall submit to the Authority before the 31st (thirty first) May of each year, an annual report (in 3 (three) copies) containing, without limitation, a detailed listing and analysis of all accidents of the preceding Accounting Year and the measures taken by the Selected Agency pursuant to the provisions of clause 3.1 of this Schedule K for averting or minimising such accidents in future.

4. Costs and expenses

Costs and expenses incurred in connection with the Safety Requirements set forth herein, including the provisions of clause 2 of this Schedule K, shall be borne by the Selected Agency in accordance with the provisions of Article 18.2.

Annex - I (Schedule-K) Safety Guidelines

1. System integrity

In the design of the Project and Project Infrastructure, particular care shall be taken to minimize the likely incidence of failure.

2. Safety management

A safety statement shall be prepared by the Selected Agency once every year to bring out clearly the system of management of checks and maintenance tolerances for various elements comprising the Project and compliance thereof. The statement shall also bring out the nature and extent of staff training and awareness in dealing with such checks and tolerances. [2 (two)] copies of the statement shall be sent to the Authority within [15 (fifteen)] days of the close of every year.

3. Emergency

A set of emergency procedures shall be formulated to deal with different emergency situations and the operations staff shall be trained to respond appropriately during emergency through periodic simulated exercises as laid down in a manual for management of disasters (the **Disaster Management Manual**) to be prepared and published by the Selected Agency prior to Project COD. The Selected Agency shall provide 5 (five) copies each of the Disaster Management Manual to the Authority and the Authority no later than [30 (thirty)] days prior to Project COD.

4. Fire safety

- 4.1. To prevent fire in the Project, the Selected Agency shall use fire resistant materials in the construction thereof and shall avoid use of materials which are to some extent flammable, or which emit smoke and harmful gases when burning.
- 4.2. To deal with incidents of fire, the Selected Agency shall provide a hydrant based fire- fighting system in conformity with the provisions of Schedule C.

5. Surveillance and Safety Manual

The Selected Agency shall, no later than [60 (sixty)] days prior to Project COD, evolve and adopt a manual for surveillance and safety of the Project, in accordance with Good Industry Practice, and shall comply therewith in respect of the security and safety of the Project, including its gate control, sanitation, fire prevention, environment protection.

6. Watch and Ward

The Selected Agency shall, at its own expense and in accordance with Good Industry Practice, provide and maintain all lighting, fencing, watch and ward arrangements for the safety of the Project and all persons affected by it.

SCHEDULE L: ESCROW ACCOUNT AGREEMENT*(See Article 26.1.2)*

THIS ESCROW ACCOUNT AGREEMENT is entered into on this the day of 20... AMONGST . , ... , , Limited, a company incorporated under the provisions

of the Companies Act, 2013 and having its registered office at..... (hereinafter Referred to as the “**Selected Agency**” which expression shall, unless repugnant to the context or meaning thereof, include its successors, permitted assigns and substitutes); (Insert name and particulars of the Escrow Bank) and having its registered

Office at (hereinafter referred to as the “**Escrow Bank**” which expression Shall, unless repugnant to the context or meaning thereof, include its successors and substitutes); and

The []¹¹ represented by the Secretary, Department of Tourism and having its principal offices at (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 an agreement dated with the Selected Agency (the “**Contract Agreement**”) for developing, operating, maintaining and management of tourist experience, in..... , and a copy of which is annexed hereto and marked As Annex-A to form part of this Agreement.
- B. The Contract Agreement requires the Selected Agency to establish an Escrow Account,
Inter alia, on the terms and conditions stated therein.

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

DEFINITIONS AND INTERPRETATION

1.1. Definitions

Unless contrary to the provisions of this Agreement, the capitalized terms used in the Agreement but not defined in this Agreement, shall have meaning assigned to it under the Contract Agreement. 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” shall mean this Escrow Account Agreement and any amendment thereto made in accordance with the provisions contained herein;

“Contract Agreement” shall mean the Contract 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” shall mean the period specified in this Agreement for curing any breach or default of any provision of this Agreement by the Selected Agency, 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 Selected Agency asking the latter to cure the breach or default specified in such notice;

“Escrow Account” shall mean an account established in terms of and under this Agreement, and shall include the Sub-Accounts;

“Escrow Account Default” shall have the meaning ascribed thereto in Article 6.1;

“Lenders’ Representative” shall mean the person referred to as the Lenders’ Representative in the foregoing Recitals;

“Parties” shall mean the parties to this Agreement collectively and “Party” shall mean any of the Parties to this Agreement individually;

“Payment Date” shall mean, in relation to any payment specified in clause 4.1, the date(s) specified for such payment; and

“Sub-Accounts” shall mean 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 not defined herein but defined in the Contract Agreement shall, unless repugnant to the context, have the meaning ascribed thereto in the Contract 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 Articles 1.2, 1.3 and 1.4 of the Contract Agreement shall apply, *mutatis mutandis*, to this Agreement.

2. ESCROW ACCOUNT

2.1. Escrow Bank to act as trustee

- 2.1.1. The Selected Agency hereby appoints the Escrow Bank to act as trustee for the Authority, the Lenders' Representative and the Selected Agency 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 Selected Agency 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 Selected Agency, and applied in accordance with the terms of this Agreement. No person other than the Authority, the Lenders' Representative and the Selected Agency 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 Selected Agency, 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 Selected Agency 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 Selected Agency shall open and establish the Escrow Account with the (name of Branch) branch of the Escrow Bank. The Escrow Account shall be denominated in Rupees.

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

Save and except as otherwise provided in the Contract Agreement, the rights of the Authority, the Lenders' Representative and the Selected Agency 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 Selected Agency shall have no other rights against or to the monies in the Escrow Account.

2.6. Substitution of the Selected Agency

The Parties hereto acknowledge and agree that upon substitution of the Selected Agency 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 Selected Agency under this Agreement on and with effect from the date of substitution of the Selected Agency with the Nominated Company.

3. DEPOSITS INTO ESCROW ACCOUNT

3.1. Deposits by the Selected Agency

- 3.1.1. The Selected Agency agrees and undertakes that it shall deposit into and/or credit the Escrow Account with:

- (a) At least 120% (One Hundred and Twenty percent) of the Annual Fee payable to the Authority, from the annual revenue from the Project, for the Accounting Year, at least 15 (fifteen) days prior to the date the Annual Fee is due and payable to the Authority. In case the annual revenue from the Project is less than 120% of the Contract Fee, then the Selected Agency shall make good the balance amount to reach the 120% of the Annual Fee from its own sources; and
 - (b) Additional Annual Fee at least 15 (fifteen) days prior the Annual Fee is due and payable to the Authority.
- 3.1.2. The Selected Agency 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) Any monies disbursed by the Authority to the Selected Agency;
- (b) all Revenues collected by the Authority, if any, in exercise of its rights under the Contract Agreement; and
- (c) Termination Payments.

Provided that, notwithstanding the provisions of clause 4.1.1, the Authority shall be entitled to appropriate from the aforesaid amounts, any Annual Fee due and payable to it by the Selected Agency and the balance remaining shall be deposited into the Escrow Account.

3.3. 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 Selected Agency in relation to the Escrow Account and credit the balance remaining to the Escrow Account.

4. WITHDRAWALS FROM ESCROW ACCOUNT

4.1. Withdrawals during Contract Period

- 4.1.1. At the beginning of every year, or at such shorter intervals as the Lenders' Representative and the Selected Agency 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, if any, in the relevant Sub-Accounts for making due payments, and if such payments are not due in any year, then retain such monies in such Sub-Accounts and pay out therefrom on the

Payment Date(s):

- (a) Annual Fee and Additional Annual Fee due and payable to the Authority;
- (b) all payments and Damages certified by the Authority as due and payable to it by the Selected Agency; and
- (c) Balance, if any, in accordance with the instructions of the Selected Agency.

4.1.2. No later than [60 (sixty)] days prior to the commencement of each Accounting Year, the Selected Agency 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 Contract 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 Selected Agency for and in respect of the Project;
- (b) Outstanding Annual Fee and Additional Contract Fee;
- (c) all payments due and payable under this Agreement and/or Damages certified by the Authority as due and payable to it by the Selected Agency; and
- (d) balance, if any, in accordance with the instructions of the Selected Agency.

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 utilized 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.

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 Selected Agency during the period of Suspension under Article 31 of the Contract 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 Selected Agency under this Agreement and all actions of the Authority hereunder shall be deemed to have been taken for and on behalf of the Selected Agency.

5. OBLIGATIONS OF THE ESCROW BANK

5.1. Segregation of funds

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

5.2. Notification of balances

[7 (seven)] business days prior to each Payment Date (and for this purpose the Escrow Bank shall be entitled to rely on an affirmation by the Selected Agency 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 Selected Agency upon a certificate signed by or on behalf of the Selected Agency;
- (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 Selected Agency or any other person hereunder or in connection herewith; and

- (d) shall, within [5 (five)] business days after receipt, deliver a copy to the Selected Agency 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 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 ACCOUNT DEFAULT

6.1. Escrow Account Default

- 6.1.1. Following events shall constitute an event of default by the Selected Agency (an "**Escrow Account 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 Selected Agency 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 Selected Agency causes the Escrow Bank to transfer funds to any account of the Selected Agency 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 Selected Agency 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 Account Default, the consequences thereof shall be dealt with under and in accordance with the provisions of the Contract Agreement.

7. TERMINATION OF ESCROW ACCOUNT AGREEMENT

7.1. Duration of the Escrow Account Agreement

This Agreement shall remain in full force and effect so long as any sum remains to be advanced or is outstanding from the Selected Agency in respect of 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 Selected Agency 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 Account Agreement with the substitute Escrow Bank.

7.3. Closure of Escrow Account

The Escrow Bank shall, at the request of the Selected Agency and the Lenders' Representative made on or after the payment by the Selected Agency of all outstanding amounts under the Contract 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 Selected Agency. Upon closure of the Escrow Account hereunder, the Escrow Account Agreement shall be deemed to be terminated.

8. INDEMNITY

8.1. General indemnity

- 8.1.1. The Selected Agency shall indemnify, defend and hold the Authority and Escrow Bank, 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 Selected Agency of any of its obligations under this Agreement or on account of failure of the Selected Agency to comply with Applicable Laws and Applicable Permits.

- 8.1.2. The Authority shall indemnify, defend and hold the Selected Agency 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 Selected Agency's obligations under the Contract 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.

- 8.1.3. The Escrow Bank shall indemnify, defend and hold the Selected Agency 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 fulfil its obligations under this Agreement materially and adversely affecting the performance of the Selected Agency's obligations under the Contract Agreement other than any loss, damage, cost and expense, arising out of acts done in discharge of their lawful functions by the Escrow Bank, its officers, servants and agents.

8.2. 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.

9. DISPUTE RESOLUTION

9.1. Dispute resolution

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.

- 9.2. The Arbitrators shall issue a reasoned award and such award shall be final and

binding on the Parties. The place of arbitration shall be the capital of the State and the language of arbitration shall be English.

10. MISCELLANEOUS PROVISIONS

10.1. Governing law and jurisdiction

This Agreement shall be construed and interpreted in accordance with and governed by the laws of India, and the courts in the State shall have jurisdiction over all matters

arising out of or relating to this Agreement.

10.2. 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).

10.3. Priority of agreements

In the event of a conflict between the Contract Agreement and this Agreement, the provisions contained in the Contract Agreement shall prevail over this Agreement. The contents of this Agreement shall prevail over any other agreement executed for the mechanism of the payment between the Selected Agency and the Senior Lenders under the Financing Agreements.

10.4. Alteration of terms

All additions, amendments, modifications and variations to this Agreement shall

be effectual and binding only if in writing and signed by the duly authorized representatives of the Parties.

10.5. Waiver

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 Pany; and
- (c) Shall not affect the validity or enforceability of this Agreement in any manner.

Neither the failure by any Party to insist on any occasion upon the performance of the terms, conditions and provisions of this Agreement or any obligation thereunder nor time or other indulgence granted by any Party to another Party shall be treated or deemed as waiver of such breach or acceptance of any variation or the relinquishment of any such right hereunder.

10.6. No third party beneficiaries

This Agreement is solely for the benefit of the Parties and no other person or entity shall have any rights hereunder.

10.7. Survival

10.7.1. Termination of this Agreement:

- (a) shall not relieve the Parties of any obligations hereunder which expressly or by implication survive termination hereof; and
- (b) except as otherwise provided in any provision of this Agreement expressly limiting the liability of either Party, shall not relieve either Party of any obligations or liabilities for loss or damage to the other Party arising out of, or
- (c) caused by, acts or omissions of such Party prior to the effectiveness of such termination or arising out of such termination.

10.7.2. All obligations surviving the cancellation, expiration or termination of this Agreement shall only survive for a period of [3 (three)] years following the date of such termination or expiry of this Agreement.

10.8. Severability

If for any reason whatever any provision of this Agreement is or becomes invalid, illegal or unenforceable or is declared by any court of competent jurisdiction or any

other instrumentality to be invalid, illegal or unenforceable, the validity, legality or enforceability of the remaining provisions shall not be affected in any manner, and the Parties will negotiate in good faith with a view to agreeing to one or more provisions which may be substituted for such invalid, unenforceable or illegal provisions, as nearly as is practicable to such invalid, illegal or unenforceable provision. Failure to agree upon any such provisions shall not be subject to dispute resolution under clause 10.1 of this Agreement or otherwise.

10.9. Successors and assigns

This Agreement shall be binding on and shall inure to the benefit of the Parties and their respective successors and permitted assigns.

10.10. Notices

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 and e-mail are set out under its name on the signing page 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.

10.11. Language

All notices, certificates, correspondence and proceedings under or in connection with this Agreement shall be in English.

10.12. Authorised representatives

Each of the Parties shall, by notice in writing, designate their respective authorised representatives through whom only all communications shall be made. A Party hereto shall be entitled to remove and/or substitute or make fresh appointment of such authorised representative by similar notice.

10.13. Original Document

This Agreement may be executed in four counterparts, each of which when executed and delivered shall constitute an original of this Agreement.

IN WITNESS WHEREOF THE PARTIES HAVE EXECUTED AND DELIVERED
THIS AGREEMENT AS OF THE DATE FIRST ABOVE WRITTEN

THE COMMON SEAL OF
SELECTED AGENCY has been affixed
pursuant to the resolution passed by the
Board of Directors of the Selected Agency at
its meeting held on the day of
..
20 hereunto affixed in the presence
of
..... ,, Director, who has signed these
presents in token thereof and.. ,

Company Secretary / Authorised Officer who has
countersigned the same in token thereof:

(Signature)
(Name)
(Designation)
(Address)
(Fax NO.)
(e-mail 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.)

(e-mail address)

SIGNED, SEALED AND
DELIVERED

For and on behalf of

THE AUTHORITY by:

For and on behalf of ESCROW BANK by: (Signature) (Name) (Designation) (Address) (Fax No.) (e-mail address)	(Signature) (Name) (Designation) (Address) (Fax No.) (e-mail address)

SCHEDULE M: VESTING CERTIFICATE*(See Article 33.4)*

[The _____]⁹ represented by..... (the “**Authority**”) refers to the Contract Agreement dated (the “**Agreement**”) entered into between the Authority and (the “**Selected Agency**”) for a Project, at in

The Authority hereby acknowledges compliance and fulfilment by the Selected Agency of the Transfer Requirements set forth in Article 33.1 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 Selected Agency in or about the Project shall be deemed to have vested unto the Authority, free from any encumbrances, charges and liens whatsoever.

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 Selected Agency to rectify and remedy any defect or deficiency in any of the Transfer Requirements and/or relieving the Selected Agency in any manner of the same.

Signed this day of....., 20.... at.....

AGREED, ACCEPTED AND SIGNED For and on behalf of Selected Agency by: (Signature) (Name) (Designation) (Address)	SIGNED, SEALED AND DELIVERED For and on behalf of Authority by: (Signature) (Name) (Designation) (Address)

In the presence of:

1.

2.

⁹ Haryana Tourism Corporation

SCHEDULE N: CONTRACT PRICE WEIGHTAGES AND PAYMENT MILESTONES

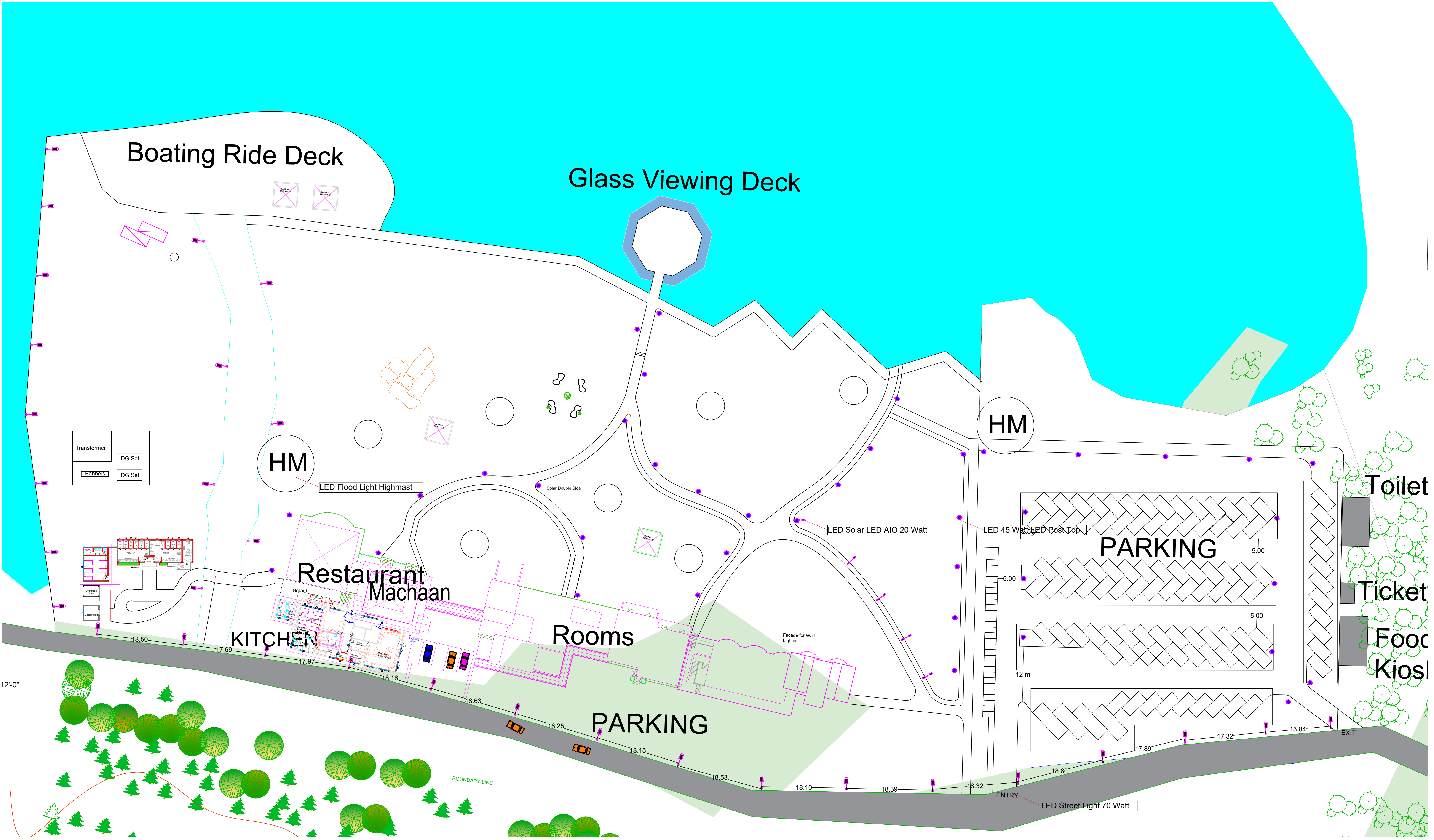
The Agency shall be made payments sequentially in order defined as per milestones mentioned.

Sl.No	Stage for Payment	Weightage in percentage to the Contract Price	Details of stage for payment	Percentage weightage	Procedure for estimating the value
1	Submission and approval of Data, drawings and Analysis of Surveys & Investigations" and "Designs, Drawings and Reports.	2%	Data, Drawings and Analysis of Surveys & Investigations	15.00%	Payment shall be made on completion of a stage on pro rata basis
			Designs report of Project facilities,	40.00%	
			Drawings and report of Building works, Landscaping, Pathways, design scope of utilities such as Electromechanically works, Water Supply, drainage, Solid waste disposal and other details as per scope of work	30.00%	
			3-D Model of all project components	5.00%	
			As Built Drawings	10.00%	
A Tikkar Taal					
2	Construction of New Structures & Sheds	3%	Toilet Block	56.67%	Payment shall be made on completion of a stage on pro rata basis
			Food Kiosk	9.24%	
			Ticketing kiosk	3.80%	
			Dormitory	11.53%	
				3.81%	
			Diesel Store		
			DG Shed	6.56%	
LT Panel Shed	8.40%				
3	Dismantling of Existing Structures	0.04%	Dismantling of Toilet, Dormitory, Shed	100.00%	

4	Site Developments	7%	Boundary Wall	7%	Payment shall be made on completion of a stage on pro rata basis
			Retaining Wall	18.87%	
			Toe Wall	0.00%	
			Pathways	8.68%	
			Gazebo	37.42%	
			Gate	3.84%	
			Benches Dustbin & Signanges	1.19%	
5	Renovation of Buildings	4%	Renovation of Basement Dormitory Hall , Rooms and Residential Block	7.76%	Payment shall be made on completion of a stage on pro rata basis
			Renovation of Restaurant Block	93.10%	
6	Water Supply & PHE Estimate,150KLD STP	4%	Domestic Water Sewage Collection & Treated Water Tanks,STP with 5 year O&M	100.00%	Payment shall be made on completion of a stage on pro rata basis
7	Electrical works, Firefighting System,HVAC & Ventilation,ELV System,Solar Voltic Power generation,EV charging	18%	Electrical works	63.65%	Payment shall be made on completion of a stage on pro rata basis
			Fire Fighting System	0.32%	
			HVAC & Ventilation	3.33%	
			Solar Voltic Power Generation System	10.42%	
			EV Charging	0.68%	
			Solar Voltic Power Generation System	21.60%	
B Adcenture Park					
8	Renovation of Buildings	2%	Renovation oh Haunted House	39%	Payment shall be made on completion of a stage on pro rata basis
			Renovation of Reception Block	20%	
			Renovation of Maze	26%	
			Renovation of Machan	12%	
			Renovation of Toilet Block	3%	
9	Construction of New Structures	17%	Construction of Watch Tower	2%	Payment shall be made on completion of a stage on pro rata basis
			Construction of Shed for Haunted House		
			Food Kiosk	2%	
			Toilet & Swiss tents	41%	

10	Site Development	28%	Chain Link Fencing	38.66%	Payment shall be made on completion of a stage on pro rata basis
			Retaining Wall	23.74%	
			Toe Wall	7.78%	
			Pathways	11.67%	
			Rammed Earth Area	0.05%	
			Open Air Theater	13.65%	
			New Parking	0.96%	
			Old Parking Renovation	2.69%	
			Benches, Dustbins Signanges	0.80%	
11	PHE	1%	PHED	100%	
12	Electrical works, Firefighting System, HVAC & Ventilation, ELV System, Elevator works	16%	Electrical works	49%	Payment shall be made on completion of a stage on pro rata basis
			Fire fighting	1%	
			HVAC & Ventilation	2%	
			ELV - Fire Alarm, Digital Audio System, CCTV System	13%	
			Elevator	7%	
			Adventure Activity	19%	
			Haunted House	11%	

The payment shall be released after a satisfactory inspection conducted by the Authority. The Selected Bidder shall raise bills to the Authority in accordance with the payment schedule mentioned in the contract. An indicative list of items covered under the construction works is attached above.



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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

PROJECT
TIKKAR TAAL

SHEET TITLE
SITE PLAN

PROJECT NO.
C1232603

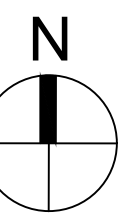
DATE
03/07/2025

MADE BY
GYZ

REVISION
0

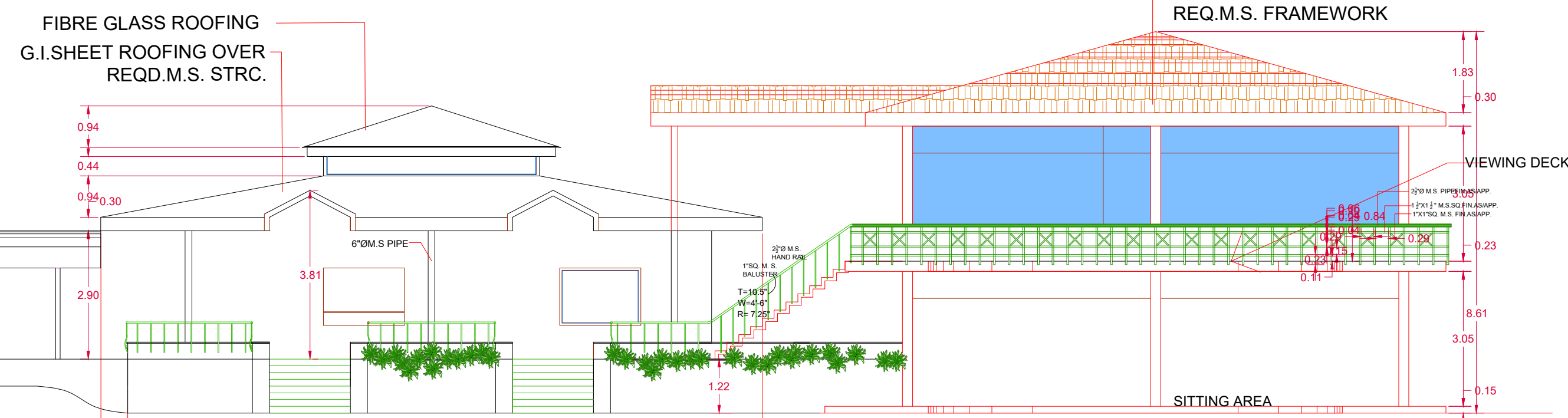
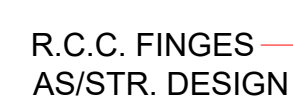
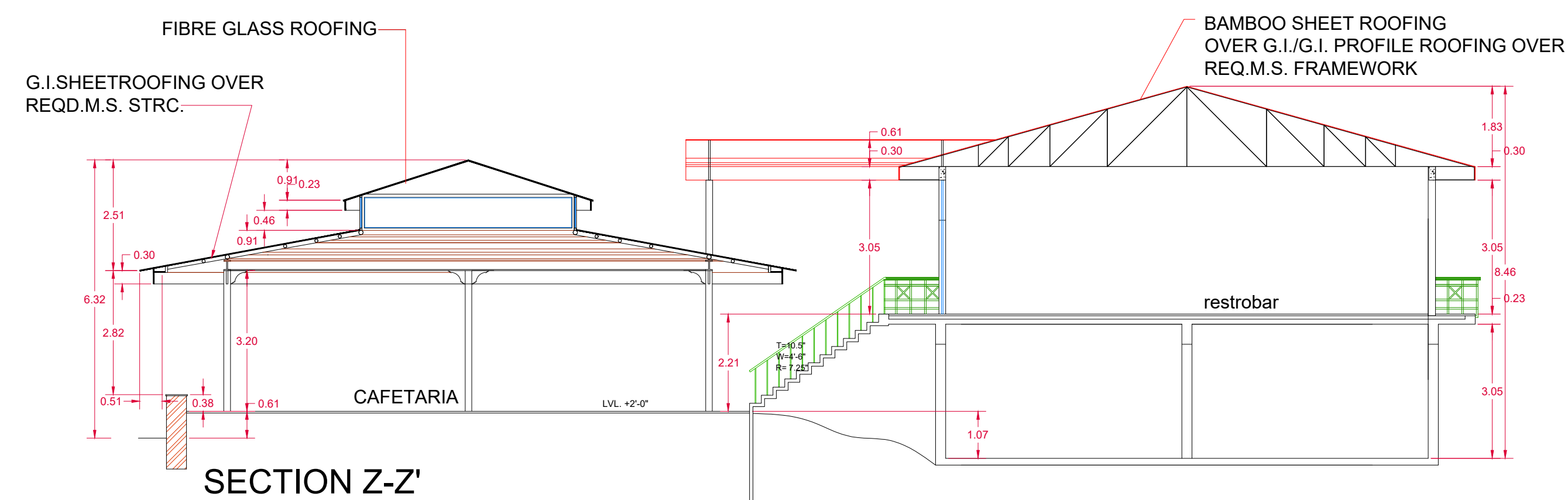
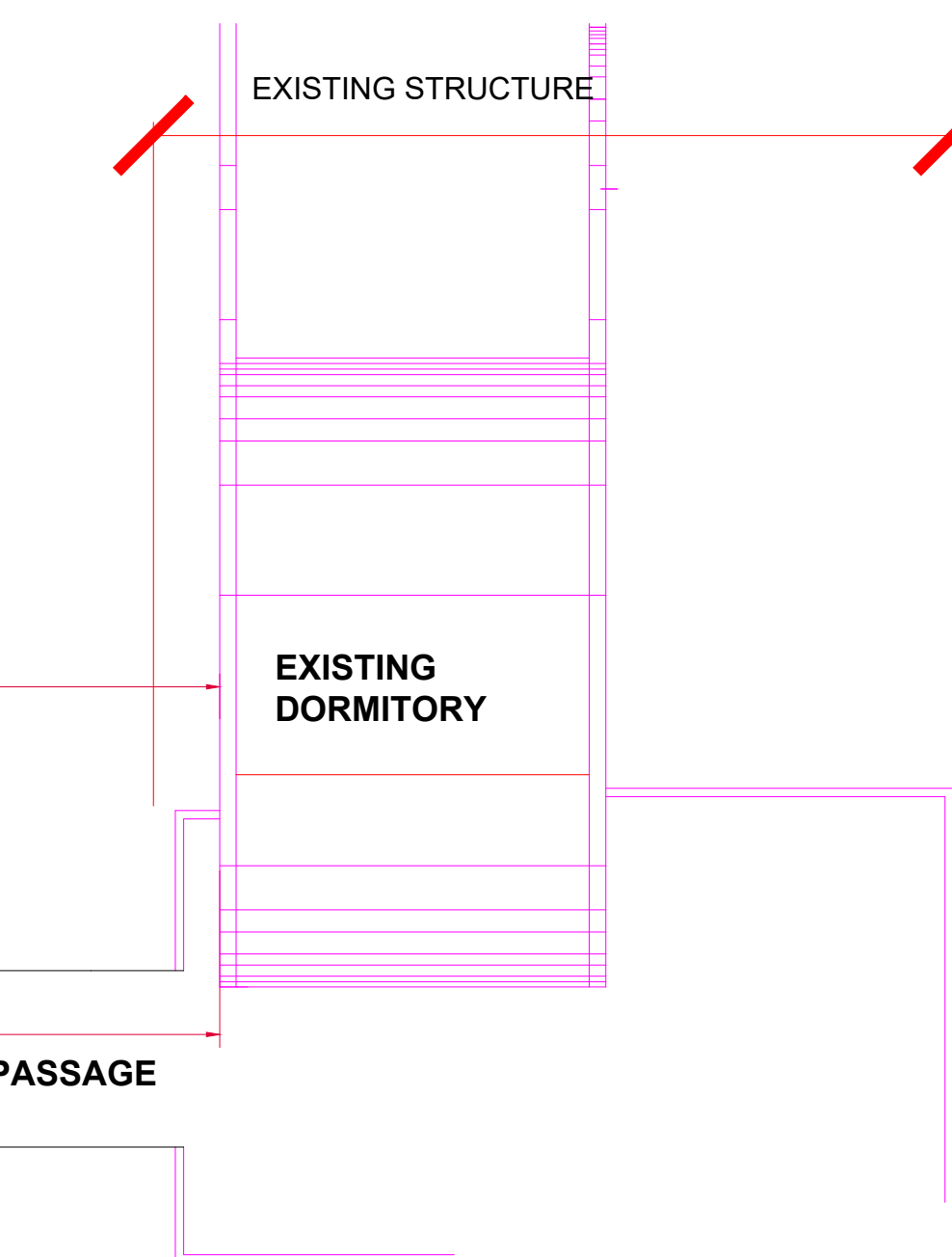
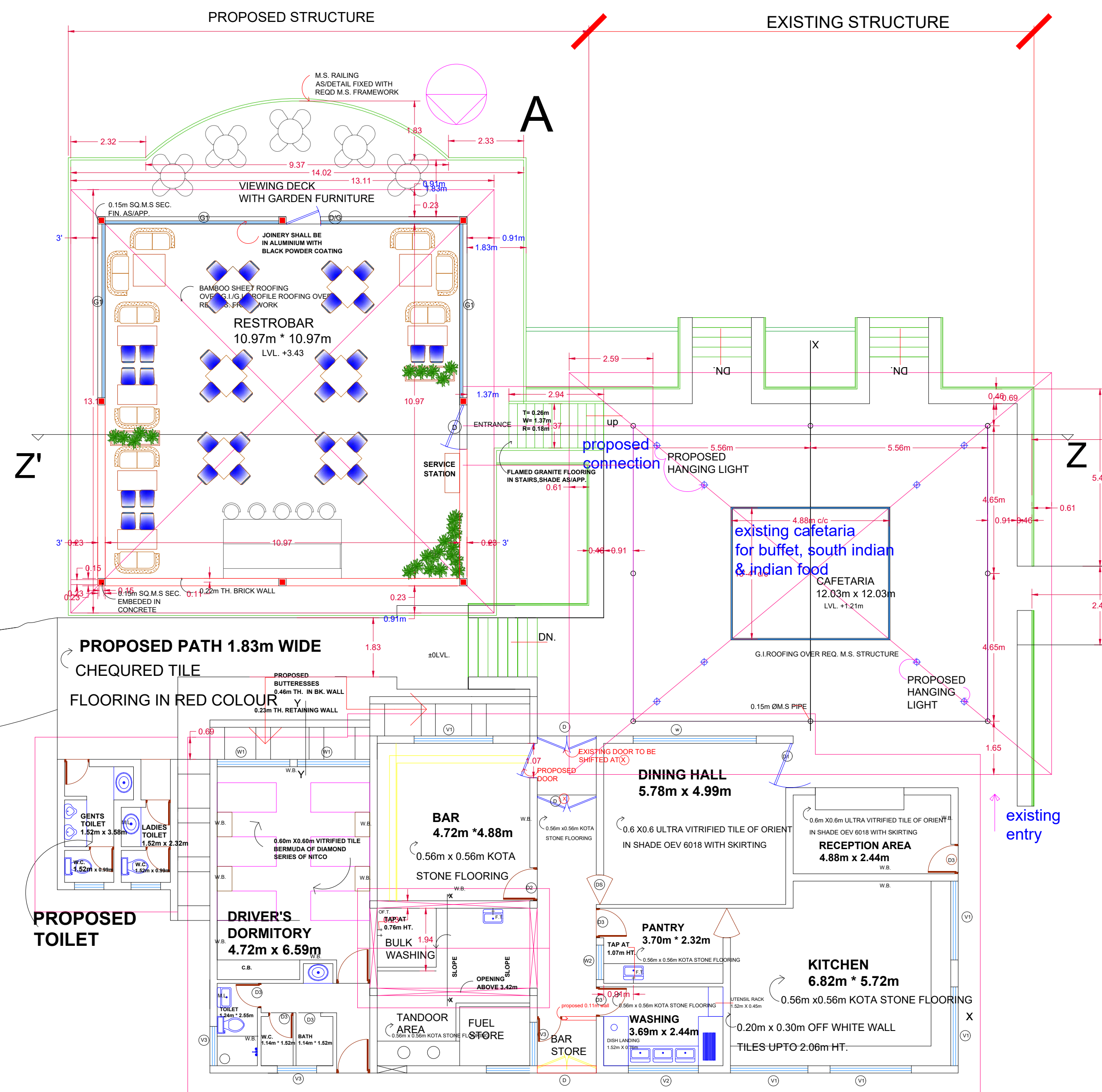
SHEET NO.
AD01

SCALE
1:200





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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

PROJECT
TIKKAR TAAL

SHEET TITLE
FOOD KIOSK PLAN

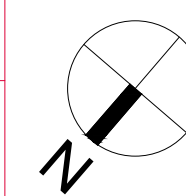
PROJECT NO.
C1232603

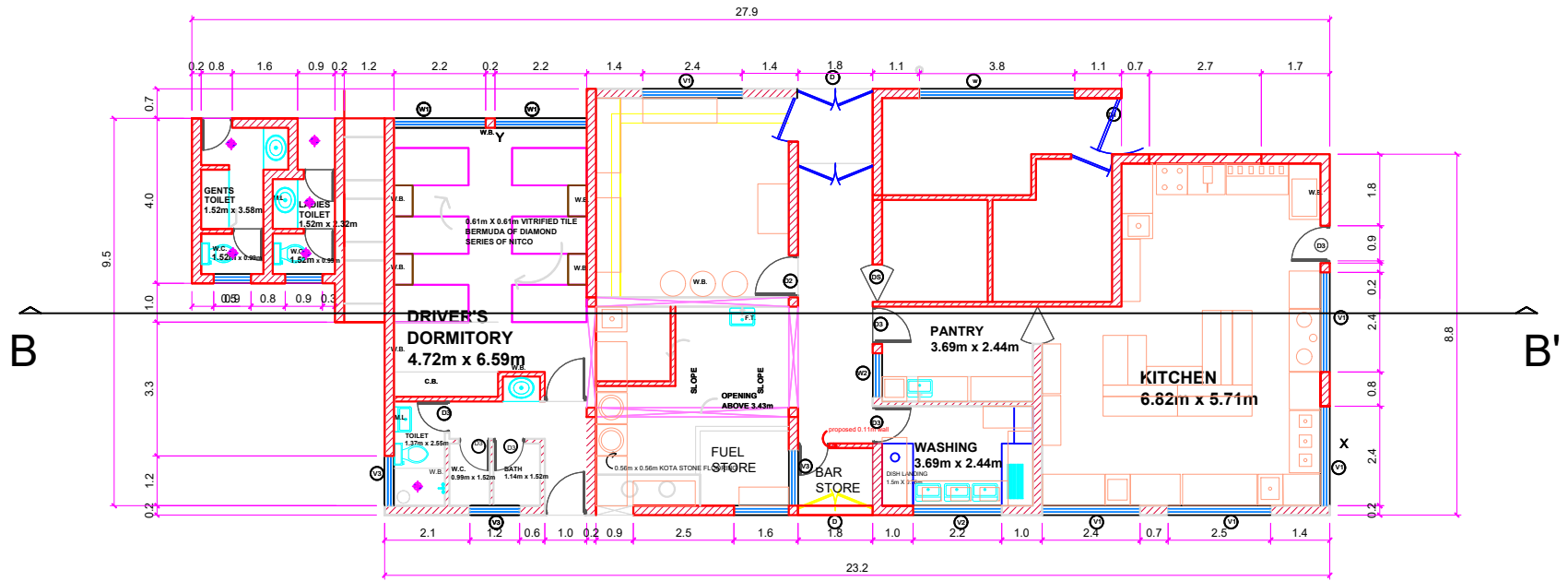
DATE
26/12/2024

MADE BY	REVISION
GYZ	0

SHEET NO.
XX

SCALE
1:50



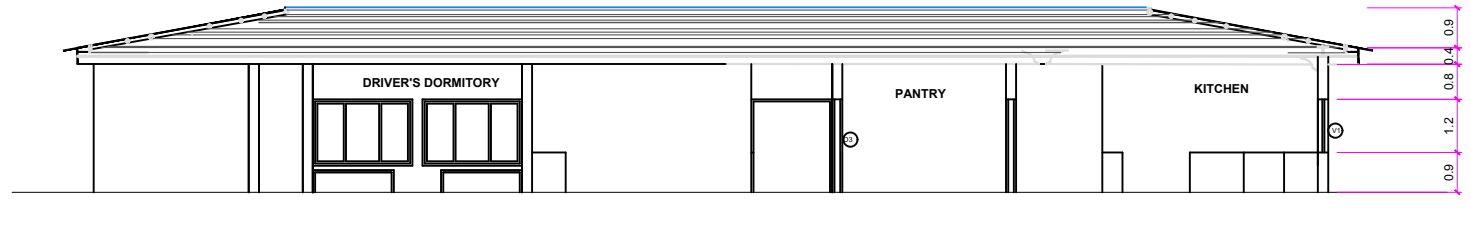


Door Schedule

Sl No.	Name	Type	Sill & Lintel	Number	Size
1	D1	Single Leaf Wooden	2200	2	1000 MM X 2200 MM
2	D2	Double Leaf Wooden	2200	2	1500 MM X 2200 MM
3	D3	Single Leaf MFC	2000	9	600 MM X 2000 MM

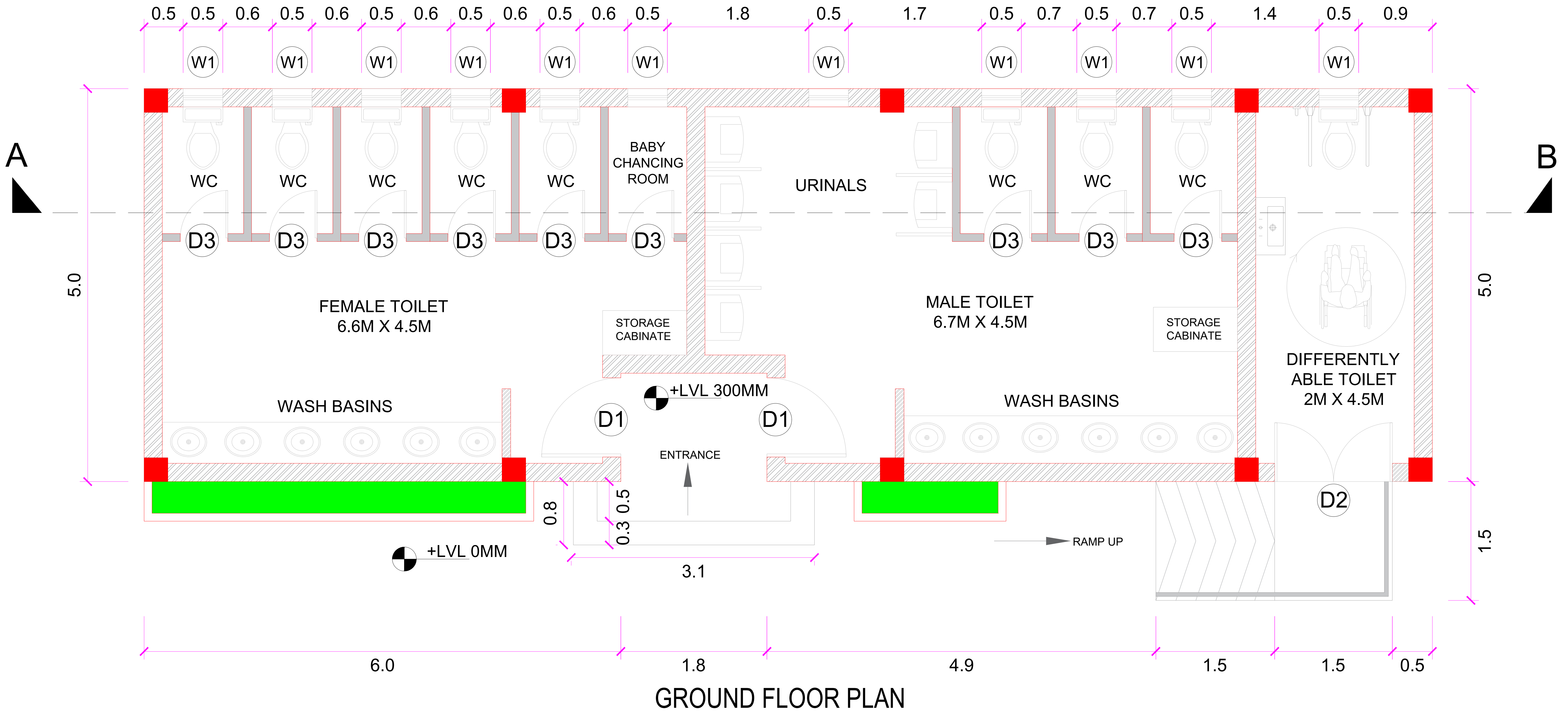
Window Schedule

Sl No.	Name	Type	Sill & Lintel	Number	Size
1	W1	Single Panel Glass Window	150, 3600	11	2000 MM X 3600 MM
2	W2	Double Leaf Glass Panel	900, 3600	3	1500 MM X 2700 MM
3	W3	UPVC Ventilation Window	2200, 2700	11	500 MM X 500 MM



SECTION B-B'





Door Schedule

Sl No.	Name	Type	Sill & Lintel	Number	Size
1	D1	Single Leaf Wooden	2200	2	1000 MM X 2200 MM
2	D2	Double Leaf Wooden	2200	2	1500 MM X 2200 MM
3	D3	Single Leaf MFC	2000	9	600 MM X 2000 MM

Window Schedule

Sl No.	Name	Type	Sill & Lintel	Number	Size
1	W1	Single Panel Glass Window	150, 3600	11	2000 MM X 3600 MM
2	W2	Double Leaf Glass Panel	900, 3600	3	1500 MM X 2700 MM
3	W3	UPVC Ventilation Window	2200, 2700	11	500 MM X 500 MM

AREA - 80.6 SQ. M.

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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

PROJECT
TIKKAR TAAL

SHEET TITLE
TOILET BLOCK PLAN

PROJECT NO.
C1232603

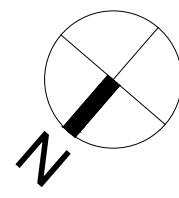
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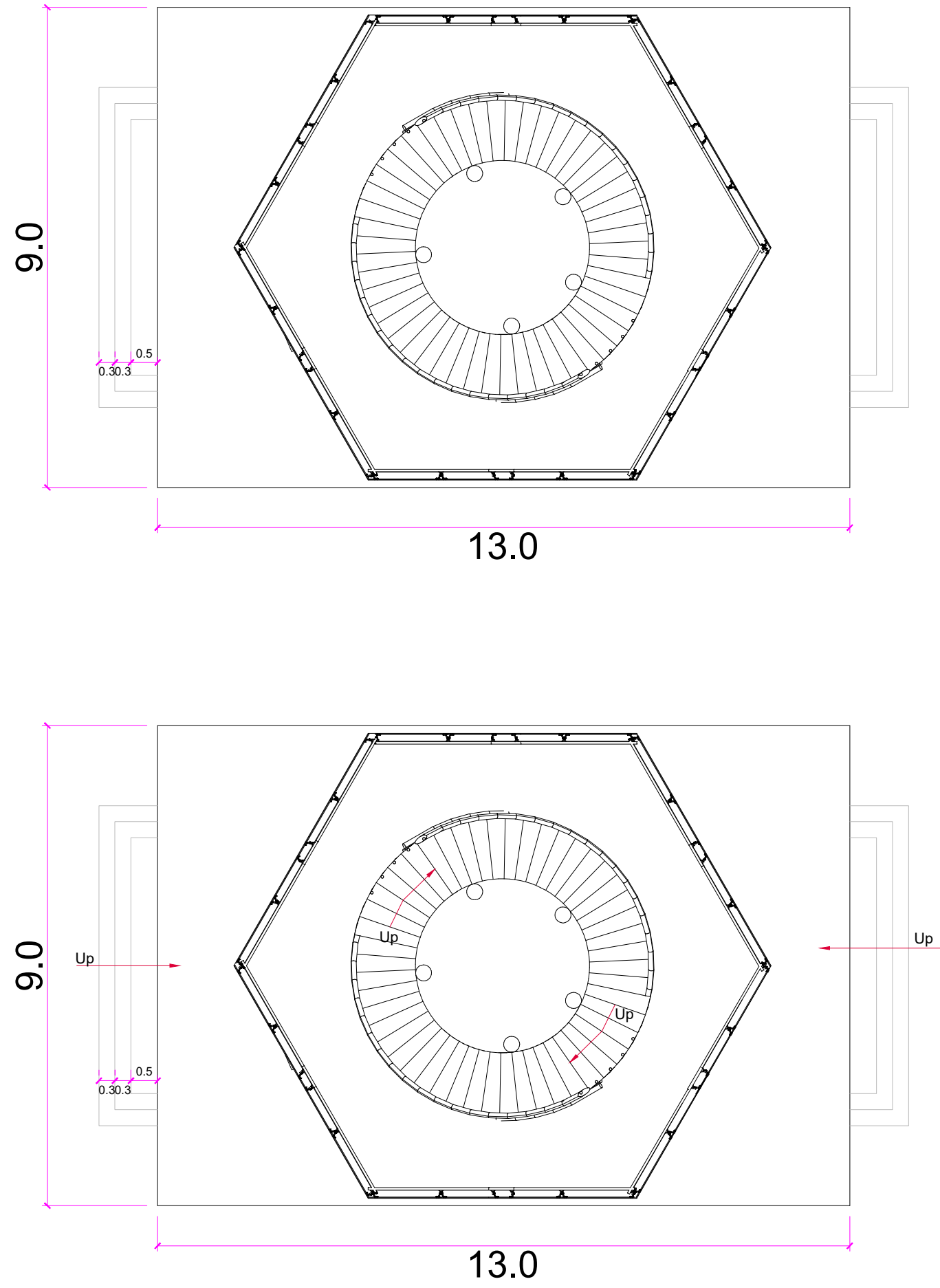
MADE BY
GYZ

REVISION
0

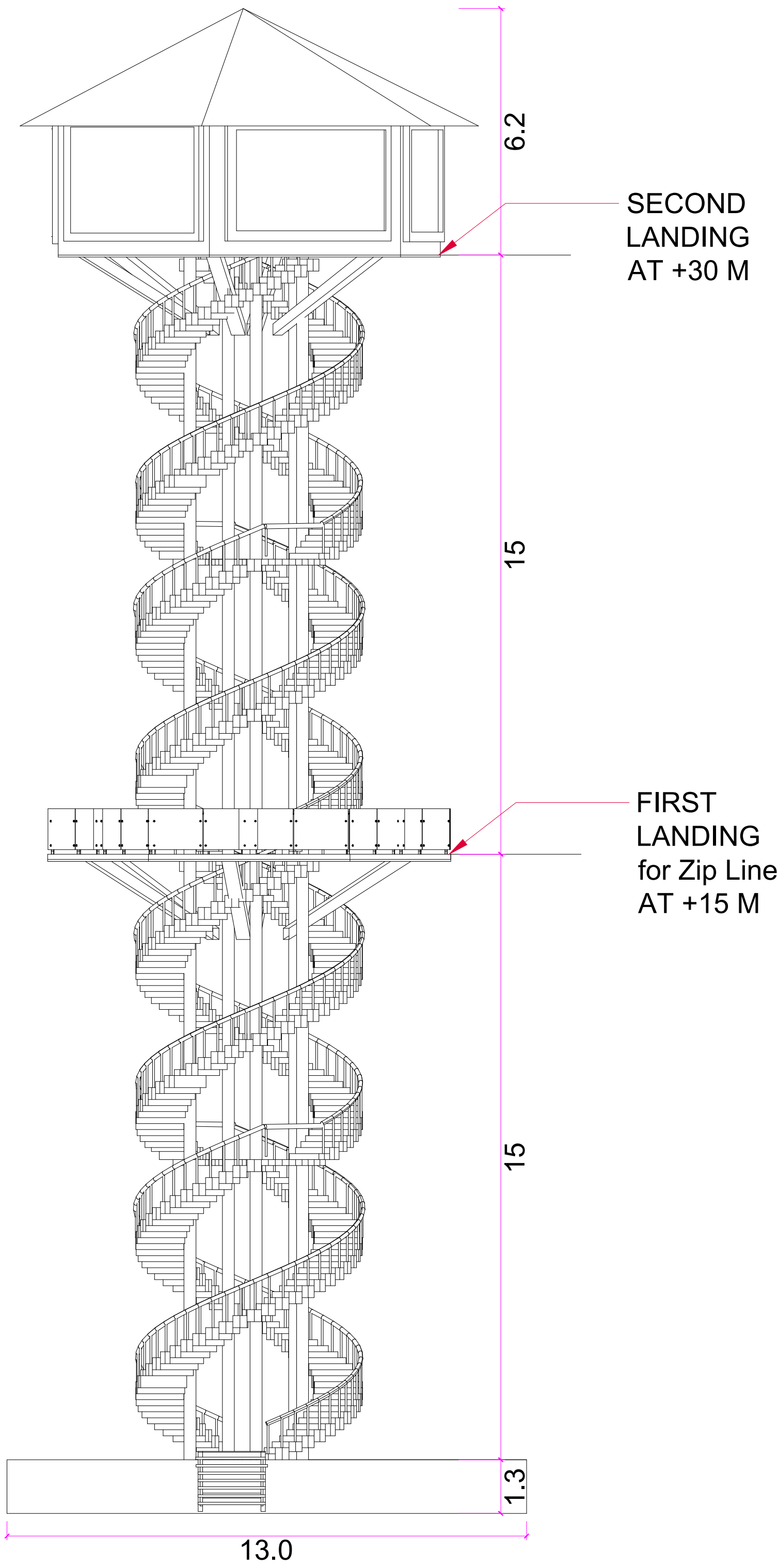
SHEET NO.
XX

SCALE
1:50





WATCH TOWER PLAN



WATCH TOWER ELEVATION

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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

PROJECT
TIKKAR TAAL

SHEET TITLE
WATCH TOWER

PROJECT NO.
C1232603

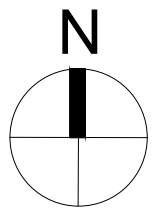
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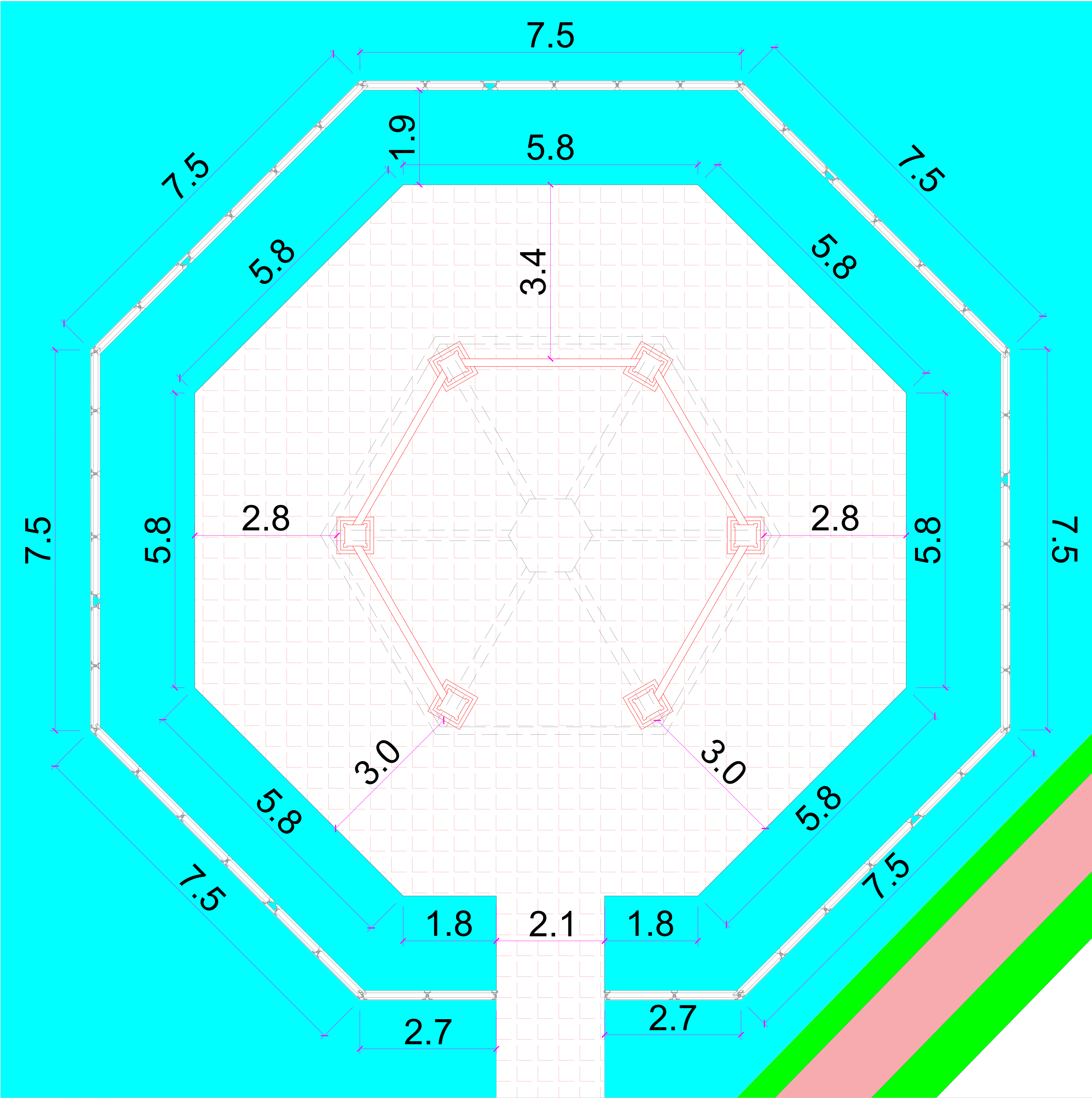
MADE BY
GYZ

REVISION
0

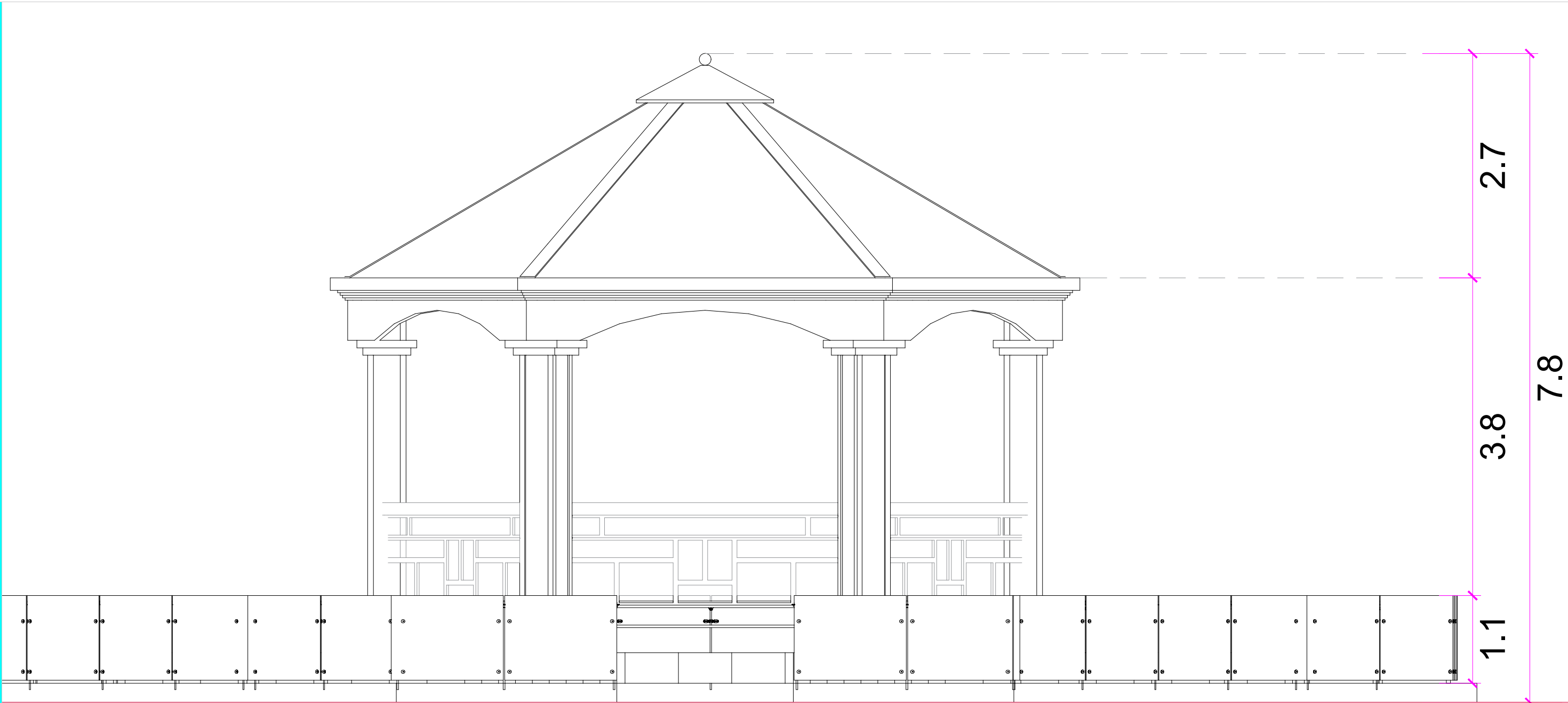
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AD01

SCALE
1:200

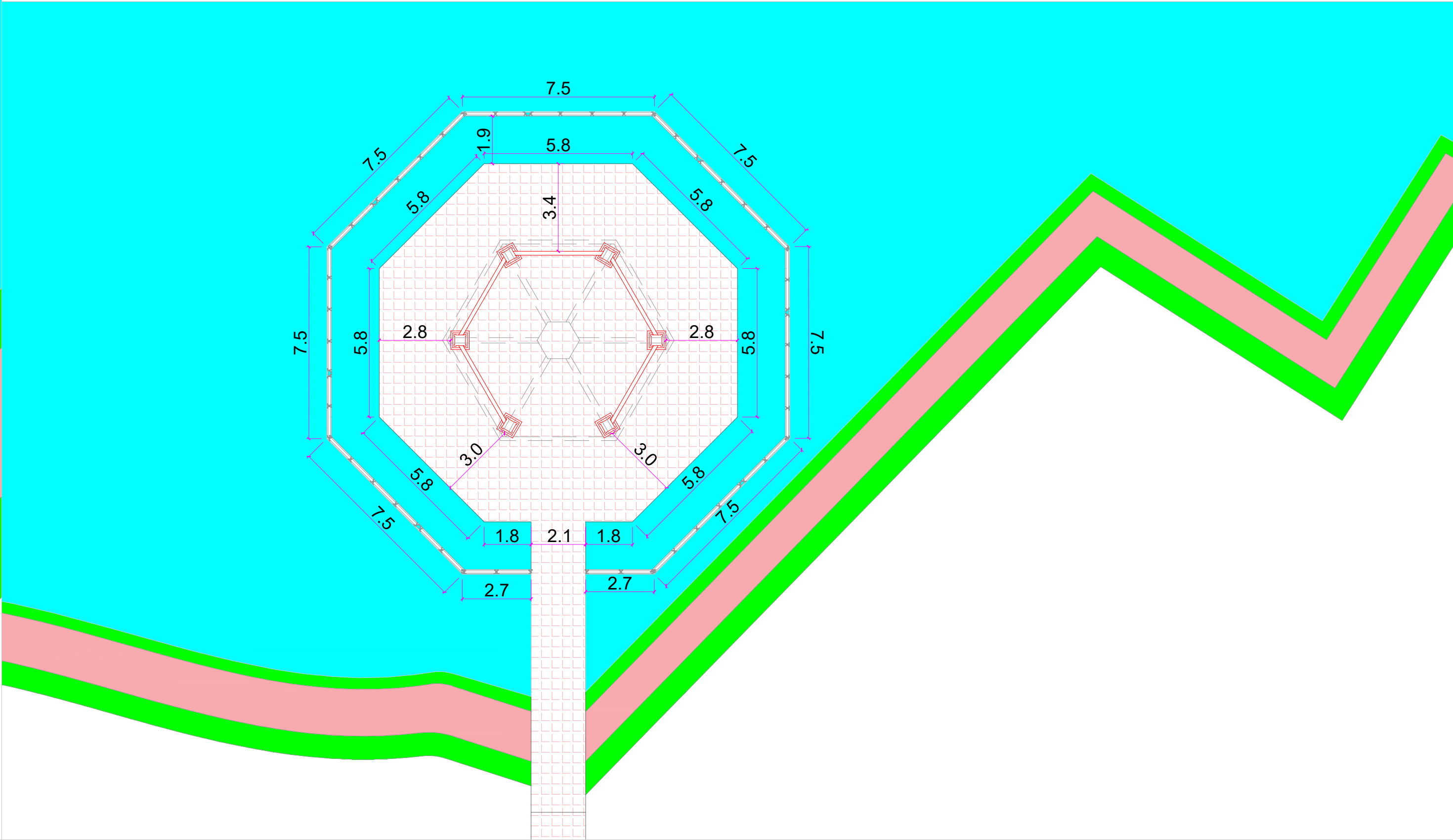




PLAN



FRONT ELEVATION



PLAN (Scale- 1:300)

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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

BUILDING NAME
GLASS OBSERVATORY

SHEET TITLE
PLAN & ELEVATION

PROJECT NO.
C1232603

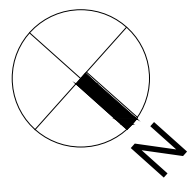
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31/12/2024

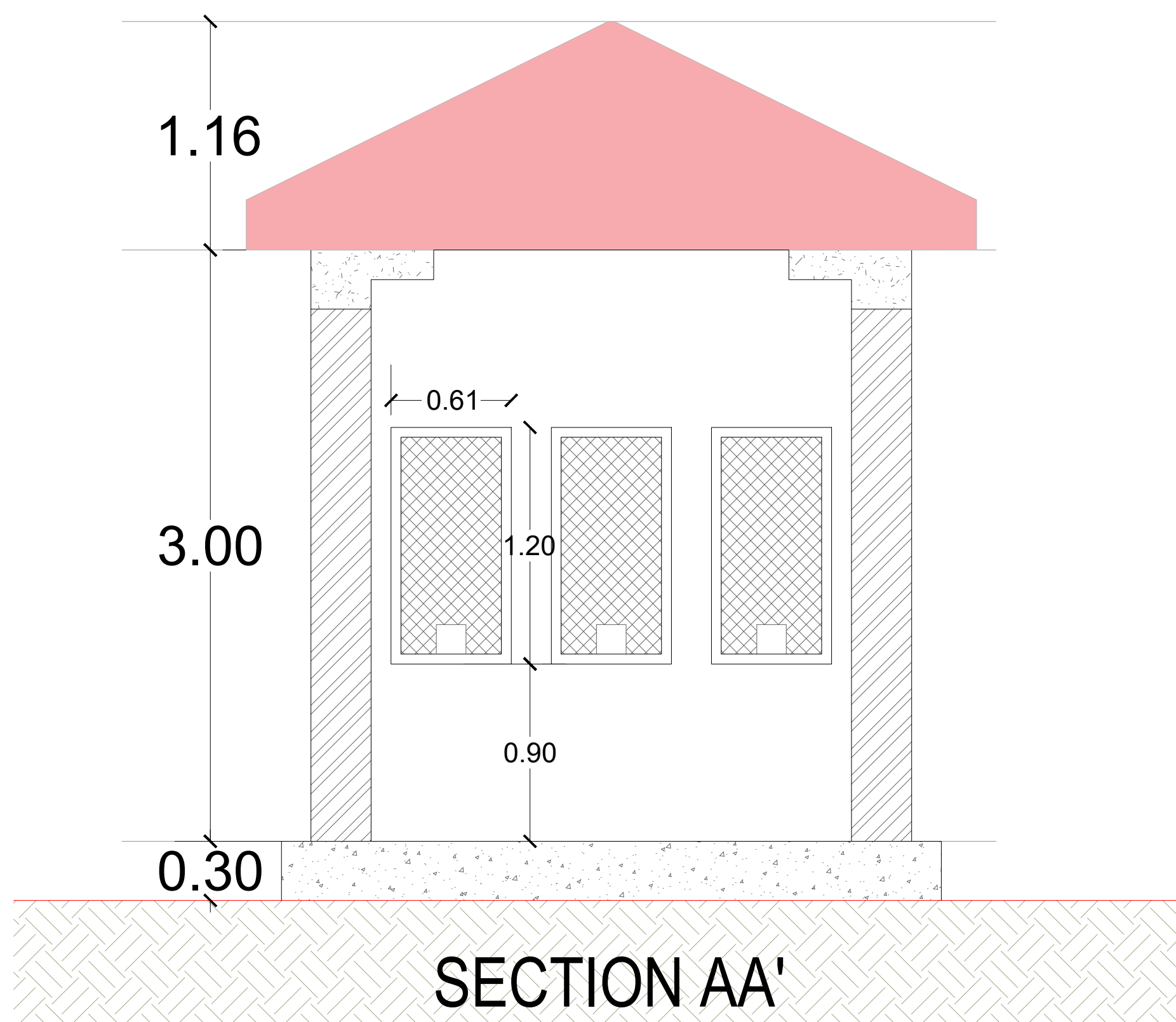
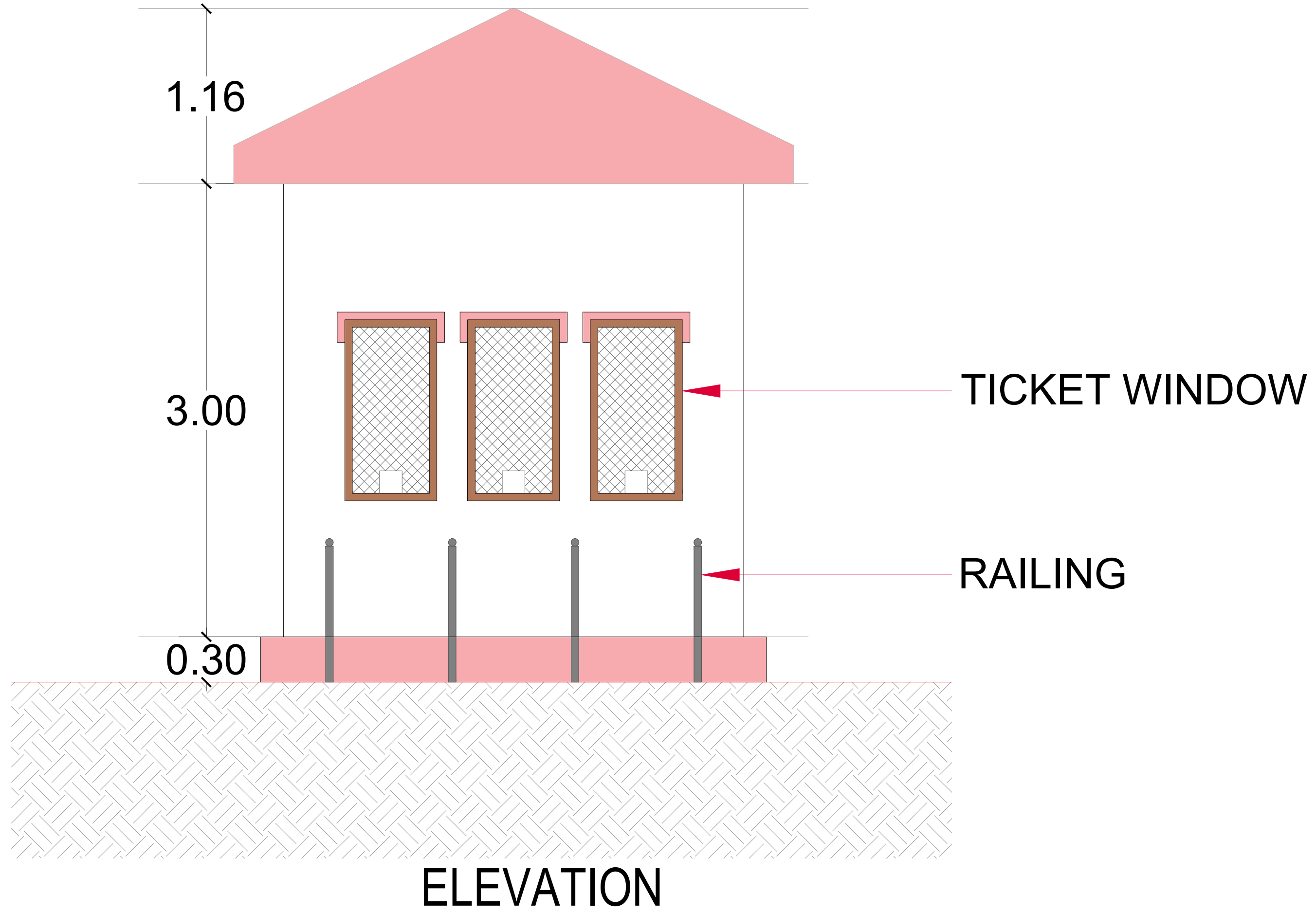
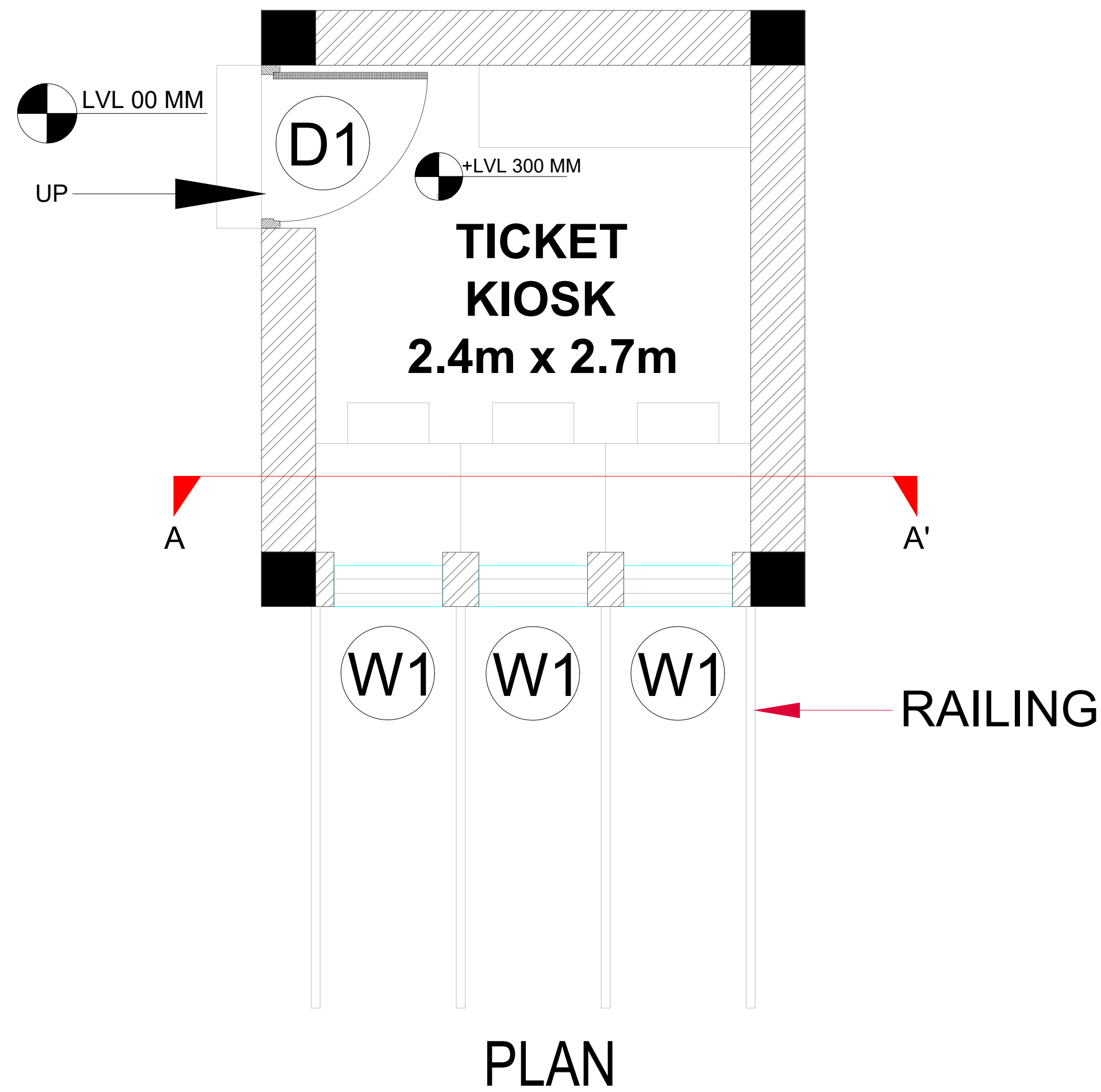
MADE BY
RB

REVISION
0

SHEET NO.
AD08

SCALE
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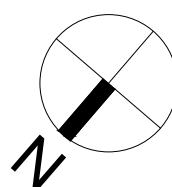


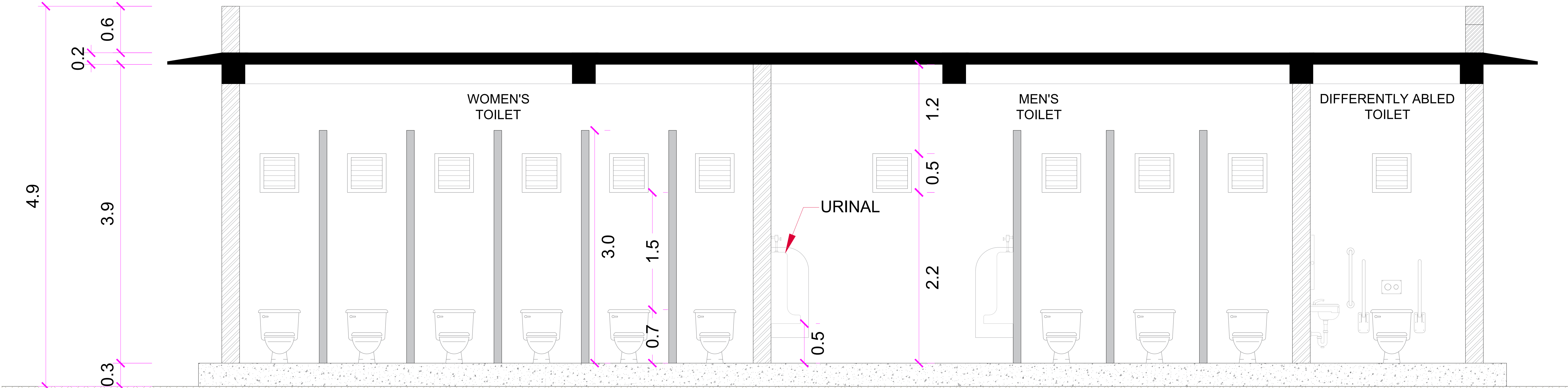
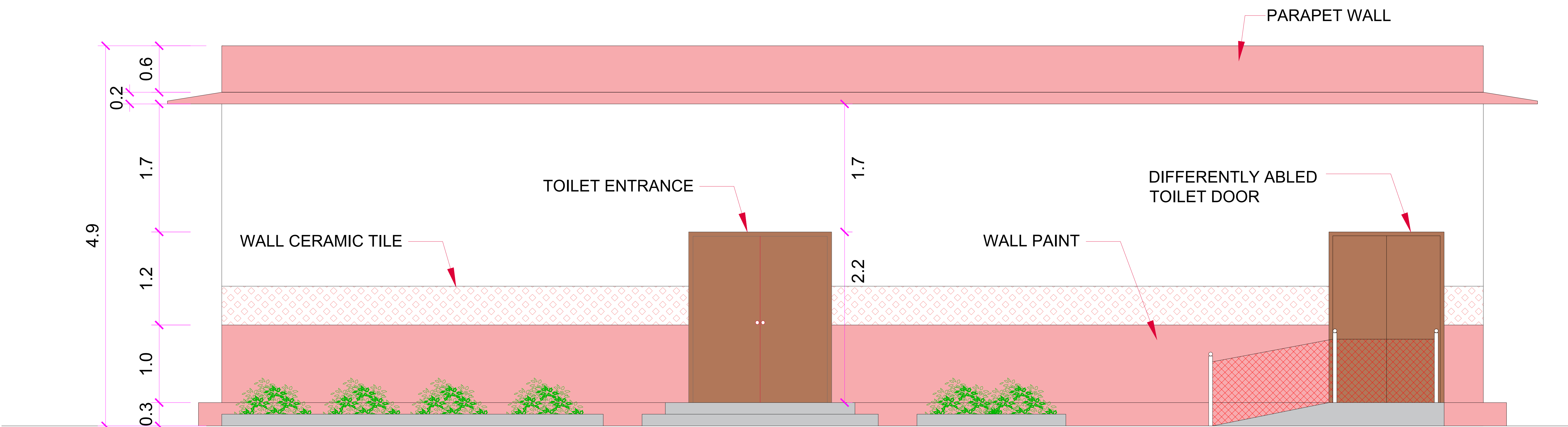


Door Window Schedule

SI No.	Name	Type	Sill & Lintel	Number	Size
1	D1	Single Leaf Wooden	2200	2	900 MM X 2100 MM
2	W1	Single Panel jali Window	900, 2100	3	600 MM X 1200 MM

AREA - 6.6 SQ. M.





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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

PROJECT
TIKKAR TAAL

SHEET TITLE
TOILET BLOCK ELEVATION & SECTION

PROJECT NO.
C1232603

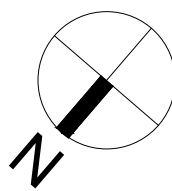
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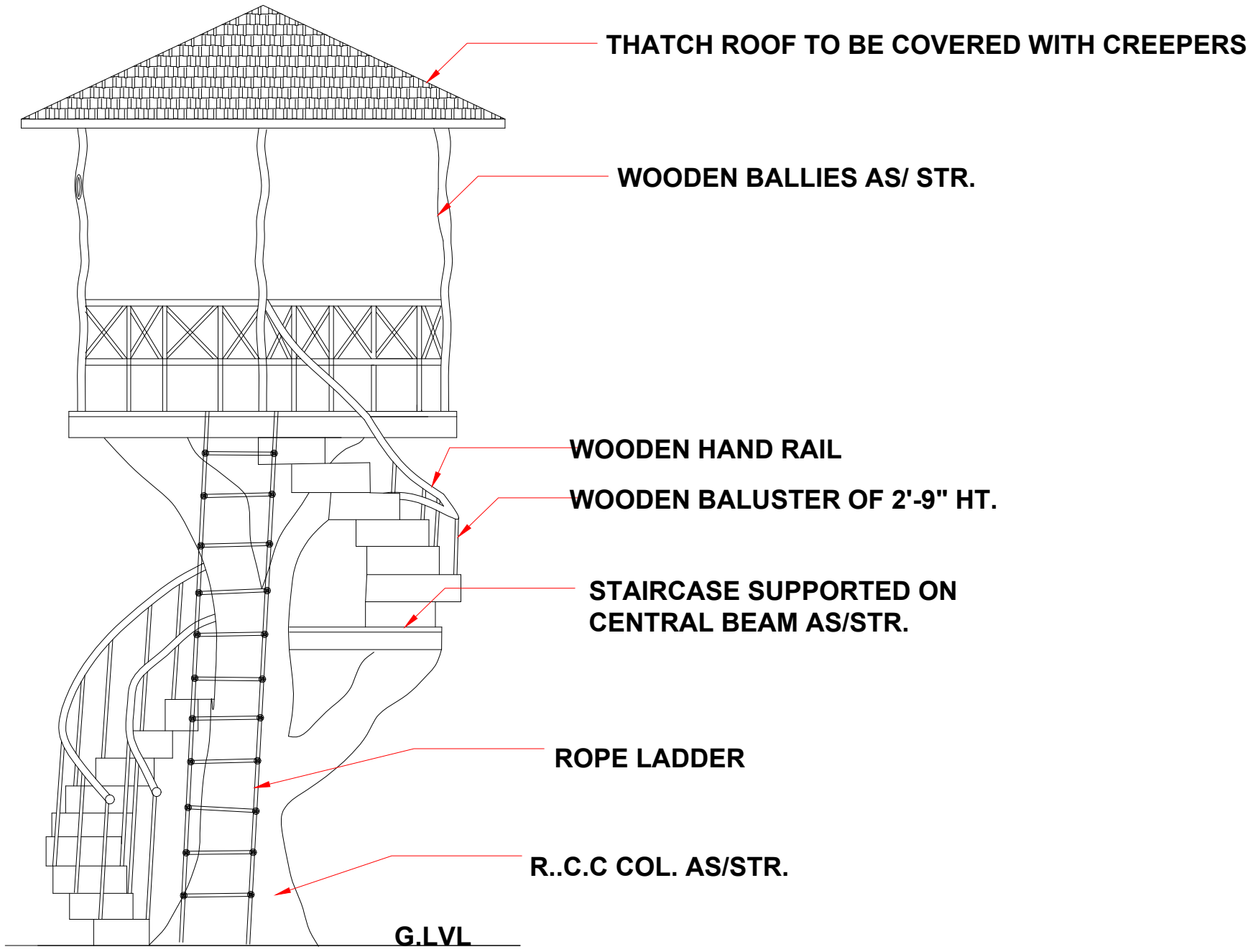
MADE BY
GYZ

REVISION
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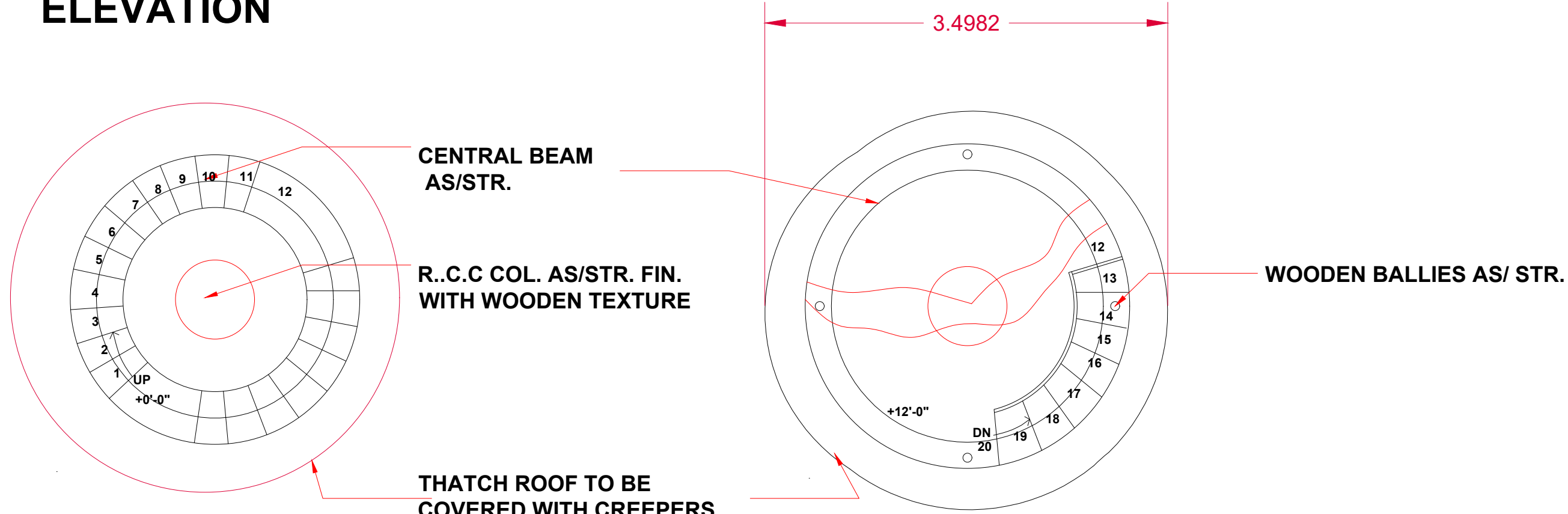
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SCALE
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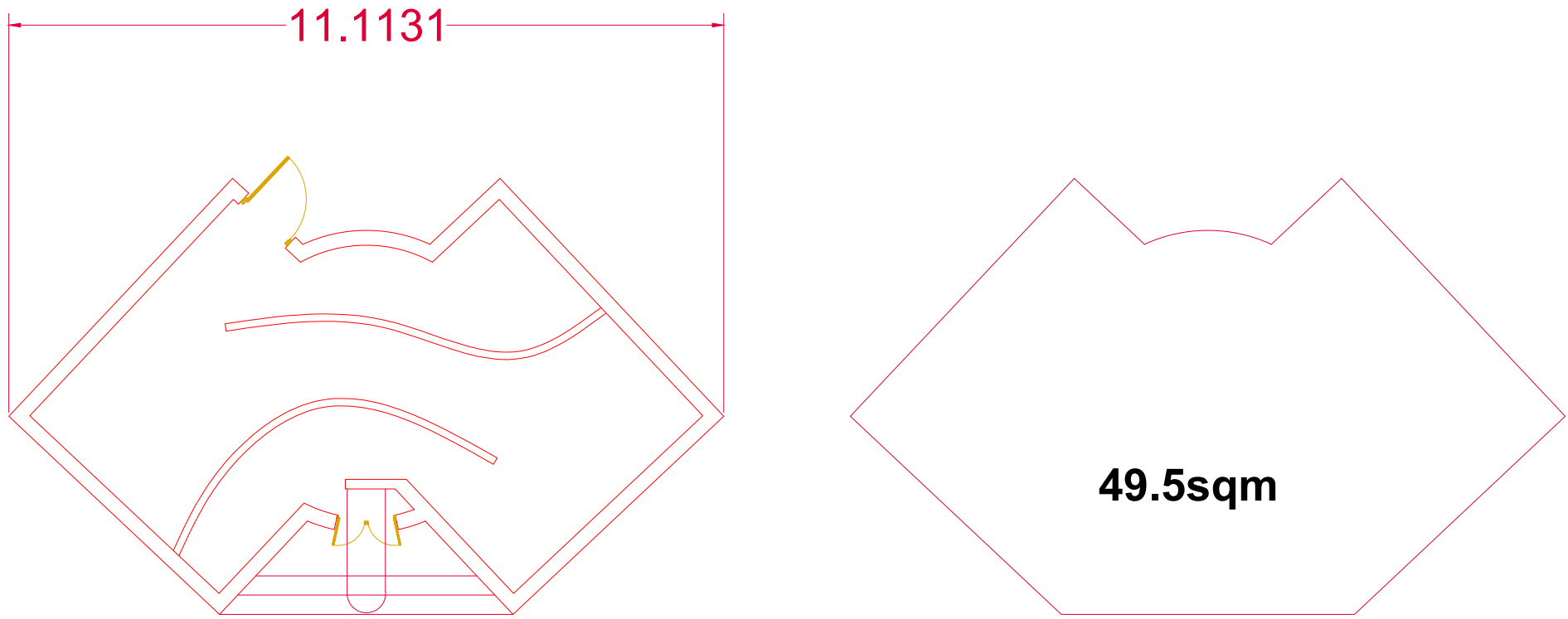
ELEVATION



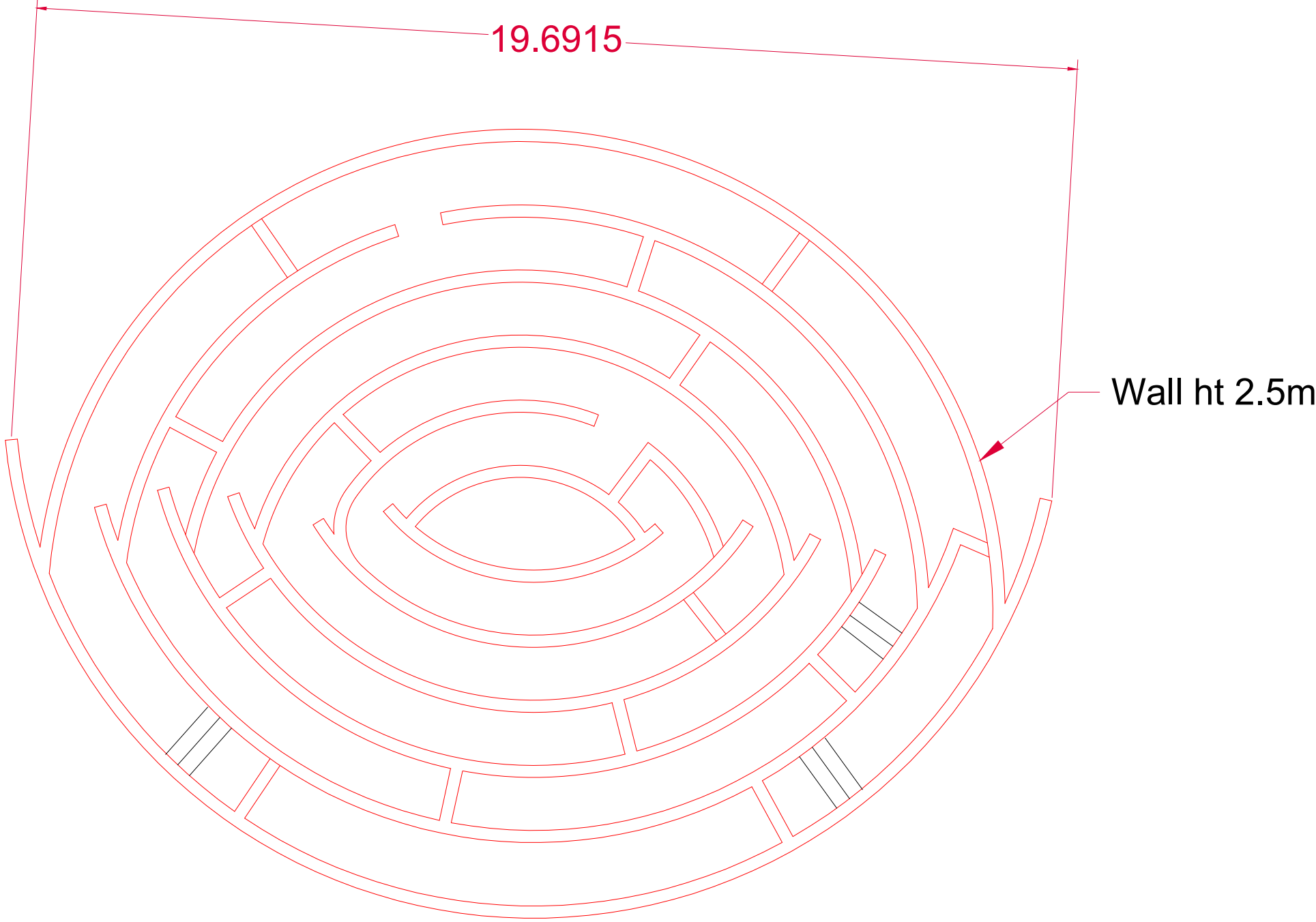
PLAN

TERRACE PLAN

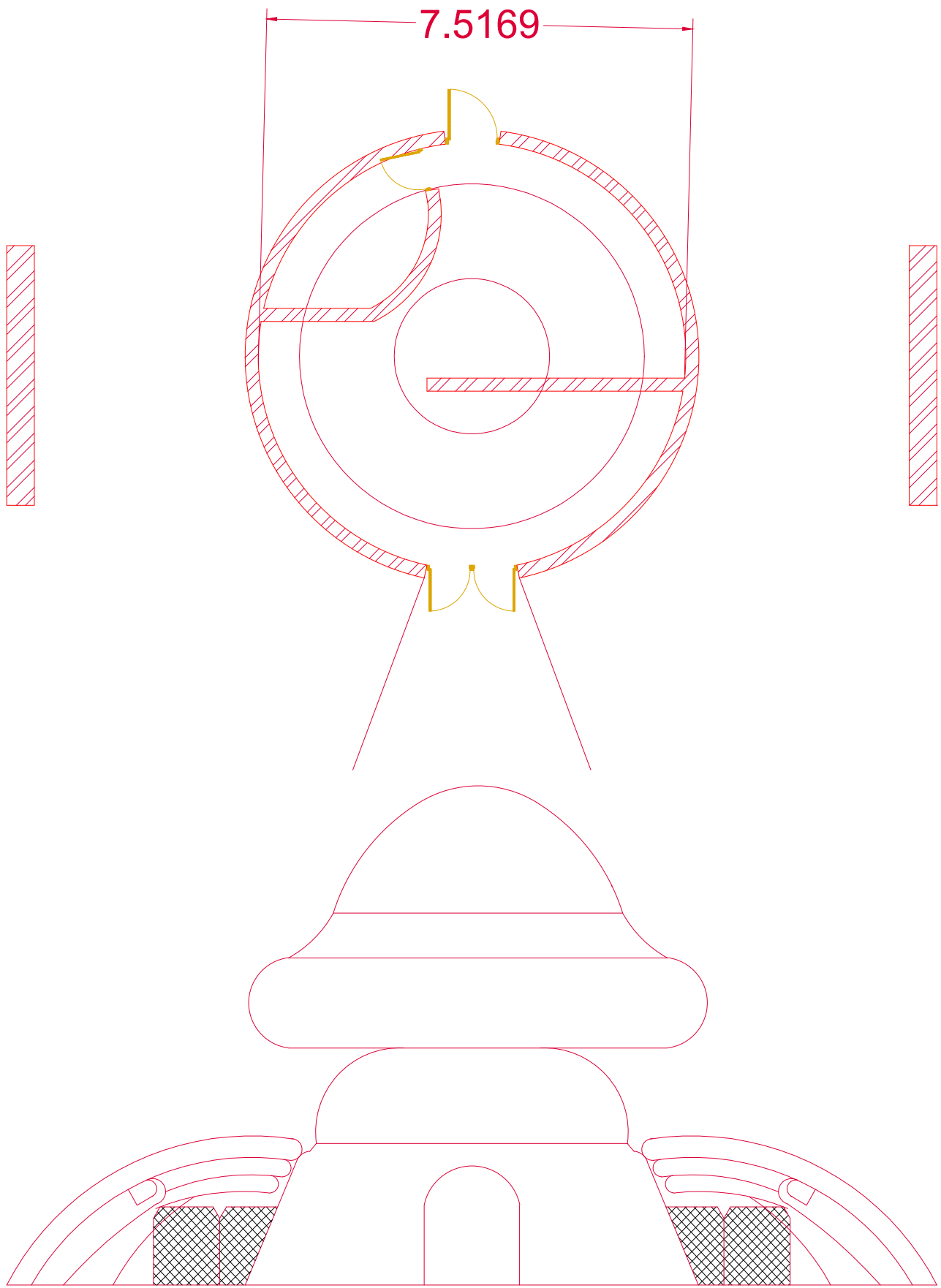
Machaan



Haunted House



Bhul Bhulaiya



Reception Block

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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

PROJECT
TIKKAR TAAL

SHEET TITLE
WATCH TOWER

PROJECT NO.
C1232603

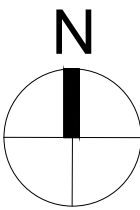
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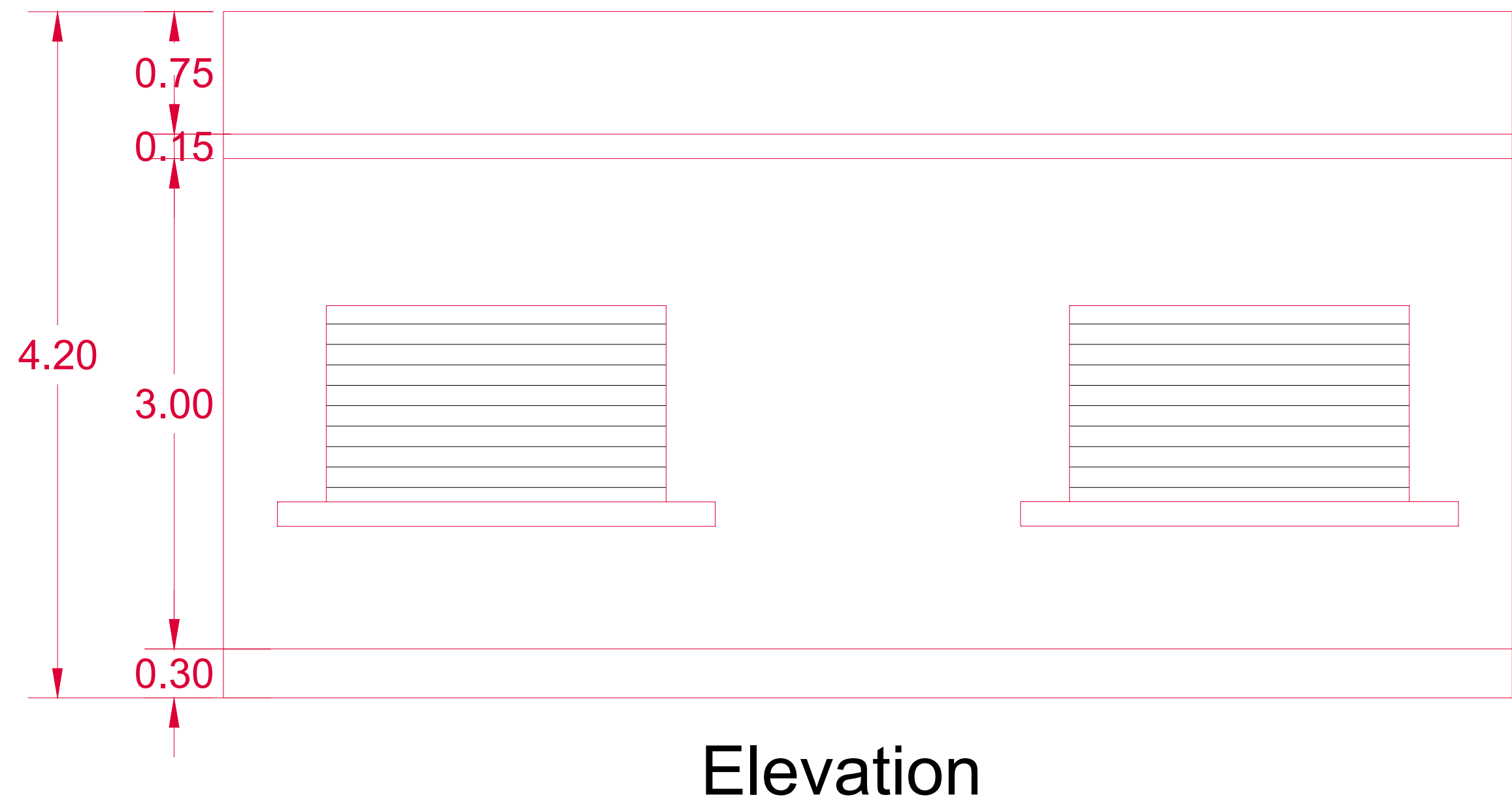
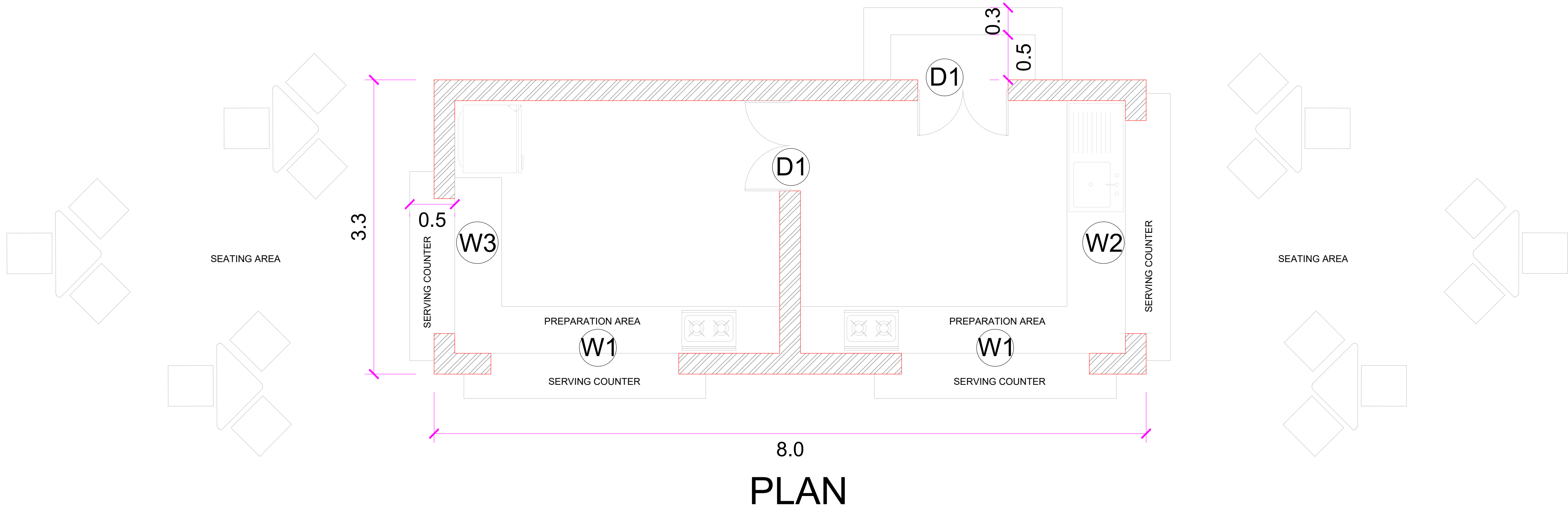
MADE BY
GYZ

REVISION
0

SHEET NO.
AD01

SCALE
1:200



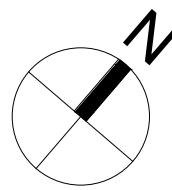


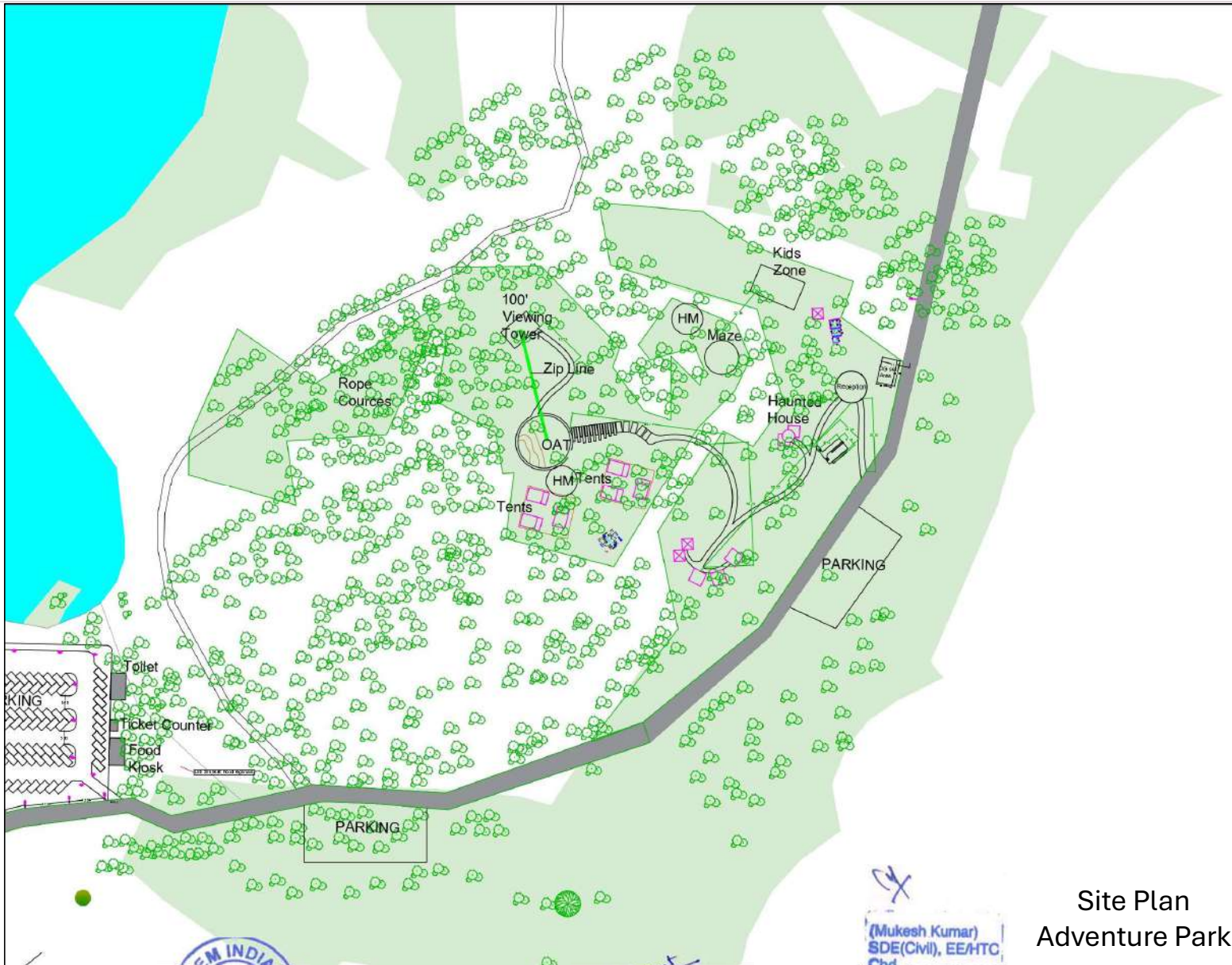
Window Schedule

SI No.	Name	Type	Sill & Lintel	Number	Size
1	W1	Single Panel Rolling Shutter	900, 3600	2	2000 MM X 2700 MM
2	W2	Single Panel Rolling Shutter	900, 3600	1	2300 MM X 2700 MM
3	W3	Single Panel Rolling Shutter	900, 3600	1	1500 MM X 2700 MM

Door Schedule

SI No.	Name	Type	Lintel	Number	Size
1	D1	Double Leaf Wooden	2200	2	1000 MM X 2200 MM





Site Plan
Adventure Park

[Signature]
Xen/HTC CHG

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PROJECT NAME
PDMC PANCHKULA, HARYANA

[Signature]
(Nishant)
Junior Engineer (Elect.)
EE/HTC

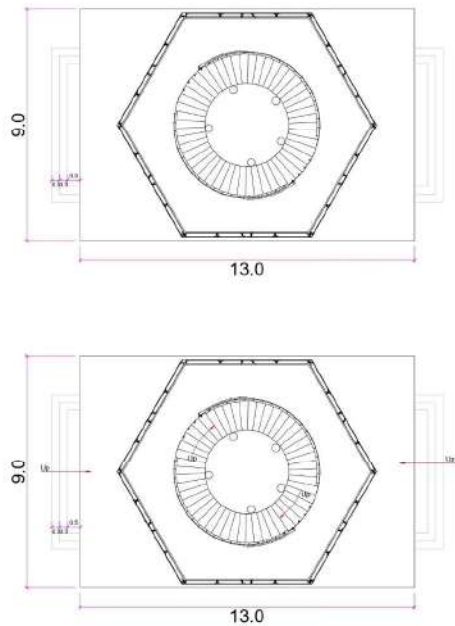
PROJECT
TIKKAR TAAL

Site Plan

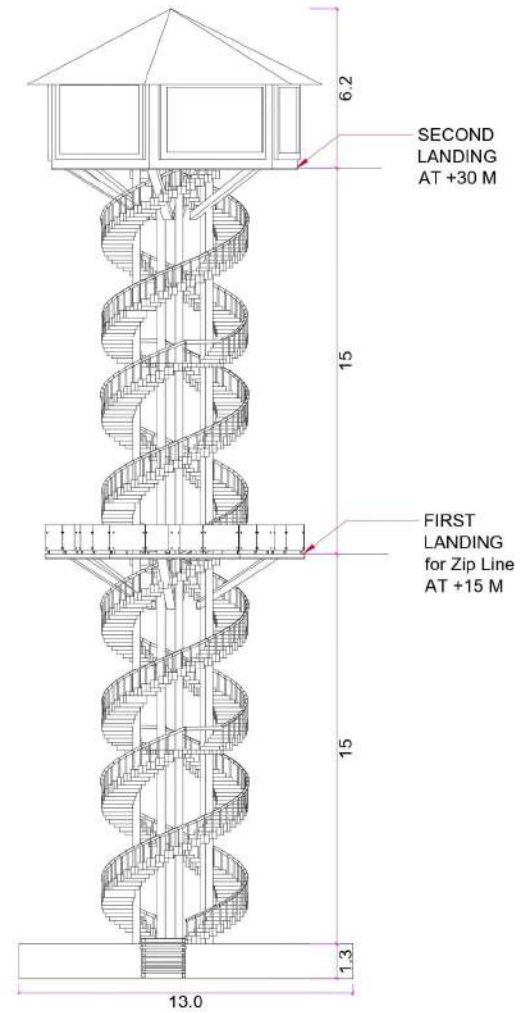
PROJECT NO.
C1232603

DATE 03/07/2025	SHEET NO. AD01
MADE BY GYZ	REVISION 0
SCALE 1:200	





WATCH TOWER PLAN



WATCH TOWER ELEVATION



PROJECT NAME
PDMC PANCHKULA, HARYANA

(Nishant)
Junior Engineer (Elect.)
EE/HTC

(Mukesh Kumar)
SDE(Civil), EE/HTC
Chd.

PROJECT
TIKKAR TAAL
SHEET TITLE
WATCH TOWER

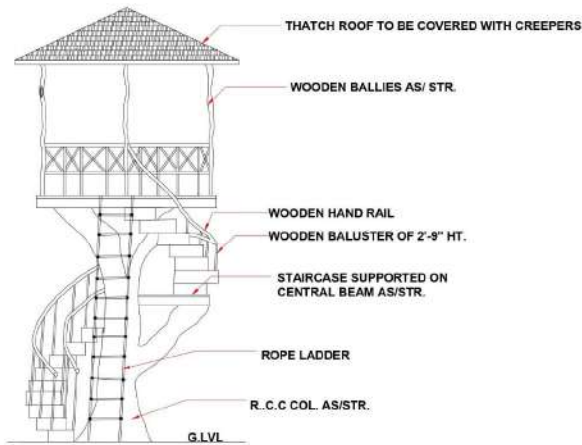
PROJECT NO.
C1232603

DATE 03/07/2025	SHEET NO. AD01
MADE BY GYZ	REVISION 0
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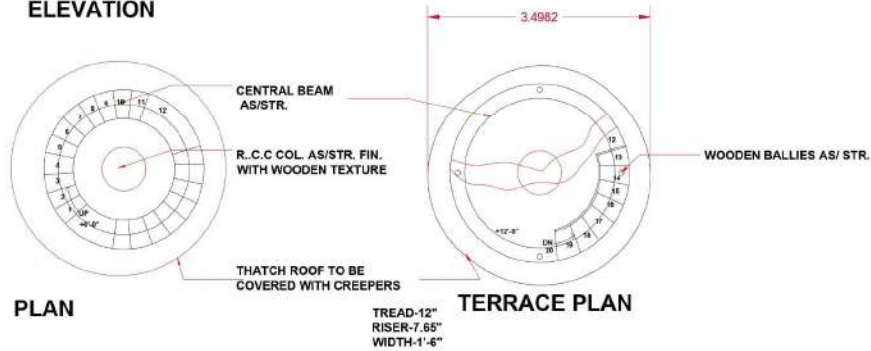


Xen/HTC CHG

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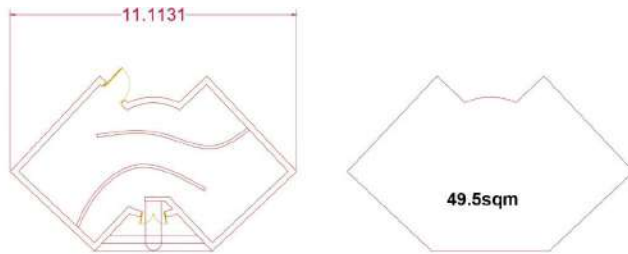
ELEVATION



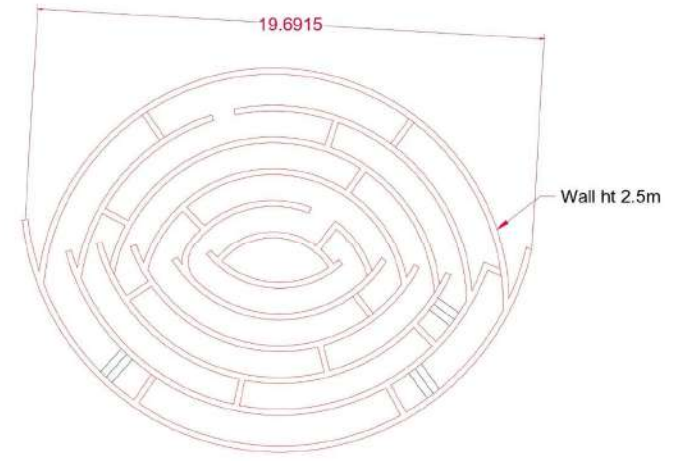
PLAN

TERRACE PLAN

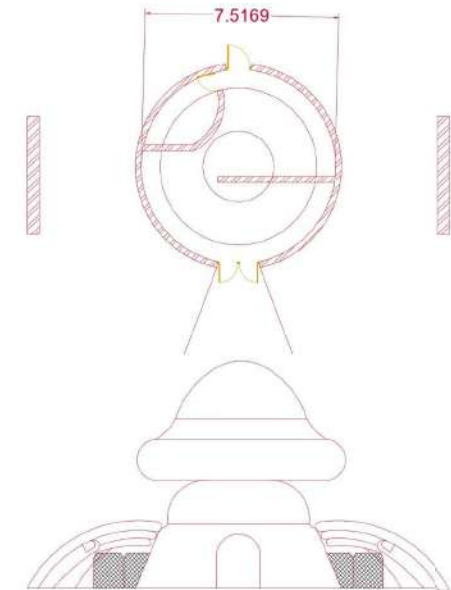
Machaan



Haunted House



Bhul Bhulaiya



Reception Block

Xen/HTC CHG

(Mukesh Kumar)
SDE(Civil), EE/HTC
Chd.

(Nishant)
Junior Engineer (Elect.)
EE/HTC

PROJECT NAME
PDMC PANCHKULA, HARYANA

PROJECT
TIKKAR TAAL

SHEET TITLE
WATCH TOWER

PROJECT NO.
C1232603

DATE
03/07/2025

MADE BY
GYZ

REVISION
0

SHEET NO.
AD01

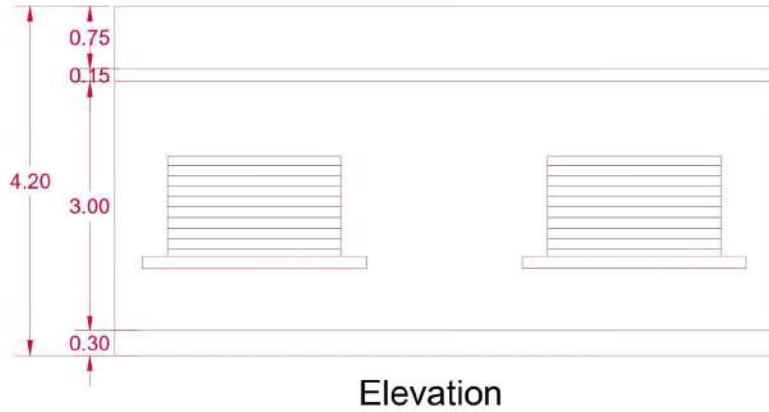
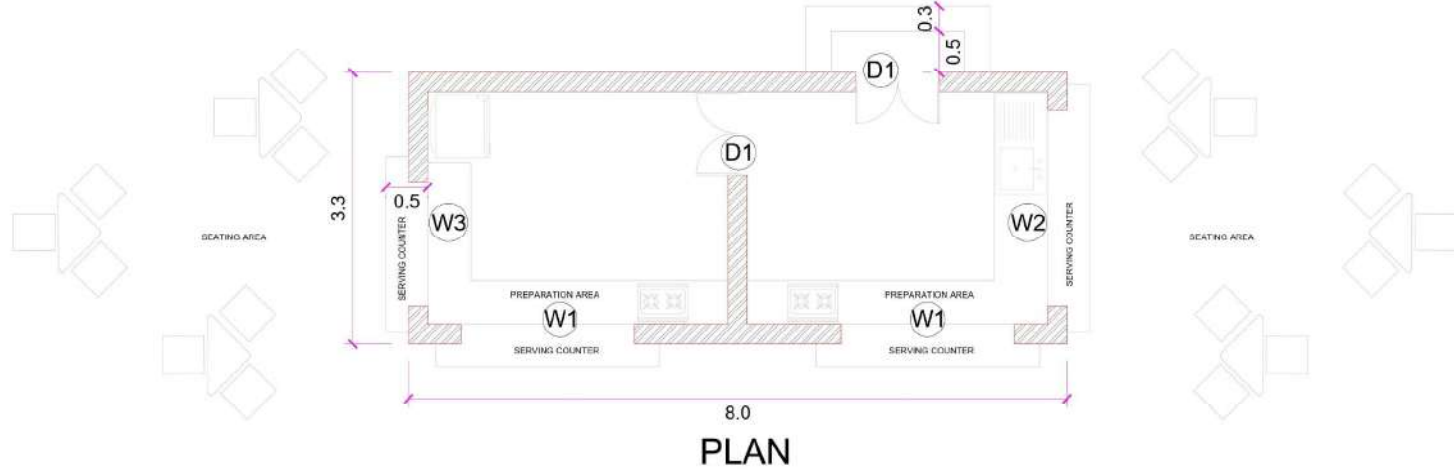
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ASSYSTEM INDIA



Window Schedule

SI No.	Name	Type	Sill & Lintel	Number	Size
1	W1	Single Panel Rolling Shutter	900, 3600	2	2000 MM X 2700 MM
2	W2	Single Panel Rolling Shutter	900, 3600	1	2300 MM X 2700 MM
3	W3	Single Panel Rolling Shutter	900, 3600	1	1500 MM X 2700 MM

Door Schedule

SI No.	Name	Type	Lintel	Number	Size
1	D1	Double Leaf Wooden	2200	2	1000 MM X 2200 MM

Signature

Xen/HTC CHG

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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

(Nishant)
Junior Engineer (Elect.)
EE/HTC

(Mukesh Kumar)
SDE(Civil), EE/HTC
Chd.

BUILDING NAME
YADAVINDRA GARDEN TOILET BLOCK

SHEET TITLE
TOILET BLOCK ELEVATION & SECTION

PROJECT NO.
C1232603

DATE
26/12/2024

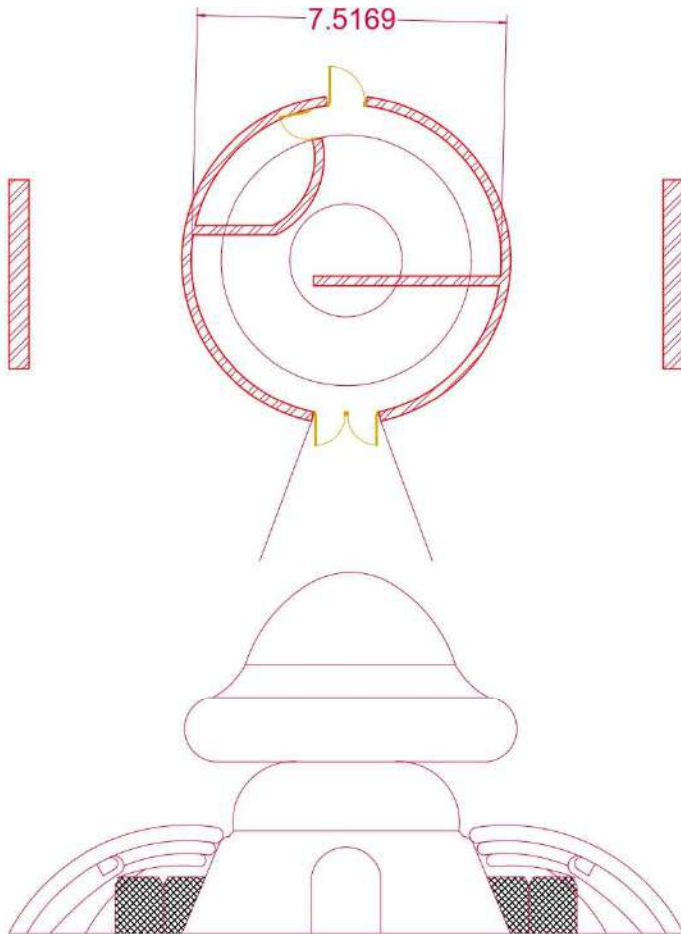
MADE BY
RB

REVISION
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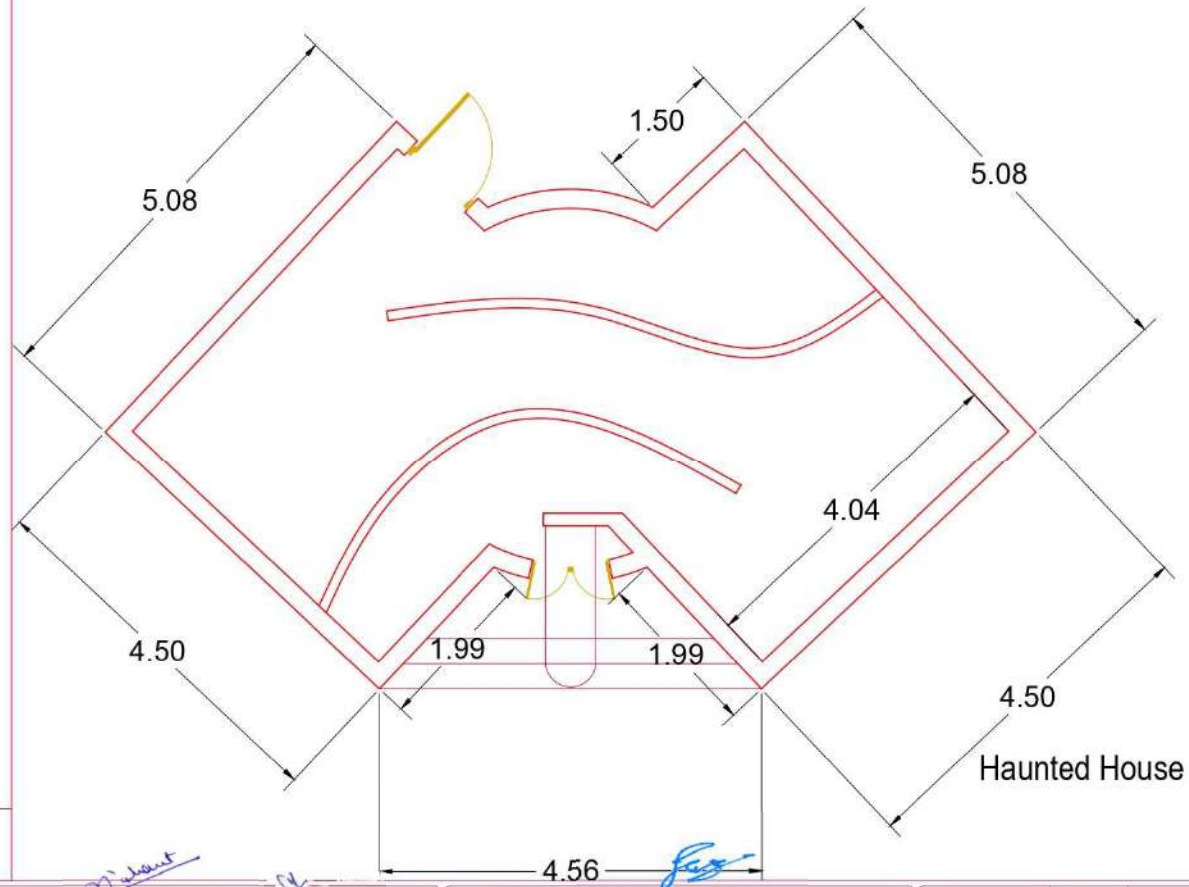
SHEET NO.
XX

SCALE
1:50





Reception Block



Haunted House

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ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

(Nishant)
Junior Engineer (Elect.)
EE/HTC

(Mukesh Kumar)
SDE(Civil), EE/HTC,
Chd.

PROJECT
TIKKAR TAAL

SHEET TITLE
WATCH TOWER

Xen/HTC CHG

PROJECT NO.
C1232603

DATE
03/07/2025

MADE BY
GYZ

REVISION
0

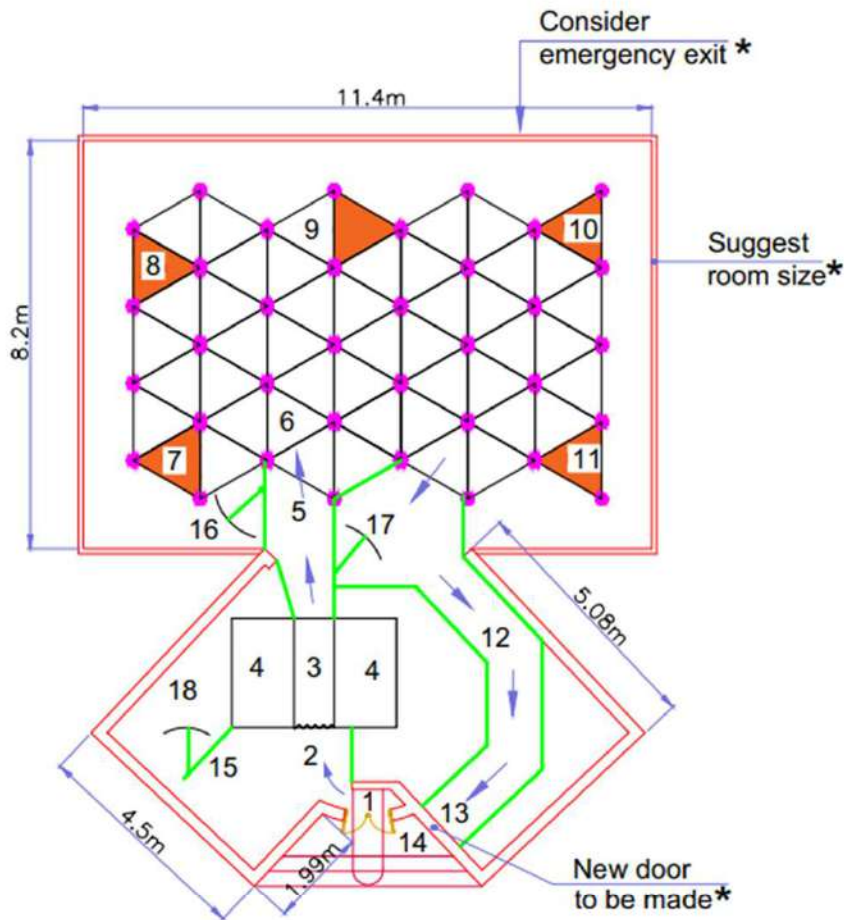
SHEET NO.
AD01

SCALE
1:200



Legend

1. Entrance
2. Curtained portal
3. Rickety bridge across infinite abyss
4. Infinite abyss
5. Into the illusion.
6. Themed illusion.
7. Savage howling werewolf appears and lunges at visitors
8. Animated horrible and scary face suddenly appearing
9. Rattling skeleton with voiceover: help me I am not dead!
10. Ghostly figure tries to catch visitors
11. Explosion of fire roasting the visitors
12. Dark escape passage but attacked by vampire bats, gale force wind
13. Curtained portal
14. Exit
15. Service door
16. Service door
17. Service door
18. Control space



— Partitions in the scope of PwTL supply.



ASSYSTEM INDIA

PROJECT NAME
PDMC PANCHKULA, HARYANA

(Nishant)
Junior Engineer (Elect.)
EE/HTC

(Mukesh Kumar)
SDE(Civil), EE/HTC
Chd.

Xen/HTC CHG

PROJECT
TIKKAR TAAL
SHEET TITLE
WATCH TOWER

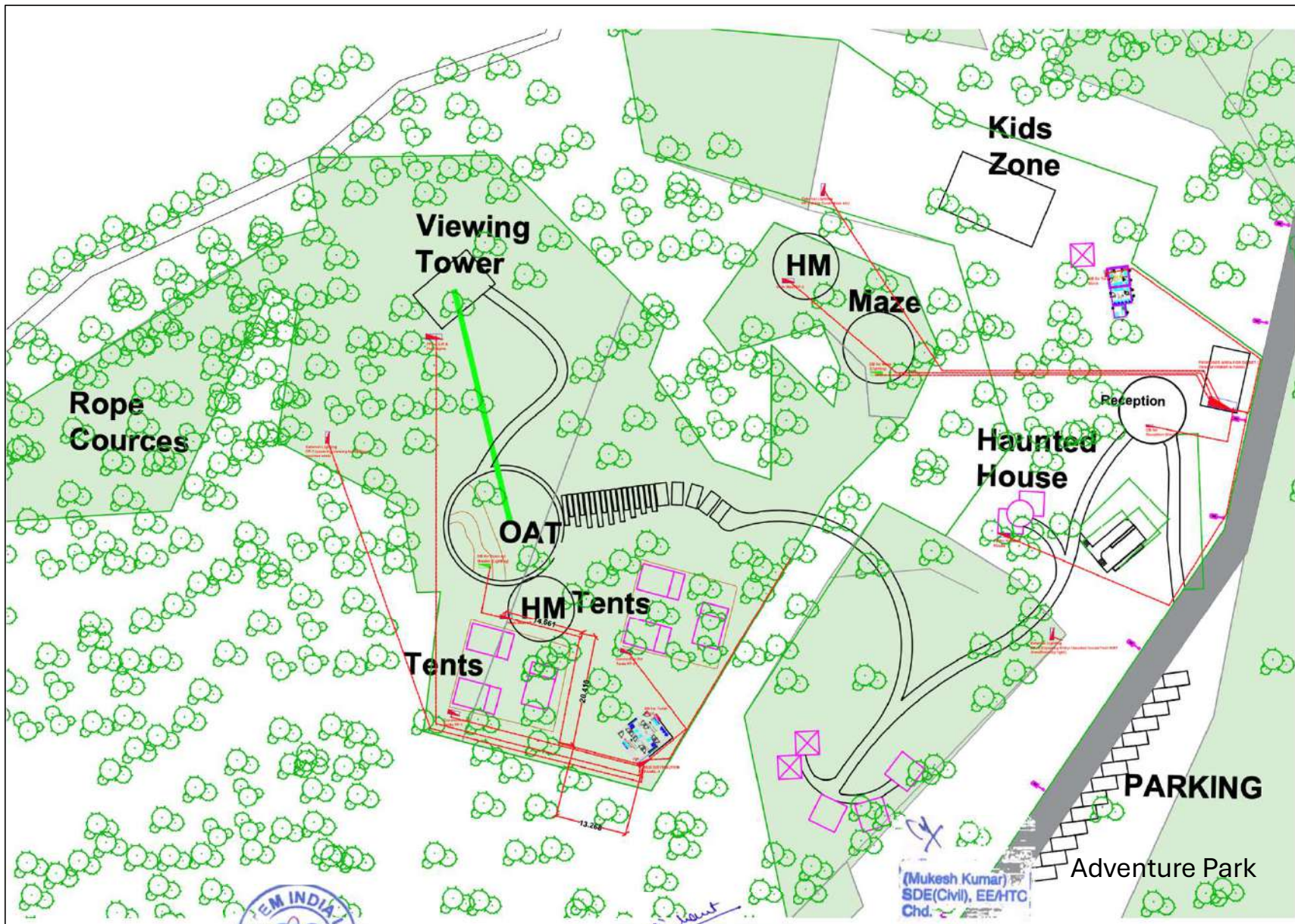
PROJECT NO.
C1232603

DATE 03/07/2025	SHEET NO. AD01
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NOTE: All dimensions are in Meter (M).
Dimensions are to be used and not measured.
If dimensions are to be checked and compared with the structural drawings.
In case of any ambiguity, it shall be brought to the notice of the concerned, before commencement of the work.



[Signature]

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PROJECT NAME
PDMC PANCHKULA, HARYANA

(Nishant)
Junior Engineer (Elect.)
EE/HTC

PROJECT
TIKKAR TAAL

Site Plan - PHE

PROJECT NO.
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