# Request for Proposal

# For

# Bidders qualifying EOI for

# Selection of Concessioner for Implementing Intelligent Poles for Smart City Project in Jabalpuron BOOT model

Reference No.:<JSCL/2016/26

**Date:** 25/11/2016

**Jabalpur Smart City Ltd, Jabalpur**

**Madhya Pradesh**

# Disclaimer

The information contained in this Request for Proposal 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 Feasibility Report, 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 Applicant 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 Successful Bidder JV or Contractor, 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.

# Index

# 1 Introduction

## 1.1 Background Information

1.1.1 City of Jabalpur participated in the Smart City Challenge (Phase 1) and is one of the 20 shortlisted cities by MoUD for implementing Smart City projects. Jabalpur is also firstof the 3 cities selected from Madhya Pradesh and ranked 7th in the country in Round 1 of Smart Cities Challenge. The selected Smart City Proposal is to leverage the available resources and focus on larger development amounting to large share of public investment for smart implementing smart solutions. The SCP has a compelling three pronged vision of improving public life through quantum jump in quality of services, simplifying governance and aligning incentives of city functionaries. The idea is to:

- Maximize reuse of existing infrastructure (ICT/non ICT)
- Creating a backbone for smarter initiatives in the future
- Modernize service delivery

1.1.2 Over a period of time Jabalpur has faced many challenges including;

- Low energy efficiency
- Lack of city infrastructure
- Citizen safety, etc

To mitigate aforementioned challenges pan-city smart solutions are considered to benefit the entire city through application of ICT and resulting improvement in local governance and delivery of public services.

1.1.3 In line to the guidelines issued by Ministry of Urban Development (MoUD)/ Government of India (GoI) Government of Madhya Pradesh has created a Special Purpose Vehicle (SPV) Jabalpur Smart City Ltd (JSCL) for implementing the Smart City mission at the city level. JSCL will plan, appraise, approve, release funds, implement, manage, operate, monitor and evaluate the Smart City development projects..

1.1.4 The key functions and responsibilities of JSCL are to;

- Approve and sanction the projects including their technical appraisal
- Take measures to comply with the requirements of MoUD with respect to the implementation of the Smart Cities programme
- Undertake review of activities of the Mission including budget, implementation of projects, etc. and co-ordination with other missions / schemes and activities of various ministries

1.1.5 Jabalpur Smart City Ltd (Hereinafter referred to as "Authority" or "JSCL") intends to appoint a Concessionaire for implementing Smart City Pan city projects in Jabalpur on Build, Own, Operate and Transfer (BOOT) model on Public Private Partnership (PPP) Basis (the "Project") for a specified Concession Period i.e. implementation period of 12 months, operation and maintenance period of 14 years comprising a total of 15 years (the "Concession Period").

1.1.6 The Successful Bidder (the "Concessionaire"), shall be responsible for designing, engineering, financing, procurement, construction, operation and maintenance of the Project under and in accordance with the provisions of a long-term concession agreement (the "Concession Agreement") to be entered into between the Successful Bidder and the Authority in the form provided by the Authority as part of the Bidding Documents pursuant hereto.

1.1.7 The scope of work includes the activities as mention in the Section 8 of this RFP.

1.1.8 An Agreement will be drawn up between the Authority and the Successful Bidder on PPP basis (the "Concession Agreement"). The Concession Agreement sets forth the detailed terms and conditions for grant of the concession to the Concessionaire, including the scope of the Concessionaire's services and obligations (the "Concession"). Revenues from the proposed Project will accrue to the Successful Bidder undertaking the Project (the "Project Company" or the "Concessionaire") and would be appropriated as per the provisions of the Concession Agreement provided as Annexure VII

1.1.9 The statements and explanations contained in this RFP are intended to provide a better understanding to the Bidders about the subject matter of this RFP and should not be construed or interpreted as limiting in any way or manner the scope of services and obligations of the Concessionaire set forth in the Concession Agreement or the Authority's rights to amend, alter, change, supplement or clarify the scope of work, the Concession to be awarded pursuant to this RFP or the terms thereof or herein contained. Consequently, any omissions, conflicts or contradictions in the Bidding Documents including this RFP are to be noted, interpreted and applied appropriately to give effect to this intent, and no claims on that account shall be entertained by the Authority.

1.1.10 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 1.3 for submission of Bids (the "Bid Due Date").

1.1.11 A Bidder shall be considered as a Successful Bidder for the project of the Authority, where the Letter of Award (LoA) has been issued.

## *1.2 Brief description of Bidding Process*

1.2.1 The Authority has adopted a single stage bidding process wherein the interested parties are required to submit the Bid (collectively referred to as the "Bidding Process") for selection of the Bidder for award of the Project. The Bid in response to the RFP is to be submitted in two parts, viz.:

- PART 1: Qualification+Technical Bid - The first stage would involve test of responsiveness, technical and financial capability for undertaking the Project based on the Qualification Bid. Only those Bids that meet the Qualification Criteria, as set out in this RFP would be qualified for opening of Financial Bid

- PART 2: Financial Bid - Opening and Evaluation of Financial Bid

On the basis of this evaluation process, Authority will issue a Letter of Award to the Successful Bidder.

1.2.2 In the Bid Stage, the aforesaid short-listed Applicants, including their successors, (the "Bidders", which expression shall, unless repugnant to the context, include the Members of the Consortium) are being called upon to submit their financial offers (the "Bids") in accordance with the terms specified in the Bidding Documents. The Bid shall be valid for a period of not less than 120 days from the date specified in Clause 1.3 for submission of bids (the "Bid Due Date").

1.2.3 The Bidding Documents also include the draft Concession Agreement for the Project which is enclosed. The aforesaid documents and any addenda issued subsequent to this RFP Document, will be deemed to form part of the Bidding Documents.

1.2.4 A Bidder is required to deposit, along with its Bid, bid security as mentioned in the clause 1.3 of the RFP (the "Bid Security") in the form of bank guarantee as specified inform 5 of the RFP

1.2.5 During the Bid Stage, 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 Concession including implementation of the Project.

1.2.6 Subject to Clause 2.15, the Project will be awarded to the Bidder scoring Highest Score (the "Highest Bidder") based on evaluation of bids on technical and financial criteria as set out in this RFP. In the event of a tie, the bid with the highest technical score (Th) will be rated as the best bid as per provisions of Clause 3.5.3 of the RFP.

1.2.7 Further and other details of the process to be followed at the Bid Stage and the terms thereof are spelt out in this RFP.Any queries or request for additional information concerning this RFP shall be submitted bye-mail to the officer designated in Clause 1.3 below.

1.2.8 Interested parties may obtain the RFP document from the www.mpeproc.gov.in withnon-refundable fee as mentioned in the clause 1.3 by way of online .

1.2.9 Further, all the parts of the Bid (PART 1: Qualification Bid + Technical, PART 2: Financial Bid) must be submitted online only.

## *1.3 Schedule of Bidding Process*

The Authority shall endeavor to adhere to the following schedule:

| # | Information | Details |
|---|---|---|
| **1.** | Name of Work | Selection of Concessioner for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model |
| **2.** | RFP No. and Date | JSCL/2016/26 Dt- 25/11/2016 |
| **3.** | Last date for submission of written queries for clarifications along with email for sending queries | **NA** |
| **4.** | Date and venue of pre-bid conference | **NA** |
| **5.** | Release of response to clarifications | **NA** |
| **6.** | Bid validity period | 180 days from the last date (deadline) for |

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|---|---|---|
| | | submission of proposals. |
| **7.** | Last date (deadline) for submission of bids | As per NiT |
| **8.** | Opening of Technical Bids | As per NiT |
| **9.** | Method of selection | The method of selection of the Concessioner shall be quality cum cost with 60:40 weightages for technical and financial score. Financial bids of only those Concessioners would be opened who qualify the minimum technical score as laid out in this tender |
| **10.** | Technical Presentation by the Concessioner | **NA** |
| **11.** | Place, Time and Date of opening of Financial proposals received in response to the RFP notice | **NA** |
| **12.** | Website for downloading RFP | www.mpeproc.gov.in , www.jscljabalpur.org |
| **13.** | Earnest Money Deposit/Bid Security | Earnest Money Deposit of amount INR <10,00,000.00>/- through DD / FDR / Bank Guarantee in favor of "**Executive Director Jabalpur Smart city Limited".**from any of the nationalized /scheduled commercial bank.<br>Bank Guarantee format is provided in the Form 5 |
| **14.** | Tender Fee | OnlineINR10,000.00 |
| **15.** | Submission of Bid | • Online |
| **16.** | Contact person | <details of contact person> |
| **17.** | Total Concession Period | 15 years (12 months implementation period and 14 years of O&M) |

# 2 Instruction to Bidders

## 2.1 General Terms for Bidding

2.1.1 A bidder bidding as a lead member is not entitled to submit another bid either as individual or as consortium. However, a bidder participating as a Consortium may tie-up with more than one lead bidders while participating.

2.1.2 Notwithstanding anything to the contrary contained in this RFP, the detailed terms specified in the draft Concession 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 Concession Agreement.

2.1.3 The Bid should be furnished in the format as defined in various forms in the RFP, clearly indicating the bid amount in both figures and words, in Indian Rupees, and signed by the Bidder's authorized signatory. In the event of any difference between figures and words, the amount indicated in words shall be taken into account.

2.1.4 The Bid shall consist of a Grant and a Revenue Share to be quoted by the Bidder. Grant shall be payable by the Authority to the Concessionaire and the Revenue Share shall be payable by the Concessionaire to the Authority, as the case may be, as per the terms and conditions of this RFP and the provisions of the Concession Agreement.

2.1.5 The Bidder may be a sole applicant (Single Entity) or a group of entities (hereinafter referred to as 'Consortium'), coming together to implement the Project. The term Bidder used hereinafter would therefore apply to both a Single Entity and a Consortium who have submitted the Bid. The Successful Bidder is the one selected by Authority to develop this Project and who has been issued LOA by the Authority. The Successful Bidder would be liable for the execution of the Project in accordance with the terms of the Concession Agreement.

2.1.6 Any condition or qualification or any other stipulation contained in the Bid shall render the Bid liable to rejection as a non-responsive Bid.

2.1.7 The Bid and all communications in relation to or concerning the Bidding Documents and the Bid shall be in English language.

2.1.8 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 2.1.9 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.

2.1.9 A 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 forfeit and appropriate 5% of the value of the Bid Security or Performance Security, as the case may be, as mutually agreed genuine pre-estimated compensation and damages payable to the Authority for, inter alia, the time, cost and effort of the Authority, including consideration of such Bidder's Bid, without prejudice to any other right or remedy that may be available to the Authority hereunder or otherwise. Without limiting the generality of the above, a Bidder shall be considered to have a Conflict of Interest that affects 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 not more than 25% (twenty 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 not more than 25% (Twenty 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 section 4A of the Companies Act, 1956. For the purposes of this Clause 2.1.10, indirect shareholding held through one or more intermediate persons shall be computed as follows: (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 (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

ii. a constituent of such Bidder is also a constituent of another Bidder; or

iii. such Bidder, its Member or any Associate thereof receives or has received any direct or indirect subsidy, grant, concessional loan or subordinated debt from any other Bidder, its Member or Associate, or has provided any such subsidy, grant, concessional loan or subordinated debt to any other Bidder, its Member or any Associate thereof; or

iv. such Bidder has the same legal representative for purposes of this Bid as any other Bidder; or

v. 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

vi. 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.

vii. Notwithstanding anything stated herein a conflict of interest situation arising at the prequalification stage will be deemed to subsist only, as between such Applicants attracting conflict of interest provisions on account of shareholdings, submit bids under this document.

Explanation:

In case a Bidder is a Consortium, then the term Bidder as used in this Clause 2.1.10, shall include each member of such Consortium. For purpose 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 percent) 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.

2.1.10 This RFP is not transferable.

2.1.11 Any award of Concession pursuant to this RFP shall be subject to the terms of Bidding Documents.

## *2.2 Consortium*

Where the Applicant is a consortium, all the members of the Consortium shall execute a Consortium Agreement setting out clearly the roles and responsibilities of the each member of the Consortium and shall submit the same with the JSCL. Further the members of the Consortium shall not amend the Consortium Agreement without the prior written consent of the JSCL. Additionally the consortium shall comply with the following additional requirements:

i. number of members in a consortium shall not exceed 4 (four) including the lead member;

ii. In case the work is awarded to a Consortium, then all parties to the Consortium shall execute the agreement with the Client and all terms shall apply to the consortium members mutatis mutandis.

iii. The Lead Member shall be liable and responsible for the work of all the consortium members while other consortium members shall be liable and responsible for their respective scope of work.

iv. subject to the provisions of sub-clause (i) above, the Application should contain the information required for each member of the Consortium;

v. 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, signed by all the other members of the Consortium;

vi. an individual Applicant cannot at the same time be member of a Consortium applying for this project. Further, a member of a particular Applicant Consortium cannot be member of any other Applicant Consortium applying for this project;

vii. in case an Applicant is a Consortium, then the term Applicant as used in this RFP document, shall include Lead Member of the consortium not exceeding four members.

viii. The consortium members shall further commit that each such member shall, for a period of 24 months from the date of commercial operation of the Project, be a part

of consortium. A consortium member not participating in the O&M phase will not own the project and will be not be part of the project transfer activities under BOOT.

2.2.1 Minimum Equity requirement for Consortium

2.2.1.1 Where the Bidder is a Consortium, change in composition of the Consortium may be permitted by the Authority during the Bid Stage, only where:

- the Lead Member continues to be the Lead Member of the Consortium;
- the substitute is at least equal, in terms of Technical Capacity or Financial Capacity, to the Consortium Member who is sought to be substituted and the modified Consortium shall continue to meet the pre-qualification and short-listing criteria for Applicants; and
- the new Member(s) expressly adopt(s) the Application already made on behalf of the Consortium as if it were a party to it originally, and is not an Applicant Member/ Associate of any other Consortium bidding for this Project.

2.2.2 Approval for change in the composition of a Consortium shall be at the sole discretion of the Authority and must be approved by the Authority in writing. As a part of Bid submission, Bidder has to duly propose the RACI Matrix showing responsibility of each consortium. The Bidder must submit its application for change in composition of the Consortium no later than 15 (fifteen) days prior to the Bid Due Date.

2.2.3 The modified/ reconstituted Consortium shall submit a revised Jt. Bidding Agreement and a Power of Attorney and other documents, substantially as provided under Form 2 in this RFP, prior to the Bid Due Date.

2.2.4 Change in Ownership

2.2.5 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 this 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 Successful Bidder, as the case may be. In the event such change in control occurs after signing of the Concession Agreement but prior to Financial Close of the Project, it would, notwithstanding anything to the contrary contained in the Concession Agreement, be deemed to be a breach of the Concession Agreement, and the same shall be liable to be terminated without the Authority being liable in any manner whatsoever to the Concessionaire. In such an event, notwithstanding anything to the contrary contained in the Concession 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 Concession Agreement or otherwise.

## *2.3 Cost of Bidding*

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.

## *2.4 Site visit and verification of information*

a) Bidders are encouraged to submit their respective Bids after doing a thorough survey ofproject site and ascertaining for themselves the site conditions, traffic, 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.

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

c) made a complete and careful examination of the Bidding Documents;

- received all relevant information requested from the Authority;
- 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;
- satisfied itself about all matters, things and information including matters 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;
- 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 2.5.1 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 Concession Agreement by the Concessionaire
- acknowledged that it does not have a Conflict of Interest; and
- agreed to be bound by the undertakings provided by it under and in terms hereof.

2.4.1 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.

## *2.5 Verification and Disqualification*

2.5.1 The Authority reserves the right to verify all statements, information and documents submitted by the Bidder in response to the RFP or the Bidding Documents and the Bidder shall, when so required by the Authority, make available all such information, evidence and documents as may be necessary for such verification. 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.

2.5.2 The Authority reserves the right to reject any Bid and appropriate the Bid Security if:

a) at any time, a material misrepresentation is made or uncovered, or

b) the Bidder does not provide, within the time specified by the Authority, the supplemental information sought by the Authority for evaluation of the Bid.

c) Such misrepresentation/ improper response shall lead to the disqualification of the Bidder. If the Bidder is a Consortium, then the entire Consortium and each Member may be disqualified/ rejected. If such disqualification / rejection occurs after the Bids have been opened and the Highest Bidder gets disqualified / rejected, then the Authority reserves the right to:

i. take any such measure as may be deemed fit in the sole discretion of the Authority, including annulment of the Bidding Process subject to provisions of Section 3 of this RFP.

2.5.3 In case it is found during the evaluation or at any time before signing of the Concession Agreement or after its execution and during the period of subsistence thereof, including the Concession 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 Concessionaire either by issue of the LOA or entering into of the Concession Agreement, and if the Successful Bidder has already been issued the LOA or has entered into the Concession 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 Successful Bidder or the Concessionaire, as the case may be, without the Authority being liable in any manner whatsoever to the Successful Bidder or Concessionaire 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 Concession Agreement, or otherwise.

## *2.6 Contents of RFP*

This RFP comprises the Disclaimer set forth hereinabove, the contents as listed below, and will additionally include any Addenda issued in accordance with Clause 2.8.

| | |
|---|---|
| **Section1** | Introduction |
| **Section 2** | Instructions to Bidders |
| **Section 3** | Evaluation of Bids |
| **Section 4** | Fraud and Corrupt Practices |
| **Section 5** | Pre-bid Conference |
| **Section 6** | Miscellaneous |
| **Section 7** | Pre-Qualification & Technical Evaluation |
| **Section 8** | Scope of Work for the Concessioner |
| **Section 9** | Responsibility Matrix |
| **Section 10** | Revenue Generation Modes |
| **Section 11** | Common guidelines/comments regarding the compliance of equipment/systems |
| **Section 12** | Technical Solution |

| | |
|---|---|
| **Section 13** | Payment Terms |
| **Section 14** | Timelines, SLA and Penalties |
| **Section 15** | Limitation of Liability |
| **Section 16** | Liquidated Damages |
| **Section 17** | Exit Management |
| **Annexures** | |

2.6.1 The Concession Agreement provided by the Authority as part of the Bid Documents shall be deemed to be part of this RFP.

## *2.7 Clarifications*

2.7.1 Bidders requiring any clarification on the RFP may notify the Authority in writing or by fax and e-mail in accordance with Clause 1.3. They should send in their queries on or before the date mentioned in the Clause 1.3. The Authority shall endeavor to respond to the queries within the period specified therein, but no later than 15 (fifteen) days prior to the Bid Due Date. The responses will be uploaded on Authority's website and will not be mailed individually.

2.7.2 The Authority shall endeavor 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.

2.7.3 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.

## *2.8 Amendment of RFP*

2.8.1 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.

2.8.2 Any Addendum issued hereunder will be in writing and shall be sent to all the Bidders.

2.8.3 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.

## *2.9 Format and Signing of Bid*

2.9.1 The Bidder would provide all the information as per this RFP. Authority reserves the right to evaluate only those Bids that are received in the required format, complete in all respects and in line with the instructions contained in this RFP.

2.9.2 The Bid and its copy shall be typed or written in indelible ink and signed by the authorized signatory of the Bidder who shall also initial each page, in blue ink. In case of printed and published documents, only the cover shall be initialed. All the alterations, omissions, additions or any other amendments made to the Bid shall be initialed by the person(s) signing the Bid.

2.9.3 The Bidders will submit their Bids online:

i. The online submission shall be according to e-procurement guidelines issued by Government of Madhya Pradesh as provided on e-procurement website.

ii. Bidders can prepare and edit their offers number of times before final submission. Once finally submitted, Bidder cannot edit their offers submitted in

any case. No written or online request in this regards shall be granted/entertained.

iii. Bidder shall submit their offer i.e. Technical bid as well as financial bid in electronic format on the website as mentioned in the RFP.

iv. Bid should be duly signed by the person who holds the power of attorney for this particular bid.

v. Financial Bid shall be submitted in the same format as provided in sample format in Annexure II of the RFP.

vi. Physical copy of bid will not be accepted

2.9.4 The pages and volumes of each part of the Bid shall be clearly numbered and stamped and the contents of the Bid shall be duly indexed.

2.9.5 The Bid shall be typed or printed. The Bid shall be signed and each page of the Bid shall be initialed by a person or persons duly authorized to sign on behalf of the Bidder and holding the Power of Attorney.

2.9.6 The Bid shall contain no alterations or additions, except those to comply with instructions issued by Authority or as necessary to correct errors made by the Bidder, in which case such corrections shall be initialed by the person or persons signing the Bid.

2.9.7 Each of the envelopes shall indicate the complete name, address, telephone number and facsimile number of the Bidder.

## *2.10 Bid Due Date and Time*

2.10.1 Bids should be submitted on or before the Bid Due Date at the address provided in Clause 1.3 in the manner and form as detailed in this RFP.

2.10.2 Authority may, at its sole discretion, extend the Bid Due Date by issuing an Addendum uniformly for all Bidders.

## *2.11 Modifications / Substitution / Withdrawal of Bids*

2.11.1 The Bidder may modify, substitute or withdraw its Bid multiple times before final online submission of Bid

## *2.12 Late Bids*

2.12.1 The eProcurement website will be closed for bid submission post the bid submission date and time

## *2.13 Rejection of Bids*

2.13.1 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.

2.13.2 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.

## *2.14 Validity of Bids*

2.14.1 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.

## *2.15 Confidentiality*

2.15.1 Information relating to the examination, clarification, evaluation and recommendation for 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 the 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.

## *2.16 Correspondence with the Bidder*

2.16.1 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.

## *2.17 Bid Security*

2.17.1 Bids need to be accompanied by a Bid Security mentioned in the Clause 1.3. The Bid Security shall be kept valid for 180 days beyond the Bid Validity period including any extensions in the Bid Validity Period inclusive of a claim period of 60 (sixty) days, and may be extended as may be mutually agreed between the Authority and the Bidder from time to time.

2.17.2 The Bid Security shall be in the following form:

An irrevocable Bank Guarantee issued by a Bank in favour of the Authority, as per the format set out in Form 5. Bank Guarantee issued by any Scheduled Bank will be accepted, provided it has been issued by a branch located in the State of M.P.

2.17.3 Authority shall reject the Bid, which does not include the Bid Security.

2.17.4 The entire Bid Security shall be forfeited in the following cases:

i. If the Bidder withdraws any of its Bid within the Bid Validity Period;

ii. In case of a successful Bidder, if the Bidder fails:

a) To furnish acceptance of the LoA within 15 days from the issue or

b) To furnish Performance Security within 30 working days from the date of issue of LoA or

c) To sign the Concession Agreement within 30 working days from the date of issue of LoA or

d) If the Bidder is found to be involved in fraudulent practices.

iii. As per the provisions of the Concession Agreement

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# 3 Evaluation of Bids

## 3.1 Opening and Evaluation of Bids

3.1.1 The Authority shall open the Bids on the Bid Due Date, at the place specified in Clause 1.3 and in the presence of the Bidders who choose to attend.

3.1.2 The Authority will subsequently examine and evaluate the Bids in accordance with the provisions set out in this Section 3.

3.1.3 To facilitate evaluation of Bids, the Authority may, at its sole discretion, seek clarifications in writing from any Bidder regarding its Bid.

## 3.2 Tests of responsiveness

3.2.1 Prior to evaluation of Bids, the Authority shall determine whether each Bid is responsive to the requirements of this RFP. A Bid shall be considered responsive only if:

a) it is received as per the formats as mentioned in this RFP;

b) it is received by the Bid Due Date including any extension thereof pursuant to Clause 2.10.2;

c) it is signed, sealed, bound together in hard cover and marked as stipulated in Clauses 2.9;

d) it is accompanied by the Bid Security as specified in Clause 2.17;

e) The purchaser of the RFP document must be the Bidder itself or a Member of the Consortium submitting the Bid. The Bidder should submit a Power of Attorney as per the format enclosed as Form 2A, authorizing the signatory of the Bid to commit the Bid.

f) In case the Bidder is a Consortium, the members of the Consortium shall furnish a Power of Attorney in the format prescribed at Form 2B designating one of the Members, as per the Memorandum of Understanding (MoU), as their Lead Member.

g) Any entity, which has been barred, by Authority and the bar subsists as on the Bid Due Date would not be eligible to submit the Bid, either individually or as Member of a Consortium. An undertaking as per the format in Form 17 should be submitted along with the Bid.

h) Members of the Consortium shall submit a Memorandum of Understanding (MoU), specific to this Project, for the purpose of submitting the Bid as per format provided in Form 18. The MoU shall be furnished on a non-judicial stamp paper of Rs. 100/-, duly attested by notary public.

i) it contains all the information (complete in all respects) as requested in this RFP and/or Bidding Documents (in formats same as those specified);

j) it does not contain any condition or qualification; and

k) it is not non-responsive in terms hereof.

3.2.2 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.

## *3.3 Selection of Bidder*

3.3.1 Subject to the provisions of Clause 2.13, the Bidder whose Bid is adjudged as responsive in terms of Clause 3.2.1, the Bidder who scores the highest Final Score shall be declared as the Successful Bidder subject to fulfilment of all other provisions of this RFP.

3.3.2 The technical and financial capability of the Bidders would be assessed based on the evaluation process and minimum requirements as set by Authority as per Section 7, to be submitted by the Bidders in formats in Annexure I.

3.3.3 A Bid that is substantially responsive is one that conforms to the preceding requirements without material deviation or reservation. A material deviation or reservation is one

i. Which affects in any substantial way the scope, quality, or performanceof the Project, or

ii. Which limits in any substantial way or is, inconsistent with the RFP,

iii. rights of Authority or the obligations of the Bidder under the Concession Agreement, or

iv. Which would affect unfairly the competitive position of other Bidders presenting substantially responsive Bids.

3.3.4 Authority reserves the right to reject any Bid which is non-responsive and no request for alteration, modification, substitution or withdrawal shall be entertained in respect of such Bids.

3.3.5 Bidders who's Qualification Bids meet the minimum technical and financial capability requirements as set out in Section 7 shall be given Technical Score (T) based on following methodology:

T = (Tb/Th) X 100,

where

- T is the Technical Bid Score
- Value of T shall be considered upto two decimal places
- Tb is the total technical bid marks of the bid under consideration
- This the highest total technical bid marks amongst all evaluated bids.

3.3.6 The Bids meeting minimum qualifying marks shall be opened and evaluated in Stage II of the Evaluation Process.

## *3.4 Evaluation of Financial Bids (Stage II)*

3.4.1 Authority will open 'FINANCIAL BID' of the Bidders, who pass the Qualification stage (Stage I) as stated, in the presence of the Bidder's authorised representatives who choose to attend.

3.4.2 Upon opening of the Financial Bid, the Bidders shall be given Financial Score based on Grant from the Authority for meeting capital investment requirements and Revenue Share with the Authority. The Bidder is expected to quote for Grant and Revenue Share in the format attached as Annexure II. The Financial Score (F) shall be assigned based on following methodology:

- F = [NRb/NRh] X 100
- NR = R - G, where
- NRb is the Net Revenue Share proposed by the Bidder for bid under consideration
- NRh is the Highest Net Revenue Share with the Authority amongst all technically qualified bids
- R is the Net Present Value of the Revenue Share with the Authority by the bid under consideration
- G is the support for capital investment in form of Grant quoted by the Bidder for bid under consideration
- For better understanding, following illustration may be referred as an example:

| Bidder | Quoted Grant (Rs. Cr.) G | NPV of Revenue Share (Rs. Cr.) R | NR=R-G | F* |
|---|---|---|---|---|
| A | 0 | 200 | 200 | **74.07** [(200÷270)X100] |
| B | 15 | 100 | 85 | **31.48** [(85÷270)X100] |
| C | 30 | 300 | 270 | **100.00** [(270÷270)X100] |

'*' Bidder C has Highest Financial Score

## *3.5 Successful Bidder*

3.5.1 Authority will determine Final Score (FS) based on scores obtained by Bidders in Stage I and II on the basis of following methodology:

Final Score (FS) = [60% X T] + [40% X F]

3.5.2 The Bid of the Bidder, who obtains the highest FS value, will be rated as the best bid and the contract will be awarded to that Bidder.

3.5.3 In the event that two or more Bidders get same Final Score (the "Tie Bidders"), the Bidder with highest technical score (Th) shall be identified as the Successful Bidder.

3.5.4 In the event that the Highest Bidder withdraws or is not selected for any reason in the first instance (the "first round of bidding"), the Authority may invite the Bidder with next highest final score for consideration as Successful Bidder;

3.5.5 The Successful Bidder shall be notified on its selection in writing or by fax or email. The Successful Bidder shall also be issued Letter of Intent confirming its selection.

3.5.6 After selection, a Letter of Award (the "LOA") shall be issued, in duplicate, by the Authority to the Successful Bidder and the Successful 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 Successful 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 Successful Bidder to acknowledge the LOA, and the next eligible Bidder may be considered.

3.5.7 After acknowledgement of the LOA as aforesaid by the Successful Bidder, it shall cause the Concessionaire to execute the Concession Agreement within thirty (30) days of the issue of LOA. The Successful Bidder shall not be entitled to seek any deviation, modification or amendment in the Concession Agreement.

3.5.8 In case, the Concession Agreement does not get executed within the period mentioned in Clause 3.5.7., Authority reserves the right to take any such measure as it may deem fit including to annul the bidding process and may invite fresh Bid for the Project. In such a case the entire Bid Security submitted by the Successful Bidder shall be forfeited. However, Authority on receiving request from the Successful Bidder may at its discretion, permit extension of time for execution of the Concession Agreement.

3.5.9 Authority will notify other Bidders that their Bids have been unsuccessful. Bid Security of other bidders will be returned within 15 days of signing of the agreement or expiry of validity period of Bids whichever is earlier.

## *3.6 Contacts during Bid Evaluation*

3.6.1 Bids shall be deemed to be under consideration immediately after they are opened and until such time the Authority makes official intimation of award/ rejection to the Bidders. While the Bids are under consideration, Bidders and/ or their representatives or other interested parties are advised to refrain, save and except as required under the Bidding Documents, from contacting by any means, the Authority and/ or their employees/representatives on matters related to the Bids under consideration.

# 4 *Fraud and Corrupt Practices*

4.1.1 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 Concession Agreement. Notwithstanding anything to the contrary contained herein, or in the LOA or the Concession Agreement, the Authority may reject a Bid, withdraw the LOA, or terminate the Concession Agreement, as the case may be, without being liable in any manner whatsoever to the Bidder or Concessionaire, as the case may be, if it determines that the Bidder or Concessionaire, 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 Concession Agreement, or otherwise.

4.1.2 Without prejudice to the rights of the Authority under Clause 4.1.1 hereinabove and the rights and remedies which the Authority may have under the LOA or the Concession Agreement, or otherwise if a Bidder or Concessionaire, 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 Concession Agreement, such Bidder or Concessionaire 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 Concessionaire, 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.

4.1.3 For the purposes of this Clause 4, 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 Concession 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), engaging in any manner whatsoever, whether during the Bidding Process or after the issue of the LOA or after the execution of the Concession Agreement, as the case may be, any person in respect of any matter relating to the Project or the LOA or the Concession 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.

# 5 *Pre-Bid Conference*

5.1.1 Pre-Bid conferences of the Bidders shall be convened at the designated date, time and place. Only those persons who have purchased the RFP document shall be allowed to participate in the Pre-Bid Conferences. A maximum of five representatives of each Bidder shall be allowed to participate on production of authority letter from the Bidder.

5.1.2 During the course of Pre-Bid conference(s), the Bidders will be free to seek clarifications and make suggestions for consideration of the Authority. 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.

5.1.3 The Bidders need to submit the pre-bid queries in the following format as per the deadline mentioned in Clause 1.3 of the RFP

| # | RFP Document Reference (Section No., Clause No. Page No.) | Content of the RFP requiring clarification | Clarification Sought |
|---|---|---|---|
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |
| | | | |

# 6 Miscellaneous

6.1.1 The Bidding Process shall be governed by, and construed in accordance with, the laws of India and the Courts in Madhya Pradesh shall have exclusive jurisdiction over all disputes arising under, pursuant to and/ or in connection with the Bidding Process.

6.1.2 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) retain any information and/ or evidence submitted to the Authority by, on behalf of, and/ or in relation to any Bidder; and/ or

d) 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.

6.1.3 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.

## *6.2 Performance Security*

6.2.1 The Concessionaire shall for due and faithful performance of its obligations shall submit a Performance Security by way of an irrevocable Bank Guarantee within 15 working days from the date of issue of LOA, for a value equivalent to sum of the following:

a) one – fourth of Annual Revenue Share for corresponding year of the Concession Period,

b) Fifty percent of the Grant quoted by the Concessionaire in its Bid and committed to be paid by the Authority.

Or,

In case a bidder doesn't opt for a VGF and do not share any revenue with the authority then the performance security will be 10% of the entire project cost (Capex + Opex) and will be active for the entire Concession period.

The Concessionaire shall be responsible for submission of the Performance Security fifteen (15) days prior to commencing of a particular year except the first year.

The Performance Security should be valid for a period of one year at a time and must be renewed every year as per provisions of the Concession Agreement. Such Performance Security shall be issued from any scheduled bank.

6.2.2 Till such time the Concessionaire provides the Performance Security, the Bid Security shall remain in full force and effect.

6.2.3 In case the Successful Bidder fails to submit Performance Security within the time stipulated, the Authority at its discretion may cancel the LOA placed on the Successful Bidder without giving any notice. Authority shall invoke Performance Security in case the Successful Bidder fails to discharge their contractual obligations during the period or Authority incurs any loss due to Bidder's negligence in carrying out the project implementation as per the agreed terms & conditions.

6.2.4 The performance security will be returned to the Concessioner post 1 month of its expiry, provided the Concessioner has renewed the BG and submitted a fresh performance security to the Authority, if required

6.2.5 The Performance Security should be issued by any scheduled bank as per the format provided in the Annexure III.

# 7 Pre-Qualification & Technical Evaluation

## 7.1 Pre-Qualification Criteria

| # | | Prequalification Requirement | Supporting Documents to be attached |
|---|---|---|---|
| 1. | **Legal Entity** | The Sole/Lead Bidder should be an Indian Registered Company registered under Company Act 1956. | • Certificate of Incorporation from Registrar of Companies.<br>• Articles and Memorandum of Association.<br>• Annual Report for the last three financial years. |
| 2. | **Financial: Turnover from IT/ ITeS/Telecom** | Average Annual Turnover of the Sole/Lead Bidder from IT/ ITeS/Telecom hardware, software services during the last three financial years, i.e., 2013-2014,2014-2015 and 2015-2016 (as per the last published audited balance sheets), should be at least Rs.500 Crores | • Audited balance sheet for the last three years |
| 3. | **Presence in India** | The Sole/Lead Bidder should have been present in India for the least 7 years and carrying out business in India as on 31.03.2016 | • Certificate of Incorporation |
| 4. | **Blacklisting** | Sole Bidder/All members of consortium shall submit a self-declaration of not having been black listed to provide similar services to any State or Central Government Department or Ministry as on bid submission date | • Self-declaration duly signed by PoA holder for signing the bid |

In computing the Technical and Financial Capacity of the Applicant/ Consortium Members, the Technical and Financial Capacity of their respective Associates would also be eligible hereunder.

For purposes of this RFP, Associate means, in relation to the Applicant/ Consortium Member, a person who controls, is controlled by, or is under the common control with such Applicant/ 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 20% (twenty 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.

## 7.2 Technical Evaluation

| # | Evaluation Criteria | Maximum Marks Allotted |
|---|---|---|
| 1. | Turnover | 5 |
| 2. | Profitability | 5 |
| 3. | Relevant Experience | 20 |

| | | |
|---|---|---|
| **4.** | Presentation along with Approach & Methodology | 35 |
| **5.** | FRS Compliance | 27 |
| **6.** | Human Resource | 8 |
| **Total** | | **100** |

Technical Bids receiving marks greater than or equal to cut-off marks in each competency group will be eligible for consideration in the subsequent round of evaluation. If required, JSCL may seek specific clarifications from any or all Concessioner(s) at this stage.

JSCL will evaluate the technical proposal of the Concessionerwith regard to the solutions offered, technology proposed, technical professional(s) and time-frame etc. JSCL will invite the Concessioner for technical presentation and discussions on the project. Concessionerisexpected to depute only those officials for technical presentations who will be responsible for providing the leadership to the project. Evaluators of Technical Proposals shall have no access to the Financial Proposals until the technical evaluation is concluded.

### 7.2.1 Technical Evaluation Criteria

| # | Evaluation Criteria | Maximum Marks Allotted | Documents/Forms required |
|---|---|---|---|
| **1** | **Concessioner's Turnover** | **5** | • Audited balance sheet for the last three years |
| **1.1** | Average Annual Turnover of the Sole/Lead Bidder from IT/ ITeS/Telecom from hardware, software and services during the last three financial years, i.e., 2013-2014, 2014-2015 and 2015-2016 (as per the last published audited balance sheets);<br>• >= 1000 crores = 5<br>• >= 750&<1000crores = 3<br>• >= 500 &<750 cores = 1 | 5 | |
| **2** | **Profitability** | **5** | • Audited balance sheet for the last three years |
| **2.1** | The average annual profit of the Sole/Lead Bidder for the past three years 2013-2014, 2014-2015 and 2015-2016;<br>• >= 150crores = 5<br>• >= 100 &<150crores = 3<br>• >= 50&< 100 crores = 1 | 5 | |
| **3** | **Bidder's Experience** | **20** | • Work Order/Completion Certificate/ Self certificate (duly signed by the Power of Attorney holder for signing the bid) |
| **3.1** | The Bidder should have completed projects of Public Wi-Fi and related network infrastructure projects.<br>The number of Access Pointsinstalled and in working condition in India;<br>• >= 500 = 5<br>• >= 250&<500 = 3<br>• >= 100&<250 = 1 | 5 | |
| **3.2** | The Bidder should have completed projects for outdoor CCTV installation of 100 IP based digital cameras with Central monitoring system.<br>• >= 200 = 5<br>• >= 150&<200 = 3<br>• >= 100 &<150 = 1 | 5 | |
| **3.3** | The Bidder should have executed projects for implementation of Smart LED Project for street light of 100 Smart LED luminaires or higher. | 5 | |

| # | Evaluation Criteria | Maximum Marks Allotted | Documents/Forms required |
|---|---|---|---|
| | • >= 200 = 5<br>• >= 150&<200 = 3<br>• >= 100 &<150 = 1<br><br>Smart LED: On/Off remotely (please refer scope for more understanding) | | |
| **3.4** | The Bidder should have experience of executing centralized communication/ monitoring of ICT infra through Command and Control Centre, including Collection of Data for MIS reporting.<br><br>AND/OR<br><br>The Bidder should have experience in implementation and managing Network Operation Centre.<br><br>The number of nodes/sites;<br>• >= 50,000 = 30<br>• >= 20,000 &< 40,000 = 20<br>• >= 10000 &< 20,000 = 10 | 5 | |
| **4** | **Presentation with Approach & Methodology** | **30** | • Technical Presentation with Approach & Methodology<br>• PoC |
| **4.1** | Technical Presentation of the overall solution including the Approach & Methodology indicating the sources of revenue and implementation schedule | 30 | |
| **5** | **FRS Compliance** | **27** | • FRS Compliance Sheet |
| **5.1** | The Bidder should comply to the technical specifications as mentioned in the RFP;<br>• >= 95% = 10<br>• >= 80% = 7.5<br>• >= 75% = 5<br><br>Less than 75% can be considered as deviation and the bid is likely to get rejected | 27 | |
| **6** | **Human Resources** | **8** | • Detailed CV as per the |

| # | Evaluation Criteria | Maximum Marks Allotted | Documents/Forms required |
|---|---|---|---|
| **6.1** | Bidder should deploy following resources on-site during the concessioner period;<br>• Project Manager (Lead Bidder): 2<br>• Smart LED Expert: 1<br>• Command & Control Center Expert: 1<br>• Project Finance Expert: 1<br>• O&M Expert (Lead Member): 2<br>• Surveillance Expert: 1<br><br>The marks will be given on the basis of Education (relevant qualification in the domain), years of relevant experience and number of relevant projects undertaken. | 8 | format in the RFP |

# 8 Scope of Work for the Concessioner

The Concessioner shall be solely and exclusively responsible to design, implement and maintain on a BOOT (Build, Own, Operate, and Transfer) model the solution as mentioned in this RFP and to provide the services as specified.

The following Smart components needed to be implemented as part of the RFP;

- Intelligent Poles
- Smart LEDs
- Surveillance
- Optical Fiber
- Smart Billboards
- Command and Control Center (With DC and DR)
- Environmental Sensors

As the concessioner period is for 15 years, hence for any technology advancement the project infra should support the latest technology

The Concessioner had to deploy at least 200 intelligent poles in the project.The locations of such poles will finalized by Concessioner post survey in the project area.

The detailed Scope of Work with respect to implementation of Smart Components is mentioned in the subsequent sections. However, following is an indicative scope of work for Bidder's reference;

- The number of equipment specified in the Bill of Material is minimum and It would be the responsibility of the Concessioner to supply all the required products and equipment (active and passive) which are required to complete and deliver the services at the sites (e.g.there should be seamless roaming and no Wi-Fi dark spots in any site). It would be inclusive of but not exclusive to:

  - Additional items/equipment/ components required if any to complete solution and project operations
  - Timely delivery to various locations as per the agreed timelines
  - Transporting the items – with no extra / additional charges (road tax, excise, toll tax, insurance, etc. ) would be considered for payment
  - Safety – The Concessioner would be responsible for maintaining adequate safety measure at the storage points. Depending upon the availability and suitability, appropriate location for storage would be provided by respective colleges. JSCL would not be responsible for any losses due to theft, fire or any exigencies in this regard

- The Concessioner must not bid/supply any equipment that it likely to declared end of sale within three years from the date of supply. The Concessioner would have to replace any such equipment with latest or at least the equivalent configuration product from same OEM with no additional cost to JSCL
- Concessioner must have highly qualified resources with experience in the field of ICT and Smart Components as envisaged in the RFP. Proposal must include copies ofcertifications and resumes for all resourceswho will be responsible for project execution throughout the concessioner period.
- Resources for Operation & Maintenance must be positioned by concessioner on permanent basis, at project site, throughout the concession period to address the arising problems and its rectification such that the SLA is not breached.
- The Concessioner shall be responsible for preparation and submission of detailed UAT schedules/ procedures/ formats. After acceptance of UAT reports by JSCL, the entire infrastructure (including network) would be deemed to have been commissioned.
- The Concessioner shall develop a plan to procure, install, and configure all the necessary items for the implementation of smart components in a timely fashion in different phases. There should be a tracker created and shared with JSCL that would track all the commissioning of the equipment, the timelines adhered to and the compliance to the requirements
- Helpdesk & FMS support
- Provision of 24/ 7 Help Desk System for technical / operational support
- Maintenance of IT/ Non-IT Infrastructure
- Providing Technical & Operational Manpower for seamless system operations

Further, following is the list of future smart city interventions for JSCL;

- Intelligent Transport System and Intelligent traffic management
- Panic sensors like Noise of 'Clap', Noise of 'Help', along with a SOS panic button on pole
- Water quality & monitoring sensors

## *8.1 LED based Smart Street Light*

Electric street lights are essential elements of a municipal environment and services. They affect resident sense of safety while influencing a city's ability to create an inviting environment for business and tourism. Unfortunately, outdoor lights are also a major energy draw. Therefore following are desired in designing, implementation and O&M of LED based Smart Street Lighting:

- Reduce energy consumption, cost, and its maintenance
- Enhance situational awareness, real-time collaboration, and decision making across city

- Add intelligent IT innovations to civic utilities, public safety without adding significantly more physical infrastructure
- Real-time data communications with low latency (or minimal delay), to improve safety and security
- Creation of the foundation of Smart City Jabalpur by implementing a smart city platform through 'networked' LED street light installation and an advanced Centralized LED Control & Monitoring application
- Ensure efficient operation and maintenance of street lighting services using the smart city platform

The replacement of existing streetlights to be replaced with particular wattage of LED streetlights in line with the specifications as per national lighting code, as published by the bureau of Indian standard.

Providing, erection and commissioning of new street light feeder panels with feedback facility using GSM/GPRS/ETHERNET technology or any other technology and having compatibility to communicate with LED luminaire to achieve two step dimming with an astronomical On/Off timer at pre-determined time & monitor parameters like load & consumption. OEMs having NABL accredited lab certification for Electrical, Optical & Electronics would be preferred.

The maintenance work includes replacement of faulty material in all street lights, poles, brackets, underground and overhead cables complete accessories in all respects up to the feeder panel.

There are ~26699 street poles in the municipal area on which ~35461street lights are housed. Please refer Annexure VI for the existing status of street light.

A copy of energy audit report is attached with the RFP as per the Annexure. Concessioners are advised to refer the said report for further understanding of the existing scenario of street lights.

Concessionaires are expected to carry out necessary field surveys to verify the status of switching points, physical installations, geographic area covered and scope of the project defined so as to fully satisfy themselves on the existing field conditions and their scope. They will also be responsible for reviewing the baselines established pursuant to Energy Audits completed recently and satisfy themselves on the scope and feasibility of the project implementation for Feeder panel and Smart LED light fixtures.

### 8.1.1 Scope of Work

The Concessioner needs to retrofit the aforementioned luminaires, other than LED, with LED luminaires and make the entire street lights smart. Each and every LED should be monitored and controlled from the Command and Control Center with the aid of a centralized software.

The scope of work includes but is not limited to;

- Supply, installation, testing and commissioning, O&M of all equipment system to meet the requirement as defined in specifications
- Concessionaire shall be responsible for conducting GIS/GPS mapping of street lighting switching points and rationalize the coverage area under the switching points.

- Concessionaire shall be responsible for identifying existing street light cables or conductors or existing damaged poles in street light infrastructure maintained by JSCL. In such instances, Concessioner will provide the reasons and related investment costs for replacement with suitable justification wherever required. The replacement of such infrastructure will be done byJSCLand/or Power Discom as the case may be

- The Concessionaire will ensure pole numbering with linkage to the respectiveswitching points/feeder panels which caters to these poles (for e.g.Pole no.).The Feeder panels and switching points from which the street lights on poles are connected and billed will also be numbered using suitable indelible method inconsultation with JSCL. Pole marking done by Energy Auditors in recent monthsmay be made use of to the extent possible. The count of street light fixture on each polenumbered should be verified by JSCL. Numbering of all poles and feeders shouldbe completed within six weeks from award of work to the ConcessionaireandConcessionaire will ensure that these numbers are not erased during the concession period. Similarly, any modifications done in the current system has to be appropriatelyfed to the GPS data and it should be updated on regular basis by Concessionaire

- All the machineries and equipment required for implementation of the project is to be arranged by the Concessioner, MC has to provide only authorization and necessary clearance and permission if required

- The quality of the luminaries/ Lux level will be maintained by Concessioner during the project life. The Concessioner has to follow all necessary safety guidelines/directions issued by Municipal Corporation from time to time

- The Concessioner need to make operational at least 40% of the LEDs in the first 6 months and remaining 60% in the another 6 months

- The dismantling of existing old light fitting will be done by the Concessioner and handed over to JSCL store in working condition without any damage to the light fixture. JSCL will maintain the daily stock record of the old fittings, cables, brackets and feeder panels replaced and handed over by the contractor to JSCL (store department). The store keeper will issue a challan or copy of receipt to Contractor listing the material handed over with quantities.

- Design, supply, installation, commissioning of LED streetlight systems as per specifications with all fixtures, fittings compatible with existing poles and other related works

- The Concessioner will have full responsible of warranty of LED's/fixture for the entire concession period and warranty will start from the date of successful commissioning of the switching Points

- Receipt, storage, preservation and conservation of equipment at the Site

- Reliability tests and performance and guarantee tests on completion of commissioning

- Labeling of information shall distinctly and indelibly marked on the housing like, Year of Manufacturing, Batch no., Serial no., Name of manufacturer, Rated wattage and Voltage(Input) & rated Lumen
- Design, Installation, testing and O&M of Central Management Software for remotely monitoring and Controlling of LED luminaires from the Command and Control Center
- Undertake measurement of the energy usage and lighting level of the street lighting segment after successful installation of the street lights
- Implementation of National Lighting Code illumination parameters towards safety of motorists & pedestrians
- The Concessioner will be fully responsible for all kind of theft including electricity
- Concessionaire will liaison with Power Discoms during pre and post implementation periods of the project for addressing all the electricity billing issues such as average billing, metering, replacement of defective meters, reduction or increase in contract demand as per the actual loads, power factor incentives etc. JSCL will support Concessionaire in this initiative;
- Concessionaire will obtain all necessary approvals, sanctions, licenses in the name of Concessionaire for installation of proposed equipment pertaining to the project from the concerned competent authorities and maintain validity of the same at all times during the project duration. Concessionaire will bear the charges or pay deposits or any other amount for such approvals/licenses/sanctions as may be necessary. JSCL shall issue the NOCs wherever necessary

Post satisfactory completion of installations, independent energy auditor will establish the savings on the feeder panel and submit a report to JSCL. JSCL shall issue “Commissioning Certificate” for switching point/meters only if the energy savings are found to be equal or more than the guaranteed savings proposed by the Concessioner.

### 8.1.2 Operation & Maintenance

Energy efficiency should be achieved by a comprehensive Operation & Maintenance. Following are the indicative activities the Concessioner shall perform during O&M period;

- Replacing defective lamps, accessories, and wires
- Early rectification of cable faults
- Regular maintenance of street light conductors and underground cables
- Making sure that cables are joined properly
- Regular maintenance of service cabinet/fuse box to avoid loose connections
- Regular cleaning of the luminaire cover to keep it free of dust/dirt and increase light output
- Regular maintenance of smart street light control system like LPR device, LED controller, feeder panels etc.

- Regular updates and upgrades of the centralized software at command and control center
- The Concessionaire shall monitor the electrical load on each phase & each circuit in the panel & also maintain load balance equally on all the phases. Concessioner shall never allow any circuit to be overloaded
- The poles owned by JSCL and smart feeder panels should be colored once in every two years as per the color codes and paints defined by JSCL

8.1.3 Guaranteed Energy Saving

Guarantee towards the Electricity Consumption for new Street Lighting instead of old existing street lights as per annexure 1. After replacement of existing street light with energy efficiency LED street light minimum 35% of energy saving should be mandatory.

The baselines for energy consumption for existing street lighting connections at all switching points will be established using the existing energy meters of the Power Discom and verified by the third party energy auditors along with the Concessionaire. For this purpose, JSCL will ensure that all meters are in proper working condition in coordination with Power Discom. Where meters are not in proper working condition, Concessionaire shall install a check meter duly tested and certified in accordance with the existing regulations and such check meter will be used for the purpose of energy consumption baselines of Concessionaire project. Where Concessionaire has doubts regarding the accuracy of any meter, it can contest the same on the basis of records obtained and seek replacement of such meters. JSCL shall assist the Concessionaire for replacement of such meters in coordination with Power Discom.

The payment will be release to the Concessioner as per the basic rate of electricity unit i.e. ~INR6.50 /KWH/KVA.

## *8.2 Public Wi-Fi*

Hot Spot Wi-Fi serves as the foundation for creating a connected city to access the wireless internet service with ease and convenience. For this purpose JSCL has identified locations within the Municipal limits of Jabalpur where these services has to be provided to citizens. As a part of this initiative free Wi-Fi need to be provided; Wi-Fi shall be free for the first 45 Minutes per Mobile subscriber per day or 20MB per day and an aggregate limit of 700 MB per month whichever is achieved first beyond that it is chargeable. Beyond the above specified limit the Concessioner can earn revenue which will be shared on a revenue share model with JSCL. For implementing the same the Concessioner will carry out survey at these 42 locations and will deploy the access points as required for providing the Wi-Fi services. As a part of Wi-Fi solution the Concessioner needs to provide Wi-Fi controller, DNS, Internet bandwidth from Internet Service Provider (ISP). 1SSID for E governance (for Client) shall be reserved

For installation of Access Points, if there is any requirement of additional poles, the same will be provided by Concessioner at its own cost with prior approval from JSCL.

City Wi-Fi Hot Spot helps cities provide citizens with Internet connectivity and access to a broad range of citywide service which has following benefits:

- More revenue and lower costs from infrastructure management

- Better city planning and development
- E-government services delivered to citizens, faster, and at a lower operating expense
- Local economic development
- Improved productivity and service
- Access to city services and Internet connectivity
- Improved quality of life
- Increased access to online services

The objective is to implement wireless networking technology that uses radio waves to provide wireless high-speed Internet and network connections. All wireless networking equipment must be based on the IEEE standards of 802.11a, 802.11b, 802.11g, 802.11n and 802.1p compatible.

8.2.1 Scope of Work

The Concessioner shall be responsible for establishment of Wi-Fi network at the selected location in the Jabalpur, these locations are normally tourist spots, public places or any other identified place by JSCL. Concessioner shall provide Operation & Maintenance throughout the concession period from the date of commissioning. The broad scope of work for the Concessioner during the entire project period would be as under;

- The Concessioner Shall undertake a Site-survey of all the specified sites and submit a sitewise survey report to JSCL mentioning the location &number of Access Points (APs) required to be installed at each site.
- Concessioner proposal must provide all the necessary electronic components needed to provide wireless access to the public. This includes but is not limited to Wireless controllers, Access points, Power over Ethernet devices, L2 and L3 managed switches, Routers, UPS, passive components i.e UTP, OFC, Electric wires, racks etc.
- The Concessioner shall install the Access Points at approved locations (on directions by JSCL after approval of Site-Survey report). The power points, connectivity and LAN points will be the responsibility of Concessioner. JSCL will facilitate the requirement/clearances as and when required
- Concessioner shall properly Wall Mount the Access Points at approved locations with external mounting kit as per OEM standard practice.
- The Concessioner shall install the AP Controller, NMS, NASand required software at Command & Control Center
- The Patch Cords, Power adapter, Power cables, connectors, mounting kit and other required accessories for successful commissioning of the Wi-Fi network shall be provided by the Concessioner and shall be properly cased and tied such that it doesn't get broken
- All intended coverage areas must be covered with wireless AP/array for high rate data applications. For density concerns, there must be multiple radios per classroom/area. Each wireless AP/array must be 802.11 a/b/g/n capable and be able to scale without adding

additional controllers or user licenses. Each wireless AP must include the ability to dedicate a radio for Intrusion Detection/Intrusion Prevention System (IDS/IPS). Application control or Deep Packet Inspection capabilities must be able to be performed at the AP and not in a single controller or external device. At each site Concessioner must consider at least one primary controller and secondary controller to avoid a single point of failure.

- The controller should be configured with 1 + 1 in Active-Active Load Balancing mode. The Concessioner should provide adequate number of one time perpetual licenses for 140 Access Points to run in Active-Standby / Active-Active Load Balancing Mode.
- The Controller must have IPS & Firewall feature along with perimeter protection and VLAN
- Each wireless device (not system) must support per SSID traffic shaping and limiting at line-rate at the Access Point (not controller). This is to prevent additional data on the network
- Each wireless device (AP) must employ a future-proof modular architecture for upgradability to future standards
- Concessioner must include PoE-injectors in the pricing and clearly define where PoE injectors are needed
- System must include a centralized management system that provides a platform for central management of all devices across the network
- Where ever applicable, Concessioner shall have to integrate the existing wired LAN and internet links to the Wi-Fi solution
- PVC case wiring should be done for the entire required passive cabling i.e. UTP and electrical wiring
- Concessioner will ensure a secure Wi-Fi connectivity and internet access through user Login ID and password to all the subscribers with central authentication mechanism
- Concessioner shall ensure that unique user ID and Password do not have provisions for simultaneous multiple logins.
- Policy on validity of the user ID and Password for internet access should be configurable as per the requirement.
- Wi-Fi access points (APs) must be configured to use cryptographic keys or other methods to ensure that only authenticated users can use the Wi-Fi services
- The log trails for any specific user shall be made available online for at least last 3 months and the backup shall be kept for one year.
- The system should be capable of managing automatically upgrade or degrade of end-user's account after threshold usage (download/time limit) is reached.
- The Wi-Fi network should be secure and conform to the industry standard security requirement. Concessioner shall suggest and help JSCL team to deploy policies at various levels (i.e. on firewall, IDS, antivirus etc.) to prevent any attack/intrusion in the Wi-Fi network

- The Concessioner shall be responsible for integrating the Wi-Fi Network with the existing LAN/SWAN network
- The Concessioner shall be responsible for integrating the available payment gateway(s) at JSCL for making online payments (if any) according to respective plans for internet usage.
- The Concessioner shall be responsible for integrating the available SMS gateway (HTTP) at JSCL for automatically sending the required details/ information through SMS to the users as per the requirement e.g. during user registration, forgot password, password reset etc.

8.2.2 Operation & Maintenance

Following are the indicative activities the Concessioner shall perform during O&M period;

- The Concessionaire need to ensure that adequate spares are retained at all times to meet onsite warranty/support and SLA requirements
- The maintenance services involves comprehensive maintenance of all component covered under the contract, including repairing, replacement of parts, modules, sub-modules, assemblies, sub-assemblies, spares part, updating, security alerts and patch uploading etc. to make the system operational
- Concessioner shall insure all the APs to ensure theft protection of all APs throughout the Concessioner period

## *8.3 Optical Fiber*

In order to achieve the objectives of JSCL to enhance the safety and security, improve efficiency of municipal services and promote a better quality of life for residents, JSCL desires to foster the development of a robust network infrastructure that supports digital applications and ensures network connectivity is available throughout the city.

Further, to provide better bandwidth to the Wi-Fi users, Surveillance Camera and as required for future Smart Services/ providing Backhaul to Telecom,48core underground Fiber shall be laid across the city at the pre-defined routes. Fiber shall be laid at a depth of 35-40 cms below the ground level.

Out of the 48 core fiber 4 cores of fiber would be provided to JSCL for its internal purposes (For converging other Governmental Projects). Concessioners could use the balance fiber for various applications, earn the revenue through leasing and shall share the revenue with JSCL. While laying fiber, Concessioners shall use necessary protection material for making the deployment future proof.

For implementation, Concessioner can use MPLS or any other network topology for deploying the smart elements as mentioned in this RFP document.

The Right of Way (RoW) will be provided by JSCL, however Concessioner need to take the clearances from various departments and JSCL will facilitate the same.

After laying the fiber, Concessioner shall be responsible for restoration of theroads, O&M for the entire concession period.

The total length of the optical fiber will be <number>kms and will go upto all last mile connectivity as proposed in this RFP document.

8.3.1 Scope of Work

The Scope of work of this project is to lay dedicated optical fiber network and create reliable, diversified, telecom connectivity within the municipal area. The entire infrastructure/connectivity has to be operated and maintained throughout the concession period.

Following is an indicative scope of work for the Concessioner;

- The Concessionaire has to provide the last mile connectivity up to all the locations defined in the RFP document using optical fibre cable as per data requirement of that location.
- The Concessionaire has to do the complete site survey for the locations a to obtain detailed information about the location and existing network infrastructure, and identify application and network requirements
- The project includes detailed network design, survey and network optimization as part of the activities of the Concessioner
- Under this project all Government offices, Street Infra with Smart Components etc shall be connected as part of the scope of this project
- The network will connect to the DC, DR and city command and control center as a part of the core network
- Besides with the network design and implementation, all the electronics such a routers, switches and other installation accessories will be included in the project scope
- Operation & Maintenance of the overall network will be under the scope of Concessioner for the entire concession period

## *8.4 Surveillance*

City Safety and Security solution helps protect cities against crime, terrorism, and civil unrest, planning events, monitoring of infrastructure, encroachments etc. It helps law enforcement monitor public areas, analyze patterns, and track incidents and suspects enabling quicker response.

Keeping the above perspective, JSCL for this purpose is intending to implement the high definitionIP based surveillance cameras across various locations within Jabalpur. The cameras should be housedonthe intelligent/street poles. It shall also be possible to adjust the camera focus from a remote location.

For installation of CCTV(s), if there is any requirement of additional poles, the same will be provided by Concessioner at its own cost with prior approval from JSCL.

Following is an indicative scope of work;

- Installation and commissioning work includes installation of all required DVRs, cameras, monitors, cables laid in PVC conduitetc, commissioning all the systems at the pre-defined locations in the project area

- The Concessioner shall prepare the final camera distribution plan at all the camera locations in discussion with JSCL
- Actual location for placement of pole & number of cameras at each location, type of cameras, fixation of height & angle for the cameras would be done carefully to ensure optimum coverage
- Concessioner should use the industry best practices while positioning and mounting the cameras. Some of the check-points which need to be adhered by the Concessioner while installing / commissioning cameras are as follows:
    - Ensure Project objectives are met while positioning the cameras, creating the required field of view
    - Ensure appropriate housing is provided to protect camera from the on field challenges
    - Carry out proper adjustments to have the best possible image
    - Ensure that the pole / mast implementation is vibration resistant
    - During implementation period, in case any camera is damaged by a vehicular accident (or due to any other reason outside the control of Concessioner) and needs repair, then the Concessioner will need to repair / have the new camera within 15 days of the incidence. Damages are to be borne by Concessioner in such cases through proper insurance.
- Concessioner shall undertake detail assessment for integration of the Surveillance System with the Geographical Information System (GIS) so that physical location of camerasare brought out on the GIS map. Concessioner is required to carry out the seamless integration to ensure ease of use of GIS in the Surveillance System Applications/Dashboards in Command Control Centers. GIS Base Map shall be developed or procured, supplied and integrated by the Systems Integrator at 1:1000 scale or better with all surveillance cameras located on the map apart from the updated map of all buildings, utilities and roads. If this requires field survey, it needs to be done by the Concessioner. If such a data is already available with JSCL, if shall facilitate to provide the same. Concessioner is to check the availability of such data and it's suitability for the project. Concessioner is required to update GIS maps from time to time
- Concessioner shall carry out SMS Gateway Integration with the Surveillance System and develop necessary applications to send mass SMS to groups/individuals, which can be either manual or system generated. Any external/third party SMS gateway can be used, but this needs to be specified in the Technical Bid
- Concessioner will have to identify and obtain necessary legal / statutory clearances for erecting the poles and installing cameras, for provisioning of the required power, etc; the same will be facilitated by JSCL. It is important to mention that a timely communication and required follow-up will be required by the Concessioner for the clearances
- During implementation period, in case the pole is damaged by a vehicular accident (or due to any other reason outside the control of SI) and needs repair, then the SI will need to

repair / have the new pole within 15 days of the incident. Damages are to be borne by SIs in such cases through proper insurance

- For the successful commissioning &operation of the edge devices and to provide the video feeds to Command Control Centers, the Concessioner will be required to provide electricity to the edge devices through the aggregation points. Concessioner has to plan the power backup based upon the power situation across the city
- The Concessioner will be responsible for the solution deployment / customization for implementing end-to-end Surveillance System including its integration with other components as required.
- The Concessioner will ensure that the best practices for software development and customization are used during the software development/customization and implementation exercise
- If at any stage the CCTV online data is required to be connected to Police Control Room/Command Center, the concessionaire will connect it to the same

## *8.5 Smart Bill Board*

As a part of the beautification of certain specific locations in the city of Jabalpur, Concessioners are required to implement smart billboards housed on intelligent poles. The number of smart billboards will be on the discretionary of Concessioner as per the viability of his business case. Revenue earned out of these advertisements shall be shared between JSCL and Concessioner. JSCL shall provide exclusive advertisement rights to Concessioner over the aforesaid smart billboards.

JSCL will have rights for usage of advertisement display boards for a minimum of 10minutes per hour per day for displaying new/information for public convenience in case of any natural calamity, emergency etc.These sites could provide information about various schemes, policies of Government being implemented for the welfare of citizens of Jabalpur.

It shall be possible to change the advertisements /Messages in these smart bill boards from a centralized location.

## *8.6 Centralized Command and Control Centre*

The Concessioner has to provide, deploy and configure a centralized command and control centerwithan integrated operations and dashboard application that will integrate various Smart City components implemented in this project and in future.

The centralized command and control center can monitor and control, via the centralized application, the smart components like Smart LED, Smart Surveillance, Access Points for the public Wi-Fi, Smart Billboards and Environmental Sensors.

Day to day operations at Command and Control Center will be monitored and operated by JSCL. All the hardware and software issues will be the responsibility of the Concessioner.

Following is an indicative scope of work;

- Establish command & control center (CCC) in the JSCL area and supply of furniture, video wall, workstation, access switch, rack, connecting cables, LAN cabling, electric cabling etc. in command and control center
- To establish Data center along with the CCC and supply of routers, firewall, switches, patch panel, racks, storage, servers, access control, fire suppression, air conditioning, UPS, DG sets, LAN cabling, electric cabling, other connecting cables etc. in data center
- The feed of said Command & Control center shall be provided to JSCL's Centralized Command & Control Center

## *8.7 Environmental Sensors*

Concessioners are required to integrate environmental sensor for providing air quality, temperature, and humidity. These Sensors should be integrated into the intelligent poles for at least 80 Nos of pole.

The locations to implement Environmental Sensors will be provided by JSCL to Concessioner before the pre-bid meeting.

## *8.8 Partial Acceptance Testing & Final Acceptance Testing of Project*

The acceptance test for the Project shall be carried as per the by the Authority or any duly appointed Independent Evaluation Agency (IEA) by the JSCL. The Concessionaire should cooperate with the IEA to ensure successful completion of acceptance tests.

The acceptance test shall consist of a Partial Acceptance Test (PAT) and Final acceptance test (FAT) depending on the phase wise implementation. The Concessionaire shall submit a detailed acceptance testing document at the stage of planning and JSCL& the Concessioner shall mutually agree upon the same.

### 8.8.1 Partial Acceptance Test

Partial Acceptance Test shall involve scrutiny of documents for various IT / Non-IT components to verify if the specifications conform to the technical and functional requirements mentioned in the Tender and subsequent corrigendum.

JSCL reserves right to conduct physical inspection of the equipment delivered to ensure that they arrive at the sites in good condition and are free from physical damage and incomplete shipments and shall return the products to the supplier at the supplier's expenses if required quality is not maintained. Physical inspection of hardware will also include physical checking and counting of the delivered equipment in presence of the Concessionaire. This equipment will only be acceptable as correct when each received item corresponds with the checklist that will be prepared by the Concessionaire prior to shipment. Any shortfalls in terms of number of items received may render the delivered equipment incomplete. Concessionaire shall submit test reports on performance for the critical components like LED luminaires, cameras, active network equipment's, servers, video wall, etc.

JSCL reserves the rights to partially accept the completion of a component by issuing a partial completion certificate to the Concessionaire. Basis the certificate Concessionaire can start

generating the revenue. However, authority may devoid Concessioner of generating revenue if there is a delay in final completion of the activities.

Before rendering the certificate JSSCL would do the testing in a real time condition for at least 15 days of trouble free operation.

8.8.2 Final Acceptance Test

Post project implementation phase, the Concessionaire would need to carry out Final Acceptance Testing in 2 different phases - (a) Unit Testing and (b) Integration Testing. These tests would be carried out based on the test cases developed and validated by JSCL. Apart from the functional testing of the entire system components, the testing would also verify following aspects:

- Configuration Testing (to ensure that all the components are configured properly)
- Security Testing (to review & evaluate security controls)

Final acceptance certificate shall be issued by JSCL to the Concessionaire after successful testing in a real time condition for at least 15 days of trouble free operation. The date on which final acceptance certificate is issued for final phase shall be deemed date of the successful commissioning of the Project. Any delay by the Concessionaire in the performance of its contracted obligations shall render the Concessionaire liable to the imposition of appropriate liquidated damages or termination, unless agreed otherwise by JSCL.

## *8.9 System Documents, User Documents*

The Concessionaire will provide documentation, which should follow the ITIL (Information Technology Infrastructure Library) standards. This documentation should be submitted as the Project undergoes various stages of implementation. Indicative list of documents include:

- Project Commencement Documentation: Project Plan in giving out micro level activities with milestones & deadlines.
- Cabling Layout: Systems Integrator shall submit the detailed cabling layout including cable routing, telecommunication closets and telecommunication outlet/ connector designations. The layout shall detail locations of all equipment and indicate all wiring pathways.
- Equipment Manuals: Original Manuals from OEMs.
- Installation Manual: For all the application systems
- Training Material: Training Material will include the presentations used for trainings and also the required relevant documents for the topics being covered. Training registers should be submitted for same.
- User Manuals: For all the application software modules, required for operationalization of the system.
- System Manual: For all the application software modules, covering detail information required for its administration.

- Standard Operational Procedure (SOP) Manual: The Bidder shall be responsible for preparing SOP Manual relating to operation and maintenance of each and every service as mentioned in the RFP. The draft process (SOP) document shall be formally signed off by JSCL before completion of Final Acceptance Test. This SOP manual will be finalized by the Concessionaire within 2 months of operationalization of each phase, in consultation with the JSCL and formally signed off by the JSCL.

Note: The Concessionaire will ensure upkeep & update all documentation and manuals during the concession period. The ownership of all documents, supplied by the Concessionaire, will be with JSCL. Documents shall be submitted in two copies each in printed (duly hard bound) & in softcopy formats.

## *8.10 Helpdesk Setup*

- Concessioner will set up a 24X7 centralized helpdesk for the project for entire concession period
- The help desk will handle user queries and issues relating to implemented solution
- Helpdesk is required to ensure that users can log calls and complaints for any technical issues they face while accessing the system. The following is included in the scope of work of the Concessioner;
  - Help Desk to have Interactive Voice Response (IVR) system for first level of call segregation
  - Accordingly Standard Operating Procedures (SOPs) shall be created by Concessioner
  - In addition to the telephone call, the Concessioner shall also provide other channels for call logging like email and web interface.
  - Following is also part of scope of work of Concessioner: (a) Development of training material for JSCL employees (b) training to be imparted to JSCL (c) provision of Call centre application (d) Development of standard operating procedures with call prioritisation guidelines, problem security codes and escalation procedures etc. in consultation with JSCL (e) Helpdesk related infrastructure.
  - Language Capabilities : Hindi and English
  - The service window for Help Desk is 365X24X7 (Monday to Sunday).
  - The call statistics will be analysed every quarter after Go-Live and the number of Customer Care Executives may be ramped up or down accordingly on a week's notice.
  - Concessioner shall deploy helpdesk application accessible to all users through the Smart City portal for logging issues.

- Concessioner to provision for inbound calls.

## *8.11 Planning, suggesting and submitting the System up-grade plan(s)*

As we are aware, constant changes / updates happen in technology, and it is very important that the Smart Solution implemented by the Concessionaire keeps its pace with the technology. JSCL would want the Concessionaire to submit a report, every 6 months, on the advancements available in technology to make the best use of the existing infrastructure. In this report, the Concessionaire can suggest certain improvements in the Software to make the operations more effective. Any upgradation / augmentation suggested by the Concessionaire would be analyzed by JSCL and appropriate decision would be taken. After "Go-Live" the major modifications or additions in the application shall be done through change management requests.

Over the period of the contract, even after the Go-Live of the system, authority may require certain modifications or additions in the application or the development of new modules. In such a situation, the Concessionaire shall be responsible for carrying out software enhancement/development activities, as requested by JSCL. Any Software development / modification will need to pass through the following envisaged phase:

- Feasibility study / proposal for change
- Conceptualization of solution
- Requirement study
- Design
- Development
- Unit and Integration testing
- Regression Testing
- User acceptance testing
- Roll out

At each of the above phases, the Concessionaire would have the deliverables (including documentation) reviewed and approved by JSCL or its nominated agencies/ representatives. JSCL will approve all the deliverables; only then should the Concessionaire shall commence with the next course of action. Software modifications / development will be considered completed only after formal acceptance provided by JSCL.

## *8.12 Capacity Building*

Concessioner need to provide training and capacity building to JSCL employees and other stakeholders like PWD, DISCOM etc. The following is a broad level scope;

- Concessioner will develop a training and capacity building strategy that will also include a detailed plan of implementation

- Concessioner will get the training and capacity building strategy including training material finalized with JSCL before starting the training programs.
- Concessioner will prepare all the requisite audio/visual training aids that are required for successful completion of the training for all stakeholders. These include the following for all the stakeholders:
  - Training manuals for JSCL employees / stakeholder departments such
  - Computer based training modules
  - Video (recorded sessions) for portal functionality, back end modules, business intelligence, dynamic reporting Smart City System
  - Presentations
  - User manuals
  - Operational and maintenance manuals for Smart Components implemented
  - Regular updates to the training aids prepared under this project
- Concessioner will maintain a copy of all the training material on the portal and access will be provided to relevant stakeholders depending on their need and role. The access to training on the portal would be finalized with JSCL. Concessioner has to ensure the following points:
  - For each training session, the Concessioner has to provide the relevant training material copies to all the attendees.
  - The contents developed shall be the property of JSCL with all rights.
- Concessioner has to ensure that the training sessions held are effective and that the attendees would be able to carry on with their work efficiently. For this purpose, it is necessary that the effectiveness of training sessions is measured. The Concessioner will prepare a comprehensive feedback form that will capture necessary parameters on measuring effectiveness of the training sessions. This form will be discussed and finalized with JSCL.
- After each training session, feedback will be sought from each of the attendees on either printed feedback forms or through a link available on the web portal. One member of the stakeholder group would be involved in the feedback process and he/she has to vet the feedback process. The feedback received would be reported to JSCL for each training session.
- For each training session, the Concessioner will categorise the feedback on a scale of 1 to 10, where 10 will denote excellent and 1 will denote unsatisfactory.

## *8.13 Operation & Maintenance*

The Concessionaire shall follow the following Operation and Maintenance guidelines:

i. The Concessionaire has to adhere to the operation and maintenance policies and procedures, as applicable from time to time, for managing and operating the entire project. This includes (but not limited to) approach related to manpower, resources, vendor management, security, customer service, repair and maintenance and other primary functions, training programs to staff, user manuals, technical manuals, financial management, risk management, life/safety management, employee management and administrative policies and procedures. It also includes the key elements of a management plan for this project to include considerations for cost containment/ expense reduction, revenue enhancement (including non-operating revenue sources), customer service improvement, enhanced economic impact generation to the key this project operational characteristics

ii. Concessionaire will be responsible to deploy on-field and off-field (but on-site at JSCL) resources for appropriate up-keeping, maintenance, and operation of all network, hardware, and software components, and ensure smooth functioning of the project throughout the entire O&M period.

iii. Concessionaire will operate and maintain all equipment installed at Command & Control Center. Day to day operations at Command and Control Center will be monitored and operated by JSCL. Timely rectification of all the hardware and software issues will be the responsibility of the Concessionaire

iv. After implementation period of 12 months, the Operations and Maintenance (O&M) period shall be upto a period of 14 years.

v. The Concessionaire shall provide comprehensive on-site warranty for all the hardware items and peripherals, both on field and inside the Command and Control Center

vi. The Concessionaire shall provide comprehensive Facility Management Service (FMS) for all devices, equipment and its related hardware, software, electrical and network infrastructure components supplied for the this project. Thisinvolves comprehensive maintenance of all component covered under the Concession Agreement, including configuration of servers, desktops, routers, switches, firewall, CCTVs, LED luminaries, Environmental Sensors, Smart Billboards and various other active and passive components along with repair, replacement of parts, sensors, providing spare parts, updating, security alerts and patch updating, regular backup of the data etc.

vii. The Concessionaire shall depute adequate manpower as full time dedicated onsite FMS team. The FMS team shall be deputed to identify, acknowledge, troubleshoot, manage, replace and repair the hardware/ system software. The FMS team shall undertake day-to-day troubleshooting and maintenance requirements for this project.

viii. The FMS team shall be also be responsible for regular monitoring of all the equipment, proactively perform warranty checks, and generate SLA reports from the SLA monitoring tool.

ix. The Concessionaire shall setup a 24X7 central helpdesk dedicated (i.e. on premise) for the Project, which shall be supported by their field units, proposed to be setup at Command Control Centers. The helpdesk will be operational for the entire Concession period

x. The FMS team shall be required to take regular backup of the application data as per the frequency defined by JSCL. Security and safety arrangements for safe custody of the backup data shall also be the responsibility of Concessionaire throughout the O&M period.

xi. Time frame for regular data backup will be provided by the Concessionaire in its proposed architecture of the system. JSCL reserves its right to ask the Concessionaire to do modification in such time-frame, if required, at any time throughout the O&M period.

xii. The Concessionaire shall ensure that the FMS team has appropriate skill-sets for managing data center, networking, hardware and application software tools.

xiii. The Concessionaire shall ensure that the instruction manuals, technical manuals and user manuals supplied by the manufacturer/ OEMs/ Concessionaire are referred, referenced, reviewed and maintained up-to-date at all times.

xiv. All patches and updates to any software and hardware devices shall be provided by the Concessionaire without any additional costs.

xv. JSCL reserves the right to ask for replacement of any hardware, software and network components if it is not from approved OEM and does not conform to the specification/requirements specified in the RFP document.

xvi. After completing life of equipment, the Concessionaire has to replace them with new hardware / software of same or better specifications free of cost throughout the concession period.

xvii. During the O&M period, if any hardware or software needs to be replaced, the same will be replaced with same or better OEM and with same or higher configuration free of cost.

xviii. The O&M also covers the specific O&M activities mentioned under scope of work.

## *8.14 Warranty*

- Concessioner shall provide comprehensive on-site warranty for 5 years from the date of Go-Live for the infrastructure deployed on the project. Concessioner need to have OEM support for these components and documentation in this regard need to be submitted to JSCL on annual basis.
- Concessioner shall provide the comprehensive on-site manufacturer's warranty in respect of proper design, quality and workmanship of all hardware, equipment, accessories etc. covered by the RFP. Concessioner must warrant all hardware, equipment, accessories, spare parts, software etc. procured and implemented as per this RFP against any manufacturing defects during the warranty period.
- Concessioner shall provide the performance warranty in respect of performance of the installed hardware and software to meet the performance requirements and service levels in the RFP.
- Concessioner is responsible for sizing and procuring the necessary hardware and software licenses as per the performance requirements provided in the RFP. During the warranty period Concessioner shall replace or augment or procure

higher-level new equipment or additional licenses/hardware at no additional cost to the JSCL in case the procured hardware or software is not enough or is undersized to meet the service levels and the project requirements.

- During the warranty period JSCL shall maintain the systems and repair/replace at the installed site, at no charge to JSCL, all defective components that are brought to the Concessioner's notice.
- The Concessioner shall carry out Preventive Maintenance (PM) of all hardware and testing for virus, if any, and should maintain proper records at each site for such PM. The PM should be carried out at least once in six months as per checklist and for components agreed with JSCL.
- The Concessioner shall carry out Corrective Maintenance for maintenance/troubleshooting of supplied hardware/software and support infrastructure problem including network (active/passive) equipment, security and rectification of the same. The Concessioner shall also maintain complete documentation of problems, isolation, cause and rectification procedures for building knowledge base for the known problems in centralized repository, accessible to JSCL team as well.
- Concessioner shall monitor warranties to check adherence to preventive and repair maintenance terms and conditions.
  - Concessioner shall ensure that the warranty complies with the agreed technical standards, security requirements, operating procedures, and recovery procedures.
  - Concessioner shall have to stock and provide adequate onsite and offsite spare parts and spare component to ensure that the uptime commitment as per SLA is met.
  - Any component that is reported to be down on a given date should be either fully repaired or replaced by temporary substitute (of equivalent configuration) within the time frame indicated in the Service Level Agreement (SLA).
  - The Concessioner shall introduce a comprehensive Assets Management process & appropriate tool to manage the entire lifecycle of every component of Smart City implementation.

## *8.15 Hand-over of the system at the end of contractual period*

Concessionaire will supply to the JSCL the following before the expiry of the contract:

- Information relating to the current services rendered and data relating to the performance of the services; Entire documentation relating to various components of the Project, any other data and confidential information related to the Project;
- All other information (including but not limited to documents, records and agreements) relating to the products & services related to the project to enable JSCL and its nominated agencies, or its replacing Concessionaire to carry out

due diligence in order to transition the provision of the Project Services to JSCL or its nominated agencies, or its replacing Concessionaire (as the case may be).

# 9 *Responsibility Matrix*

The roles of the stakeholders shall change over a period of time as the Project will evolve from design to implementation and enter the operations phase. Stakeholders' responsibilities, illustrative organizational structure for the design & implementation phase, operational phase is given below:

Following are the various stakeholders identified for the project;

- JSCL : Jabalpur Smart City Co. Ltd
- OS : Other Stakeholders (JMC, Power Department, Water Department, PWD etc.)
- PMC : Project Management Consultant
- IEA : Independent Evaluation Agency
- IA : Implementation Agency/Concessionaire (Bidder to be selected for the Project's Implementation)

Responsibilities are shown using RACI Matrix which splits Project tasks down to four participatory responsibility types that are then assigned to different stakeholders in the Project.

- R (Responsible) : Those who do work to achieve the task
- A (Approve) : The Stakeholder that ultimately approves the task
- C (Consulted) : Those whose opinions are sought (2 way communications)
- I (Informed) : Those who are kept up-to-date on progress (1 way communication)

| # | Activity | JSCL | OS | PMC | IEA | IA |
|---|---|---|---|---|---|---|
| 1. | Issuance of LoA/LoI | A | I | R | | I |
| 2. | Signing of the Contract | R | I | C | | R |
| 3. | Preparation of the Inception Report | I | I | C | | R |
| 4. | Preparation of Detailed Project Plan for the implementation | A | I | C | | R |
| 5. | Preparation and finalize various reporting formats | A | | C | | R |
| 6. | Validate the Technical Design and sample review of the specifications | A | | R | | C |
| 7. | Supply, Installation, Configuration and Commissioning of various equipment, components, systems | I | I | C | | R |
| 8. | Supply, Installation of other facilities such as Interiors, Electrical, UPS, DG Sets, Access Control System, BMS Fire detection and suppression System, etc | I | I | I | | R |
| 9. | Provisioning of Connectivity the field equipment and Command & Control Center | I | I | I | | R |
| 10. | Preparation of the Policy Documents for Use & Operations of Smart City implementation | A | C | C | | R |
| 11. | Training and Capacity Building of JSCL | R | I | C | | R |

| # | Activity | JSCL | OS | PMC | IEA | IA |
|---|---|---|---|---|---|---|
| 12. | Submission of the Partial Acceptance Testing & Final Acceptance Testing Formats | I | | C | R | R |
| 13. | Partial Acceptance Testing & Final Acceptance Testing of IT & Non-IT Equipment | A | I | | R | C |
| 14. | System Documents, User Documents as per ITIL (Information Technology Infrastructure Library) standards | I | I | C | | R |
| 15. | Review and Validation of the Documentation submitted by Concessionaire | A | I | R | | C |
| 16. | On-Site Facilities Management service | A | I | I | | R |
| 17. | Comprehensive warranty maintenance of the supplied equipment/Services | I | I | I | | R |
| 18. | Provision of on-site spares/Services | I | I | I | | R |
| 19. | Weekly Progress Reports | I | I | C | | R |
| 20. | Monthly Progress Reports | I | I | C | | R |
| 21. | Penalty for breach of SLA | A | I | C | | R |
| 22. | Completion certificate after each phase | A | I | R | | R |
| 23. | Hand-over of the system at the end of contractual period along with all documentation required to operate and maintain the system | A | C | C | | R |

## *9.1 Other Support from JSCL*

- JSCL shall provide warehousing facility in Jabalpur
- JSCL will provide electricity free of cost for Surveillance Camera, LED lights and Environmental Sensors, however for other components like BTS, Digital Billboards, Access Points etc will be borne by the Concessioner. The Concessioner will install a UPS with a backup capacity of min 2 hrs. Concessioner will install a meter, at its own cost, to measure the electricity consumed. JSCL will send a monthly bill to the Concessioner basis the consumption against which the Concessioner will make the required payment.
- JSCL will provide meters, wherever required, for energy accounting of LED luminaires

# 10 Revenue Generation Modes

## 10.1 Intelligent Poles and Street Poles

- Non-exclusive & free ROW to access 26699 existing street polesfor advertisement or components mentioned in this RFP.
- Exclusive Right of Way (RoW) throughout the Concession period, free of cost, for telecom site deployment on the Intelligent Poles installed by concessionaire and generate revenue out of tenancy

## 10.2 Smart Street Light

- Revenue sharing as per the Energy Saving out of the smart LEDs (refer scope of work for further understanding on energy savings)

## 10.3 Public Wi-Fi

Non-exclusive and free RoW across 26699 street poles & other municipal street furniture and exclusive rights on Intelligent Poles to house access points for Public Wi-Fi. Following are the indicative modes of generating revenue;

- Earn revenue on account of usage of Wi-Fi beyond the free period
- Advertisement on the login page of Wi-Fi
- Concessioner can utilize multiple SSIDs for providing paid services

## 10.4 Advertisement

Following are the modes of revenue from advertisement;

- Exclusive RoW for installing Smart Billboards on the Intelligent Poles
- Exclusive RoW of street light poles for installing dual side backlit advertisement billboard
- Municipal Corporation will not renew the contract of existing agencies
- No fresh contract will be offered to any other agency for aforementioned street light poles from the date of signing of contract up to the end of concession period
- No permission will be granted, to any other agency, for advertisement up to 100 meters on either sides of Intelligent Poles. The same will be applied from the date of signing of contract and throughout the concession period.

## *10.5 Optical Fiber*

RoW free of cost for laying of fiber will be provided by the Authority within Municipal limits. This right shall be available for the entire concession period.

The Concessioner can monetize the laid fiber by leasing it to the service providers.

## *10.6 Others*

- During the implementation phase Concessioner can suggest any additional revenue generating modes from the implemented smart components and can submit a proposal in this regard. JSCL will review the proposal and decide go/no-go. If approved, the Concessioner will share additional revenue with JSCL on mutually agreed terms.
- JSCL shall coordinate with other governmental departments, if any,for facilitating the RoW. The delay in obtaining clearances from such department will not attract any penalty towards the Concessioner

# 11 Common guidelines/comments regarding the compliance of equipment/systems

- The specifications mentioned for various IT / Non-IT components are indicative requirements and should be treated for benchmarking purpose only. Bidders are required to undertake their own requirement analysis and may propose higher specifications that are better suited to the requirements.
- None of the IT / Non-IT equipment's proposed by the Bidder should be End of Life product. It is essential that the technical proposal is accompanied by the OEM certificate and Manufacture Authorization Form, where-in the OEM will certify that the product is not end of life product & shall support for the entire concessioner period.
- All IT Components should support IPv4 and IPv6
- Technical Bid should be accompanied by OEM's product brochure / datasheet. Bidders should provide complete make, model, part numbers and sub-part numbers for all equipment/software quoted, in the Technical Bid.
- Bidder should ensure that only one make and model is proposed for one component in Technical Bid for example all PTZ cameras must belong to a single OEM and must be of the same model etc.
- Bidders should ensure complete warranty and support for all equipment from OEMs. All the back-to-back service agreements should be submitted along with the Technical Bid.
- All equipment, parts should be original and new.
- The user interface of the system should be a user friendly Graphical User Interface (GUI).
- Critical core components of the system should not have any requirements to have proprietary platforms and should conform to open standards.
- For custom made modules, industry standards and norms should be adhered to for coding during application development to make debugging and maintenance easier. Object oriented programming methodology must be followed to facilitate sharing, componentizing and multiple-use of standard code. Before hosting the application, it shall be subjected to application security audit (by any of the CERT-In empanelled vendors) to ensure that the application is free from any vulnerability; and approved by the Authority.
- All the Clients Machines / Servers shall support static assigned IP addresses or shall obtain IP addresses from a DNS/DHCP server.
- The Concessioner should also propose the specifications of any additional servers / other hardware, if required for the system.

- The indicative architecture of the system is given in this volume. The Concessioner must provide the architecture of the solution it is proposing.
- The system servers and software applications will be hosted in Data Centers as specified in the Bid. It is important that the entire set of Data Center equipment are in safe custody and have access from only the authorized personnel and should be in line with the requirements & SLAs defined in the Tender.
- The Servers provided should meet industry standard performance parameters (such as CPU Utilisation of 60 percent or less, disk utilisation of 75 percent or less). In case any non-standard computing environment is proposed (such as cloud), detail clarification needs to be provided in form of supporting documents, to confirm (a) how the sizing has been arrived at and (b) how SLAs would be met.
- Concessioner is required to ensure that there is no choking point / bottleneck anywhere in the system (end-to-end) and enforce performance and adherence to SLAs.
- All the hardware and software supplied should be from the reputed Original Equipment Manufacturers (OEMs). JSCL reserves the right to ask replacement of any hardware / software if it is not from a reputed brand and conforms to all the requirements specified in the tender documents.
- Concessioner shall place orders on various OEMs directly and not through any sub-contractor / partner.
- All licenses should be in the name of Jabalpur Smart City Ltd.
- For implemented components registered service/support center should be existing or established in India within 30 days of award of contract. The Concessioner should submit an undertaking from the OEM to that effect.

# 12 Technical Solution

## 12.1 Intelligent Pole

### 12.1.1 Specifications

| #. | Specifications |
|---|---|
| 1. | Intelligent pole should able to meet city aesthetic requirement and it should visual appealing. It should easily blend-in into city street pole master plan. |
| 2. | Maximum height requirement is up-to 12 meter. |
| 3. | It should be possible to house minimum 3-4 telecom technologies (GSM, WCDMA, LTE and Wi-Fi etc) simultaneously. It should also be possible to support future technologies such as 5G. |
| 4. | Site passive infra (space and power) sharing among telecom operators is mandatory requirement. |
| 5. | It should be possible to support LED luminaries from reputed OEMs |
| 6. | Intelligent pole should able to support city as well telecom standards for India such as wind speed, climate,aestheticetc |
| 7. | It should be possible to support connectivity for Intelligent pole |
| 8. | The maximum allowed diameter (at bottom section) is 250mm |
| 9. | All cabling, cooling/heating etc should be via/inside the pole and it should not be visible from outside due to aesthetic and security reasons |
| 10. | It should meet EMC requirement of telecom sites as per Indian regulations |
| 11. | The minimum power backup requirement is minimum 2 hrs for telecom equipment |
| 12. | It should be possible to provide multiple color options as asked by municipality/user as per city light pole colors |
| 13. | It should be possible to house radio units with integrated antenna,MW /optical transmission unit , SMPS (AC to DC convertor),batteries, controllers,power distribution etc inside the intelligent pole |
| 14. | It should be possible to house telecom equipment's from all reputed OEMs. |
| 15. | It should be possible to provide light connection in daisy chain with separate MCB for lighting and telecom part |
| 16. | There should be provision to have separate connection for light as well for telecom equipment for maintenance purpose. |

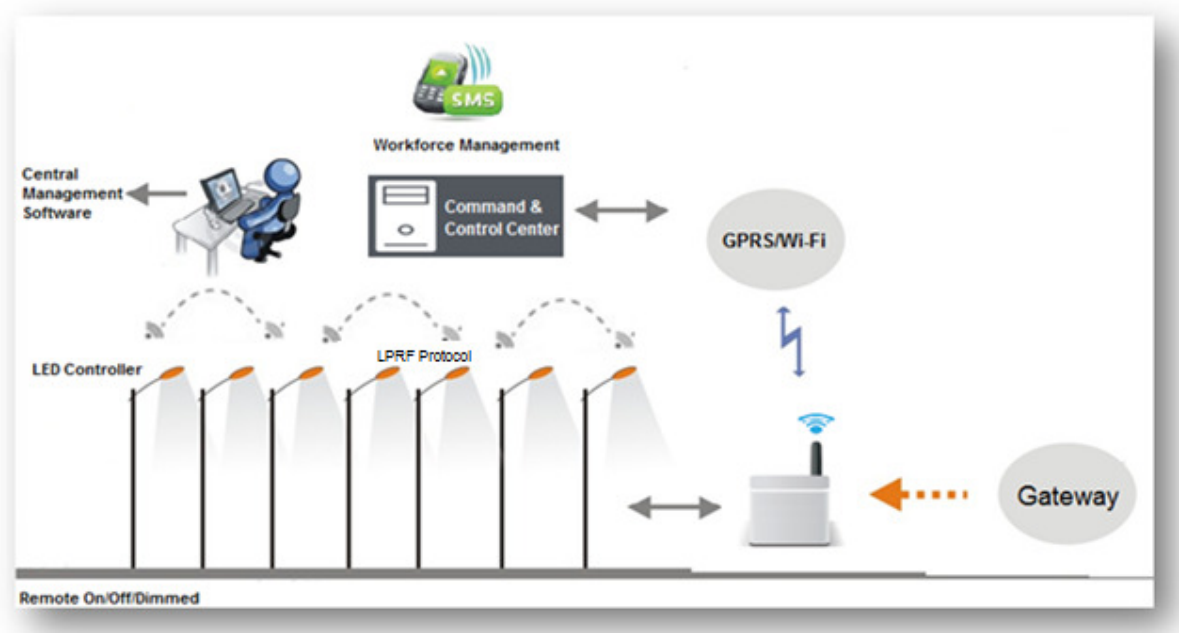
| #. | Specifications |
|---|---|
| 17. | The paint material (to cover the RF section ) should complied to RF/Telecom requirements |
| 18. | It should be possible to color the complete body (including RF equipment camouflaging) by any paint color |
| 19. | The camouflaging material (to cover RF equipment's) should have RF transparency with maximum 0.5db of attenuation covering all the radio frequency bands available in India |
| 20. | The cooling/heating equipment's to cool /heat telecom equipment should be integral part of intelligent pole .Maximum allowable limit for cooling equipment is 100W for cooling solution, efforts should be made to reduce the power consumption as much as possible. |
| 21. | The intelligent pole structure should be IP67 up-to 1 meter height from reference ground level. |
| 22. | There should be suitable mounting options for Radio /Antenna unit mounting |
| 23. | The ambient temperature requirement is 0-50 deg |
| 24. | The overall power budget for intelligent pole should not exceed 2KW (telecom + lights) |
| 25. | It should be possible to support 1 light arm/2 light arm option by intelligent pole |
| 26. | The minimum life requirement of above intelligent pole structure is 15 years (metal parts) |
| 27. | The Concessioner should not use any banned /restricted material as per Indian regulations |
| 28. | Pole hat mounting should have suitable option for GPS antenna, small MW antenna |
| 29. | The intelligent pole should support Environmental sensors |

## *12.2 LED based Smart Street light*

National Lighting Code by Bureau of Indian Standards (IS)- SP 72, 2010, IS 1944, IS 1977 and IEC Standards shall be complied for design and development of street lighting calculations, selection of lighting fixtures, lighting technologies, pole structure & erection, cable selection and sizing, insulation requirements, conductor specifications etc.

### 12.2.1 Technical Architecture of the Smart Street Light

Following is an indicative technical architecture of the Smart Street Light for Concessioner's reference;




### 12.2.2 Recommended Levels of Illumination (as per BEE guidelines)

| # | Type of Road | Road Characteristics | Average Level of Illumination on Road Surface in Lux | Ratio of Minimum/ Average Illumination |
|---|---|---|---|---|
| 1 | A-1 | Important traffic routes carrying fast traffic | 30 | 0.4 |
| 2 | A-2 | Main roads carrying mixed traffic like city main roads/streets, arterial roads, throughways | 15 | 0.4 |
| 3 | B-1 | Secondary roads with considerable traffic like local traffic routes, shopping streets | 8 | 0.3 |
| 4 | B-2 | Secondary roads with light traffic | 4 | 0.3 |

### 12.2.3 Specifications

The scope includes design, development, manufacturing, testing and supply of energy efficient luminaire complete with all accessories, LED lamps with suitable current control driver circuit including mounting bracket for street light and High mast light. The luminaire shall be suitable for rugged service under the operational and environmental conditions encountered during service.

#### 12.2.3.1 Smart Street Light Solution

| # | Specifications |
|---|---|
| 1. | The smart street lighting system should be able to operate at any weather conditions |
| 2. | The smart street lighting system should preferably be communicating using WIFI technology. Other allowed technologies can be ZigBee, LoRA, IEEE 802.15.4, UNB, Star topology, RF Mesh/DALI interface etc |
| 3. | The smart street lighting system should be able to communicate to the Lighting Operations Management software hosted on the data centre |
| 4. | The smart street lighting system should have the capability to receive the instruction from the Lighting Operations Management software and act accordingly |
| 5. | The smart street lighting system should be able to operate the lights switch on/off, increase/decrease luminosity (Dimming) as per the command received from the Lighting Operations Management software |
| 6. | The software should have the capability to apply policies to the smart lighting system.<br>Example: set up policies like light up alternate lights during low traffic density, increase the luminosity of the lights as per the dullness of the day lights |
| 7. | The city administration should be able to see the real time status of the Smart Lighting System on a city map view of the Lighting Operations Management software |
| 8. | The city administration should be able to operate the Smart Lighting System manually too. |
| 9. | The smart lighting system should be able to communicate the system issue or failure to the Lighting Operations Management software. |
| 10. | The smart lighting system are preferably a combination of LED lights and sensors |
| 11. | The individual lights are to be monitored by electronic controller using a long range radio frequency communication technology |
| 12. | Should enable Over the Air (OTA) firmware update |

#### 12.2.3.2 LED Luminaire

| # | Minimum Specifications |
|---|---|
| 1. | High bright white power LEDs shall be used in the Luminaries and the wattage of these LEDs shall be>1W and <3W. |
| 2. | Life span of LEDs used in the Luminaire shall be more than 50,000 hours at 70% light output.( Manufacture shall submit the proof-L70& TM 21 test report) |
| 3. | Color rendering index (CRI) of the LEDs used in the luminaire shall be greater than 70. |
| 4. | Color temperature of the proposed white color LED shall be 5000K-6500K |
| 5. | Junction Temperature;<br>Should be less than value at which LM80 (IS16105) data published. Should be >105 Degree C |

| | |
|---|---|
| 6. | The distributionof luminaire illumination ( control of distribution) shall be based on type of roads as per BIS standard IS 1944 |
| 7. | Power Factor:<br>0.95 |
| 8. | Chip Efficacy:<br>Shall be 135 lumen/watt, system lumen output at 25 degree C, supported by LM80 report shall be submitted. |
| 9. | CRI of Luminaries:<br>>=70 ( supported by LM80) |
| 10. | Light Uniformity ratio ( Emin/ Eavg) shall be as IS 1944 based on category of road |
| 11. | The luminaire light output (lumen) shall be constant. The voltage variations/ fluctuations in the specified voltage range shall not impinge upon the lumen it produce maximum +/-2% is allowed throughout in the input operating voltage range |
| 12. | Operating voltage:<br>120 V to 270 V universal electronic driver with surge protection of 6 KV (Application IS 15885, Driver safety 16104-1/2) |
| 13. | Total Harmonic Distortion:<br><10% THD Test method IEC:610003-2 |
| 14. | LEDs shall be operated at a current less than 90% of its rated current |
| 15. | LED driver efficiency:<br>>=350ma<=1000mA |
| 16. | LED driver efficiency Driver (High Voltage, Low current):<br>>85% |
| 17. | Luminaire body temperature should not exceed 30 deg C from ambient (45 deg C) without tolerance of 10 deg. C after 24 Hrs. |
| 18. | Heat dissipation/heat sink:<br>Well-designed thermal management system with defined heat sink |
| 19. | Input Current< 1000mA |
| 20. | Should have Open Circuit protection |
| 21. | The Luminaire shall be equipped with distortion free, clear, heat resistant, toughened, UV stabilized glass cover in the front fixed to the die cast. Aluminum frame which shall be fixed to the housing by means of stainless steel screw. |
| 22. | The Luminaire shall be built in such a way it can withstand wind speed of 80Kmps |
| 23. | Cover/glass without lens or with lens:<br>Fixture cover-UV stabilized Polycarbonate/heat resistance toughened glass or equivalent will be accepted for the Luminaire without lens. For the Luminaire with lens, toughened glass be required with proper IP66 provision |
| 24. | Frequency:<br>50 Hz+/-3% |
| 25. | Operating temperature:<br>Range -10C to +50 C |
| 26. | Protections:<br>IP66 for all wattage, Surge protection 6 KV, IEC61000-4-5 |
| 27. | Working humidity:<br>10% to 90% RH |

| | |
|---|---|
| 28. | Conformation standards of Luminaire:<br>The Luminaire should conform to IEC 60598/IS:10322. The Luminaire should be tested as per IEC 60598-2-3:2002/IS:10322 Part 5 sec-3 standards and following test reports should be submitted. Heat resistance test, thermal test, Ingress protection test, drop test electrical/insulation resistance test, endurance test, humidity test, photometry test (LM80 report) vibrant test. |
| 29. | Finish:<br>Aesthetically designed housing with corrosion resistant polyester powder coating |
| 30. | Luminaire configuration/technical requirement:<br>Side entry type. Shall consist of separate optical and color gear compartments. It should be easy replacement in the field condition |
| 31. | Compliance:<br>RoHS/CE/ERTL/ERDI |
| 32. | Surge protection:<br>External surge protection of 10 KV to be separately installed with the each fixture |
| 33. | Lamp starting time:<br>Max 10 sec |
| 34. | Overall system efficacy:<br>>85% |

12.2.3.3 Feeder Panels

The Concessioner shall replace the feeder panel in non-working conditions as per the below mentioned specifications (refer scope of work). Concessioner shall upgrade the feeder panels in working conditions (like remote transfer of data) with the below mentioned functionality.

The design and operation of feeder panels shall comply with SP 72 Part 8 of NationalLighting Code 2010.

| # | Specifications |
|---|---|
| 1. | Principle equipment should be designed on the basis of `Lossless Series Reactance withSecondary Compensation' technology (Auto-transformer) |
| 2. | The efficiency of such principle equipment should not be less than 99.4% between 50%- 110% of loading |
| 3. | Other than basic switching components, no other moving parts are allowed to beinstalled in the feeder panel |
| 4. | 240 VAC 50 Hz Single Phase Two Wire / 415 VAC 50 Hz Three Phase Four WireInput |
| 5. | Three Taps of Single / Three Phase Four Wire Outputs |
| 6. | Standard Output Taps in each Phase at 200/205/210 VAC @ 240 VAC Nominal Input |
| 7. | Feeder panels should have GPRS/GSM based remote streetlight monitoring systemwith capacity for self-protection from short-circuit, over voltage and anti-theft alert |
| 8. | The rating of the Streetlight controller should be at least 1.3 times the lighting load asmeasured during the initial studies |
| 9. | Energy Meters to be installed in separately sealable and open able compartment withinthe Feeder Panels as per the following specifications:<br>• Energy Meters should have Accuracy class of Class 1 or better;<br>• Meters could be either three phase whole current or CT operated for LT as may be required based on the load connected to the feeder panel. The space to becreated in |

| # | Specifications |
|---|---|
| | the feeder panel for housing the meters should consider the same.<br>• Energy Meters should be capable of logging parameters for each 15 minute timeblock with stamping of date and time. Such data logs should be retained in theenergy meters for a period of 60 days or more.<br>• Such Energy Meters should record the following minimum parameters<br>• Phase to neutral voltages<br>o Phase-wise current<br>o Phase-wise power factor and frequency<br>o Total active power<br>o Total reactive power<br>o Total active energy<br>o Total reactive energy<br>o Total KVAH energy<br>• Meters should have requisite port (Serial port communication – RS232 orRS485) for enabling remote reading and for connection of Modem for the same<br>o Energy Meter specifications should meet the minimum specificationsspecified by DISCOM and a sign-off on the same shall be obtained fromDISCOM prior to finalizing the specifications;<br>o Energy Meters shall be tested, installed and sealed in accordance withprocedures specified by DISCOM;<br>o A signoff from DISCOM on the design and specifications of thecompartment in the Feeder Panel where the meters are to be housed is also recommended; |
| 10. | Bidder has to install appropriate power conditioning devices to protect the new EEtechnologies and components of feeder panels from damage. Poor power quality is notallowed as an excuse for non-functioning of the new technologies installed under the project |
| 11. | Fixed capacitor with appropriate capacity shall be introduced in each feeder panel toalways maintain a power factor above 0.90 |
| 12. | In case of Single phase controller unit, 1 pole contactor or multiple parallel polecontactors should be used and in case of 3 phases, appropriate duty 3 pole contactorshould be used. The number of contactors used should be suitable for ON/OFF/Dimmed and forchangeover between full voltages to various voltage taps and interchanging betweentaps.The panels should be equipped with a microprocessor based Dual ChannelAlmanac Timer controller which should be user programmable to enable setting ofON/OFF/Dimmed times and also switching over to savings mode/bypass mode when required |
| 13. | All the principle equipment's along with input output switchgears, metering, switches(bye pass and tap changers), contactors, fuses, auto transformer coils etc. should be ofreputed manufacturers and should meet best engineering practices and norms asapplicable in relevant standards;<br>• Auto transformer coil should have full current operating efficiency of better than99%<br>• The total heat dissipation from single coil should not exceed 6 watts-sec/kVAunder fully loaded condition<br>• The rated current of the auto transformer should be for continuous 120% that ofinput rated current<br>• The switched fuse units should be of 32 Amp continuous AC current capacities.<br>• Fuses used should be of 20 Amp. Rating of high rupturing capacity (S/c currentat least 50 kA) |
| 14. | The bidders should always ensure that the System is capable to capture live data andrecord it at variable time-intervals. Following parameters should be recorded for every60-120 minutes time interval:<br>• Voltages |

| # | Specifications |
|---|---|
| | • Current<br>• Power Factor<br>• Active Power (kW)<br>• Apparent Power (kVA)<br>• Metering kWh cumulative<br>• Metering kVAh cumulative<br>• Number of hours the lamps were glowing<br>• Special emergency on/off facility with wireless control.<br>• Benchmarking capacity so as to generate alert SMS for:<br>  o Phase-wise currents on crossing threshold values<br>  o Phase-wise voltages on crossing threshold values<br>  o JSCLB trips<br>  o Theft alerts<br>  o Group failure of lights<br>  o Contactor failure<br>  o No output supply<br>• Alert SMS shall be forwarded to five (5) phone numbers.<br>• GPRS/GSM modem should be used |
| 15. | Enclosure Box of feeder panels shall be IP-56 compliant and should be fabricated outof MS sheet SWG 16 / 14 duly powder coated for corrosion resistance and long life.<br>• It should have Single Phase power socket for connecting utility tools like drillmachine etc. (capacity 1phase 240Vac / 5Amp socket)<br>• Utility Service Lamp inside Panel for use during maintenance work<br>• Gland Plates for Cable Entry at Incomer and Outgoing<br>• Auto Bypass / Tap Changing in lieu of Manual. The tap changing should beautomatic between the full voltage and lower voltage for minimum two numbersselected taps. |
| 16. | The bidder shall have to get the control panels fabricated from the vendor having typetest certificate from CPRI for 31 MVA short-circuit rating up to 400 amp for cubicalpanels. The copy of the type test certificate shall also have to be produced failing whichfeeder panels shall not be accepted |
| 17. | Design life of the control panel should be mentioned in form of MTBF (mean timebetween failures) and it should be minimum 15 years |

12.2.3.4 LED Luminaire Controller

| # | Specifications |
|---|---|
| 1. | Advance 32 bit Microcontroller based design. |
| 2. | Very easy key board operation |
| 3. | HMI LCD display. 16 character and two line type display. Which helpwhile maintenance and reduce dependability. Contentious Scrolling display of events (Like ON time, Off time, Dimt time, Voltage, Current,Staggering time , Alarm events, Burning hours, etc) on Single HMI LCDdisplay to help the local monitoring of systems. Parameters can beupdated from local panel. Log the alarm of last 5 events |
| 4. | Data Measurement for Monitoring and controlling Data monitoringthrough Class 1 type Multi – Function Panel mounted Energy meter :By using this to measure the individual phase voltage, individual phaseload amps, PF, KW, KVA, KVAR, Phase to Phase voltage, Average PF,KWH etc. ( Local display of 36 and 28 for remote display in software) |
| 5. | Auto / Manual facility by way of contactor / relay operation for fasterservice mode. From local panel in manual mode it shows individualline / channel current and show no of lamp |

| # | Specifications |
|---|---|
| | which is not workingwhich helps to judging the problem in line (by difference of calibration current and existing line current. Judgment is possible forapproximately find out no of lamps are not working |
| 6. | Street light ON / OFF / Dim on Longitude, Latitude base sunset and sunrisetime generation not by any fixed time table |
| 7. | Door Open information |
| 8. | Real time clock with battery with life of more than 7 years(Manufacturer provided 10 years life for the battery with the accuracyof +/- 60 second per month. Power reserve of more than 60000 hours) |
| 9. | System parameter data protection with special RAM, which hold theparameter for more than 10 years without any power |
| 10. | Master and user Password Protection. |
| 11. | Inbuilt auto recovery systems for power failure which helps instreetlight operation |
| 12. | Double Inrush current capability of electrical switch gears to supportsodium vapor lamp |

12.2.3.5 Centralized Management Software

| # | Specifications |
|---|---|
| 1. | Web Base Software replaces visual inspections of individual streetlighting with sitting at pc with Internet connectivity. Also by fault alarmand monitoring of data user can judge the fault status and severity offault |
| 2. | Remote switching through Web Base Software to override local controller |
| 3. | User can demand any time live status of feeder pillar for currentelectrical and real time parameters |
| 4. | Emergency Stop / Manual ON / Manual OFF / Test Mode of feederpillar |
| 5. | User can monitoring and change all settable parameter setting andclock time setting |
| 6. | Control at any level of individually Street lights. Generate electricalprofile of any individual feeder pillar |
| 7. | Unit can be Direct mapping on Google Map |
| 8. | The software shallreceive the self-generated data message fromindividual Feeder Pillar like, ON time, Off time,Dim time, Power Down time, Auto mode / Manual Mode, Volt Fault, OverCurrent Fault, Short Circuit Fault, Neutral Fault, RTC Fault, ADC Fault,Memory Fault, Low Ampere Fault, Door Open, Relay Fault, CalibrationData and acknowledgement of massage demand by WEB ofParameter writing, E Stop, Test Mode, E Profile, All this massagecontain All electrical parameter with real-time clock date and time |
| 9. | The software shallgenerates report of any date or any date range forfault and message of individual unit or all the units. The software shall also generate Range Report for fault, Message, Voltagegraph, Current Graph, Streetlight On time, VA Consumption, etc |
| 10. | All the data collected by the software can be export to worksheet format for further analysis as per requirement. You cangenerate graph and report as per requirements |
| 11. | Can be operate and view from anywhere in the world |
| 12. | System is easily expanded and maintained. New configurations can bemade remotely |
| 13. | Web Interface gives instant status of the street lights on the dynamicGoogle map |

12.2.4 Minimum Illumination Level

| # | Type of LED Luminaries | Vertical Distance from the floor level (Meters) | Minimum Illumination Level (Lux) centre | Color of Illumination |
|---|---|---|---|---|
| 1. | 45-50W | 5 | (12-15) | 5000K-6500K |
| 2. | 100-105W | 7 | (15-18) | 5000K-6500K |
| 3. | 140-170W | 7 | (18-20) | 5000K-6500K |
| 4. | 260W | 7 | (20-22) | 5000K-6500K |
| 5. | 50W | 5 | (12-15) | 5000K-6500K |
| 6. | 105-110W | 7 | (15-18) | 5000K-6500K |
| 7. | 190W | 7 | (20-22) | 5000K-6500K |
| 8. | 25-30W | 5 | (10-12) | 5000K-6500K |
| 9. | 60W | 7 | (15-18) | 5000K-6500K |

12.2.5 Minimum desired illumination levels during peak hours

| # | Type of LED Luminaries | Type of Road | Lampmountingheightfromthe floor level(Meters) | Minimum Illumination Level (Lux) centre | Color of Illumination |
|---|---|---|---|---|---|
| 1. | 250-260W | | Above 18 | (20-22) | 5000K-6500K |
| 2. | 190W | A1 | Between 11-15 | (20-22) | 5000K-6500K |
| 3. | 140-170W | A1 | 9-15 | (18-20) | 5000K-6500K |
| 4. | 90-120W | A2/B1 | 7-9-11 | (15-18) | 4300K-5600K |
| 5. | 70-120W | A2/B1 | 7-9-11 | (15-18) | 4300K-5600K |
| 6. | 70-120W | B1/B2 | 6-7-9 | (15-18) | 4300K-5600K |
| 7. | 70-50W | B1/B2/C1 | 7-9 | (12-15) | 4300K-5600K |
| 8. | 45-50W | B1/B2/C1 | 5-7 | (12-15) | 4300K-5600K |
| 9. | 25-30W | B1/B2/C1 | 5-7 | (10-12) | 4300K-5600K |

- Variation in illumination level shall be ± 2% is allowed in input voltage range from 180VAC to 250VAC.
- The illumination shall not have infra-red and ultra-violet emission. The test certificate from the NABL approved laboratory shall be submitted.
- Electronic efficiency shall be more than 85%

12.2.6 Conformance Standards

Product Certification should be obtained from UL or CPRI or any other NABL certified lab. The following test reports should be provided:

| | |
|---|---|
| LM-79 | Luminaire efficacy (Photometry data) |
| LM-80 | LED chip data |
| IP 67 | Luminaire Ingress Protection |
| Luminaire Endurance Test | Practical testing of luminaire through 20,000 cycles |
| EN 60929 | Performance |
| IEC 60598-1 | General requirement and tests |
| IEC 61000-3-2 | Limits for Harmonic current emission - THD < 10% |

## *12.3 Surveillance*

12.3.1 Specifications

12.3.1.1 PTZ - High Definition Camera

| # | Parameters | Minimum Specifications or better |
|---|---|---|
| 1. | Video Compression | H.264 |
| 2. | Video Resolution | 1920 X 1080 |
| 3. | Frame rate | Min. 25 fps |
| 4. | Image Sensor | 1/3" OR ¼" Progressive Scan CCD / CMOS |
| 5. | Lens | Auto-focus, 4.7 - 94 mm (corresponding to 20x) |
| 6. | Minimum Illumination | Colour: 0.5 lux, B/W: 0.1 lux (at 30 IRE) |
| 7. | Day/Night Mode | Colour, Mono, Auto |
| 8. | S/N Ratio | ≥ 50Db |
| 9. | PTZ | Pan: 360° endless/continuous, 0.2 to 300°/s (auto), 0.2 to 100°/s (Manual)<br>Tilt: 90°, 0.2 to 100°/s (Auto), 0.2 to 40°/s (Manual)<br>20x optical zoom and 10x digital zoom<br>64 preset positions<br>Auto-Tracking<br>Pre-set tour |
| 10. | Auto adjustment + Remote Control of Image settings | Colour, brightness, sharpness, contrast, white balance, exposure control, backlight compensation, Gain Control, Wide Dynamic Range |
| 11. | Protocol | HTTP, HTTPS, FTP, RTSP, RTP, TCP, UDP, RTCP, DHCP, UPnP, QoS, IPV4, IPV6 |
| 12. | Security | Password Protection, IP Address filtering, User Access Log, HTTPS encryption |
| 13. | Operating conditions | 0 to 50°C (temperature), 50-90% humidity |
| 14. | Casing | NEMA 4X / IP-66 rated |
| 15. | Certification | UL/EN,CE,FCC |
| 16. | Local storage | Minimum 64 GB Memory card in a Memory card slot |

12.3.1.2 Fixed Box cameras (High Definition)

| # | Parameters | Minimum Specifications or better |
|---|---|---|
| 1. | Video Compression | H.264 |
| 2. | Video Resolution | 1920 X 1080 |
| 3. | Frame rate | Min. 25 fps |
| 4. | Image Sensor | 1/3" Progressive Scan CCD / CMOS |
| 5. | Lens Type | Varifocal, C/CS Mount, IR Correction |
| 6. | Lens | Auto IRIS |

| | | |
|---|---|---|
| | | 8 – 40 mm, F1.4 |
| 7. | Minimum Illumination | Colour: 0.5 lux, B/W: 0.1 lux (at 30 IRE) |
| 8. | IR Cut Filter | Automatically Removable IR-cut filter |
| 9. | Day/Night Mode | Colour, Mono, Auto |
| 10. | S/N Ratio | ≥ 50 Db |
| 11. | Auto adjustment + Remote Control of Image settings | Colour, brightness, sharpness, contrast, white balance, exposure control, backlight compensation, Gain Control, Wide Dynamic Range |
| 12. | Audio | Audio Capture Capability |
| 13. | Local storage | Minimum 64 GB Memory card in a Memory card slot |
| 14. | Protocol | IPV4, IPV6, HTTP, HTTPS, FTP, RTSP, RTP, TCP, UDP, RTCP, DHCP, UPnP, QoS |
| 15. | Security | Password Protection, IP Address filtering, User Access Log, HTTPS encryption |
| 16. | Operating conditions | 0 to 50°C (temperature), 50 to 90% (humidity) |
| 17. | Casing | NEMA 4X / IP-66 rated |
| 18. | Certification | UL/EN, CE,FCC |

12.3.1.3 Infrared Illuminators

The infrared illuminators are to be used in conjunction with the cameras specified above to enhance the night vision.

| # | Parameters | Minimum Specifications or better |
|---|---|---|
| 1. | Range | Min. 100 meters, with adjustable angle to cover the complete field of view at specified locations |
| 2. | Minimum Illumination | High sensitivity at Zero Lux |
| 3. | Power | Automatic on/off operation |
| 4. | Casing | NEMA 4X / IP-66 rated |
| 5. | Operating conditions | -5° to 50°C |
| 6. | Certification | UL/EN/CE/FCC |

12.3.1.4 Field Junction Box

| # | Parameters | Minimum Specifications or better |
|---|---|---|
| 1. | Size | Suitable size as per site requirements to house the field equipment |
| 2. | Cabinet Material | Powder coated CRCA sheet/ Stainless steel |
| 3. | Material Thickness | Min 1.2mm |
| 4. | Number of Locks | Two |
| 5. | Protection | IP66 / NEMA 4X |
| 6. | Mounting | On Camera Pole / Ground mounted on concrete base |
| 7. | Form Factor | Rack Mount/DIN Rail |

| | | |
|---|---|---|
| 8. | Other Features | Rain Canopy, Cable entry with glands and Fans/any other accessories as required for operation of equipment's within junction box. |

12.3.1.5 Sign Specifications

It is necessary that the CCTV Camera locations put some standardized signs informing the public of the existence of CCTV cameras. This will bring about the transparency on installation of CCTV cameras and no one would be able to later complaint for breach of privacy. The international standards with respect to sign types need to be adhere to for all camera locations.

| # | Parameters | Minimum Specifications or better |
|---|---|---|
| 1. | Size | Board Width = 8" / 12" (For type A and B)<br>Board Width = 12" / 18" / 24" (For type C and D) |
| 2. | Plate Material | Corrosion resistant Aluminium Alloy as per IRC 67:2001 (Code of Practice for Road signs) |
| 3. | Plate Thickness | Minimum 1.5 mm |
| 4. | Retro-Reflective sheeting for sign-plate | Weather-resistant, having colour fastness |
| 5. | Other Specifications | As per IRC 67:2001 (Code of Practice for Road signs) |
| 6. | Mounting | Can be mounted on wall or pole (appropriate mounting brackets to be provided) |
| 7. | Design | As per following signage diagrams |

12.3.1.6 Edge Level Switch (at Camera locations)

| # | Parameters | Minimum Specifications or better |
|---|---|---|
| 1. | Type | Managed Outdoor Industrial grade switch |
| 2. | Total Ports | • Minimum 4 10/100/TX PoE/PoE+, 2x SFP Ports (can have 4xSFP Ports in certain locations)<br>• May require higher port density at some locations, depending upon site conditions<br>• May require fiber ports at some locations, depending upon site conditions/distances. |
| 3. | PoE Standard | IEEE 802.3af/IEEE 802.3at or better |
| 4. | Protocols | • IPV4,IPV6<br>• Support 802.1Q VLAN<br>• DHCP support<br>• IGMP<br>• SNMP Management<br>• Should support Loop protection and Loop detection<br>• Should support Ring protection<br>• End point Authentication<br>• Should support NTP |
| 5. | Access Control | • Support port security<br>• Support 802.1x (Port based network access control).<br>• Support for MAC filtering |
| 6. | PoE Power per port | Sufficient to operate the CCTV cameras/edge devices connected |

| | | |
|---|---|---|
| 7. | Enclosure Rating | IP 30 or equivalent Industrial Grade Rating(to be housed in Junction box) |
| 8. | Operating Temperature | 0 -50 C or better Industrial Grade Rating |
| 9. | Multicast support | IGMP Snooping V1, V2, V3<br>MLD Snooping V1, V2 |
| 10. | Management | • Switch needs to have RS-232/USB/RJ45 console port for management via a console terminal or PC<br>• Web GUI<br>• NTP<br>• Syslog for log capturing<br>• SNMP V1,V2,V3 |
| 11. | Compliance | UL/EN/IEC or equivalent |

12.3.2 Video Management System (VMS)

| # | Functional Requirement |
|---|---|
| 1. | VMS shall be used for centralized management of all field camera devices, video servers and client users |
| 2. | VMS server shall be deployed in a clustered server environment for high availability and failover |
| 3. | VMS shall support a flexible rule-based system driven by schedules and events |
| 4. | VMS shall be supported for fully distributed solution for monitoring and control function, designed for limitless multi-site and multiple server installations requiring 24/7 surveillance with support for devices from different vendors |
| 5. | VMS shall support ONVIF compliant internet protocol (IP) cameras |
| 6. | The Concessioner shall clearly list in their proposal the make and models that can be integrated with the VMS, additionally all the offered VMS and cameras must have Open Network Video Interface Forum (ONVIF) compliance |
| 7. | VMS shall be enabled for any standard storage technologies and video wall system integration |
| 8. | VMS shall be enabled for integration with any external Video Analytics Systems |
| 9. | VMS shall be capable of being deployed in a virtualized server environment without loss of any functionality. |
| 10. | All CCTV cameras locations shall be overlaid in graphical map in the VMS Graphical User Interface (GUI). The cameras selection for viewing shall be possible via clicking on the camera location on the graphical map. The graphical map shall be of high resolution enabling operator to zoom-in for specific location while selecting a camera for viewing |
| 11. | VMS shall have an administrator interface to set system parameters, manage codecs, manage permissions and manage storage |
| 12. | VMS day to day control of cameras and monitoring on client workstations shall be controlled through the administrator interface |
| 13. | Whilst live control and monitoring is the primary activity of the monitoring workstations, video replay shall also be accommodated on the GUI for general review and also for pre- and post-alarm recording display |
| 14. | The solution design for the VMS shall provide flexible video signal compression, display, storage and retrieval |
| 15. | All CCTV camera video signal inputs to the system shall be provided to various command |

| | |
|---|---|
| | control center(s), viewing center etc., and the transmission medium used shall best suit the relative camera deployments and access to the CCTV Network |
| 16. | VMS client shall have the capability to work with touch enabled multi-monitor workstations. It shall be capable of displaying videos in up to three (3) monitors simultaneously |
| 17. | VMS shall be capable of transferring recorded images to recordable media (such as CD/DVD and/or tapes) in tamper evident and auditable form. All standard formats shall be supported including, but not limited to:<br>• AVI files<br>• Motion- Joint Photographic Experts Group (M-JPEG)<br>• Moving Picture Expert Group-4 (MPEG-4) |
| 18. | The bidder shall provide capability to transfer recorded images only at the Storage Area Network (SAN) administration terminal where a suitable video printer shall be supplied to create video prints from snapshots of the recorded footage. |
| 19. | All streams to the above locations shall be available in real-time and at full resolution. Resolution and other related parameters shall be configurable by the administrator in order to provide for network constraints |
| 20. | The VMS shall support field sensor settings. Each channel configured in the VMS shall have an individual setup for the following settings, the specific settings shall be determined according to the encoding device:<br>• Brightness<br>• Contrast<br>• Color<br>• Sharpness<br>• Saturation<br>• Hue<br>• White balance |
| 21. | The VMS shall support the following operations:<br>• Adding an IP device<br>• Updating an IP device<br>• Updating basic device parameters<br>• Adding/removing channels<br>• Adding/removing output signals<br>• Updating an IP channel<br>• Removing an IP device<br>• Enabling/disabling an IP channel<br>• Refreshing an IP device (in case of firmware upgrade)<br>• Multicast at multiple aggregation points |
| 22. | The VMS shall support retrieving data from edge storage. Thus when a lost or broken connection is restored, it shall be possible to retrieve the video from SD card and store it on central storage. |
| 23. | The VMS shall support bookmarking the videos. Thus, allowing the users to mark incidents on live and/or playback video streams |
| 24. | The VMS shall allow the administrator to distribute camera load across multiple recorders and be able shift the cameras from one recorder to another by simple drag and drop facility |
| 25. | VMS shall support automatic failover for recording. |
| 26. | VMS shall support manual failover for maintenance purpose |
| 27. | VMS shall support access and view of cameras and views on a smartphone or a tablet (a mobile device). |
| 28. | VMS shall support integration with the ANPR application |

| | |
|---|---|
| 29. | VMS shall support integration with other online and offline video analytic applications |
| 30. | VMS shall be able to accept alerts from video analytics built into the cameras, other third party systems, sensors etc |

## *12.4 Public Wi-Fi*

### 12.4.1 Specifications

#### 12.4.1.1 WLAN Controller

| # | Parameter | Specifications |
|---|---|---|
| 1. | Hardware | Redundancy Features: Controller Must support Active: Active and Active: Standby. Same license should be shared by both the controller. |
| 2. | General Feature Requirements | Ability to map SSID to VLAN |
| 3. | | Should support automatic channel selection – interference avoidance (Co-channel management, Adjacent Channel Management, Channel reuse management) |
| 4. | Auto Deployment of APs at different locations | Access points can discover controllers on the same L2 domain without requiring any configuration on the access point. |
| 5. | | Access points can discover controllers across Layer-3 network through DHCP or DNS option |
| 6. | Firewall & IPS | Built-in ICSA Certified Wireless Firewall in the Switch |
| 7. | | Firewall should support minimum 100000 concurrent sessions |
| 8. | | System should provide L2 / L3 stateful firewall, Role based firewall, DOS attacks and Strom control |
| 9. | | The firewall must be able to take action including allowing the traffic, denying the traffic, rejecting the traffic, routing the traffic, destination or source NAT the traffic, modify the QoS level of the traffic, and blacklist (remove from the network) the client for policy matches |
| 10. | | Should include IPS licensing for 3 years from the date of installation |
| 11. | System Architecture | Centralized MAC addresses filtering |
| 12. | | Should support onboard and external DHCP server |
| 13. | | Controller should support Onboard AAA server |
| 14. | | The proposed architecture should be based on controller based Architecture with thick AP deployment. While Encryption / decryption of 802.11 packets should be performed at the AP |
| 15. | | Support roaming between access points deployed on same subnet and different subnets |
| 16. | QoS features | Per user bandwidth Rate Limiting |
| 17. | | Self-healing (on detection of RF interference or loss of RF coverage) |
| 18. | | Should support per user, per device, and per application/TCP-port prioritization |
| 19. | | Dynamic load balancing to automatically distribute clients to the least loaded 802.11 channel and AP; load balancing must not require any client specific configurations or software |
| 20. | | Adaptive RF management that provides the capability to pause channel scanning / adjust RF scanning intervals based on application and load presence. |
| 21. | | Capability to provide preferred access for –fast clients over –slow clients (11n vs. 11g) in order to improve overall network performance. |
| 22. | | Support advanced multicast features with multicast rate optimization, multi-channel use and IGMP snooping |
| 23. | RF Management | Should be able to load balance clients across channels and access points |

| | | |
|---|---|---|
| 24. | | Should be able to load balance clients based on client count |
| 25. | | Should be able to load balance clients based on effective throughput on AP |
| 26. | | Should be able to use client and throughput as a measure to load balance between bands |
| 27. | Inline Security Features | Should allow authenticated client devices to roam securely from one access point to another, within or across subnets, without any perceptible delay Security during re association. |
| 28. | | Controller should support DES, 3DES and AES-128 and AES-256 encryption, with site-to-site and client-to-site VPN capabilities; should have provision to supports IPSEC tunnels |

12.4.1.2 Access Point

| # | Parameter | Specifications |
|---|---|---|
| 1. | Features | The wireless solution should be based on dual radio. |
| 2. | | The 802.11 N Access Point should be 2x2 MIMO , dual-radio (concurrent 802.11 a/n and b/g/n) wireless access points |
| 3. | | The second radio should be band unlocked to work either on 5 GHz or act as sensor for full time WIPS operation |
| 4. | | The Access Point should have single 10/100/1000 Ethernet interfaces |
| 5. | | The AP should independently be configurable to handle security, mesh, firewall, WIPS, RF Management, QOS , roaming, local forwarding without the need for a controller so as to increase performance of the WLAN network |
| 6. | | 802.11n Access Point should be able to power up using standards 802.3 at POE input. |
| 7. | | Radio 1: 2.4GHz: Chan 1-13 (2412-2472 MHz), Chan 14 (2484 MHz) |
| 8. | | Radio 2: 2.4GHz: Chan 1-13 (2412-2472 MHz), Chan 14 (2484 MHz) 5GHz: All channels from 5200 MHz to 5825 MHz Actual operating frequencies depend on national regulatory limits |
| 9. | | Maximum available transmit power: 2.4GHz: 21dBm per chain, 5.0GHz: 20dBm per chain |
| 10. | | Antenna configuration: 1x1, 1x2, 2x2 |
| 11. | Antenna Characteristics | External Antenna Gain |
| 12. | | 2.4 GHz-2.5 GHz : 4 dBi |
| 13. | | 5.150 GHz- 5.875 GHz : 5dBi |
| 14. | Operating temperature | 30 to +60°C or better |
| 15. | Storage Temperature | -40 to 85°C or better |
| 16. | Regulatory | FCC certified |
| 17. | | CE Mark |
| 18. | Enclosure | Should be IP67 rated or higher for outdoor application |
| 19. | AP Characteristics | Able to be powered over 802.3at standard Power-over-Ethernet (PoE). Auto sensing, 10/100 on the network port |
| 20. | | 32 WLANs, 16 BSSIDs per radio |
| 21. | | On Demand Channel Scan, Auto Channel Select |
| 22. | | Capable of multi-function services including: data access, intrusion detection, intrusion prevention, location tracking, real-time non-disruptive packet capture, RF monitoring with no physical touch and no additional cost |
| 23. | | The AP should proactively probe other rates to determine if greater throughput is available, intelligently adjusting its selection tables to favor higher performance. The AP should |

| | | |
|---|---|---|
| | | support mesh backhaul feature in which the root AP will determine if its wired connection is down and take action correspondingly. AP should support Self-Healing, Self-forming, dynamic path selection Wireless MESH function |
| 24. | | Automatic neighbor detection and route determination |
| 25. | | AP will provide make before break handovers |
| 26. | | The wireless meshing AP shall support low hop latency (< 1 ms per hop) under clear channel conditions and high SNR |
| 27. | | Support of 802.11s compliance via software upgrade |
| 28. | | MESH link should support QoS – WMM |
| 29. | | MESH link should support AES encryption on the MESH link |
| 30. | | MESH link should support extending corporate network with VLAN Tags and VLAN priority tags to the remote site |
| 31. | | The AP shall support Layer 2 routing |
| 32. | | The MESH AP shall be transparent to Layer 3 devices (i.e. embedded router) |
| 33. | | A wireless meshing AP with redundant links shall select an alternative route within 100 ms |
| 34. | | AP shall provide external antenna options |
| 35. | | Wi-Fi alliance 802.11 n Draft 2.0 certified APs |

12.4.1.3 L2+ 8 Ports Managed Switch

| # | Parameter | Specifications |
|---|---|---|
| 1. | Port Density & Redundancy | The switch should have 8 ports 10/100TX and with 2 combo ports (10/100/1000T or 100/1000 SFP) |
| 2. | System Capacity | Should have 16MB flash memory, 16K MAC addresses, 128MB RAM |
| 3. | Performance | The switch should have min. 5.6 Gbps of switching capacity & min. 8 Mbps of forwarding rate |
| 4. | VLAN | Support for Port-based VLANs, 4096 VLANs (IEEE 802.1Q), GARP VLAN Registration Protocol (GVRP), MAC-based VLANs, Port-based Private VLANs, IP subnet-based VLANs 256. |
| 5. | Quality of Service | Support for Egress rate limiting, Eight egress queues per port, Voice VLAN, DSCP for IP-based QoS, Differentiated services architecture, IEEE 802.1p Class of Service with strict and weighted round Robin scheduling. |
| 6. | Multicast | Support for IGMPv1 and IGMPv2 snooping, Multicast groups 255, IGMPv2 snooping querier |
| 7. | Management | Support for Telnet server, should have Console management port, Web GUI, Enhanced Stacking, HTML, HTTP, TFTP, zModem, SNMP V3, RMON 4 groups Stats, History, Alarms and Events, Event log, Auto config, MIB, SNTP, sFlow or equivalent. |
| 8. | Security | The switch should support TACACS+, RADIUS accounting and RADIUS client, IEEE 802.1x port-based Network Access Control (NAC), IEEE 802.1x multiple supplicant mode, EAP, EAP-TLS, LEAP, PEAP, TTLS, Microsoft NAP compliant, Symantec NAC support, Per port MAC address filtering, Layer 2/3/4/ Access Control Lists (ACLs), SSLv3 for Web management, Per port MAC address limiting, MAC address security/lockdown, Guest VLANs and SSH session Time out. |
| 9. | Resiliency | IEEE 802.1D Spanning-Tree Protocol, IEEE 802.1D- |

| | | |
|---|---|---|
| | | RapidSpanning-Tree Protocol and IEEE802.1q-Multiple Spanning-Tree Protocol, BPDU guard, Loop guard and Root guard |
| 10. | Other Essential Feature | Support for IPv6 host, ICMPv6, IPv6 ACL, Dual-stack IPv4/IPv6 management, IPv6 applications WEB/SSL, Static IPv4 routing 4K, RIPv1,v2, Proxy ARP, IEEE 802.3ad, ICMP, LLDP-MED, LLDP, DHCP snooping, DHCP option 82, DHCP relay, ICMP. The switch should have ECO Friendly design and fan less operation. |
| 11. | Power Characteristics | Voltage: 100-240V AC (10% auto-ranging), Frequency 47-63Hz Operating temperature: 0C to 40C Storage temperature: -25C to 70C Operating humidity: 5% to 90% non-condensing |
| 12. | Safety Certifications | EMI: FCC class A, EN55022 class A, C-TICK, VCCI Class A, CE, UL 60950-1 (cUlus), EN60950-1 (TUV), EN60825 Etc and Compliant with RoHS standards. |

12.4.1.4 L2+ 8 Ports Managed PoE Switch

| # | Parameter | Specifications |
|---|---|---|
| 1. | Port Density & Redundancy | The switch should have 8 ports 10/100TX PoE+( min. 6 Port IEEE802.3at Or 8 Port 802.3af) and with 2 combo ports (10/100/1000Tor 100/1000 SFP) and PoE Power will be min 185W |
| 2. | System Capacity | Should have 16MB flash memory, 16K MAC addresses, 128MB RAM |
| 3. | Performance | The switch should have min. 5.6 Gbps of switching capacity & min. 8 Mbps of forwarding rate |
| 4. | VLAN | Support for Port-based VLANs, 4096 VLANs (IEEE 802.1Q), GARP VLAN Registration Protocol (GVRP), MAC-based VLANs, Port-based Private VLANs, IP subnet-based VLANs 256. |
| 5. | Quality of Service | Support for Egress rate limiting, Eight egress queues per port, Voice VLAN, DSCP for IP-based QoS, Differentiated services architecture, IEEE 802.1p Class of Service with strict and weighted round Robin scheduling. |
| 6. | Multicast | Support for IGMPv1 and IGMPv2 snooping, Multicast groups 255, IGMPv2 snooping querier. |
| 7. | Management | Support for Telnet server, should have Console management port, Web GUI, Enhanced Stacking, HTML, HTTP, TFTP, zModem, SNMP V3, RMON 4 groups Stats, History, Alarms and Events, Event log, Auto config, MIB, SNTP, sFlow or equivalent. |
| 8. | Security | The switch should support TACACS+, RADIUS accounting and RADIUS client, IEEE 802.1x port-based Network Access Control (NAC), IEEE 802.1x multiple supplicant mode, EAP, EAP-TLS, LEAP, PEAP, TTLS, Microsoft NAP compliant, Symantec NAC support, Per port MAC address filtering, Layer 2/3/4/ Access Control Lists (ACLs), SSLv3 for Web management, Per port MAC address limiting, MAC address security/lockdown, Guest VLANs and SSH session Time out. |
| 9. | Resiliency | IEEE 802.1D Spanning-Tree Protocol, IEEE 802.1D-RapidSpanning-Tree Protocol and IEEE802.1q-Multiple Spanning-Tree Protocol, BPDU guard, Loop guard and Root |

| | | |
|---|---|---|
| | | guard |
| 10. | Other Essential Feature | Support for IPv6 host, ICMPv6, IPv6 ACL, Dual-stack IPv4/IPv6 management, IPv6 applications WEB/SSL, Static IPv4 routing 4K, RIPv1,v2, Proxy ARP, IEEE 802.3ad, ICMP, LLDP-MED, LLDP, DHCP snooping, DHCP option 82, DHCP relay, ICMP. The switch should have ECO Friendly design and fan less operation |
| 11. | Power Characteristics | Voltage: 100-240V AC (10% auto-ranging), Frequency 47-63Hz<br>Operating temperature: 0C to 40C<br>Storage temperature: -25C to 70C<br>Operating humidity: 5% to 90% non-condensing |
| 12. | Safety Certifications | EMI: FCC class A, EN55022 class A, C-TICK, VCCI Class A, CE, UL 60950-1 (cUlus), EN60950-1 (TUV), EN60825 Etc and Compliant with RoHS standards. |

12.4.1.5 Layer 3 / Core Level Managed Switch

| # | Parameter | Specifications |
|---|---|---|
| 1. | Port Density & Redundancy | The switch should have minimum 24x10/100/1000T Ports plus 2 Nos. SFP/SFP+ ports to accommodate 1000 Base-X/10G Fiber module for flexibility and 02 & Nos.10 G Ports/Stack Port. Should have dual internal / External Power supply from day one. |
| 2. | Performance | The switch should have minimum 125 GBPS Switching Fabric or higher |
| 3. | | The switch should have minimum 94 Mpps Forwarding rate or higher |
| 4. | | Should support at least 16000 MAC Address |
| 5. | | Should have at least 2MB Packet Buffer Memory |
| 6. | | Should support at least 9KB Jumbo Frame |
| 7. | | Should have stacking option to act as single switch with 20 GBps of stacking bandwidth and Switch should come with Stacking Module and Cable |
| 8. | Management | Should have USB interface for software release file , configuration or backup |
| 9. | | Should have industry standard CLI and GUI |
| 10. | | Should have RJ45/DB9 console port for management purpose |
| 11. | | Should have mechanism to disable the Port LEDs of switch for low power consumption/ECO Friendly nature |
| 12. | | Should support VRRPv3 MIB |
| 13. | | Should support IEEE 802.1AB Link Layer Discovery Protocol (LLDP) |
| 14. | | Support sFlow/nFlow: A Method for Monitoring Traffic in Switched and Routed Networks |
| 15. | | Should support RFC 2787 Definitions of Managed Objects for VRRP |
| 16. | | Should support RMON MIB (groups 1,2,3 and 9) |
| 17. | | Should support Definitions of Managed Objects for Remote Ping, Trace route, and Lookup Operations |
| 18. | Security | Should support Strong password security &WEB Authentication |
| 19. | | Should have private VLAN and intrusion detection mechanism |
| 20. | | Should support Access Control List, IP Source Guard, BPDU Guard |
| 21. | | Should support Guest VLAN and MAC based Authentication |

| | | |
|---|---|---|
| 22. | | Should support RADIUS and RADIUS Accounting |
| 23. | | Should support DoS Attack Blocking and Virus Throttling |
| 24. | | Should support Secure Shell (SSHv2) Protocol Architecture |
| 25. | | Should support TACACS+ Accounting and Authentication |
| 26. | | Should support IEEE 802.1X Authentication protocols (TLS, TTLS, PEAP ) |
| 27. | | Should support IEEE 802.1X Multi-Supplicant Authentication |
| 28. | | Should support IEEE 802.1X Port Based Network Access Control |
| 29. | Routing | Should support RIP,OSPF,OSPFV3,RIPng,Q in Q |
| 30. | | Should support Internet Protocol (IP), UDP, Equal Cost Multi Path (ECMP) routing |
| 31. | | Should support Address Resolution Protocol (ARP), Reverse ARP and Proxy ARP |
| 32. | | Should support Policy-based Routing and Route Maps |
| 33. | | Should support RIPng for IPv6, RIP-2 MD5 Authentication |
| 34. | | Should support Bootstrap Protocol (BootP) and DNS Client |
| 35. | | Should support ICMP Router Discovery Messages and Classless Inter-Domain Routing (CIDR) |
| 36. | | Should support OSPF Link-local Signaling and OSPF protocol analysis |
| 37. | QOS | Should support DiffServ Precedence for 8 queues/port and DiffServ Architecture |
| 38. | | Should support Policy-based QoS based on VLAN, Port, MAC & general packet classifiers |
| 39. | | Should support Limit bandwidth per port or per traffic class down to 64Kbps |
| 40. | | Should support IEEE 802.1p Priority Tagging and Policy-based Storm Protection |
| 41. | | Should support Strict priority scheduling, weighted round robin or mixed |
| 42. | | Should support RED and WRED curves for drop precedence |
| 43. | VLAN | Should support IEEE 802.1Q Virtual LAN (VLAN) Bridges |
| 44. | | Should support Generic VLAN Registration Protocol (GVRP) |
| 45. | | Should support IEEE 802.1v VLAN classification by protocol & port |
| 46. | | Should support IEEE 802.3ac VLAN tagging and Voice VLAN |
| 47. | IPV6 Support | Should supportIPv4 & IPv6 Dual Stack |
| 48. | | Should support 6to4 Tunneling and DHCPv6 Relay |
| 49. | | Should support DNSv6 and NTPv6 |
| 50. | | Should support IPv6 Management via Ping, Trace Route, Telnet and SSH |
| 51. | Resiliency Features | Should support STP Root Guard and Dynamic Link Failover |
| 52. | | Should support VRRP version 3 for IPv4 and IPv6 |
| 53. | | Should support IEEE 802.1Q Multiple Spanning Tree Protocol (MSTP) |
| 54. | | Should support IEEE 802.1D Rapid Spanning Tree Protocol (RSTP) |
| 55. | | Should support Loop Protection - Loop Detection and Thrash Limiting |
| 56. | | Should support PVST+ compatibility-mode |
| 57. | Other Features | Should support Port Mirroring, Trace Route |
| 58. | | Should support Full environmental monitoring of PSUs, fans, temperature and internal voltages. SNMP traps alert network |

| | | |
|---|---|---|
| | | managers in case of any failure |
| 59. | | Should support Private VLANs, providing security and port isolation of multiple customers using the same VLAN |
| 60. | | Should support IGMP Snooping, MLD Snooping (v1 & v2), IGMPv3 , PIM-SM |
| 61. | | Should support SMTP Service Extension for Authentication |
| 62. | | Should Support IEEE 802.1AX Link Aggregation (static and LACP) |
| 63. | Environment | Operating temperature range:0°C to 45°C (32°F to 113°F) |
| 64. | | Storage temperature range: -25°C to 70°C (-13°F to 158°F) |
| 65. | | Operating relative humidity range: 5% to 90% non-condensing |
| 66. | Electrical Approvals | Should be complied for EMC: EN55022 class A, FCC class A, VCCI class A EN55024, EN61000-3-levels 2 |
| 67. | Safety | Safety Standards should be as mentioned UL60950-1, CAN/CSA-C22.2 No. 60950-1-03, EN60950-1, EN60825-1 |
| 68. | | Certification: UL, cUL, TUV or equivalent |
| 69. | RoHS | The switch should be RoHS complied |

12.4.1.6 Network Management System and WLAN Management System

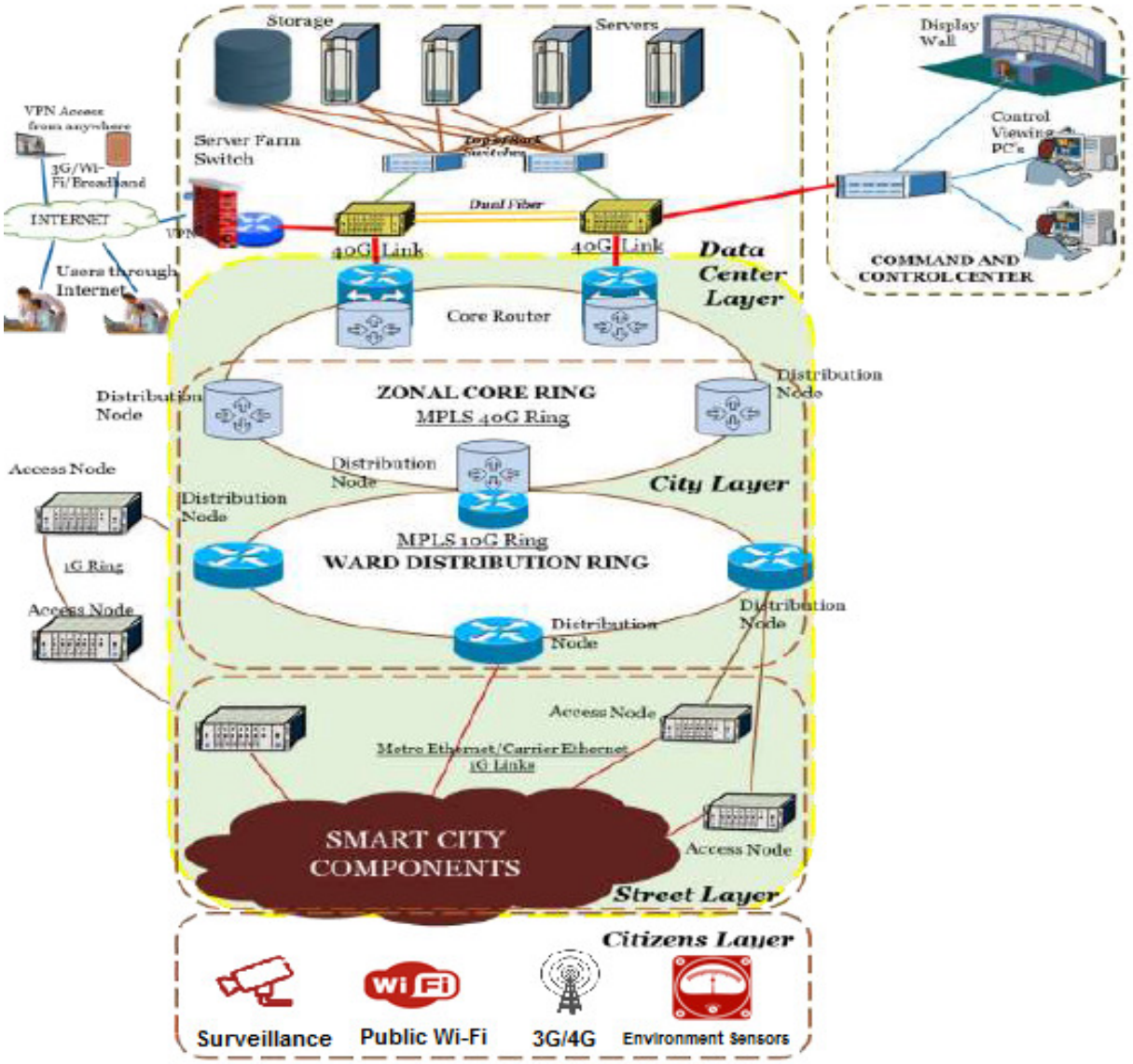
| # | Network Management System for LAN Switches |
|---|---|
| 1 | Management system should provide a single integrated solution for comprehensive lifecycle management of the wired and wireless LAN (of same OEM), and should support rich visibility into end-user connectivity and application performance assurance issues |
| 2 | The NMS should support an open database schema, configuration, administration, monitoring and troubleshooting of Switches, guided workflows based on best practices with built-in configuration templates, the capability to view the network topology, Layer 2 Services and Fault Management |
| 3 | The NMS should automatically discover IP devices, SNMP compliant network devices on the network |
| 4 | The NMS should support Inventory management of Network devices, should support Monitoring and troubleshooting of Devices, should support configuration management and reporting. |
| 5 | The NMS should support flexible reporting for inventory, user tracking, compliance, switch port usage and end-of-sale |
| 6 | The NMS should provide on dedicated appliance/installed as a virtual appliance/ Intel based severs/ AMD based server and should support installation on Windows/ Linux |
| 7 | Support for Wireless Management Features (Same functionality can be provided via separate Wireless management system but same should be able to integrate with Wired Management system to implement unified policies) |
| 8 | Must show location information of clients, infrastructure Access Points, Rogue Access Points, and RF tags in a map format. |
| 9 | Must support following features |
| 10 | Wireless LAN Planning and Design, Network Monitoring and Troubleshooting, Indoor location monitoring capability, Centralized Software updates, Network mapping with floor plans for easier automated site survey |

| # | Network Management System for LAN Switches |
|---|---|
| 11 | Shall provide in-depth visibility of finding, classifying, correlating, and mitigating interference from Wi-Fi and non-Wi-Fi sources such as rogue access points, microwave ovens, Bluetooth devices, and cordless phones. |
| 12 | Should provide deep integration with the authentication; authorization, posture & Profiler to further extend the visibility across security and policy- related problems, presenting a complete |
| 13 | Must support virtualization, whereby wireless resources (APs, controllers, geographical areas) can be divided into logical domains and administrator access limited to specific domains. |
| 14 | NMS has to be from the same OEM as of Switches |

## *12.5 Optical Fiber*

### 12.5.1 Network Architecture

High level design architecture of the proposed Smart City Network for Jabalpur is illustrated in the figure below. As illustrated in the architecture, the whole city will be covered using the fiber rings. Here for illustration only one ring is shown, however there will be multiple rings to cover the entire endpoints of the city.



- **Core Node:** The two Core nodes/Routers shall reside in the data center which shall act as redundant nodes and connected to server farm switch north bound and connected to distribution node (at the same premises) south bound.
- **Zonal Core Ring:** The scope of this ring under city layer is interconnecting all the zonal offices (15 numbers) along with along with Command & Control Center/Data Center. The key objective of this ring is to aggregate traffic from all the ward rings
- **Distribution Node:** There shall be Ward distribution rings under city layer. The proposed Fiber network rings will connect various service distribution points (Street layer) where the connectivity will be further extended to the actual service delivery point (citizen layer). These Service delivery points are here named as Distribution Node (DN).
- **Ward Distribution Ring:** There shall be ward offices (79 numbers) connected to zonal offices. Approximately 5-6 ward offices shall be connected in a ring architecture with one zonal node
- **Access Node:** The Access nodes shall connected to the nearest distribution node through ring/linear topology whichever is feasible & effective while actual design. The Nodes connected to the distribution nodes north bound and connected to services node south bound are here named as Access Node (AN)

Following are the main features of the solution;

- Shall support multi-tenancy- which enables multiple agencies share common network securely
- Shall be redundant and high available across levels, zonal, ward etc.
- Shall be secure – Network protocols and firewalls, Migration of perimeter to role based security
- Leverage future technologies – Software defined networks, Network function virtualization etc
- Shall be Intelligent and QoS based , To cater to critical and normal traffic

12.5.2 Specifications

12.5.3 Optical Fiber (24/48 Core)

| # | Cable Type | Armored Optical Fiber Single Mode 24/48 Core |
|---|---|---|
| 1. | Core | 24/48 |
| 2. | Mode | Single Mode |
| 3. | Cladding diameter | 125.0 µm ± 1.0 |
| 4. | Coated fibre diameter | 245 µm ±10 |
| 5. | Core/cladding concentricity Error | ≤ 0.8µm |
| 6. | Coating/cladding concentricity | ≤ 12µm |

| | | |
|---|---|---|
| | Error | |
| 7. | Cladding non-circularity | ≤ 1.0 % |
| 8. | Mode Field Diameter | 9.3µm ± 0.5 at 1310nm |
| 9. | Attenuation (cable) | 0.36dB/Km at 1310nm, 0.25dB/Km at 1550nm |
| 10. | Zero-Dispersion Wavelength | 1300 to 1322 nm |
| 11. | Zero-Dispersion Slope | ≤0.092 ps/Sq. Nm .km |
| 12. | Cut-off Wavelength | ≤1260 nm |
| 13. | Polarization Mode Dispersion Coefficient | ≤0.2 at 1310nm |
| 14. | Fibre macro bend loss | ≤0.05dB at 1550 nm with 75 mm dia, 100 turns |
| 15. | Fibre macro bend loss | ≤0.5dB at 1550 nm with 32 mm dia, 1 turn |
| 16. | Cut off Wavelength | 1260-1270 nm |

12.5.4 Patch Cord

| # | Make and Type | Simplex Patch cord |
|---|---|---|
| 1. | Cable Diameter | 3mm Simplex |
| 2. | Ferrule | Ceramic |
| 3. | Buffer | .9 mm easy strip |
| 4. | Insertion Loss | MAX .3 db Typical .15 db |
| 5. | Return Loss | > 60dB APC |
| 6. | Temperature Range | -25 Deg. C +70 Deg. C |

12.5.5 HDPE for laying OFC

Permanently lubricated HDPE telecom Ducts for use as underground optical fibre cable conduits conforming to TEC/GR/TX/CDS-008/03/MAR-11 issued by Telecom Engg. Centre, New Delhi.

| # | Parameter |
|---|---|
| 1. | HDPE Pipe Silicon Coated 40/33 mm i.e. outer/inner dia |
| 2. | Permanent lubricated HDPE Pipe / Duct shall confirm to IS 7328 or to its equivalent |
| 3. | Impact strength No crack or split in compliance to IS 12235 |
| 4. | Environmental Stress cracking resistance (ESCR) conforming to American Society forTesting& Materials (ASTM) D 1693 |
| 5. | Environment Condition with ambient temperature : 0 deg C to +55 degree C |
| 6. | Appearance: Smooth inside & outside surface, free of blisters, shrink, hole, flaking, scratches & roughness. Duct shall be smooth, clean and round |
| 7. | Lubricated layer: Must have inner lubricant layer clearly visible & white in color, uniform in thickness |
| 8. | HDPE Jointing Coupler:<br>a) As per standards, Compatible with the FDMS<br>b) Should be able to house Single mode fibre connectors<br>c) Should have option of 3 Duplex SC adaptor |

| | |
|---|---|
| | d) Should have rugged ceramic (Ziconia) sleeve for fibre ferrule alignment<br>e) Insertion loss (Max) = 0.5 db<br>f) Insertion loss(Typical) = 0.2 db<br>g) Service life (Cycles) = 1000 cycles<br>h) Storage temperature- 0 deg C to 85 deg C |

12.5.6 Network Switch (Junctions) Ruggedized

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Switch Architecture and Performance | The switch should provide minimum 12 port 10/100/1000 Mbps ports for downlink out of which minimum eight should be POE/POE+ and switch should additionally have 2 GE SFP uplinks scalable to 4 within the same unit. Should be proposed with ruggedized transceivers as per SI solution. |
| 2. | Switch Architecture and Performance | Switch should have wire rate switching fabric of minimum 20 Gbps or more. |
| 3. | Switch architecture and Performance | 802. 1Q VLAN on all ports with support for minimum 500 active VLANs amd minimum 1K Mac addresses |
| 4. | Layer 2 Features | Spanning Tree Protocol as per IEEE 802.1d, 802.1s qnd 802.1w |
| 5. | Switch Architecture and Performance | Should support Improved resiliency with support for ring protection protocol for ring topology |
| 6. | Layer 2 Features | Link Aggregation Control Protocol (LACP) as per IEEE 802.3ad |
| 7. | Switch Architecture and Performance | Switch should support IGMP v1/v2/v3 as well as IGMP snooping and minimum 500 IGMP Multicast Groups |
| 8. | Quality of Service (QoS) Features | Switch should support classification and scheduling as per IEEE 802.1P on all ports and four egress queues per port. Switch should also support Egress Queueing/shaping, Mechanism of applying Automatic QoS or equivalent mechanism |
| 9. | Quality of Service (QoS) Features | Switch should support strict priority queuing or equivalent to guarantee that the highest-priority packets are serviced ahead of all other traffic. |
| 10. | Security Features | Switch should support ACLs, TACACS+, RADIUS, "IP Route Filtering, ARP spoofing, DHCP snooping, DHCP Option 82, Dynamic ARP Inspection (DAI) |
| 11. | Standards | IEEE 802.1ae, IEEE 802.3af and IEEE 802.3 at power over Ethernet (POE) standards on all ports |
| 12. | Management Features | Switch should have a console port, support for SNMP Version 1, 2 and 3, TELNET, SSHv2, 4 groups of embedded RMON, , DHCP server |
| 13. | IPv6 Feature | The switch should support following IPv6 Features: 128-Bit Wide Unicast Addresses, DNS for IPv6, ICMPv6, Neighbour Discovery, SNMP and Syslog Over IPv6, HTTP over IPv6 and IPv6 MLD snooping |
| 14. | Certification | RoHS Compliant Minimum QM333 or NEMA TS2 |
| 15. | Certification | ODVA Industrial Ethernet/IP, PROFINETv2, ABB IT Certificate minimum IP30 |
| 16. | Certification | CSA C22.2, UL/CSA 60950-1, EN60950-1, CB to IEC 60950-1 |
| 17. | Switch Architecture and Performance | DIN rail mount |
| 18. | Certification | FCC, IEC/EN 55022, RoHS |

| | | |
|---|---|---|
| 19. | Operating Temperature | 0°C to +65°C with Enclosure, Enclosure to be provided as required |
| 20. | Certification | IEC 60068-2-27 (Operational Shock, Non-Operational Shock) |
| 21. | Certification | IEC 60068-2-6, IEC 60068-2-64, EN61373 (Operational Vibration, Non-operational Vibration) |
| 22. | Operating Humidity | Relative Humidity of 10% or 85% Non-condensing, IEC 60068 -2-3, IEC 60068-2-30, IEC 60068-52-2 |
| 23. | Product Support | The system should not be end of life/end of service product |

12.5.7 Junction Box

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | General Requirement | All the junction boxes shall be out door type with IP65 protection from rain, water.<br>Provision for theft prevention. (Expected outdoor temperature 500C). |
| 2. | | 1.5 mm steel sheet, profiled frame construction consisting of 9 folded rolled hollow sections punched on a 25mm DIN Pitch pattern with load carrying capacity of 1000 Kgs.<br>Front and rear 2 mm thick sheet steel door with PU Foamed Seal (Gasketing) with removable galvanized rectangular frame with holes on a 25 mm DIN pitch pattern with 3 point locking system. The hinges and retainers should be made of die cast, copper nickel chrome plated with SS hinge pins. The doors should be swapped to LH if required with door opening angle 130 deg to VDI. Top panel made of 1.5 mm thick sheet steel with PU foamed (Gasketing) boltable from inside.<br>Bottom panel made of 1.5 mm thick sheet steel with PU foamed (Gasketing) with provision for fixing 4 nos of PG 29 glands.<br>Side panels in double walled construction with air gap of minimum 20 mm between two walls with PU foamed(Gasketing) for IP 55 protection.<br>Painting: Electro-phoretic dip coat priming to 20 Microns and then powder coated to RAL 7035 textured Pure Polyester (PP) to 80 to 120 Microns. Powder coated with surface finishing With nano-coating, for the best possible surface protection and corrosion resistance. Side and Wall Panels shall be double wall constructed, with fixing bolts internal to the cabinet. |
| 3. | | Should be outdoor type, Floor mounting with 3 point locking option, suitable to mount the switches and required UPS. The opening lever/handles shall be made of metal. Each Cabinet will be mounted on a raised height concrete Plinth, 600 - 1000 mm high, as per site requirements |
| 4. | | The cabinet will be provided with a dimension of 800mmW x 1200mmH (24UH) x 800mmD with 19" mounting arrangement suitable for the mounting of the associated network, power, UPS and Split Battery components securely and safely within the cabinet. |
| 5. | | The junction box shall have floor mount type with required mounting accessories to provide a flexible solution for space constrained traffic applications. |
| 6. | | 2 x 5 way/15 Amp PDU's will be provided to support the site equipment. 2 x thermostat controlled 230V AC Fans with 100% Duty Cycle with Filter and 2X Filter units with IP55 Rating with rain Canopy shall be fitted to the front door of the cabinet to provide ventilation to cool the equipment. Fan and Cabinet should be from |

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| | | same OEM for better SLA and provision to drive power for the camera is required. |
| 7. | | 75mm Rain canopy on Top with all around projection of the enclosure such that that rain water, water logging shall not penetrate in the junction box and hamper working of the system, cable entry with glands |
| 8. | | Small Junction box for mounting the electric meter with viewing window should be provided for mounting Electrical Meter and Fuse and MCB with separate lock for utility power connection, as per electricity board, rules. |
| 9. | | Protection from ants, bugs and other small insects entering into the enclosure |
| 10. | Standard and Support | Regulatory Standard Compliance: IP55 to EN60529/09.2000, ISO 9001, 14001, 18001 comply with EIA 310, DIN 41494 and IEC 297 standards. The system should not be an end of life / end of service product. |

12.5.8 Field UPS

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Capacity | 1 KVA |
| 2. | Input Range | Voltage Range 155-280 V on Full Load<br>Voltage Range 110-280 V on Less than 70% Load Frequency 50 HZ ±3<br>HZ |
| 3. | Output Voltage & Waveform | 220V AC/ 230V AC/ 240V AC (Selectable) |
| 4. | I/P & O/P Power Factor | 0.9 or higher power factor |
| 5. | Mains & Battery | Sealed Lead Maintenance Free VRLA type (Lead Calcium SMF batteries NOT acceptable), Mains & Battery with necessary indicators, alarms and protection with proper battery storage stand |
| 6. | Frequency | 50 Hz +/- 0.5% (free running), Pure Sine wave |
| 7. | Crest Factor | min. 3:1 |
| 8. | Third Harmonic Distribution | < 3% |
| 9. | Input Harmonic Level | < 10% |
| 10. | Overall Efficiency | Min. 90% on Full Load; |
| 11. | Noise Level | < 55 dB @ 1 Meter |
| 12. | Backup | at least 240 minutes (4 hours / VAH) |
| 13. | Warranty | 3 years with UPS & battery |
| 14. | Certification | ISO 9001:2008 & ISO 14001 certified |
| 15. | Protection | To be provided for overload/ short circuit; overheating; input over/under voltage; output over/ under voltage. |
| 16. | Alarms & Indications | All necessary alarms & indications essential for performance monitoring of UPS like mains fail, low battery & fault detection |
| 17. | Interface | SNMP interface support (for remote monitoring) |
| 18. | Galvanic Isolation | To be provided through Inbuilt transformer |
| 19. | Compatibility | UPS to be compatible with DG Set supply and mains supply |
| 20. | Bypass | Automatic Bypass Switch |
| 21. | Technology | True ON-LINE (Double Conversion) with IGBT based inverter and PWM Technology |
| 22. | Support | The system should not be an end of life / end of service product |

| | | |
|---|---|---|
| 23. | Operating Temperature | 0 to 55 Degrees Centigrade |

12.5.9 Patch Panel/Fiber Interface Unit

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | 48 Port Patch Panel | Straight or Angled, 110 IDC type at rear end & RJ 45 jack on front Panel individually replaceable, with individually replaceable jacks 19" rackmountable, should confirm or exceed the EIA/TIA 568C standardsfor CAT 6,Metallic high strength & 1U height to save rack space, confirmEIA/TIA 568B wiring pattern, Panel Black powder coat steel with markings, ULlisted&Verified. |
| 2. | 24 port Patch Panel | 24-port, Unshielded Twisted Pair, Category 6, TIA / EIA 568-C.2 Angled or Straight<br>Port arrangement: PCB based 110 connect modular type<br>Ports must be individually replaceable, 24 Port, Circuit Identification Scheme: Icons on each of 24-ports<br>Port Identification: 9mm or 12mm Labels on each of 24-ports (to be included in supply)<br>Height: 1 U (1.75 inches)<br>Modular Jack: 750 mating cycles<br>Wire terminal (110 block): 200termination cycles<br>Accessories: Jack with Strain relief and bend limiting booton jack for cable<br>Materials: ROHS compliant<br>Housing: Polyphenyleneoxide, 94V-0 rated,<br>Wiring blocks: Polycarbonate, 94V-0 rated, IDC<br>Jack contacts: Beryllium copper with thick gold and minimum thick nickel under plate<br>Panel: Black, powder coated steel<br>Approvals: UL , ETL and 3P<br>Termination Pattern: TIA / EIA 568 A and B,<br>Performance Characteristics: Attenuation, NEXT, PS NEXT, FEXT and Return Loss. |

12.5.10 EMS Software for Transport Layer

| # | Specifications |
|---|---|
| 1 | The system shall support capability for central monitoring through NOCs. The system should also support remote monitoring and configuration. |
| 2 | EMS shall provide the FCAPS management functionality to the network elements. All proprietary implementations shall end at EMS itself. EMS shall provide all information/functions required by NMS. |
| 3 | EMS for Network Elements shall support northbound open interfaces like SNMP/JAVA/CORBA/XML for integration with the NMS. Open interfaces supported by EMS should, inter-alia, provide fault, topology and performance statistics. The Concessioner shall be required to provide API/MIBs to facilitate integration of EMS with NMS. It should be possible to provide FCAPS for all NEs in the network from NMS. |
| 4 | The EMS system shall support SNMPv1, v2 & v3. |

| # | Specifications |
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| 5 | The EMS architecture shall be client–server based. The server will be Windows/Linux/Solaris based server with client being GUI/web browser based access with secure interface to the server. |
| 6 | EMS should facilitate simplified configuration, fault and performance management by allowing the user to zoom down to the port level of any given card /equipment. |
| 7 | EMS should support the following regarding NE software management:- |
| 8 | • Loading of new NE software images.,<br>• Management of multiple versions of NE software on the same network.<br>• Installation of software updates.<br>• Software download status reporting.<br>• Administrator authorization for the loading of NE software from local or remote operator terminals.<br>• The Management System shall be able to coordinate the software download to multiple NEs based on a single software source.<br>• The Management System shall manage version control for all NE software and be able to ascertain if a specific software version need to be downloaded to a target NE. |
| 9 | Administrator authorization for the loading of NE software from local or remote operator terminals. |
| 10 | Common Configuration Management Requirements |
| 11 | The EMS should be able to provision, configure and manage portfolios of the corresponding sub system. |
| 12 | EMS should allow service and equipment provisioning. |
| 13 | The Management System shall be able to auto-discover the NEs and the corresponding connections between the NEs. |
| 14 | The Management System shall support the provisioning of :- |
| 15 | All equipment parameters. Threshold Crossing Alert(TCA) Alarm Severity |
| 16 | It should be able to classify the alarms into different categories e.g. emergency/Critical, Flash/Major, Immediate/Minor, Priority/Warning, Deferred/Informative depending upon the severity of the alarm. |
| 17 | It should be able to display a dashboard indicating the number of active alarms with filtering options based on the period, duration, severity, event type and location. |
| 18 | The NMS system should be able to email or SMS to the users belonging to the roles assigned for the corresponding event type. |
| 19 | All failure and restore events should be time-stamped. |
| 22 | The GUI shall provide the ability to create, delete and modify topology views of the network that will be displayed graphically. |
| 23 | EMS should be open, secure, and scalable software for optimizing network infrastructure and operations management through dynamic policy. |
| 26 | Should support automated discovery of network topology (devices and interconnections). |

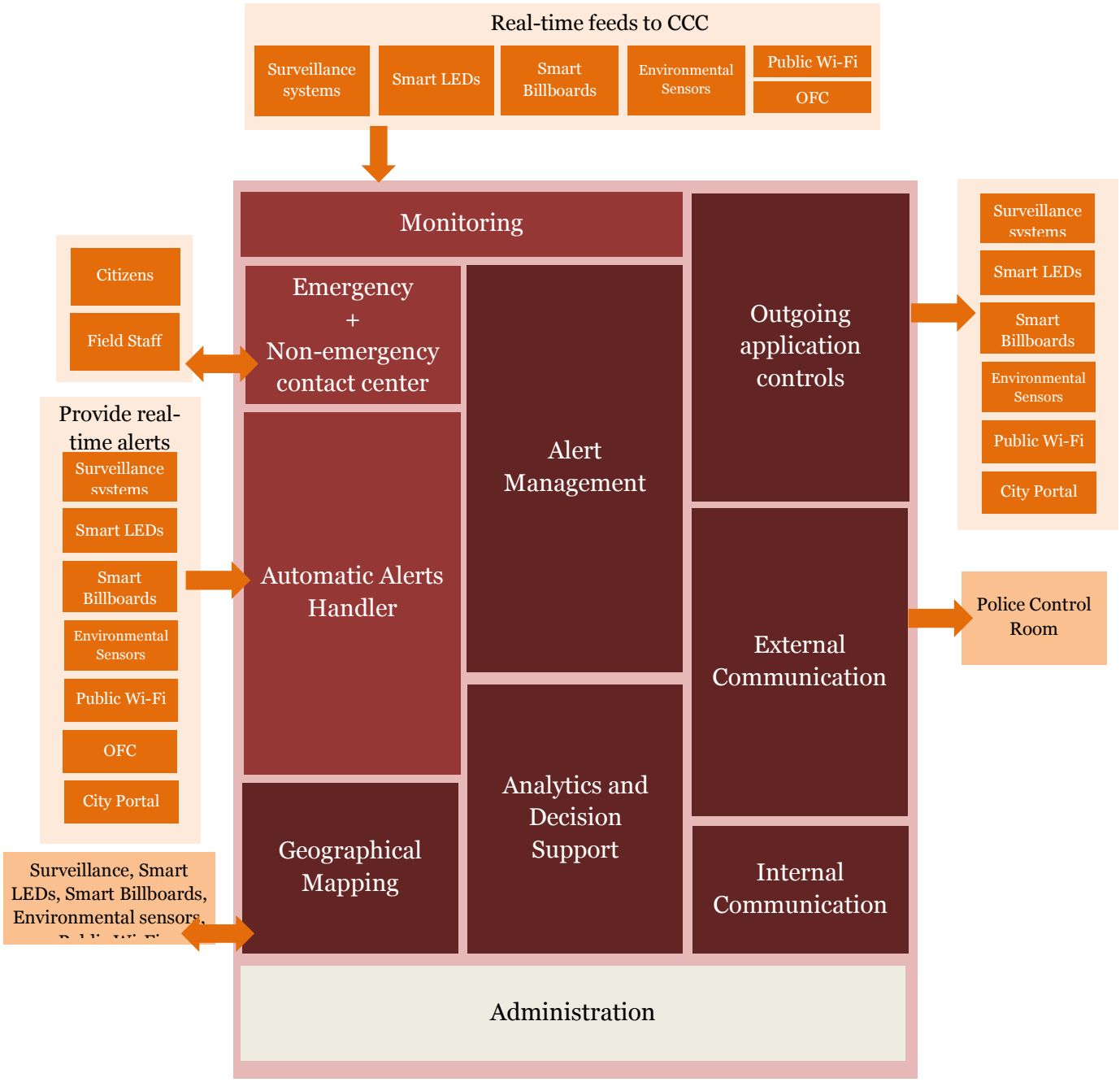
| # | Specifications |
|---|---|
| 27 | Should have tools for visualizing the discovered topology. |
| 29 | Should support zooming for fine-grained device view. |
| 32 | Should support configuration editor that provides the ability to view, edit, and delete all aspects of a device's configuration. |
| 33 | Should support audit log that captures all template deployment operations. |
| 34 | Should have ability to view a given device's configuration and edit add, or delete portions of that configuration. |
| 36 | Should support rapid deployment of switching, routing, and security infrastructure. |
| 38 | Should support fast problem identification and resolution. |
| 39 | Should support APIs for customization and integration. |

## *12.6 Smart Bill Board*

| #. | Specifications |
|---|---|
| 1 | Smart Billboard should be able to house small cell or limited macro main remote telecom sites and site build solution with space for all necessary equipment and functions that radio sites in mobile networks require. This should be self -contained, multi-application intelligent site that is aesthetically unique and functionally viable. |
| 2 | Height of smart billboard should be of 9-10 mtr height |
| 3 | It should provide Space for telecom equipment, should be able to support 2G, 3G, LTE, Wi-Fi, 5G etc. |
| 4 | It should have ability to house power plant and battery |
| 5 | It should have provision for incoming power input cables and fiber connectivity |
| 6 | It can be Floor or Ground Mounted |
| 7 | It should be Vandal Proof |
| 8 | It should have display of minimum 60 inch. |
| 10 | It should be Aesthetical & Camouflaged finish with respect to environment |

## *12.7 Central command and control Centre*

The implemented system will comprise of various Applications and field level equipment's which will provide data and information to the Centralized Command and control Centre (CCC). The CCC will process these inputs and provide the integrated view to the various decision makers like emergency response team for actionable intelligence. The below diagram shows the interaction of various entities with the various functions of the CCC:



12.7.1 Specifications

12.7.2 The Command & Control Center Application

| # | Minimum Specifications |
|---|---|
| 1. | The solutionshould be commercial-off-the-shelf applications that are customizable to meet the requirements of the RFP. |
| 2. | The solution should have the capability to integrate with existing GIS. If certain layers are not available then the Concessioner should give the details to the owner for creation of the layers |
| 3. | The solution operators and managers with a management dashboard that provides a regular status and is automatically updated when certain actions, incidents and resources have been assigned, pending, acknowledged, dispatched, implemented, and completed. The above attributes shall be colour coded. |
| 4. | The solution shall provide the “day to day operation”, “Common Operating Picture” and situational awareness to the centre and participating agencies during these modes of operation |
| 5. | It shall improve scalability for large and geographically distributed environments |
| 6. | It shall provide complete view of facilities, sensors, and alarms in an easy-to-use and intuitive GIS-enabled graphical interface with a powerful workflow and business logic engine |
| 7. | It shall provide a uniform, coherent, user-friendly and standardized interface |
| 8. | It shall provide possibility to connect to workstations in order to be displayed in one or more video wall with one or more module/application/solution being independently and/or simultaneously being displayed and functional |
| 9. | The dashboard content and layout shall be configurable and information displayed on these dashboards shall be filtered by the role of the person viewing dashboard |
| 10. | The solution should allow creation of hierarchy of incidents and be able to present the same in the form of a tree structure for analysis purposes |
| 11. | The solution shall integrate with GIS and map information and be able to dynamically update information on the GIS maps to show status of resources. |
| 12. | The solution shall also provide an integrated user interface for all the smart components implemented |
| 13. | The solutionshall be available via a VPN as a web-based interface or a thin-client interface |
| 14. | It shall be possible to combine the different views onto a single screen or a multi-monitor workstation |
| 15. | The solution should maintain a comprehensive and easy to understand audit trail of read and write actions performed on the system |
| 16. | The solution should provide ability to extract data in desired formats for publishing and interfacing purposes |
| 17. | The solution should provide ability to attach documents and other artifacts to incidents and other entities |
| 18. | The solution is required to issue, log, track, manage and report on all activities underway during these modes of operation:<br>• anticipation of incident<br>• incident or crisis<br>• recovery<br>• incident simulation |
| 19. | **Core Components**<br>• Business Rules and SOP Definitions – should enable users to define the business rules around incidents handling as per agreed SOPs for JSCL<br>• System Platform – The platform should provide a common data integration layer which can collect and contextualize information from disparate data sources regardless of protocol. The platform should support templatization to allow “build once-deploy everywhere” functionality. |

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| | • Workflow and Incidents Lifecycle engine – This function should allow users to define and modify new workflows. The workflow could cut across multiple systems via the interfacing modules. Workflow for operational alerts and escalations should be triggered automatically without human intervention. Workflow approvals should have facility to approve from any device with e-signature. This function should provide facility to trigger a corrective action workflow and define the stakeholders for the same. Should manage the life cycle of incidents and related entities via pre-define workflows. The workflow could cut across multiple systems via the interfacing modules. Workflow for operational alerts and escalations should be triggered automatically without human intervention.<br>• Incidents Planning – should manage the planning preparations of an incident including resource allocation, tasks management etc.<br>• Analytics and MIS – should provide users with business analytics reporting and tools to organize, evaluate and efficiently perform day to day operations<br>• Incidents and KPI Dashboards – should present role filtered critical information pertaining to incidents and KPIs collated in a single view which can be drilled down further for more detailed information<br>• Security & Roles – should manage roles definition for internal as well as external access<br>• Centralized data archiving for operational data : Should provide facility for centralized storage of operational data (time-series or transactional) with high granularity and data compression capability<br>• Mobility: should enable app-based access to monitor alerts, KPI,KOPs, SOPs and reports to mobile users. Should support popularly user's smartphone /tablets. App content should be presented in context to the user role. |
| 20. | **Planning**<br>• The solution should have a planning, workflow and business rules engine to define the Standard Operating Procedures (SOPs) into the system.<br>• JSCL and other stakeholders should be configured into the application. The application should be able to create the JSCL organization structure together with roles and responsibilities within the system. Access to system functions and data shall be as per define roles and organization structure.<br>• The SOPS shall be capable of being converted into editable but administrator protected workflow and tasks.<br>• The solution shall present the workflow and task information in a clear and logical manner on the incidents screen.<br>• The solution shall include a section that will contain the Policy and standard operation procedures with easy to search functions to support the Operators during a crisis. |
| 21. | **Situational Awareness COP (Common Operational Picture)**<br>• The solution should be able to combine data from various sources and present it as different views tailored to different operator's needs.<br>• The solution should automatically update the information based on alarms and incidents that are presented to it via the business rules engine. The polling and application database refresh cycle shall be configurable to match the status of the situation (whether there is an emergency or crisis or just monitoring only).<br>• Common Operational Picture should comprise of a comprehensive view of the incident or a group of related incidents as on a specific date and time which should include but not be limited to the following:<br>o Tasks assignment and their status<br>o Agencies involved<br>o Resources deployed<br>o Incident status across relevant parameters of the incident e.g. household affected by a transformer shut down<br>o Timeline view of the situation |

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| | ○ Suggested actions from the system with their status |
| 22. | **Warning and Mitigation**<br>• The solution should use analytics to create a view of hazards and priorities based on a severity and risk profile.<br>• The solution shall be able to import data into its analytical tool.<br>• The solution should be capable of easily interfacing with any other external analytical tool that might be required in future to provide warning inputs to JSCL.<br>• The solution shall present a prioritized list of key anticipated incidents, actual incidents, and tasks requiring action.<br>• The solution should be capable of performing multi-dimensional analysis on incidents data. This should provide capability to do:<br>○ Trends Analysis<br>○ Predictive Capability<br>○ "What-if" analysis |
| 23. | **Resource Management**<br>• The solution shall provide an object based as well as visual representation of the multi-agency command structure at an incident. This visual representation is to be in the form of an organizational structure diagram. The management of resources, (who is doing what and answering to whom) is a critical part of this system and shall be configured into a particular actors attributes.<br>• The solution shall provide the following configuration functions around roles:<br>○ Allocation of roles<br>○ Creation, Editing and renaming of roles<br>○ Color coded role definition<br>○ Symbolic representation of roles<br>○ Notes and comments against roles<br>• The solution should provide a mechanism to define roles that are consistent with Organization Structure defined in application as part of requirements defined Planning section earlier.<br>• The solution should provide the following configuration functions around resources:<br>○ Building up the resourcing information on the organization structure<br>○ Creation of resources as different types of assets (Human, physical, financial, equipment, vehicles, machinery etc.)<br>○ Assignment of individuals to locations, agencies, tasks, or other resources<br>○ Creation of call signs and symbols relating to resources.<br>○ Maintaining relationships between resources.<br>○ Tracking of availability and movement of resources<br>• The solution should provide ability to define attributes of above mentioned resources and their relationships in order to capture the resource definition in a structured manner.<br>• The solution should provide ability to create organization structures that could be assigned to a specific operation, incident or a task. Thus assigned organization structure take precedence over the default organization structure |
| 24. | **Task Management**<br>• The solution should be able to create, assign, track and report on the lifecycle of tasks during a particular incident.<br>• The solution should allow a particular task to be decomposed into sub-tasks.<br>• The solution should provide an easy to interpret management dashboard view of the progress of all tasks during an incident.<br>• The solution should be able to organise the visual representation of tasks into prioritized list, filtered list, as well as colour coded representation for ease of understanding.<br>• The solution should be able to perform the following functions around task management: |

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| | ○ Create a task with unique ID. (Subtasks shall follow parent ID with second level numbering).<br>○ Assign a target completion date and time for the task, either directly or as a time-span from the task's creation.<br>○ Date and time stamp of the creation of the task.<br>○ Log and track status of tasks. Solution should provide capability to define status of tasks during its lifecycle. These status definitions could be mapped to other task attributes such as the task type.<br>○ Key-word search against task list.<br>• The above attributes shall be colour coded.<br>• The solution shall allow the tasks to be filtered on the real-time dashboard by agency then by task status. This filtering should allow an operator to filter for all tasks of a particular state or a combination of state; and by the time remaining until (or time elapsed since) the target completion time.<br>• The solution should allow multiple individual workstations to select specific agencies of interest on each workstation simultaneously.<br>• The solution should allow the JSCL to display all agencies' tasks simultaneously as well.<br>• The tasks should be displayed on a real-time timeline.<br>• The criticality of tasks should be dynamically changed depending on the performance of the incident response. |
| 25. | **Timeline and Charting**<br>• The system should provide a facility to see incidents and actions (tasks) added to the solution in a tabular list form as well as GANTT chart format filtered by day, week, month, year or any specific date range.<br>• The solution should provide a facility to see incidents, actions and interdependencies between actions in a clear visual graphical manner.<br>• The solution should be able to filter the information based on at least the following parameters:<br>○ Incident information<br>○ Resources information<br>○ Agency type<br>○ Tasks<br>○ Criticality or priority |
| 26. | **Business Rules Engine**<br>• The solution should have a built-in alarm handling facility based on configurable cause and effect rules.<br>• The solution should receive inputs (referred to as "incidents") from various sources. These incidents when passed through the business rules engine shall trigger an automated response as defined using the business rules engine.<br>• The business rules engine should be able to send and receive messages to other applications running within the solution suite as well as external systems like the surveillance system.<br>• The business rules engine shall be able to co-relate between different types of incidents or frequency of similar types of incidents.<br>• The business rules engine shall be able to distinguish between "early warning or anticipation" type mode of operation and an "emergency or crisis" mode of operation.<br>• The solution shall provide capability for users with appropriate rights to define business rules.<br>• Any update to the Business Rules (Add/Edit/Delete) shall go through an approval workflow before the rule gets activated. Workflow approvals should have facility to approve from any device with e-signature.<br>• The solution shall provide capability to do a simulation run of a newly created/added business rule before it is activated. |

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| 27. | **CCA Graphical User Interface (GUI)**<br>• The solution should present information on standard Windows based workstations and terminals.<br>• The solution GUI should have the following capabilities as standard:<br>o The solution GUI shall be able to present management data such as dashboards, alarm and alerts, resource management information, incident information in colour coded, clear, simple and unambiguous, logical format.<br>o The colour coding on the solution GUI shall represent the different status of a task or incident / alert.<br>o The solution layout and arrangement of windows shall be user customizable.<br>o Be able to present information and distinguish between an "early warning or anticipation" type set of data and "emergency or crisis" operating mode.<br>• The solution should be capable of presenting information in a browser based format such that it is accessible from any terminal with a web-browser. The supported browser should include, but not limited to, Internet Explorer, Chrome, Firefox and Safari<br>• The solution should be capable of showing still as well as video imagery.<br>• The solution shall also be able to present information on mobile devices such as tablets, smart-phones and tablet type devices while maintaining the basic UI features such as user friendliness, colour coding etc.<br>• The solution information shall be capable of pushing onto other display devices such as the video wall of the Command & Control Center.<br>• The solution should be capable of providing the following features for still imagery:<br>o The solution shall have a thumbnail gallery to display all imported images<br>o The solution shall be able to import pictures from still imagery cameras<br>o The solution shall be able to import pictures from local hard drives<br>o The solution shall be able to share the imported images with other users<br>o The solution shall time and date stamp any imported images<br>o The solution shall have the ability to view each still image full screen<br>o The solution shall have the ability to zoom in an out of a still image when viewed full screen<br>o The solution shall allow the image to be imported to the planning whiteboard module<br>o The solution shall enable users to add tags to images for easy search and retrieval later on<br>o The solution shall enable users to group and title images together for easy retrieval<br>• The solution should be capable of providing the following features for video imagery:<br>o The solution shall be able to display video imagery<br>o The solution shall have a thumbnail gallery to display all video images<br>o The solution shall allow the video streams to be grouped and titled as per defined requirements.<br>• The solution presentation server shall have the capability of only refreshing those elements of the GUI that have changed state. |
| 28. | **Recovery and Reporting**<br>• The solution should have a background function to collect and store the centre's performance data during an incident. The performance data shall be user configurable. Typical fields for performance shall be:<br>o Actions-planned versus actual<br>o Resources involved<br>o Decisions executed<br>o Schedule / incident duration performance<br>o Incident information, e.g. no. of fatalities, persons recovered<br>o Post-incident recovery information<br>• The analytics tool should be able to produce performance analysis and produce |

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| | dashboard reports on performance.<br>• The solution should be capable of providing a clear reporting function following an incident for:<br>  o Management and dashboard reporting<br>  o Analysis of what went well and "lessons learnt"<br>• The solution should allow users to define benchmarks against performance parameters. Performance reports shall have the option to generate reports with or without benchmark comparison<br>• The solution should provide facility to trigger a corrective action workflow and define the stakeholders for the same. |
| 29. | **General System Display Functionality**<br>• Shall have the facility to view and handle multiple alarms at one time<br>• Shall have the facility to view multiple video windows at one time. Operators shall be able to resize and move video windows.<br>• Shall have the facility to view windows in a single monitor or across multiple monitors<br>• Shall have the facility to access, display and manage incidents/alarms and related sensors data and information from subsystem based on priority and authority level.<br>• Shall view and manage detailed response procedures and tasks<br>• Shall enable a single operator or multiple operators to monitor and control commands from connected subsystems, including all operational capabilities for detection, assessment, notification, entry control, and communications<br>• Shall provide the rapid annunciation and display of alarms to facilitate evaluation and assessment |
| 30. | **GIS Display**<br>• Shall view the environment through geospatial or fixed composite computer-generated (JPEG, BMP, AutoCAD, etc.) map<br>• Should allow user to view sensor and related name from the displayed map<br>• Should allow all resources, objects, sensors and elements on the map to be geo-referenced such that they have a real world coordinate.<br>• Should visually display a camera sensor with related camera orientation, camera range and camera field of view angle.<br>• Should visually display an alarming sensor on map<br>• Should visually differentiate sensor alarm severities on map through different color and icon identifiers<br>• Should immediately view alarm details (including description, video, etc.) and investigate the alarm from the map<br>• Should allow user to choose camera and other sensors from map to view live video and the data<br>• Should allow user to choose camera and take live video image snapshot and save to file from any camera<br>• Should allow user to choose camera from map to move PTZ cameras<br>• Should allow user to choose camera to play, pause, stop, fast-forward, rewind, and play recorded video from preset time<br>• Should allow user to choose camera and take recorded video image snapshot and save to file or print from any live or recorded video<br>• Should allow user to jump from one map to the next with a single click of a mouse with map links<br>• Should allow map information "layers" to be displayed/hidden on items such as –<br>  o Sensor names<br>  o Sensors<br>  o Sensor range (e,g. camera – orientation, range, field of view angle)<br>  o Locations and zones<br>  o Perimeter ranges<br>  o Resource tracks |

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| | ○ Allow user to zoom in/out on different regions of map graphic |
| 31. | **Video Display**<br>• Shall view live or recorded video from resizable and movable windows<br>• Should have an ability to perform video controls for video systems from workstation<br>• Shall play, fast-forward, rewind, pause, and specify time to play recorded video<br>• Shall take a video still image (snapshot) from live or recorded video<br>• Shall export video for user specified time and duration<br>• Shall have the capability to move PTZ cameras<br>• Shall view Video in Video Matrix<br>• Shall display in 1x1, 2x2, 3x3 and 4x4 window formats<br>• Shall enable operator to specify video windows to be displayed in matrix<br>• Shall enable matrix settings to be saved per user<br>• Shall view either live or recorded video can be displayed in the video matrix window.<br>• Shall enable video snapshot to be taken and saved from any window pane in the matrix view<br>• Shall rotate video in "virtual" video guard tour<br>• Shall rotate through multiple video views based on predefined video camera sequence and duration.<br>• Shall enable the user to pause the rotation of video and resume the video rotation again<br>• Shall enable times between new video to be adjusted<br>• Shall enable both live video and recorded video to be played through the video guard tour.<br>• Shall enable alarms to be generated from any video pane<br>• Shall enable to only view and control video for which they have been assigned permissions by the administrator<br>• Shall manually create an alarm from the live or recorded video with specified severity and description |
| 32. | **Summary Dashboard**<br>• Shall provide alarm summary of each monitoring zone or monitoring area in graphical chart format<br>• Shall display the following charts per global area, monitoring zone or monitoring area<br>• Shall Open Alert Count by Monitoring Zone/Monitoring Area<br>• Shall have the capability of New vs. Viewed (Opened Alerts)<br>• Shall Open Alert Count by Alert Severity<br>• Should have Highest Severity Alert<br>• Shall enable Monitoring Zone or Monitoring area default to Summary view dashboard or to a map when the zone or area is selected.<br>• Shall provide a tabular list of sensors in each monitoring are |
| 33. | **Alarm Display**<br>• Shall display real time, dynamic, iconic status of alarm point indications, overlaid onto a computer generated or GIS graphic map of the detection area and zone<br>• Shall display textual alarm description alarm status, severity, activity, operator actions, tasks and procedures, and time/date status.<br>• Shall allow users to view digital video scenes, automatically or manually, related to alarm for both live and recorded video<br>• Shall allow users to handle alarms based on priority<br>• Shall allow users to handle and view multiple alarms in individual windows or in a list<br>• Shall allow users to view alarm notification in system tray<br>• Shall allow users to view alarm notification and alarm summary in alert list window pane |

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| | • Shall allow users to view alarm notification in the hierarchical tree view<br>• Shall allow users to view alarm in a specific zone and associated with specific sensor on the map<br>• Shall allow users to view a list of alarms associated to a sensor on the map<br>• Shall sort alarms list by<br>  o time/date<br>  o severity (i.e. highest severity on top)<br>  o alarm type<br>  o location<br>  o alarm source |
| 34. | **Alarm Handling**<br>• Should have an ability to display alarm condition through visual display and audible tone<br>• Should have an ability to simultaneously handle multiple alarms from multiple workstations<br>• Should have an ability to automatically prioritize and display multiple alarms and status conditions according to pre-defined parameters such as alarm type, location, sensor, severity, etc.<br>• Should display the highest priority alarm and associated data / video in the queue as default, regardless of the arrival sequence |
| 35. | **Historical Alarm Handling**<br>• Should have an ability to view historical alarms details even after the alarm has been acknowledged or closed.<br>• Should have an ability to sort alarms according to date/time, severity, type, and sensor ID or location. |
| 36. | **Alarm Reporting**<br>• Should have an ability to generate a full incident report of the alarm being generated.<br>• Should have an ability to display report on monitor and print report<br>• Should have details of alarm including<br>  o severity, time/date, description and location<br>  o Captured video image snapshots<br>  o Relevant sensor data such as SCADA sensors<br>  o Response instructions<br>  o Alarm activities (audit trail)<br>• Should have an ability to export alarm report in various formats including pdf, jpeg, html, txt, and mht formats<br>• Should have an ability to generate an alarm incident package including the full incident report and exported sensor data from the incident in a specific folder location. |
| 37. | **Alarm Policies and Business Logic Administration**<br>• The solution should have the following ability to handle the workflow alarms through graphical user interface.<br>• Should have an ability to match keywords or text from the alarming subsystem's incident description to raise an alarm using criteria including exact match, exact NOT match, contains match, wildcard match and regularly expression match (such as forced door alarm, denied access, door open too long, etc.)<br>• Should have an ability to optionally match alarming subsystem's incident status, incident severityand sensor type<br>• Should have an ability to apply any alarm policy to one or more monitoring area(s) or zone(s) without having to reapplying the policy multiple times.<br>• Should have an ability to apply any alarm policy to one or more sensors without having to reapply the policy multiple times.<br>• Should have an ability to assign specific actions for each alarm<br>• Should have an ability to activate or deactivate alarms as required |

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| | • Should have an ability to create exceptions<br>• Should Create batch-wise rules and process them<br>• Should Check and rectify logical errors and contradictory rules<br>• Should have an ability to schedule execution of rules<br>• Should Suspend or Terminate the application of rule<br>• Should archive unused or deactivated rules |
| 38. | **Availability, Scalability, Performance and Usability**<br>• The solution shall be highly available platform.<br>• The solution shall be very tolerant to losses or reduction of communication such that the system shall recover gracefully from such incidents, with no human interaction required.<br>• Should have a high performance and high availability architecture.<br>• Shall be flexible, modular and tolerant to failures/errors and able to exchange information with other systems<br>• The system must have an open architecture such that additional systems when added can be integrated with command center solution without upgrades or disruption to other interfaces.<br>• The communications use standard components that are widely available.<br>• Should allow scalability and flexibility to include more applications / solutions in the future<br>• The server shall refresh GUI within 1 second of an incident trigger requiring a change of state in the information in the database.<br>• The server hardware shall be based on high availability, fault tolerant design and capable of operating in mirrored server configuration.<br>• The solution shall have a resilient processing architecture such that failure of a single component does not affect entire application.<br>• The solution shall be able to operate at network bandwidth down to a minimum of 250 kbps.<br>• The solution shall be able to operate at network latencies as long as 2 seconds. |

12.7.3 Control Room Video-wall Solution

12.7.3.1 Video-wall Screen

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Technology | Solid state LED illumination technology |
| 2. | Display Unit | The Visual Display Unit / Rear Projection Module must be based on Single Chip Rear Projection Technology. Should have the scalability and upgradeability to be made up of multiple rear projection modules stacked up in columns to achieve a display wall for better viewing ability in linear or curved configuration. |
| 3. | Resolution | Full high definition (1920X1080) |
| 4. | Brightness | Uniformity of 85% |
| 5. | Contrast Ratio | Min. 1400 : 1 |
| 6. | Wall Uptime | Min. 60,000 hours of rated life (Expected to be operational 24X7) |
| 7. | Viewing Angle | 180 degree viewing angle |
| 8. | Screen to Screen gap | - The inter screen gap should be <0.6mm. |
| 9. | Other Features | - RS232 control (with loop-through) |

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| | | - On Screen Display (OSD)<br>- IR remote control<br>- flicker free image on the Large Screen Graphics Wall<br>- Should be supplied with necessary display controller (if required), to support viewing of the video feeds of multiple cameras |
| 10. | Input | Analog D-sub/Digital DVI/Digital HDMI (as per solution) |

12.7.3.2 Video-wall Controller & Software

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1 | Controller | Controller to control Video wall in a matrix as per requirement along with software's |
| 2 | Chassis | 19” Rack mount |
| 3 | Processor options | Single Quad Core Intel® CoreTM i7 Quad Core 3.4 GHz processor) or better |
| 4 | OS | Supports 64-bit Operating System Windows 7 |
| 5 | RAM Capacity | 16 GB or more |
| 6 | HDD | 500 GB or more |
| 7 | Networking | Dual-port Gigabit Ethernet |
| 8 | RAID | RAID 1, 5, 10 supports |
| 9 | Power Supply | ( 1+1) Redundant hot swappable |
| 10 | Cooling | Any Advanced Proven cooling mechanism |
| 11 | Input / Output support | DVI/HDMI/USB/ LAN/ VGA/SATA port |
| 12 | Accessories | DVD +RW, Keyboard and mouse |
| 13 | Voltage | 100-240V@50Hz |
| 14 | Redundancy support | Power Supply, HDD, LAN port & Controller |
| 15 | Scalability | Display multiple source windows in any size, anywhere on the wall |
| 16 | Control functions | Brightness / contrast / saturation/ Hue/ Filtering/ Crop / rotate |
| 17 | Universal Inputs | Minimum 2 |
| 18 | Formats | DVI /RGB/Component |
| 19 | Input Format | NTSC/ PAL/SECAM |

| # | Parameter | Minimum Specifications |
|---|---|---|
| 20 | Operating Temperature | 10°C to 35°C , 80 % humidity |
| 21 | Cable & Connections | Vendor should provide all the necessary cables and connectors |

12.7.3.3 Video Wall Management Software

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1 | Display & Scaling | Display multiple sources anywhere on display up to any size |
| 2 | Input Management | All input sources can be displayed on the video wall in freely resizable and movable windows |
| 3 | Scenarios management | Save and Load desktop layouts from Local or remote machines |
| 4 | Layout Management | Support all Layout from Video, RGB, DVI, Internet Explorer, Desktop and Remote Desktop Application |
| 5 | Multi View Option | Multiple view of portions or regions of Desktop, Multiple Application Can view from single desktop |
| 6 | Other features | SMTP support |
| 7 | | Remote Control over LAN |
| 8 | | Alarm management |
| 9 | | Remote management |
| 10 | | Multiple concurrent client |
| 11 | | KVM support |
| 12 | Cube Management | Cube Health Monitoring |
| 13 | | Pop-Up Alert Service |
| 14 | | Graphical User Interface |
| 15 | Cube ,Controller & Wall Management Software | Cube, Controller and Wall management Software should be from the same manufacturer |

12.7.4 Contact Center/Helpdesk

| # | Minimum Specifications |
|---|---|
| 1. | The contact center solution should be able to route voice/ VOIP calls from centralized Interactive Voice Response System (IVRS) to respective call center (s) along with interaction history of the calling party |
| 2. | The callers should be able to access the various services through state-of-art centralized integrated Interactive Voice Response System (IVRS). The information is envisaged to be available to the customer through telephone (IVRS) and call centres agents. |

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| 3. | The IVRS should establish two way communication on the same channel with customers through recorded synthesized voice in Hindi / English / Regional Language or in combination of languages to give information, reply to queries and provide other. |
| 4. | IVRS should be modular and scalable in nature for easy expansion without requiring any change in the software |
| 5. | It should be possible to access IVRS through any of the access device such as Landline telephone, Mobile phone (GSM as well as CDMA) etc |
| 6. | The system should have the ability to define business rules based upon which the system should quickly identify, classify and prioritize callers, and using sophisticated routing, to deliver interactions to the best qualified agent in the any of the connected local/remote call centre, regardless of interaction channel |
| 7. | The application should provide CTI services such as:<br>• Automatic display (screen pop) of information concerning a user/customer on the call agent screen prior to taking the call based on ANI, DNIS or IVR data.<br>• Synchronized transfer of the data and the call to the call centre agent.<br>• Transfer of data corresponding to any query raised by any IP agent regarding a query raised by a customer whose call is being attended by the call IP agent.<br>• Call routing facilities such as business rule based routing, skills-based routing etc. |
| 8. | The application should support integration to leading CTI middleware vendors. |
| 9. | Should provide pre-integration with industry standard IVR servers and enhance routing & screen-pop by passing forward the information. |
| 10. | Should provide facilities for outbound calling list management, and software based predictive or preview dialing |
| 11. | The application should allow service level plans to be varied by day, time of day, or a specific date |
| 12. | Call Centre Agent's Desktop: The agents desktop shall have an application which shall fulfil the following functionalities :<br>• It should provide consistent agent interface across multiple media types like fax, SMS, telephone, email, and web call back.<br>• The agent's desktop should have a "soft-phone" – an application that enables standard telephony functions through a GUI.<br>• It should provide the agents with a help-desk functionality to guide the agents to answer a specific query intelligently.<br>• It should also provide an easy access to agents to previous similar query which was answered successfully.<br>• It should also be possible to identify a request to be a similar request made earlier.<br>• It should be possible for agents to mark a query as complex/typical and put in to database for future reference by other agents.<br>• It should be possible for agents to escalate the query. |
| 13. | System should be able to integrate with e–mail / sms gateway so that appropriate messages can be sent to the relevant stakeholders after the interaction and any updates thereon |
| 14. | Should intelligently and automatically responds to email inquiries or routes inquires with skills based routing discipline to agents |
| 15. | Should have an Intelligent distribution of email to agents |
| 16. | **CTI Application Requirements**<br>• The CTI link should allow a computer application to acquire control of the agent resources on the IP EPABX & change state of the agent phone through commands on the CTI link.<br>• The CTI link should pass events & information of agent states & changes in agent states as well as incoming calls to the computer applications.<br>• The CTI link should allow a computer application to take control of the call flow inside the IP EPABX & also allow the computer application to decide the most suitable action / agent for an incoming call. |
| 17. | **Automatic Call Distribution (ACD) Requirements**<br>• The ACD solution should be able to route the call to any remote call center agent |

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| | using IP phones<br>• Should have an ability to queue or hold the call for an agent if none is immediately available.<br>• Should have an ability to keep the callers informed as to the status of the call and providing information to callers while they wait in queue.<br>• System should be able to perform prioritized call routing |
| 18. | **Supervisor Module**<br>The call centre should provide a graphical console application program for the supervisor's workstation. This position shall facilitate the following features:-<br>• Any supervisor shall be able to monitor or control any group in the call Centre.<br>• It shall show the live activity of each agent in details as well as in a summarized fashion including information like total number of calls received, calls answered, average response time etc.<br>• The Supervisor console shall also graphically display live status of the call session summary, number of call waiting in the queue, call traffic etc.<br>• Live status of the group shall be shown, including waiting calls and calls being answered currently.<br>• Access to the supervisor console shall be restricted.<br>• It shall be possible for a supervisor to attend calls whenever necessary. |
| 19. | Should have a comprehensive audit trail detailing every user activity including system/security administrators with before and after image |

12.7.5 Technical Specifications for Data Center infrastructure

12.7.5.1 Aggregation/ Data center Switches (L3 Manageable)

| # | Features | Specifications |
|---|---|---|
| 1. | Ports | • 24 or 48 (as per requirements) 10/100/1000 Base-TX Ethernet ports/FX and extra 2 numbers of Base-SX/LX ports<br>• FX/TX Splits for a switch as per location requirement<br>• All ports can auto-negotiate between 10Mbps/ 100Mbps/ 1000Mbps, half-duplex or full duplex and flow control for half-duplex ports. |
| 2. | Switch type | Layer 3 |
| 3. | MAC | Support 8K or 16K MAC address. (as per solution offered) |
| 4. | Backplane | 56 Gbps or more Switching fabric capacity for 24 ports.<br>104 Gbps or more Switching fabric capacity for 48 ports |
| 5. | Forwarding rate | Packet Forwarding Rate should be 70.0 Mbps or better |
| 6. | Port Features | Must support Port Mirroring, Port Trunking and 802.3ad LACP Link Aggregation port trunks |
| 7. | Flow Control | Support IEEE 802.3x flow control for full-duplex mode ports. |
| 8. | Protocols | • Support 802.1D, 802.1S, 802.1w, Rate limiting<br>• Support 802.1X Security standards<br>• Support 802.1Q VLAN encapsulation, IGMP v1, v2 and v3 snooping<br>• 802.1p Priority Queues, port mirroring, DiffServ<br>• Support based on 802.1p priority bits with at least 8 queues<br>• DHCP support & DHCP snooping/relay/optional 82/ server support<br>• Shaped Round Robin (SRR) or WRR scheduling support.<br>• Support for IPV6 ready features with dual stack |

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| | | • Support up to 255 VLANs and up to 4K VLAN IDs<br>• Support IGMP Snooping, IGMP Querying and Multicasting<br>• Should support Loop protection and Loop detection, Should support Ring protection (when used in aggregation location) |
| 9. | Access Control | • Support port security<br>• Support 802.1x (Port based network access control).<br>• Support for MAC filtering.<br>• Should support TACACS+ and RADIUS authentication |
| 10. | VLAN | • Support 802.1Q Tagged VLAN and port based VLANs and Private VLAN<br>• The switch must support dynamic VLAN Registration or equivalent<br>• Dynamic Trunking protocol or equivalent |
| 11. | Protocol and Traffic | • Network Time Protocol or equivalent Simple Network Time Protocol support<br>• Switch should support traffic segmentation<br>• Traffic classification should be based on user-definable application types: TOS, DSCP, Port based, TCP/UDP port number |
| 12. | Management | • Switch needs to have RS-232/USB console port for management via a console terminal/PC<br>• Must have support SNMP v1,v2 and v3<br>• Should support 4 groups of RMON<br>• Should have accessibility using Telnet, SSH, Console access, easier software upgrade through network using TFTP etc. Configuration management through CLI, GUI based software utility and using web interface |

12.7.5.2 Aggregation Level Routers (if required)

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Ports | As per overall network architecture proposed by the bidder, the router should be populated with required number of LAN/WAN ports/modules, with cable for connectivity to other network elements. |
| 2. | Speed | As per requirement, to cater to the entire bandwidth requirement of the project. |
| 3. | Multi-services | Should deliver multiple IP services over a flexible combination of interfaces |
| 4. | Interface modules | Must support 10G interfaces, Must have capability to interface with various interfaces |
| 5. | Protocol Support | Must have support for TCP/IP, PPP, X.25, Frame relay and HDLC<br>Must support MPLS,VPN<br>Must have support for integration of data and voice services<br>Routing protocols of RIP, OSPF, and BGP.<br>Support IPV4 & IPV6 |
| 6. | Manageability | Must be SNMP manageable |
| 7. | Scalable | The router should be scalable. For each slot multiple modules |

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| | | should be available. |
| 8. | Traffic control | Traffic Control and Filtering features for flexible user control policies |
| 9. | Bandwidth | Bandwidth on demand for cost effective connection performance enhancement |
| 10. | Remote Access | Remote access features |
| 11. | Redundancy | Redundancy in terms of Power supply. |
| 12. | Security features | • MD5 encryption for routing protocol<br>• NAT<br>• URL based Filtering<br>• RADIUS Authentication/AAA Authentication<br>• Management Access policy<br>• IPSec / Encryption<br>• L2TP |
| 13. | QOS Features | • RSVP<br>• Priority Queuing<br>• Policy based routing<br>• Traffic Engineering<br>• Traffic shaping<br>• Time-based QoS Policy<br>• Bandwidth Reservation / Committed Information Rate |

12.7.5.3 Central (Core) Router (if required)

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Multi-Services | Should deliver multiple IP services over a flexible combination of interfaces |
| 2. | Ports | As per overall network architecture proposed by the bidder, the router should be populated with required number of LAN/WAN ports/modules, with cable for connectivity to other network elements. |
| 3. | Speed | As per requirement, to cater to entire bandwidth requirement of the project. |
| 4. | Interface modules | Must support up to 10G interfaces as per the design. Must have capability to connect with variety of interfaces. |
| 5. | Protocol Support | • Must have support for TCP/IP, PPP, X.25, Frame relay and HDLC<br>• Must support VPN<br>• Must have support for integration of data and voice services<br>• Routing protocols of RIP, OSPF, and BGP.<br>• Support IPV4 & IPV6<br>• Support load balancing |
| 6. | Manageability | Must be SNMP manageable |
| 7. | Scalable | • The router should be scalable. For each slot multiple modules should be available.<br>• The chassis offered must have free slots to meet the |

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| | | scalability requirement of expansion of the project in the future. |
| 8. | Traffic control | Traffic Control and Filtering features for flexible user control policies |
| 9. | Bandwidth | Bandwidth on demand for cost effective connection performance enhancement |
| 10. | Remote Access | Remote access features |
| 11. | Redundancy | • Redundancy in terms of Power supply(s). Power supply should be able to support fully loaded chassis<br>• All interface modules, power supplies should be hot-swappable |
| 12. | Security features | • MD5 encryption for routing protocol<br>• NAT<br>• URL based Filtering<br>• RADIUS/AAA Authentication<br>• Management Access policy<br>• IPSec / Encryption<br>• L2TP |
| 13. | QOS Features | • RSVP<br>• Priority Queuing<br>• Policy based routing<br>• Traffic shaping<br>• Time-based QoS Policy<br>• Bandwidth Reservation / Committed Information Rate |

12.7.5.4 Firewall

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Physical attributes | • Should be mountable on 19" Rack<br>• Modular Chassis<br>• Internal redundant power supply |
| 2. | Interfaces | • 4 x GE, upgradable to 8 GE<br>• Console Port 1 number |
| 3. | Performance and Availability | • Encrypted throughput: minimum 1 Gbps<br>• Concurrent connections: up to 100,000<br>• Simultaneous VPN tunnels: 2000 |
| 4. | Routing Protocols | • Static Routes<br>• RIPv1, RIPv2<br>• OSPF |
| 5. | Protocols | • TCP/IP<br>• RTP<br>• IPSec, DES/3DES/AES<br>• FTP, HTTP, HTTPS<br>• SNMP, SMTP<br>• DHCP, DNS |

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|---|---|---|
| | | • Support for IP v4 & IPv6<br>• IPSEC |
| 6. | Other support | • 802.1Q, NAT, PAT, IP Multicast support, Remote Access VPN, Time based Access control lists, URL Filtering, support VLAN, Radius/ TACACS, Support multilayer firewall protection, Traffic shaping, Bandwidth monitoring |
| 7. | QoS | • QoS features like traffic prioritisation, differentiated services, committed access rate. Should support for QoS features for defining the QoS policies. |
| 8. | Management | • Console, SSHv2, Browser based configuration<br>• SNMPv1, SNMPv2, SNMPv3 |
| 9. | Certifications | ICSA |

12.7.5.5 Intrusion Prevention System

This can be offered as separate unit or as a module in firewall

| # | Parameter | Required Specifications |
|---|---|---|
| 1. | Performance | Should have an aggregate throughput of no less than 200Mbps<br>Total Simultaneous Sessions – 500,000 |
| 2. | Features | IPS should have Dual Power Supply<br>IPS system should be transparent to network, not default gateway to Network<br>IPS system should have Separate interface for secure management<br>IPS system should be able to protect Multi Segment in the network, should be able to protect 4 segments. |
| 3. | Real Time Protection | • Web Protection<br>• Mail Server Protection<br>• Cross Site Scripting<br>• SNMP Vulnerability<br>• Worms and Viruses<br>• Brute Force Protection<br>• SQL Injection<br>• Backdoor and Trojans |
| 4. | Stateful Operation | • TCP Reassembly<br>• IP Defragmentation<br>• Bi-directional Inspection<br>• Forensic Data Collection<br>• Access Lists |
| 5. | Signature Detection | Should have provision for Real Time Updates of Signatures, IPS Should support Automatic signature synchronization from database server on web Device should have capability to define User Defined Signatures |
| 6. | Block attacks in real time | • Drop Attack Packets<br>• Reset Connections<br>• Packet Logging<br>• Action per Attack |

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|---|---|---|
| 7. | Alerts | • Alerting SNMP<br>• Log File<br>• Syslog<br>• E-mail |
| 8. | Management | • SNMP v1, v2, v3<br>• HTTP, HTTPS<br>• SSHv2, Console |
| 9. | Security Maintenance | • IPS Should support 24/7 Security Update Service<br>• IPS Should support Real Time signature update<br>• IPS Should support Provision to add static own attack signatures<br>• System should show real-time and History reports of Bandwidth<br>• IPS should have provision for external bypass Switch |

12.7.5.6 Application / Database/ Recording / Viewing / Other Servers

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Processor | Latest series/ generation of 64 bit x86/RISC/EPIC/CISC processor(s) with Four or higher Cores<br>Minimum 2 processors per each physical server) |
| 2. | RAM | Minimum 64 GB Memory per physical server |
| 3. | Internal Storage | 2x300 GB SAS / SATA (10k rpm) hot swap disk with extensible bays |
| 4. | Network interface | Dual Integrated Gigabit Ethernet ports (10 G ports may be required/provided for certain types of servers)<br>(Minimum 2 Integrated Gigabit Ethernet ports)<br>Optional : Fiber channel adapter (if required) |
| 5. | Power supply | Dual Redundant Power Supply |
| 6. | RAID support | As per requirement/solution |
| 7. | Operating System | Licensed version of 64 bit latest version of Linux/ Unix/Microsoft® Windows based Operating system) |
| 8. | Form Factor | Rack mountable/ Blade |
| 9. | Virtualisation | Shall support Industry standard virtualisation hypervisor like Hyper-V, VMWARE |

12.7.5.7 Storage Specifications

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Solution/Type | • Concessioner is expected to provide Unified storage solution (or a Combination of NAS/Scale-out NAS/SAN) supporting all required protocols (IP Based/iSCSI/FC/NFS/CIFS etc.) for the offered storage solution, meeting benchmark performance parameters specified in SLA<br>• Solution proposed should yield low cost per TB, while meeting the performance parameters<br>• Licenses for the actual protocols used in the storage solution |

| # | Parameter | Minimum Specifications |
|---|---|---|
| | | must be provided from day 1. |
| 2. | Storage | • Primary Storage to have 100% capacity for all cameras and smart solutions of the project for 7 Days as per recording parameters<br>• To store video stream and other data as required, to meet the archival requirement for different type of video feeds<br>• The storage design must be based on the expected data volume from the project, including the expansion requirement of 5 years<br>• Storage solution should be capable of scaling vertically & horizontally |
| 3. | Hardware Platform | • Rack mounted form-factor<br>• Modular design to support controllers and disk drives expansion |
| 4. | Connectivity | • The storage system shall be capable of providing host connectivity as per solution offered (Unified/SAN/NAS/Scale out NAS) as to meet operational SLA requirements |
| 5. | Controllers | • At least 2 Controllers in active/active mode<br>• The controllers / Storage nodes should be upgradable seamlessly, without any disruptions / downtime to production workflow for performance, capacity enhancement and software / firmware upgrades |
| 6. | RAID support | • Should support various RAID levels (Minimum RAID6 or equivalent) |
| 7. | Cache | • Minimum 128 GB of useable cache spread across all controllers of the storage system. If cache is provided in additional hardware for unified storage solution, then cache must be over and above 128 GB. |
| 8. | Redundancy and High Availability | • The Storage System should be able to protect the data against single point of failure with respect to hard disks, connectivity interfaces, fans and power supplies |
| 9. | Storage Management software | • All the necessary software (GUI Based) to configure and manage the storage space, RAID configuration, logical drives allocation, snapshots etc. are to be provided for the entire system proposed.<br>• Licenses for the storage management software should include disk capacity/count of the complete solution and any additional disks to be plugged-in in the future, up to the max disk capacity of the existing controllers/units.<br>• A single command console for entire storage solution.<br>• Should also include storage performance monitoring and management software<br>• Should provide the functionality of proactive monitoring of Disk drive and Storage system for all possible disk failures<br>• Should be able to take "snapshots" (or equivalent feature) of the stored data to another logical drive for backup purposes |
| 10. | Data Protection | The storage array must have complete cache protection mechanism either by de-staging data to disk or providing complete cache data protection with battery backup for up to 4 hours |

| # | Parameter | Minimum Specifications |
|---|---|---|
| 11. | IOPS | Offered Primary Storage shall support up for the operation. Please suggest how we reached this value |
| 12. | Operating system support | The storage system should support latest versions of operating systems like Linux, RHEL, SUSE, Windows, Apple, etc |
| 13. | File system | The File system managing the SAN Storage should support the management of Secondary Storage to move the data from Primary to Secondary Storage |
| 14. | Firmware | The storage system should support non-disruptive updation/upgrade of firmware for controllers and disks |
| 15. | Diagnostic | The storage system should have facility to report any failures & errors through Intranet for diagnosis and quick resolution of problems |
| 16. | Interface | The storage management software should come with web-based/CLI interface for configuring the SAN system from anywhere using TCP/IP network |

12.7.5.8 San Switch

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Power Specification | 200-240V, 50-60 Hz |
| 2. | Operating temperature range | 0° to 40° C |
| 3. | Operating Relative Humidity range (non-condensing) | 10 to 90% relative humidity |
| 4. | Total no. of ports on the proposed switch | 24 |
| 5. | Throughput of each FC port | 8/16Gbps |
| 6. | Support for 4/8/16 Gb/s HBAs | YES |
| **Protocol Supported** | | |
| 7. | FC | Yes |
| 8. | FCP | Yes |
| 9. | FC-AL | Yes |
| 10. | Designed for high availability with no Single Point of Failure | Yes |
| **Power Supply** | | |
| 11. | Hot Swappable Power supply proposed | Yes |
| 12. | (N+1) redundant power supply proposed | Yes |
| **Cooling Fans** | | |

| # | Parameter | Minimum Specifications |
|---|---|---|
| 13. | Hot Swappable Cooling Fans proposed | Yes |
| 14. | (N+1) redundant Cooling Fans proposed | Yes |
| 15. | Capability for streaming the data in multiple paths with Optimization algorithms for streaming data through shortest available path. | Yes |
| 16. | Capabilities for cascading of switches | Yes |
| 17. | Non-disruptive firmware update | Yes |
| 18. | End to end performance monitoring | Yes |
| 19. | Capability to interface with host based adapters (HBA) of multiple OEM, supporting multiple Operating System including but not limited to AIX, HP-UX, Linux, Solaris, Windows, etc. | Yes |
| **Zoning And Security** | | |
| 20. | Support for hardware - enforced zoning | Yes |
| 21. | Policy based security and centralised fabric management | Yes |
| 22. | Support for Encrypted password | Yes |
| 23. | Support for PKI Digital certificates | Yes |
| 24. | Support for FCAP authentication | Yes |
| 25. | Support for RADIUS, SSL / HTTPS, SSH, SNMP V3 | Yes |
| 26. | Support for LUN masking | Yes |
| **Support For Hardware Based Trunking** | | |
| 27. | Compatibility with | Yes |

| # | Parameter | Minimum Specifications |
|---|---|---|
| | proposed network devices | |
| 28. | Compatibility with proposed servers | Yes |
| 29. | The system should not be an end of life / end of service product. | Yes |

12.7.5.9 Tape Library

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | General | The Shared SAN File System Software offered with the Secondary Storage Option shall support large file systems and in-Built data archiving to tape mechanism, scaling to Petabytes(PB) |
| 2. | | The File System for the Secondary Storage Tape solution should be responsible to allocate & move the data between Primary & Secondary Storage automatically |
| 3. | | The Models of the Secondary Storage solution along with the File System should be proposed and Storage capacity calculations is required<br>The solution should be quoted with the min. capacity but it should have the capability to add the future load. |
| 4. | SAN Shared File System | The Shared SAN File System shall provide low latency, high throughput concurrent data access to all the clients on SAN connected and LAN connected systems. For LAN Clients, File system can use any server on SAN as a Gateway to get the access of the Data for LAN Clients, if required. |
| 5. | | The Shared SAN File System shall support automatic placement & movement of the files created by the user / applications into appropriate multi-vendor Disk storage arrays & Tape pools, based on the defined affinity policies. |
| 6. | | The Shared SAN File System shall support heterogeneous clients on SAN network and LAN Network with shared data access for the same data set. Heterogeneous clients include Microsoft Windows, Red Hat Enterprise Linux & SUSE Linux, MAC, AIX etc. |
| 7. | | If required, File system should have the capability to allocate the Primary Storage space to recording server, monitors, analyst using SAN/ LAN network for read and write access accordingly. |
| 8. | | The Shared SAN File System shall permit consolidation of Storage Arrays with different capacities, performance capabilities and make and model into a common single Global storage pool. |
| 9. | | Addition, deletion or failure of any clients shall not have any effect on file system functionality |
| 10. | | The offered Shared SAN File System shall support multivendor switches |
| 11. | | SAN File system also offers to help to reduce the cost of Primary / Secondary Storage on Increasing the Retention for the same Camera Count or increasing the Camera on future expansion. |
| 12. | | Offered Secondary Storage solution with LTO Tape by the bidder shall be Certified by the Quoted VMS solution. |
| 13. | Global Name Space | The Shared file system should support the different/ multiple |

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| | | make of Storage under the same existing Global name space view for all the users/ files in single file system view to all the Heterogeneous client at the time of Storage Expansions and volume expansion with Capacity. |
| 14. | | The Shared SAN File System should present the location of the file with the same file path and filename to all its clients. |
| 15. | File Sharing | The Shared SAN File System should allow multiple clients to access the same file for concurrent read. |
| 16. | | Metadata server should support file sharing locks to assure integrity while supporting concurrent access |
| 17. | Storage Upgrade/ Migration Support | The Shared SAN File System shall allow online expansion and retirement of storage capacity and disk array swap-outs without taking the file system off line. This includes adding addition disks to existing storage arrays, adding incremental or new storage arrays, and/or the removal of older arrays in replacement of new storage subsystems |
| 18. | Storage Manager for Tape-out | Offered file system shall have the inbuilt Data Archiving functionality as a single software and single GUI to move the data onto Tape Library in the Native File Format and leave the Stubs on to Primary Storage.<br>Offered File System shall also have the in-built functionality of retrieving the data from Tape active slots in Native Format to Primary Storage through the VMS application by accessing the Stubs on the Primary Storage by which the Original Data can be accesses and read by the application or User without using any data recovery console. |
| 19. | | Secondary Storage should have the provisioning of keeping a Duplicate / Backup copy of the Primary storage's Online Data. Data Older than the Primary storage's retention can be kept only on Secondary LTO Tape Storage.<br>Data stored on Primary & Secondary should be accessible online for minimum of 10 days as Online data, rest day's data can be on Secondary storage as offline Data. |
| 20. | | Shared SAN File System should be capable of recovery in case of system crash or unplanned shutdown.<br>Offered SAN Shared file system should be capable of recovering all the Backup & archived data in the Native Format from Tape without using the main server, in case of server is down or not in use. |
| 21. | | In case of increasing the Retention from 30 Days to 90 Days, only LTO media cartridge to be added to Retain the Data. No other licenses required to increase the Retention to control the Cost. |
| 22. | Retrieval | Secondary Storage should have the in-built Retrieval process, under which it shall restore the data directly on the Same Primary Storage location under the same path from where it was backup & Archive. |
| 23. | | Retrieved data from Secondary Storage shall be access directly by the VMS application and its recording server for view/ Monitoring purpose. |
| 24. | Vaulting | It shall have the functionality to 'vault' the media and provide a means of notifying the operator to retrieve a 'vaulted' media when an 'oldest' file is requested. |
| 25. | Administration features of the file system | Shall have automated de-fragmentation capabilities |
| 26. | | Shall have administration capabilities through GUI and CLI |
| 27. | | Shall provide capabilities for user administration |
| 28. | | File system shall provide features for file system audits |

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| 29. | | File system shall provide extensive alert capabilities. |
| 30. | Replication / DR support | The Shared SAN File System shall support replication for Disaster Recovery |
| 31. | Licenses required | Bidder has to estimate licensing requirement for server, workstations for SAN & LAN Clients and storage equipment's. It is the bidder responsibility to make the solution operational as per RFP requirement. |
| 32. | Min. No. of FC Dual port Drives required | 2 Nos. Full Height Drives |
| 33. | Reporting feature | Yes |
| 34. | Backup | The Same tape library has to be utilized for Backup of any OS Database's , App data , VM data & any file data via Backup Server & Software |

12.7.5.10 Workstation with Joystick Controller

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Processor | Latest generation 64bit X86 Quad core processor(3Ghz) or better |
| 2. | Chipset | Latest series 64bit Chipset |
| 3. | Motherboard | OEM Motherboard |
| 4. | RAM | Minimum 8 GB DDR3 ~~ECC~~ Memory @ 1600 Mhz. Slots should be free for future upgrade |
| 5. | Graphics card | Minimum Graphics card with 2 GB video memory (non shared) |
| 6. | HDD | 2 TB SATA-3 Hard drive @7200 rpm |
| 7. | Media Drive | NO CD / DVD Drive |
| 8. | Network interface | 10/100/1000 Mbps autosensing on board integrated RJ-45 Ethernet port. |
| 9. | Audio | Line/Mic IN, Line-out/Spr Out (3.5 mm) |
| 10. | Ports | Minimum 6 USB ports (out of that 2 in front) |
| 11. | Keyboard | 104 keys minimum OEM keyboard |
| 12. | Mouse | 2 button optical scroll mouse (USB) |
| 13. | PTZ joystick controller | • PTZ speed dome control for IP cameras<br>• Minimum 10 programmable buttons<br>• Multi-camera operations<br>• Compatible with all the camera models offered in the solution<br>• Compatible with VMS /Monitoring software offered |
| 14. | Monitor | Min. 22" (*or 21.5"*) TFT LED monitor, Minimum 1920 x1080 resolution, 5 ms or better response time, TCO 05 (or higher) certified<br>For command Control Centers : 3 LED Monitors *attached to the same workstation (multi monitor)*<br>For viewing centers : 1 LED Monitor |
| 15. | Certification | Energy star 5.0/BEE star certified |
| 16. | Operating System | 64 bit pre-loaded OS with recovery disc |
| 17. | Security | BIOS controlled electro-mechanical internal chassis lock for the system. |

| # | Parameter | Minimum Specifications |
|---|---|---|
| 18. | Antivirus feature | Advanced antivirus, antispyware, desktop firewall, intrusion prevention (comprising of a single, deployable agent) which can be managed by a central server. (Support, updates, patches and errata for the entire contract/ project period) |
| 19. | Power supply | SMPS;. Power supply should be 90% efficient with EPEAT Gold certification for the system. |

12.7.5.11 IP Phone Specifications

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Display | 2 line or more, Monochrome display for viewing features like messages, directory etc. |
| 2. | Integral switch | 10/100 mbps for a direct connection to a 10/100BASE-T Ethernet network through an RJ-45 interface |
| 3. | Speaker Phone | Yes |
| 4. | Head set | Port for Head set (Headset also to be provided) |
| 5. | VoIP Protocol | SIP V2 |
| 6. | PoE | IEEE 802.3af or better |
| 7. | Supported Protocols | SNMP, DHCP, DNS |
| 8. | Codecs | G.711, G.722 including handset and speakerphone |
| 9. | Speaker Phone | Full duplex speaker phone with echo cancellation<br>Speaker on/ off button, microphone mute |
| 10. | Volume control | Easy decibel level adjustment for speaker phone, handset and ringer |
| 11. | Phonebook/Address book | Minimum 100 contacts |
| 12. | Call Logs | Access to missed, received, and placed calls. (Minimum 20 overall) |
| 13. | Clock | Time and Date on display |
| 14. | Ringer | Selectable Ringer tone |
| 15. | Directory Access | LDAP standard directory |

IP PBX to support minimum 500 IP Phones with at least 100 concurrent sessions with following features:

- Provide reports for calls based on records, calls on a user basis, calls through gateways etc.
- Able to add bulk add, delete, and update operations for devices and users
- Session Initiation Protocol (SIP) Trunk support
- Centralized, configuration database, Web based management
- Lightweight Directory Access Protocol (LDAP) directory interface

- Facilities to users like Call Back, Call Forward, Directory Dial, Last number Redial, etc.
- Calling Line Identification

12.7.5.12 Server/Networking Rack

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Type | • 19” 42U racks mounted on the floor<br>• Floor Standing Server Rack - 42U with Heavy Duty Extruded Aluminium Frame for rigidity. Top cover with FHU provision. Top & Bottom cover with cable entry gland plates. Heavy Duty Top and Bottom frame of MS. Two pairs of 19" mounting angles with 'U' marking. Depth support channels - 3 pairs with an overall weight carrying Capacity of 500Kgs.<br>• All racks should have mounting hardware 2 Packs, Blanking Panel.<br>• Stationery Shelf (2 sets per Rack)<br>• All racks must be lockable on all sides with unique key for each rack<br>• Racks should have Rear Cable Management channels, Roof and base cable access |
| 2. | Wire managers | Two vertical and four horizontal |
| 3. | Power Distribution Units | • 2 per rack<br>• Power Distribution Unit - Vertically Mounted, 32AMPs with 25 Power Outputs. (20 Power outs of IEC 320 C13 Sockets & 5 Power outs of 5/15 Amp Sockets), Electronically controlled circuits for Surge & Spike protection, LED readout for the total current being drawn from the channel, 32AMPS MCB, 5 KV AC isolated input to Ground & Output to Ground |
| 4. | Doors | • The racks must have steel (solid / grill / mesh) front / rear doors and side panels. Racks should NOT have glass doors / panels.<br>• Front and Back doors should be perforated with at least 63% or higher perforations.<br>• Both the front and rear doors should be designed with quick release hinges allowing for quick and easy detachment without the use of tools. |
| 5. | Fans and Fan Tray | • Fan 90CFM 230V AC, 4" dia (4 Nos. per Rack)<br>• Fan Housing Unit 4 Fan Position (Top Mounted) (1 no. per Rack) - Monitored - Thermostat based - The Fans should switch on based on the Temperature within the rack. The temperature setting should be factory settable. This unit should also include - humidity & temperature sensor |
| 6. | Metal | Aluminium extruded profile |
| 7. | Side Panel | Detachable side panels (set of 2 per Rack) |

12.7.5.13 Online UPS

| # | Parameter | Minimum Specifications |
|---|---|---|

| # | Parameter | Minimum Specifications |
|---|---|---|
| 1. | Capacity | Adequate capacity to cover all above IT Components at respective location |
| 2. | Output Wave Form | Pure Sine wave |
| 3. | Input Power Factor at Full Load | >0.90 |
| 4. | Input | Three Phase 3 Wire for over 5 KVA |
| 5. | Input Voltage Range | 305-475VAC at Full Load |
| 6. | Input Frequency | 50Hz +/- 3 Hz |
| 7. | Output Voltage | 400V AC, Three Phase for over 5 KVA UPS |
| 8. | Output Frequency | 50Hz+/- 0.5% (Free running); +/- 3% (Sync. Mode) |
| 9. | Inverter efficiency | >90% |
| 10. | Over All AC-AC Efficiency | >85% |
| 11. | UPS shutdown | UPS should shutdown with an alarm and indication on following conditions 1)Output over voltage 2)Output under voltage 3)Battery low 4)Inverter overload 5)Over temperature 6)Output short |
| 12. | Battery Backup | 30 minutes in full load |
| 13. | Battery | VRLA (Valve Regulated Lead Acid) SMF (Sealed Maintenance Free) Battery |
| 14. | Indicators & Metering | Indicators for AC Mains, Load on Battery, Fault, Load Level, Battery Low Warning, Inverter On, UPS on Bypass, Overload, etc.<br>Metering for Input Voltage, Output Voltage and frequency, battery voltage, output current etc. |
| 15. | Audio Alarm | Battery low, Mains Failure, Over temperature, Inverter overload, Fault etc. |
| 16. | Cabinet | Rack / Tower type |
| 17. | Operating Temp | 0 to 50 degrees centigrade |
| 18. | Management Protocol | SNMP Support through TCP/IP |

12.7.5.14 DG Set

| # | Item | Minimum Specifications |
|---|---|---|
| 1 | General Specifications | • Auto Starting DG Set mounted on a common base frame with AVM (Anti-Vibration) pads, residential silencer with exhaust piping, complete conforming to ISO 8528 specifications and CPCB certified for emissions.<br>• KVA rating as per the requirement |
| 2 | Engine | Radiator cooled, multi cylinder, 1500 RPM diesel engine, with electronic/manual governor and electrical starting arrangement complete with battery, conforming to BS 5514/ ISO 3046/ IS 10002 |
| 3 | Fuel | High Speed Diesel (HSD) |
| 5 | Alternator | Self-exciting, self-regulating type alternator rated at 0.8 PF or |

| | | |
|---|---|---|
| | | better, 415 Volts, 3 Phase, 4 wires, 50 cycles/sec, 1500 RPM, conforming to IS 4722/ BS 5000, Windings of 100% Copper, class H insulation, Protection as per IP 23. |
| 6 | AMF (Auto Main Failure) Panel | AMF Panel fitted inside the enclosure, with the following:<br>It should have the following meters/indicators<br>• Incoming and outgoing voltage<br>• Current in all phases<br>• Frequency<br>• KVA and power factor<br>• Time indication for hours/minutes of operation<br>• Fuel Level in fuel tank, low fuel indication<br>• Emergency Stop button<br>• Auto/Manual/Test selector switch<br>• MCCB/Circuit breaker for short-circuit and overload protection<br>• Control Fuses<br>• Earth Terminal<br>• Any other switch, instrument, relay etc. essential for Automatic functioning of DG set with AMF panel |
| 7 | Acoustic Enclosure | • The DG set shall be provided with acoustic enclosure / canopy to reduce the sound level and to house the entire DG set (Engine & Alternator set) assembly outside (open-air).<br>• The enclosure must be weather resistant powder coated, with insulation designed to meet latest MOEF/CPCB norms for DG sets, capable to withstand Jabalpur climate. The enclosure must have ventilation system, doors for easy access for maintenance, secure locking arrangement, complete and |
| 8 | Fuel Tank Capacity | It should be sufficient and suitable for containing fuel for minimum 12 hours continuous operation, Complete with level indicator, fuel inlet and outlet, air vent, drain plug, inlet arrangement for direct filling and set of fuel hoses for inlet and return. |

12.7.5.15 Enterprise Management System

The Enterprise Management System (EMS) is an important requirement of this Project. Various key components of the EMS are:

- SLA & Contract management System
- Network Monitoring System
- Server Monitoring System
- Helpdesk System

Proposed EMS Solution shall be based on industry standard best practice framework such as ITIL etc.

**i. SLA & Contract management System**

The SLA & Contract Management solution should enable JSCL to capture all the System based SLAs defined in this RFP and then calculate quarterly (or for any duration) penalty automatically. Measuring service performance requires incorporation of a wide variety of data sources of the project. The SLA solution should support the collection data from various sources in order to calculate Uptime / Performance / Security SLAs. Various features required in this component to EMS are -

- It must be a centralized monitoring solution for all IT assets (including servers, network equipment etc.)
- The solution must have integrated dashboard providing view of non performing components / issues with related to service on any active components
- The solution must follow governance, compliance and content validations to improve standardisation of service level contracts
- Application should be pre-configured so as to allow the users to generate timely reports on the SLAs on various parameters.
- The solution must support Service Level Agreements & Lifecycle Management including Version Control, Status Control, Effectively and audit Trail to ensure accountability for the project.
- The solution must have the ability to define and calculate key performance indicators from an End to End Business Service delivery perspective related to the project
- The solution should support requirements of the auditors requiring technical audit of the whole system
- The solution must have an integrated dashboard, view of Contract Parties & current SLA delivery levels and view of Services & current SLA performance
- The solution should support SLA Alerts escalation and approval process.
- Solution should support effective root cause analysis, support capabilities for investigating the root causes of failed service levels and must make it possible to find the underlying events that cause the service level contract to fail.
- Accept Data from a variety of formats; provide pre-configured connectors and adapters, ability to define adapters to data source in a visual manner without coding.
- Support for defining and calculating service credit and penalty based on clauses in SLAs.

### ii. Reporting

- Ability to generate reports on penalty and credit due, to check on non-compliance of SLAs for the surveillance project
- Monetary penalties to be levied for non-compliance of SLA, thus the system must provide Service Level Performance Report over time, contract, service and more.
- The solution should provide historical and concurrent service level reports for the surveillance project in order to ensure accountability of the service provider's performance
- Automatic report creation, execution and scheduling, must support variety of export formats including Microsoft Word, Adobe PDF etc.

- The solution must support templates for report generation, report filtering and consolidation & context sensitive Drill-down on specific report data to drive standardisation and governance of the surveillance project
- The solution must support security for drill-down capabilities in dashboard reports ensuring visibility for only relevant personnel of the surveillance project
- Support real-time reports (like at-a-glance status) as well as historical analysis reports (like Trend, TopN, Capacity Planning reports etc.)
    - Resource utilisation exceeding or below defined limits
    - Resource utilisation exceeding or below predefined threshold limits

An indicative List of SLAs that need to be measured centrally by SLA contract management system are given in the RFP. These SLAs must be represented using appropriate customisable reports to ensure overall service delivery.

### iii. Network Management System

Solution should provide Fault, Configuration & Performance management of the entire datacenter infrastructure and should monitor IP\SNMP enabled devices such as Routers, Switches, Cameras, Online UPS, etc. Proposed Network Management shall integrate with SLA & Contract Management system in order to supply KPI metrics like availability, utilisation in order to measure central SLA's and calculate penalties. Following are key functionalities that are required, which will help measuring SLA's as well as assist administrators to monitor network faults & performance degradations in order to reduce downtimes, increase availability and take proactive actions to remediate & restore network services.

- The proposed solution must automatically discover manageable elements connected to the infrastructure and map the connectivity between them. Solution should provide centralized monitoring console displaying network topology map.
- Proposed solution should provide customizable reporting interface to create custom reports for collected data.
- The system must use advanced root-cause analysis techniques and policy-based condition correlation technology for comprehensive analysis of infrastructure faults.
- The system should be able to clearly identify configuration changes as root cause of network problems and administrators should receive an alert in case of any change made on routers spread across surveillance project.
- Network Performance management system should provide predictive performance monitoring and should be able to auto-calculate resource utilisation baselines for the entire managed systems and networks and allow user to set corresponding upper and lower threshold limits based on baseline data instead of setting up manual thresholds for monitored devices.
- The system must support the ability to create reports that allow the administrators to search all IP traffic over a specified historical period, for a variety of conditions for critical router interfaces.
- The proposed system must be capable of providing the following detailed analysis across solution domain:
    - Top utilised links (inbound and outbound) based on utilisation of link

- Top protocols by volume based on utilisation of link
- Top host by volume based on utilisation of link

- **Server Performance Monitoring System**
  - The proposed tool should integrate with network performance management system and support operating system monitoring for various platforms supplied as part of the project.
  - The proposed tool must provide information about availability and performance for target server nodes.
  - The proposed tool should be able to monitor various operating system parameters such as processors, memory, files, processes, file systems, etc. where applicable.
  - The solution should provide a unified web based console, which consolidates all aspects of role based access under a single console.
  - Proposed Network Management shall integrate with SLA & Contract Management system in order to supply KPI metrics like availability, utilisation, and performance in order to measure central SLA's and calculate penalties.

- **Centralised Helpdesk System**
  - The proposed helpdesk solution must provide flexibility of logging, viewing, updating and closing incident manually via web interface for issues related to project.
  - Helpdesk system should provide incident management, problem management templates along with helpdesk SLA system for tracking SLA's pertaining to incident resolution time for priority / non-priority incidents.
  - The proposed helpdesk solution must have a built-in workflow engine to define escalations or tasks to be carried out after issues or change order are logged pertaining to the project.
  - Centralized Helpdesk System should have integration with Network/Server Monitoring Systems so that the Helpdesk Operators can to associate alarms with Service Desk tickets to help operators that for what particular alarms corresponding helpdesk tickets got logged.
  - Network admin should be able to manually create tickets through Fault Management GUI.
  - System should also automatically create tickets based on alarm type
  - System should provide a link to directly launch a Service Desk view of a particular ticket created by alarm from within the Network Operation console.

12.7.5.16 WAN Services router OR Internet Router

| Item | Specifications for WAN services router or Internet Router |
|---|---|
| **Form Factor/Dimension** | **General Specifications** |
| Architecture | The router shall facilitate all applications like voice, video and data to run over a converged IP infrastructure along with hardware assisted IPSEC & Network Address Translation (NAT),capability. The router should also support hitless interface protection, In-band and out-band management, Software rollback feature, Graceful Restart, nonstop routing for OSPF, BGP, LDP, MP-BGP etc. The platform shall have modular software that will run service & features as processes having full isolation from each |
| | The router shall provide sub-second IGP convergence, NSF/SSO/NSR, TE FRR, VRRP and ISSU for high availability. The router shall support fast BGP route convergence for IP and MPLS VPN routes with no dependency of the BGP routing table size. |
| | The router line card must support following interface: Fast Ethernet, Gigabit Ethernet,. Support for these port requirement can be considered optional for Internet routers |
| Performance | Backplane Architecture: The back plane architecture of the router must be modular and redundant. The back plane bandwidth must be 20 Gbps from day one with minimum scalability upto 30 Gbps with minimum routing performance of 20 mpps from day one (1) scalable upto 30 mpps, with minimum three (3) open slots. |
| | The Router should have individual dedicated control plane processor and data plane processor module. Data plane Processor module should be independent of the control plane Processor. Control plane Processor should have support for internal memory to support multiple software images for backup purposes and future scalability. The router processor architecture must be multi-processor based and should support hardware accelerated, parallelized and programmable IP forwarding and switching. |
| | The router should support the IPv4 and IPv6 DUAL-stack in hardware and software. The router should support minimum 450k IPv4, IPv6 routes from day one (1) & scalable to minimum 1MN IPv4, IPv6 unicast routes, should have 4K Multicast routes & 500 IGMP groups from day |
| Protocol Support | The router shall have RIPv1, RIPv2, RIPng, BGP, OSPFv2 & v3, Policy Based Routing for both IPv4 & IPv6, IP Multicast Routing Protocols to facilitate applications such as streaming, webcast, command & control including PIM SM, PIM SSM, GRE (Generic Routing Encapsulation) Tunneling with 1000 tunnels enabled from day one |

| Item | Specifications for WAN services router or Internet Router |
|---|---|
| | Router should support following MPLS features – LDP, Layer 2 VPN with LDP signaling, Route Reflector (RR), Traffic Engineering with RSVP-TE, Fast Reroute Link Node & Path protection enabled from day one. Support for these features can be considered optional for Internet routers |
| QoS Features | The router shall support QoS policy in the router shall support dual Strict Priority Queue or Low Latency Queue per policy so that voice and video traffic can be put in different queue. It also should have hierarchical QOS (Inbound and Outbound) to ensure bandwidth allocation for all type of traffic during congestion and non-congestion scenario. |
| | The router shall perform traffic Classification using various parameters like source physical interfaces, source/destination IP subnet, protocol types (IP/TCP/UDP), source/destination ports, IP Precedence, 802.1p, DSCP and by some well-known application types through Application |
| Security Feature | The router should have support for hardware enabled Network Address Translation (NAT) and Port Address Translation (PAT) . The router shall support NAT6to4 function. Mention the number of sessions that it can support. The router shall support vrf-aware NAT function. |
| | Theroutershallmeetthefollowing requirements forsecurity: Access Control List to filter traffic based on Source & Destination IP Subnet, Source & Destination Port, Protocol Type (IP, UDP, TCP, ICMP etc) and Port Range etc. Router should support deep packet inspection to recognize a wide variety of applications |
| | The router shall support firewall service in hardware on all interfaces for enhanced security to protect the backbone from malicious activities. The firewall performance shall be at least 5 Gbps (internal/external). In case of external firewall, Concessioner should propose the firewall with necessary 10G interface and redundant power supply. |
| | Router should have at least 1 Gbps of IPSEC throughput from day one. In case of external VPN box, Concessioner should propose the hardware with necessary 10G interface and redundant power supply. The proposed router should have embedded support for 2000 IPsec tunnels from day one. The router should support vrf aware IPSEC. Should have support for Suite-B crypto engine requirements for IKE and IPsec |

| Item | Specifications for WAN services router or Internet Router |
|---|---|
| Management | Theroutermustsupportmanagementthrough SNMPv1/v2/v3, support RADIUS and TACACS. The router must role based access to the system for configuration and monitoring &packet inspection to recognize a wide variety of applications The router shall be provided with IETF standards based feature so that granular traffic analysis can be performed for advanced auditing, usage analysis, capacity planning or generating security telemetry events, also the router shall have SLA monitoring tools to measure state of the network in real time. The SLA operations shall provide information on TCP/UDP delay, jitter, application response time, Packet Loss etc. |
| Interface Requirements: | Router should be provided with 6 x 1 GE port with required transceivers as per solution & one 10 gig interface |
| Security Norm | Should support SSHV2 |

12.7.5.17 Non-IT Components

The Concessioner should adhere to the specifications given below for Non-IT components. It is essential that Fire Proof material be used as far as possible and Certification from Fire Department be taken for Command Centers before Go-Live.

**1. Civil and Architectural work**

**a) False Ceiling (at Command Centers)**

- Providing and fixing metal false ceiling with powder coated 0.5mm thick hot dipped galvanised steel tiles 595 x 595 mm with regular edge (10mm) suitable for 25mm grid supported on suitable powder coated galvanised steel grid as per manufacturer specification. The same shall be inclusive of cut outs for lighting, AC grills, Fire detectors, nozzles, etc.

- Providing and fixing 12 mm thick fire line Gypsum false ceiling and lighting troughs 300 mm as per design including 100 mm high cornices as lighting pelmets on G.I. frame work, in G.I. vertical supports at every 450mm c/c and horizontal runners at every 900mm c/c self-taping metal screws to proper line and level. The same shall be inclusive of making holes and required framing for fixing electrical fixtures, A.C. grills etc. GI vertical supports to be anchored to slab by means of anchor fasteners.

**b) Furniture and Fixture**

- Workstation size of min. 18" depth made with 1.5mm thick laminate of standard make over 18mm thick commercial board complete with wooden beading including cutting holes & fixing of cable manager etc. complete with French polish. Edges shall be factory post-formed. The desk shall have the necessary drawers, keyboard trays, cabinets etc. along with sliding / opening as per approved design with quality drawer slides, hinges, locks etc.

- Providing & making of storage unit with 18 mm thick MDF board along with 1.5 mm approved laminate colour outside and 2 coat of enamel paint inside the storage of size 1'6"x1'6"x2'4". The same should be provided with all the required accessories including the handle, lock, sliding channel and necessary hardware, etc. complete with French polish

- Cabin table of min. depth 2' made with 1.5mm thick laminate of standard make over 19mm thick commercial board complete with wooden beading including cutting holes & fixing of cable manager etc. complete with French polish.

- Providing, making & fixing 6" high laminated strip using 1.5mm thick laminate over 10mm thick commercial board on all vertical surface in the entire server & ancillary areas including low height partition, brick wall, partition wall, cladding etc. complete with French polish in all respect.

- Providing, making & fixing an enclosure for gas cylinder of Shutters and Partitions along with wooden support and 18 mm thick MDF board along with 1.5 mm approved laminate colour outside and 2 coat of enamel paint inside the shutter. The same should be provided with all the required accessories including the handle, lock, loaded hinges, tower bolt and necessary hardware etc. complete with French polish.

**c) Partitions (wherever required as per approved drawing)**

- Providing and fixing in position full height partition wall of 125 mm thick fire line gyp-board partition using 12.5 mm thick double fire line gyp-board on both sides with GI steel metal vertical stud frame of size 75 mm fixed in the floor and ceiling channels of 75 mm wide to provide a strong partition. Glass wool insulation inside shall be provided as required. Fixing is by self-tapping screw with vertical studs being at 610 mm intervals. The same should be inclusive of making cut-outs for switch board, sockets, grill etc. It shall also include preparing the surface smoothly and all as per manufacture's specification etc. finally finishing with one coat of approved brand of fire resistant coating.

- With glazing including the framework of 4" x 2" powder coated aluminium section complete (in areas like partition between server room & other auxiliary areas).

- Providing & fixing Fire Rated Wire Glass minimum 6 mm thick for all glazing in the partition wall complete. (External windows not included in this).

- All doors should be minimum 1200 mm (4 ft.) wide.

**d) Painting**

- Providing and applying Fire retardant paint of pre-approved make and shade to give an even shade over a primer coat as per manufacturers' recommendations after applying painting putty to level and plumb and finishing with 2 coats of fire retardant paint. Base coating shall be as per manufacturer's recommendation for coverage of paint.

- For all vertical Plain surface.

- For fire line gyp-board ceiling.

- Providing and laying POP punning over cement plaster in perfect line and level with thickness of 10 - 12 mm including making good chases, grooves, edge banding, scaffolding pockets etc.
- Applying approved fire retardant coating on all vertical surfaces, furniture etc. as per manufacturer's specification.

**2. PVC Conduit**

- The conduits for all systems shall be high impact rigid PVC heavy-duty type and shall comply with I.E.E regulations for non-metallic conduit 1.6 mm thick as per IS 9537/1983.
- All sections of conduit and relevant boxes shall be properly cleaned and glued using appropriate epoxy resin glue and the proper connecting pieces, like conduit fittings such as Mild Steel and should be so installed that they can remain accessible for existing cable or the installing of the additional cables.
- No conduit less than 20mm external diameter shall be used. Conduit runs shall be so arranged that the cables connected to separate main circuits shall be enclosed in separate conduits, and that all lead and return wire of each circuit shall be run to the same circuit.
- All conduits shall be smooth in bore, true in size and all ends where conduits are cut shall be carefully made true and all sharp edges trimmed. All joints between lengths of conduit or between conduit and fittings boxes shall be pushed firmly together and glued properly.
- Cables shall not be drawn into conduits until the conduit system is erected, firmly fixed and cleaned out. Not more than two right angle bends or the equivalent shall be permitted between draw and junction boxes. Bending radius shall comply with I.E.E regulations for PVC pipes.
- Conduit concealed in the ceiling slab shall run parallel to walls and beams and conduit concealed in the walls shall run vertical or horizontal.
- The chase in the wall required in the recessed conduit system shall be neatly made and shall be of angle dimensions to permit the conduit to be fixed in the manner desired. Conduit in chase shall be hold by steel hooks of approved design of 60cm center the chases shall be filled up neatly after erection of conduit and brought to the original finish of the wall with cement concrete mixture 1:3:6 using 6mm thick stone aggregate and course sand.

**3. Wiring**

- PVC insulated copper conductor cable shall be used for sub circuit runs from the distribution boards to the points and shall be pulled into conduits. They shall be stranded copper conductors with thermoplastic insulation of 650 / 1100 volts grade. Colour code for wiring shall be followed.
- Looping system of wring shall be used, wires shall not be jointed. No reduction of strands is permitted at terminations.
- Wherever wiring is run through trunking or raceways, the wires emerging from individual distributions shall be bunched together with cable straps at required regular intervals. Identification ferrules indication the circuit and D.B. number shall be used for sub main,

sub circuit wiring the ferrules shall be provided at both end of each sub main and sub-circuit.

- Where, single phase circuits are supplied from a three phase and a neutral distribution board, no conduit shall contain wiring fed from more than one phase in any one room in the premises, where all or part of the electrical load consists of lights, fans and/or other single phase current consuming devices, all shall be connected to the same phase of the supply.
- Circuits fed from distinct sources of supply or from different distribution boards or M.C.B.s shall not be bunched in one conduit. In large areas and other situations where the load is divided between two or three phases, no two single-phase switches connected to difference phase shall be mounted within two meters of each other.
- All splicing shall be done by means of terminal blocks or connectors and no twisting connection between conductors shall be allowed.
- Metal clad sockets shall be of die cast non-corroding zinc alloy and deeply recessed contact tubes. Visible scraping type earth terminal shall be provided. Socket shall have push on protective cap.
- All power sockets shall be piano type with associate's switch of same capacity. Switch and socket shall be enclosed in a M. S. sheet steel enclosure with the operating knob projecting. Entire assembly shall be suitable for wall mounting with Bakelite be connected on the live wire and neutrals of each circuit shall be continuous everywhere having no fuse or switch installed in the line excepting at the main panels and boards. Each power plug shall be connected to each separate and individual circuit unless specified otherwise. The power wiring shall be kept separate and distinct from lighting and fan wiring. Switch and socket for light and power shall be separate units and not combined one.
- Balancing of circuits in three phases installed shall be arranged before installation is taken up. Unless otherwise specified not more than ten light points shall be grouped on one circuit and the load per circuit shall not exceed 1000 watts.

## 4. Earthing

All electrical components are to be earthen by connecting two earth tapes from the frame of the component ring and will be connected via several earth electrodes. The cable arm will be earthen through the cable glands. Earthling shall be in conformity with provision of rules 32, 61, 62, 67 & 68 of Indian Electricity rules 1956 and as per IS-3043. The entire applicable IT infrastructure in the Control Rooms shall be earthed.

- Earthing should be done for the entire power system and provisioning should be there to earth UPS systems, Power distribution units, and AC units etc. so as to avoid a ground differential. State shall provide the necessary space required to prepare the earthing pits.
- All metallic objects on the premises that are likely to be energized by electric currents should be effectively grounded.
- The connection to the earth or the electrode system should have sufficient low resistance in the range of 0 to 25 ohm to ensure prompt operation of respective protective devices in

event of a ground fault, to provide the required safety from an electric shock to personnel & protect the equipment from voltage gradients which are likely to damage the equipment.

- Recommended levels for equipment grounding conductors should have very low impedance level less than 0.25 ohm.
- In case of a UPS and Transformer equipment, the Earth resistance shall be automatically measured on an online basis at a pre-configured interval and corrective action should be initiated based on the observation. The automatic Earthing measurements should be available on the UPS panel itself
- There should be enough space between data and power cabling and there should not be any cross wiring of the two, in order to avoid any interference, or corruption of data.
- The earth connections shall be properly made.
- A complete copper mesh earthing grid needs to be installed for the server farm area, every rack need to be connected to this earthing grid. A separate earthing pit needs to be in place for this copper mesh.
- Provide separate earthing pits for servers, UPS & generators as per the standards.

**5. Cable Work**

- Cable ducts should be of such dimension that the cables laid in it do not touch one another. If found necessary the cable shall be fixed with clamps on the walls of the duct. Cables shall be laid on the walls/on the trays as required using suitable clamping/ fixing arrangement as required. Cables shall be neatly arranged on the trays in such manner that a criss-crossing is avoided and final take off to switch gear is easily facilitated.
- All cables will be identified close to their termination point by cable number as per circuit schedule. Cable numbers will be punched on 2mm thick aluminium strips and securely fastened to the. In case of control cables all covers shall be identified by their wire numbers by means of PVC ferrules. For trip circuit identification additional red ferrules are to be used only in the switch gear / control panels, cables shall be supported so as to prevent appreciable sagging. In general distance between supports shall not be greater than 600mm for horizontal run and 750mm for vertical run.
- Each section of the rising mains shall be provided with suitable wall straps so that same the can be mounted on the wall.
- Whenever the rising mains pass through the floor they shall be provided with a built-in fire proof barrier so that this barrier restricts the spread of fire through the rising mains from one section to the other adjacent section.
- Neoprene rubber gaskets shall be provided between the covers and channel to satisfy the operating conditions imposed by temperature weathering, durability etc.
- Necessary earthling arrangement shall be made alongside the rising mains enclosure by Mean of a GI strip of adequate size bolted to each section and shall be earthed at both ends. The rising mains enclosure shall be bolted type.

- The space between data and power cabling should be as per standards and there should not be any criss-cross wiring of the two, in order to avoid any interference, or corruption of data.

## 6. Fire Detection and Control Mechanism

Fire can have disastrous consequences and affect operations of a Control Room. It is required that there is early-detection of fire for effective functioning of the Control Room.

System Description

- The Fire alarm system shall be an automatic 1 ton (e.g. 8) zone single loop addressable fire detection and alarm system, utilizing conventional detection and alarm sounders.
- Detection shall be by means of automatic heat and smoke detectors located throughout the Control Room (ceiling, false floor and other appropriate areas where fire can take place) with break glass units on escape routes and exits.

Control and Indicating Component

- The control panel shall be a microprocessor based single loop addressable unit, designed and manufactured to the requirements of EN54 Part 2 for the control and indicating component and EN54 Part 4 for the internal power supply.
- All controls of the system shall be via the control panel only.
- The system status shall be made available via panel mounted LEDs and a backlit 8 line x 40-character alphanumeric liquid crystal display.
- All system controls and programming will be accessed via an alphanumeric keypad. The control panel will incorporate form fill menu driven fields for data entry and retrieval.
- The system will include a detection verification feature. The user shall have the option to action a time response to a fire condition. This time shall be programmable up to 10 minutes to allow for investigation of the fire condition before activating alarm outputs. The operation of a manual call point shall override any verify command.

Manual Controls

- Start sounders
- Silence sounders
- Reset system
- Cancel fault buzzer
- Display test
- Delay sounder operation
- Verify fire condition
- Disable loop

Smoke detectors

Smoke detectors shall be of the optical or ionisation type. Devices shall be compatible with the CIE conforming to the requirements of EN54 Part 7 and be LPCB approved. The detectors shall have twin LEDs to indicate the device has operated and shall fit a common addressable base.

- Heat detectors
- Heat detectors shall be of the fixed temperature (58° C) or rate of temperature rise type with a fixed temperature operating point.
- Devices shall be compatible with the CIE conforming to the requirements of EN54 Part 5 and be LPCB approved.
- The detectors shall have a single LED to indicate the device has operated and shall fit a common addressable base.

Addressable detector bases

- All bases shall be compatible with the type of detector heads fitted and the control system component used. Each base shall comprise all necessary electronics including a short circuit isolator.
- The device shall be automatically addressed by the CIE on power up of the loop without the need of the insertion of a pre-programmed EPROM or setting of DIL switches.
- Detector bases shall fit onto an industry standard conduit box.

Audible Alarms

Electronic sounders shall be colored red with adjustable sound outputs and at least 3 sound signals. The sounders should be suitable for operation with a 24V DC supply providing a sound output of at least 100dBA at 1 meter and 75 dBA min, for a bed head or sounder base type device. The sounder frequency shall be in the range of 500Hz to 1000Hz.

Commissioning

- The fire detection and alarm system will be programmable and configurable via an alpha numeric keypad on the control panel.

## 7. High Sensitivity Smoke Detection System

General – The HSSD system shall provide an early warning of fire in its incipient stage, analyze the risk and provide alarm and actions appropriate to the risk. The system shall include, but not be limited to, a Display Control Panel, Detector Assembly and the properly designed sampling pipe network. The system component shall be supplied by the manufacturer or by its authorized distributor.

Regulatory Requirements

- National Electrical Code (NEC)
- Factory Mutual

- Local Authority having Jurisdiction

## 8. Access Control System

The Access Control System shall be deployed with the objective of allowing entry and exit to and from the premises to authorized personnel only. The system deployed shall be based on Biometric Technology. An access control system consisting of a central PC, intelligent controllers, power supplies and all associated accessories is required to make a fully operational on line access control system. Access control shall be provided for doors. These doors shall be provided with electric locks, and shall operate on fail-safe principle. The lock shall remain unlocked in the event of a fire alarm or in the event of a power failure. The fire alarm supplier shall make potential free contacts available for releasing the locks in a fire condition especially for staircase and main doors. Entry to the restricted area shall be by showing a proximity card near the reader and exit shall be using a push button installed in the secure area. The system shall monitor the status of the doors through magnetic reed contacts. The system should be designed and implemented to provide following functionality:

- Controlled Entries to defined access points
- Controlled exits from defined access points
- Controlled entries and exits for visitors
- Configurable system for user defined access policy for each access point
- Record, report and archive each and every activity (permission granted and / or rejected) for each access point.
- User defined reporting and log formats
- Fail safe operation in case of no-power condition and abnormal condition such as fire, theft, intrusion, loss of access control, etc.
- Day, Date, Time and duration based access rights should be user configurable for each access point and for each user.
- One user can have different policy / access rights for different access points.

## 9. Rodent Repellent

The entry of Rodents and other unwanted pests shall be controlled using non-chemical, non-toxic devices. Ultrasonic pest repellents shall be provided in the false flooring and ceiling to repel the pests without killing them. However periodic pest control using Chemical spray can be done once in 3 months as a contingency measure to effectively fight the pest menace.

- Configuration : Master console with necessary transducer
- Operating Frequency: Above 20 KHz (Variable)
- Sound Output : 50 dB to 110 dB (at 1 meter)
- Power output : 800 mW per transducer
- Power consumption : : 15 W approximately

- Power Supply : 230 V AC 50 Hz
- Mounting : Wall / Table Mounting

## *12.8 Environmental Sensors*

| #. | Minimum Specifications / Functionalities / Capabilities |
|---|---|
| | **General Hardware and Interface requirements** |
| 1 | Environmental sensor should be able to measure Air pressure |
| 2 | Environmental sensor should be able to measure Humidity |
| 3 | Environmental sensor should be able to measure temperature |
| 4 | Environmental sensor should be able to measure Gas |

## *12.9 Bill of Quantity (BOQ)*

Following is an indicative Bill of Quantity to deploy overall solution. Concessioner to note that the following is only indicative and bare minimum requirement. Concessioner can enhance the BoQ basis his solution requirement;

| # | Component | Unit | Quantity | Remarks |
|---|---|---|---|---|
| **Intelligent Poles** | | | | |
| 1. | Intelligent Poles | No. | <number> | |
| **Smart Street Light** | | | | |
| 1. | LED Control Nodes | No. | 23873 | |
| 2. | LED Luminaires | No. | 18234 | Basis the existing infra as mentioned in section 14.6.1 |
| 3. | Feeder Panels | No. | As required | |
| 4. | Necessary brackets for pole, cabling and other accessories required to install and make functional complete Smart LED solution | No. | As required | |
| **Public Wi-Fi** | | | | |
| 1. | Access Point for 42 hotspots | No. | As required | |
| 2. | L2+ 8 Ports Managed Switch | No. | As required | |
| 3. | L2+ 8 Ports Managed PoE Switch | No. | As required | |
| 4. | Layer 3 / Core Level Managed Switch | No. | As required | |
| **Optical Fiber** | | | | |
| 1. | Optical Fiber | Kms | <number> | Minimum |
| 2. | Patch Cord | No. | As required | |
| 3. | HDPE for laying OFC | No. | As required | |
| 4. | Network Switch (Junctions) Ruggedized | | As required | |
| 5. | Junction Box | | | |
| 6. | Field UPS | | | |
| 7. | Patch Panel/Fiber Interface Unit | | | |
| **Smart Billboards** | | | | |
| 1. | Smart Billboards | No. | <number> | |
| **Surveillance** | | | | |
| 1. | PTZ High Definition Camera | No. | 125 | |
| 2. | Fixed Box Camera (High Definition) | No. | 500 | |
| 3. | Infrared Illuminators | No. | As required | |
| 4. | Field Junction Box | No. | As required | |
| 5. | Edge Level Switch (at Camera locations) | No. | As required | |
| 6. | Supply & Laying of Cable and other passive components | No. | 625 | |

| # | Component | Unit | Quantity | Remarks |
|---|---|---|---|---|
| | including fibre, PVC, HDPE Pipe, Outdoor Enclosure, Network Rack with accessories etc | | | |
| **Central command and control Centre** | | | | |
| 1. | Centralised Software for Smart Street Lights | No. | 1 | |
| 2. | Video Management System | No. | 1 | |
| 3. | WLAN Controller | No. | 2 | |
| 4. | Network Management System and WLAN Management System | No. | 1 | |
| 5. | EMS Software for Transport Layer | No. | 1 | |
| 6. | Command & Control Center Application | No. | 1 | |
| 7. | Video-wall Screen | No. | 2 | |
| 8. | Video-wall Controller & Software | No. | 1 | |
| 9. | Video Wall Management Software | No. | As required | |
| 10. | Contact Center/Helpdesk | No. | 1 | |
| 11. | Aggregation/ Data center Switches (L3 Manageable) | No. | As required | |
| 12. | Aggregation Level Routers (if required) | No. | As required | |
| 13. | Central (Core) Router (if required) | No. | As required | |
| 14. | Firewall | No. | 1 | |
| 15. | Intrusion Prevention System | No. | 1 | |
| 16. | Application / Database/ Recording / Viewing / Other Servers | No. | As required | |
| 17. | Storage | No. | 1 | |
| 18. | San Switch | No. | As required | |
| 19. | Tape Library | No. | As required | |
| 20. | Workstation with Joystick Controller | No. | As required | |
| 21. | IP Phone | No. | As required | |
| 22. | Server/Networking Rack | No. | As required | |
| 23. | Online UPS | No. | As required | |
| 24. | DG Set | No. | As required | |
| 25. | EMS | No. | 1 | |
| 26. | WAN Services router OR Internet Router | No. | As required | |
| **Environmental Sensors** | | | | |
| 1. | Environmental Sensors | No. | 80 | |

# 13 Payment Terms

## 13.1 Revenue Sharing

- Concessioner will generate revenue as per the various modes mentioned in the RFP and share the revenue with the JSCL on quarterly basis.
- In case any penalty is imposed on the Concessioner, the same will be paid by the Concessioner with the next quarterly installment of revenue
- During the implementation phase Concessioner can suggest any additional revenue generating modes from the implemented smart components and can submit a proposal in this regard. JSCL will review the proposal and decide go/no-go. If approved, the Concessioner will share additional revenue with JSCL on mutually agreed terms.
- Concessioner to pay the relevant taxes to the Government which would occur while generating the revenue

# 14 Timelines, SLA and Penalties

ThissectionistobeagreedbytheselectedConcessionerastheService Levels andkeyperformanceindicatorforthisengagement.Thefollowingsectionreflectsthe measurementstobeusedfortracking,monitoringandreportingofperformanceonaregularbasisandimp ositionof penalties fornon-performanceasperttheterms of thisRFP.

ThepurposeofthissectionistodefinethelevelsofservicewhichshallbeprovidedbytheConcessionertofort hedurationofthecontract.ServiceLevelAgreement(SLA)shall becomethepartofcontractbetweenClientandtheConcessioner.TheConcessionerhastocomply withServiceLevelsrequirementstoensureadherencetoprojecttimelines,qualityandavailabilityofservic es,throughouttheperiodofthiscontracti.e.duringimplementationphaseof12 months andforaperiodoffourteen(14)years,postGo-Live.

Forpurposesof theSLA,thedefinitionsandtermsasspecified in thedocumentalongwiththefollowingtermsshallhavethemeanings set forthbelow:

a) “Total Time” - Total number of hours in the quarter being considered for evaluation of SLA performance.

b) "Uptime" – Time period for which the specified services/ outcomes are available in the quarter being considered for evaluation of SLA

c) “Downtime”- Time period for which the specified services/ components/outcomes are available in the quarter being considered for evaluation of SLA

d) “Scheduled Maintenance Time”: Time period for which the specified services/ components with specified technical and service standards are not available due to scheduled maintenance activity. The Concessioner is required to take at least 10 days prior approval from Client for any such activity. This would be allowed in off peak hours- generally from midnight for a maximum of 4 hours and would be granted once in a quarter and exclude festive timings etc.

e) “Incident”: Any event / abnormalities in the service being rendered, that may lead to disruption in normal operations and services to the end user.

f) “Response Time”: Time elapsed from the moment an incident is reported in the Helpdesk over phone or by any applicable mode of communication, to the time when a resource is assigned for the resolution of the same.

g) “Resolution Time”: Time elapsed from the moment incident is reported to Helpdesk either in person or automatically through system, to the time by which the incident is resolved completely and services as promised are restored.

## *14.1 TimelineforDelivery*

T=DateofSigningofContract

| # | Project Activity | Deliverables | Responsibility | Timelines | Payment% (if Grant) |
|---|---|---|---|---|---|
| 1 | Supply of Hardware / Software/equipment etc from the date of signing the Contract | • Delivery Challan<br>• Invoice Copy<br>• Inspection report from authentic third party<br>• Warranty certificate issued by respective OEMs for each hardware / software (back to back, in the name of Client also)<br>• License in case of software<br>• MAF | Concessioner | T+20 weeks | 15% |
| 2 | Installation, Configuration Integration of Hardware/ Software/ systems | • Device wise Configuration report stating IP Schema<br>• Routing details<br>• In case of Software, the report should consist of<br>• Software Installation Guide and checklist.<br>• Complete set of Technical/ Operation and Maintenance Manual.<br>• Report formats for approval of Client UAT/testing report<br>• Helpdesk and SLA compliance report<br>• Configuration change report<br>• Inventory Reports | Concessioner | T+28 weeks | 15% |
| 3 | UAT and Commissioning of entire system as per scope of work | • UAT Report and Successful Commissioning<br>• Certificate/ Rectification activities | Concessioner | T+36 | 20% |
| 4 | Rectifications based on UAT | • Test reports and configurations | Concessioner | T+39 | 10% |
| 5 | Go-Live | • All project locations working successfully | Concessioner | T+42 | 20% |
| 6 | Operations Phase Satisfactory Working Inspection | • Inspection to be done by Client followed by submission and approval of | Client | T+54 | 20% |

| | | | | | |
|---|---|---|---|---|---|
| | | Satisfactory Working Inspection Report | | | |
| 7 | Comprehensive Annual operations period for 15 years | • All project locations in working condition (after satisfactory inspection)<br>• Quarterly SLA compliance reports<br>• Quarterly Preventive Maintenance reports<br>• Quarterly Configuration change reports<br>• Quarterly location wise Inventory reports<br>• Other reports as desired<br>• Quarterly user report-Location wise<br>• Quarterly bandwidth utilization report-Location wise<br>• Quarterly report indicating daily uptime-Location wise<br>• Quarterly user feedback reports-Location wise<br>• Quarterly report user complaint- Location wise showing complaint, complaint time & date, solution given, complaint clear time & date | Concessioner | Quarterly after Go-live period | |

The aforementioned schedule is indicative, however Concessioners need to provide an exhaustive work plan in their proposal which would be evaluated during technical evaluation.

## *14.2 Service LevelConditions*

14.2.1 Pre-Implementation SLAs:

TheseSLAsshallbeusedtoevaluatethetimelinesforcompletionofdeliverablesthatarelistedin the deliverable.These SLAs for completion of theentiresystemcommissioningtillGO LIVE.

Fordelayofeveryweekincompletion&submissionofthedeliverablementioned inthesectionofDeliverables&Timeline,theConcessionerwouldbechargedwithapenalty asfollows:

| Delay (Weeks) | Penalty%on the contractvalue |
|---|---|
| 1week | 1% per week for the undelivered supply/services |

| | |
|---|---|
| Foreveryweekthereafter | 1% per weekfor the undelivered supply/services |
| Maximum for 10 weeks | 10% for the undelivered supply/services. Post 10 week JSCL may invoke the termination clause. |

14.2.2 Post-Implementation SLAs (During O&M Period):

- These SLAs shall be used to evaluate the performance of the services on monthly basis but penalties would be levied for cumulative performance for the quarterly basis.
- The SLA parameters shall be measured for each of the sub systems' SLA parameter requirements and measurement methods, through appropriate SLA Measurement tools. All such required tools should be provided by the successful Concessioner. JSCL will have the authority to audit these tools for accuracy and reliability.
- Notwithstanding anything contained elsewhere in this RFP, if penalty calculations exceed 10% of the Opexafteraggregation for four consecutive quarters, JSCL can take appropriate action including termination of the contract after providing written notice and cure period of one quarter from the date of receipt of such written notice of termination to the Concessionaire.
- Monthly and Quarterly cost will be evaluated as per the early cost provided by the Concessioner for the Opex.

14.2.2.1 SLAs for Wi-Fi

| # | Uptime SLA (Quarterly) For AP hours | Penalty values per Quarter |
|---|---|---|
| 1. | Uptime up to >= 95% | No Deduction |
| 2. | <95% | (100%-Uptime%) of monthly Operational Expense for the component for the year. For example if uptime of component is 95%, then penalty imposed will be 100%-95% i.e. 5% of operational expense for the year |

- Penalty levied for non- performance as per SLA requirements will have to be paid by the successful Concessioner to JSCL.
- The penalties would be levied for every AP down time – be it for non-availability of network, theft, damage or non- availability of power etc. because the successful Concessioner is responsible for supply of all enabling components on end to end basis.

14.2.2.2 SLA for Internet through put

- Throughput and Coverage: Minimum throughput and coverage has to be 95% of prescribed values of each AP. Successful Concessioner must ensure measurement of these results using an automated tool and provision of results to JSCL.
- In case throughput falls below the guaranteed level, JSCL will be impose the penalty of Rs.2000/-(Rupees two thousand) per instance per location in additional to SLA and Penalty.

14.2.2.3 SLAs for Smart LEDs and Smart Surveillance

| # | Uptime SLA (Quarterly) For AP hours | Penalty values per Quarter |
|---|---|---|
| 1. | Uptime up to >= 99.5% | No Deduction |
| 2. | < 99.5% | (100%-Uptime%) of monthly Operational Expense for the component for the year. For example if uptime of component is 95%, then penalty imposed will be 100%-95% i.e. 5% of operational expense for the year. |

- Uptime definition:All devices have to be working and deliver the desired results. The no. of hours that the particular device/ equipment does not work will be treated as down time. Uptime shall be calculated as Uptime (%) = {1-[(Downtime)/(Total time- scheduled maintenance time)]}*100. For ex, if 10 nos. of Environmental Sensors are deployed at various locations, and 2 device/ units does not work for 5 Hrs, the total non-working device hours will be 10 unit hours and the uptime would be {1-(10/(10*90*24)}, 10 being the number of units, for 90 days on 24 hours basis.

- Penalty levied for non- performance as per SLA requirements will have to be paid by the successful Concessioner to JSCL.

- The penalties would be levied for every unit down time hour– be it for non-availability of network or non- availability of power etc. because the successful Concessioner is responsible for supply of all enabling components on end to end basis.

14.2.2.4 SLA and Penalty for Helpdesk Response and Resolution time

| # | Particulars | Penalty Amount |
|---|---|---|
| 1. | For less than 1% of the calls not getting responded in less than or equal to 60 seconds per quarter | No Penalty. Post that 0.01% of Opex for every call not responded. |
| 2. | For Grievances and complaints from users, resolutions provided within 4 hours | No Penalty. Post that 0.01% of Opex for every 2 hours beyond 4 hours. |

14.2.2.5 SLAs for Resource Replacement

| # | Service Metric Parameter | Metric | Frequency | Penalty |
|---|---|---|---|---|
| 1. | Resource Replacement | Within 7 days of exit of resource (in case of JSCL or successful Concessioner initiated) | Per Occurrence | 0.01% of monthly Opex value per day of unavailability of resource |

14.2.3 Other Penalties

- It is expected that the successful Concessioner should comply with all the Policy / Procedural / Regulatory Guidelines enforced by Government of India, Government of Madhya Pradesh, MeitY, Concern Agency, TRAI and other related bodies and as amended from time to time.

- The Concessioner should also safeguard the Application Security and Application Integrity. Penalty would be applicable for non-compliance of relevant security certifications. There would be Zero Tolerance policy against such breaches.
- The penalties across various breaches could be categorized as follows; (this includes but not limited to the following)
    - Information Security Breach: Any data leakage, information sharing, reports sharing without the consent of Concern Agency.
    - Network & System Security Breach: Any instance of hacking, information/data compromise, unauthorized access to public Wi-Fi.
    - Guidelines Breach: Non-compliance to guidelines shared by various government agencies such as complying with standards for website/mobile app development etc.
- For any of the breach for above mentioned category, a penalty would be levied on the successful Concessioner for every instance of occurrence if not responded as per the timelines mentioned in the table below. The response of the same is desired to be provided in the timelines as specified in the table below. The details of the same are given below:

| Type | Measurement (Unit) | ResolutionTime (in unit) | Penalty on resolution with respect to delay/Unit |
|---|---|---|---|
| Information Security Breach | Hours | 1 | 0.01% of aggregated Opex value for all components. In case event of severe issues, this may be termination of contract. |
| Network & System Security Breach | Hours | 1 | 0.01% of aggregated Opex value for all components. In case event of severe issues, this may be termination of contract. |
| Guidelines Breach | Days | 7 | 0.01% of aggregated opex value for all components. In case event of severe issues, this may be termination of contract. |

- The response time refers to immediate remedial action taken and preventive measures updated by the successful Concessioner on occurrence of the event.
- In case the breaches are not responded to in the time frame as specified, penalties would be levied as per the table above and failing to address the breach in desired timeline, recurring penalties would be levied w.r.t. to delay in units as mentioned.
- In case of more than 3 instances of breach within the project year, JSCL reserves the right to invoke the termination clause along with legal action would be initiated for serious offence as decided by JSCL.
- Guidelines Breach includes non-compliance to certain guidelines as set by various agencies like DoIT, DST etc. In such cases, resolution of the issue is also mandatory. The successful

Concessioner would be required to respond with the action plan / change request, as applicable, in order to resolve the guidelines breach with the specified response time.

14.2.4 Conditions for No Penalties

- There is a force majeure event effecting the SLA which is beyond the control of the Concessioner. Force Majeure events shall be considered in line with the clause mentioned in the RFP.
- The non-compliance to the SLA has been due to reasons beyond the control of the successful Concessioner.
- Theft cases would not be considered as “beyond the control of Concessioner”. Hence, the Concessioner should be taking adequate anti-theft measures, spares strategy, Insurance as required to maintain the desired Required SLA.

14.2.5 SLA Reporting System

- The Concessioner shall design, implement/customize, deploy the Enterprise Management System (EMS) and shall develop any additional tools required to monitor the performance indicators listed as per the SLAs mentioned in the RFP.
- The EMS deployed for the project, based on SLAs, shall be configured by the Concessioner to calculate the payment to be paid toJSCL. EMS should be integrated with the toll free call center (established by the Concessioner) for site fault reporting.

# 15 Limitation of Liability

The liability of Concessionaire (whether in contract, tort, negligence, strict liability in tort, by statute or otherwise) for any claim in any manner related to the work, deliverables or services coveredunder this RFP, shall be the payment of direct damages only which shall in no event in the aggregate exceed the 10% of the total amount of revenue realised by the Concessionaire over a period of 5 years from the date of go-live.

In noevent shall Concessionaire shall be liable for any consequential, incidental, indirect, special or punitive damage, loss or expenses (including but not limited to business interruption, lost business, lost profits, or lost savings) nor for anythird party claims even if it has been advised of their possible existence.

# 16 Liquidated Damages

In the event of delay or any gross negligence, for causes attributable to the Concessionaire, in meeting the deliverables, the JSCL shall be entitled at its option to recover from the Concessionaire as agreed, liquidated damages, as per the criteria mentioned in Service Level Conditions as mentioned in this RFP document. LDs (if any) shall be applicable only for delays solely attributable to the Concessioner.

# 17 Exit Management

## 17.1 Purpose

i. This clause sets out the provisions which shall apply on expiry or termination of the "Contract Agreement" on account of material breach by Concessioner. In the case of termination of the Contract Agreement due to any illegal activity performed by the selected Concessioner during/ as part of the activities related to the project, or due to material breach by the Concessioner of Contract, Client shall have the right to, at its sole discretion, apply this clause.

ii. The Parties shall ensure that their respective associated entities, in case of the Client or its nominated agencies and any nominated agencies in case of the selected Concessioner, carry out their respective obligations set out in this Exit Management Clause.

## 17.2 Transfer of Assets

ThisclauseisvalidtillthedateofexpiryornoticeofterminationoftheAgreement after whichtheassetshavetobetransferredtoClient.

- During this period, the Successful Concessioner will transfer all the assets in good working condition and as per the specifications of the bidding document including the ones being upgraded to the Client.
- The Concessioner, if not already done, shall transfer all the right to use software licenses under the name of Client during the Exit Management Period. The Concessioner shall also transfer all the relevant Software Passwords, User Names and Keys. If such a transfer of Assets happens before the expiry of Work Contract Period, Parties shall mutually discuss and agree on the transfer value of the Assets together with the termination and transfer assistance fee.
- The Successful Concessioner shall be entitled to use the Assets for the duration of the exit management period which shall be three months from the date of expiry or notice of termination of the Agreement.
- For any material breach on the part of Concessioner during the Project Implementation Phase and Operation & Management Phase, Client is entitled to provide notice in writing on the selected Concessioner at any time during the exit management period as detailed here in above requiring the selected Concessioner to provide the department or its nominated agencies with a complete and up to date list of the Assets within 30 days of such notice.

Uponserviceof a notice as mentioned in point above, the following provisionsshall apply:

- All risk in and title to the Assets to be transferred to Client on the last day of the exit management period. All expenses incurred during transfer of assets shall be borne by the Successful Concessioner.
- That on the expiry of this clause, the Successful Concessioner and any individual assigned for the performance of the services under this clause must hand overall Confidential

Information and all other related materials in its possession, including all the software and hardware supplied by selected Concessioner under this clause to the department.

- As Concessioner is supposed to provide 15 years of comprehensive maintenance of all the hardware/Software as detailed in RFP, Concessioner must ensure that all the items are in working condition with support of OEM related to repair/replacement/availability of spare parts for at least 05 years at the time of exit.

### *17.3 Cooperation and Provision of Information*

Duringtheexitmanagementperiod:

a) The Concessioner shall permit Client or its nominated agencies access to information reasonably required to classify the current mode of operation related with the provision of the services to enable it to Client assess the existing services being delivered.

b) In the event of there being a termination owing to material breach by Concessioner, on quick request by Client or its nominated agencies, the selected Concessioner shall provide access to and copies of all information held or controlled by it which it has prepared or maintained in accordance with the MSA (Master Service Agreement), the Project Implementation, the Operation and Management SLA and SoW (Scope of Work) relating to any material aspect of the services (whether provided by the selected Concessioner). Client or its nominated agencies shall be entitled to copy all such information. Such information shall include details pertaining to the services rendered and other performance data. The selected Concessioner shall permit Client or its nominated agencies and/or any entity nominated by Client to have reasonable access to it employees and facilities as reasonably required to understand the methods of delivery of the services employed by the selected Concessioner and to support appropriate knowledge transfer.

### *17.4 Confidential Information, Security and Data*

- The selected Concessioner shall be quick on the commencement of the exit management period and supply to Client the following:
    - Information relating to the present services provided and customer satisfaction surveys.
    - Documentation pertaining to Project related data and confidential information.
    - All current and updated data as is needed for purposes of the Client or its nominated agencies for transitioning the services either to Client or the entity nominated by Client.
    - All other information (including but not limited to documents, records and agreements) relating to the services reasonably compulsory to enable Client or its nominated agencies, or to the entity nominated by Clientto carry out due diligence in order to transition the provision of the Services to the Client or its nominated agencies, or to any entity nominated by Client(as the case may be).
- Before the exit management period expire, the selected Concessioner shall deliver to Client or its nominated agencies all new or up-dated materials from the categories set out in point

(i) above and shall not keep any copies thereof, except that the selected Concessioner shall be permitted to keep one copy of such materials for archival purposes only.

- Before the exit management period expire, unless otherwise provided under the MSA, Client or its nominated agencies shall deliver to the selected Concessioner all forms of selected Concessioner confidential Data which is in the possession or control of Client or its nominated agencies or during the exit management period In any time, the selected Concessioner shall, subject to applicable laws, restraints and regulations(including in particular those relating to privacy) provide to Client or its nominated agencies a list of all employees (with job titles) of the selected Concessioner dedicated to providing the services at the beginning of the exit management period; its users.

### *17.5 Employees*

- Where any national, regional law or regulation relating to the mandatory or automatic transfer of the contracts of employment from the selected Concessioner to the department or its nominees, or an entity nominated by Clientapplies to any or all of the employees of the selected Concessioner, then the Parties shall comply with their respective obligations under such Transfer Regulations.

- To the extent that any Transfer Regulation does not apply to any employee of the selected Concessioner or its nominated agencies or its entity nominated by Client may make an offer of employment or contract for services to such employee of the selected Concessioner and the selected Concessioner shall not enforce or impose any contractual provision that would prevent any such employee from being hired by the Client or its nominated agencies or any Replacement Concessioner.

### *17.6 Transfer of Certain Agreements*

OnrequestbytheClientoritsnominatedagencies,theselectedConcessionershall effectsuchassignments,transfers,novation,licensesandsub-licensesin favorofClientoritsnominatedagencies,oritsentity nominated by Clientinrelationtoanyequipmentlease,maintenanceorserviceprovisionagreement between selectedConcessionerandthirdpartylessors,ConcessionersorConcessioner,andwhicharerelatedtothe servicesandreasonablynecessaryforthecarryingoutofreplacement Concessioner.

### *17.7 Right of Access to Premises*

- At any time during the exit management period, where Assets are located at the selected Concessioner's premises, the selected Concessioner shall be obliged to give full rights of access to (or, in the case of Assets located on a third party's premises, procure reasonable rights of access to Client or its nominated agencies, and/or any entity nominated by Clientin order to inventory the assets or Assets.

- The selected Concessioner shall also give the Client or its nominated agencies, or any entity nominated by Clientright of reasonable access to the selected Concessioner's premises and shall procure the department or its nominated agencies and any entity nominated by Clientrights of access to relevant third party premises during the exit management period and for such period of time following termination or expiry of the MSA as is reasonably

necessary to migrate the services to Client or its nominated agencies, or a Replacement Concessioner.

### *17.8 General Obligations of the Selected Concessioner*

- The selected Concessioner shall provide all such information as may reasonably be necessary to effect as seamless a handover as practicable in the circumstances to Client or its nominated agencies or any entity nominated by the Client and which the selected Concessioner has in its possession or control at any time during the exit management period.
- For the purposes of this Clause, anything in the possession or control of any selected Concessioner or associated entity is deemed to be in the possession or control of the selected Concessioner.
- The selected Concessioner shall commit adequate resources to comply with its obligations under this Exit Management Clause.

### *17.9 Exit Management Plan*

The Successful Concessioner shall provide the Client or its nominated agencies with recommended exit management plan ("Exit Management Plan") which shall deal with MSA as a whole and in relation to the Project Implementation, the Operation and Management, SLA and SOWs.

### *17.10 End of Support*

Whilehandlingoverthecompletelyworkingandfunctionalnetworkandsystems, ConcessionermustensurethatOEMofallhardware/software/ equipment are contractually bound to provide supportforrepair/replacement/availabilityofitssparepartsforfurtherfiveyears(total10yearsat similarrates).Itshallbepartof exitplantosubmitletterfromOEMsinthisregard.

# 18 Annexures

## 18.1 Annexure I: Technical Bid Templates

a) The Concessionerisexpected to respond to the RFP using the forms given in this section and all documents supporting Technical Evaluation Criteria.

b) Technical Proposal shall comprise following forms:

i. Form 1: Technical Proposal Covering Letter

ii. Form 2: Power of Attorney

iii. Form 3: Undertaking on Total Responsibility

iv. Form 4: Particulars of the Concessioner

v. Form 5: Bank Guarantee for Earnest Money Deposit

vi. Form 6: Project Citation Format

vii. Form 7: Proposed Solution

viii. Form 8: Technical Compliance - FRS

ix. Form 9: Proposed Implementation Work plan

x. Form 10: Team Composition

xi. Form 11: Curriculum Vitae (CV) of Project Manager (dedicated on-site)

xii. Form 12: Deployment of Personnel

xiii. Form 13: Manufacturers/Producers' Authorisation Form

xiv. Form 14: Undertaking on Service Level Compliance

xv. Form 15: Undertaking on Exit Management and Transition

xvi. Form 16: Declaration that the Concessioner has not been blacklisted

xvii. Form 17: Declaration that the Concessioner has not been blacklisted

xviii. Form 18: Consortium MoU

## *Form 1: Technical Proposal Covering Letter*

Place:

Date:

To,
Jabalpur Smart City Ltd (JSCL)
<insert address>

Ref: "Proposal for Selection of Concessioner for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model".

Bid Reference No:.

Sub: Technical Proposal covering Letter

Dear Sir,

We, the undersigned, offer to provide the services for [Insert Title of the Assignment] in accordance with your Request for Proposal dated [Insert Date]. Our attached Technical Proposal is based on our full understanding of scope of work, requirements, terms & Conditions and we unequivocally accept the same and shall be binding as mentioned in the RFP.

To undertake the project on BOOT basis for a period including implementation phase of 12 months and 14 years of O&M.

Yours sincerely,

Signature:

Name:

Designation:

Address:

Date:

Company Seal:

## *Form 2: Power of Attorney*

Form 2A: Power of Attorney for signing of bid

(On Non – judicial stamp paper of Rs 100 duly attested by notary public)

POWER OF ATTORNEY

Know all men by these presents, we (name and address of the registered office of the Single Entity / Lead Member) do hereby constitute, appoint and authorize Mr. / Ms. S/o, D/o, W/o, R/o_____(name and address of residence) who is presently employed with us and holding the position of as our attorney, to do in our name and on our behalf, all such acts, deeds and things necessary in connection with or incidental to the bid of the consortium consisting of , and (please state the name and address of the Members of the Consortium) for submitting bid for Selection of Concessioner for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model (the "Project"), including signing and submission of all documents and providing information / responses to Authority, representing us in all matters in connection with our bid for the said Project.

We hereby agree to ratify all acts, deeds and things lawfully done by our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney shall and shall always be deemed to have been done by us.

For

(Signature)

(Name, Title and Address)

Accept

(Signature)

(Name, Title and Address of the Attorney)

Notes:

- To be executed by the Single Entity or the Lead Member in case of a Consortium.
- The mode of execution of Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law.
- Also, wherever required, the executant(s) should submit for verification the certified documents such as a resolution / Power of attorney in favour of the Person executing this Power of Attorney for the delegation of power hereunder on behalf of the executant(s).

Form 2B: Power of Attorney for Lead Member of the Consortium

(On Non – judicial stamp paper of Rs 100 duly attested by notary public)

POWER OF ATTORNEY

Whereas the Authority has invited applications from interested parties for Bid for Selection of Concessioner for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model called the "Project" for a specified Concession period (the "Concession Period").

Whereas, M/s_____M/s_____, and M/s_____ (the respective names of theMembers along with address of their registered offices) have formed a Consortium and are interested in bidding for the Project and implementing the Project in accordance with the terms and conditions of the Request for Proposal (RFP), Concession Agreement and other connected documents in respect of the Project, and

Whereas, it is necessary under the RFP for the members of the Consortium to designate one of them as the Lead Member and its said employees, as 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 to appoint one of them as the Lead Member who, acting jointly, would have all necessary power and authority to do all acts, deeds and things on behalf of the Consortium, as may be necessary in connection with the Consortium's bid for the Project. The Lead Member is hereby authorized to delegate the said powers to any of its employees duly approved by the Board of Directors of the Lead Member.

NOW THIS POWER OF ATTORNEY WITNESSETH THAT:

We, M/s_____M/s_____, and M/s_____ (the respective names of theMembers along with address of their registered offices) do hereby designate M/s (name along with address of the registered office) being one of the members of the Consortium, as the Lead Member of the Consortium, to do on behalf of the Consortium, all or any of the acts, deed or things necessary or incidental to the Consortium's bid for the Project, including submission of Bid, participating in conference, responding to queries, submission of information / documents and generally to represent the Consortium in all its dealings with , any other Government Agency or any person, in connection with Project until culmination of the process of bidding and thereafter till the Concession Agreement is entered into with _____.

We hereby agree to ratify all acts, deeds and things lawfully done by Lead Member our said attorney pursuant to this Power of Attorney and that all acts, deeds and things done by our aforesaid attorney, shall be deemed to have been done by us

Dated this day of 200_.

[Executant(s)]

(To be executed by all the members in the Consortium)

- The mode of execution of the Power of Attorney should be in accordance with the procedure, if any, laid down by the applicable law.
- Also wherever required, the executant(s) should submit for verification the certified documents such as resolution/ Power of attorney in favour of the person executing this Power of attorney for the designation of power hereunder on behalf of the Bidder.

## *Form 3: Undertaking on Total Responsibility*

No.

Date

To:

Dear Sir,

**Sub:** Self certificate regarding Total Responsibility

This is to certify that we undertake total responsibility for the successful and defect free operation of the proposed Project solution, as per the requirements of the RFP for Jabalpur Smart City LtdProject.

Thanking you,

Yours faithfully

(Signature of the Authorized signatory of the Bidding Organisation)

Name :

Designation :

Date :

Time :

Seal :

Business Address :

## *Form 4: Particulars of the Concessioner*

[In case of Consortium, all members of the Consortium need to fill this form]

| # | Information Sought | Details to be Furnished |
|---|---|---|
| 1. | Name and address of the bidding Company | |
| 2. | Incorporation status of the firm (public limited/private limited, etc.) | |
| 3. | Year of Establishment | |
| 4. | Date of registration | |
| 5. | ROC Reference No. | |
| 6. | Details of company registration | |
| 7. | Details of registration with appropriate authorities for service tax | |
| 8. | Turnover in the last 3 years | • 2015-16<br>• 2014-15<br>• 2013-14 |
| 9. | Name, Address, email, Phone nos. and Mobile Number of Contact Person | |

## *Form 5: Bank Guarantee for Earnest Money Deposit*

To,

<insert name and address>

Whereas <Name of the Concessioner> (hereinafter called 'the Concessioner') has submitted the bid for Submission of RFP # <RFP Number> dated <Date> for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model(hereinafter called "the Bid") to Jabalpur Smart City Ltd

Know all Men by these presents that we <bank name> having our office at <Address> (hereinafter called "the Bank") are bound unto the Jabalpur Smart City Ltd(hereinafter called "the Purchaser") in the sum of INR<Amount in figures> (Rupees <Amount in words> only) for which payment well and truly to be made to the said Purchaser, the Bank binds itself, its successors and assigns by these presents. Sealed with the Common Seal of the said Bank this <Date>

The conditions of this obligation are:

1. If the Concessioner having its bid withdrawn during the period of bid validity specified by the Concessioner on the Bid Form; or
2. If the Concessioner, having been notified of the acceptance of its bid by the Purchaser during the period of validity of bid
    a) Withdraws his participation from the bid during the period of validity of bid document; or
    b) Fails or refuses to participate in the subsequent Tender process after having been short listed;

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

This guarantee will remain in force up to <insert date> and including <extra time over and above mandated in the RFP> from the last date of submission and any demand in respect thereof should reach the Bank not later than the above date.

NOTHWITHSTANDING ANYTHING CONTAINED HEREIN:

I. Our liability under this Bank Guarantee shall not exceed INR<Amount in figures> (Rupees <Amount in words> only)

II. This Bank Guarantee shall be valid up to <insert date>)

III. It is condition of our liability for payment of the guaranteed amount or any part thereof arising under this Bank Guarantee that we receive a valid written claim or demand for payment under this Bank Guarantee on or before <insert date>) failing which our liability under the guarantee will automatically cease.

(Authorized Signatory of the Bank)

Seal:

Date:

## *Form 6: Project Citation Format*

| General Information | |
|---|---|
| Name of the project | |
| Client for which the project was executed | |
| Name and contact details of the client | |
| **Project Details** | |
| Description of the project | |
| Scope of services | |
| Technologies used | |
| Outcomes of the project | |
| **Other Details** | |
| Total cost of the project | |
| Total cost of the services provided by the | |
| Duration of the project (no. of months, start date, completion date, current status) | |
| **Other Relevant Information** | |
| Letter from the client to indicate the successful completion of the projects | |

## *Form 7: Proposed Solution*

Technical approach, methodology and work plan are key components of the Technical Proposal. Thisneeds to be provided for implementation of;

i. Intelligent Poles

ii. LED street light

iii. WI-FI Services in 42 Hot Spots identified by JSCL

iv. Optical Fiber

v. Smart Bill Board

vi. Central command and control Centre

vii. Environmental Sensors

viii. Ground Based Masts

ix. Managing the Complete Network

You are suggested to present Approach and Methodology divided into the following sections foreach of the above areas:

a) Solution Proposed

b) Understanding of the project (how the solution proposed is relevant to the understanding)

c) Technical Approach and Methodology

### *Form 8: Technical Compliance - FRS*

The Client will randomly check the compliance provided by the Concessioner against the functionality during PoC and in case of any discrepancy the marks will be reduced to zero for this section.

*Note: Please refer to Section 8 of the RFP for detailed Specifications.*

*Please mention the compliance (Yes/No) against each specification (as mentioned in Section 8) of the following Components:*

i. Intelligent Poles
ii. LED Street light
iii. Smart Surveillance
iv. Wi-Fi Services in 42 hotspots
v. Optical Fiber
vi. Smart Bill Board
vii. Central command and control Centre
viii. Environmental Sensors

Further Concessioner need to share the complete Bill of Quantity (indicative mentioned section 12.11) with make and model of the equipment.

## *Form 9: Proposed Implementation Work plan*

| # | Activity | Months[2] | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | |
| 1 | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | |
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| 6 | | | | | | | | | | | | | | |
| 7 | | | | | | | | | | | | | | |
| 8 | | | | | | | | | | | | | | |
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1. Indicate all main activities and drill down to sub-activities of the assignment, including delivery of reports and other benchmarks.
2. Duration of activities shall be indicated in the form of a bar chart.

## *Form 10: Team Composition*

| Name of Staff with Qualification and Experience | Area of Expertise | Position Assigned | Task Assigned | Time committed for the engagement |
|---|---|---|---|---|
| | | | | |
| | | | | |
| | | | | |
| | | | | |

## *Form 11: Curriculum Vitae (CV) of the Project Staff*

| General Information | |
|---|---|
| Name of the person | |
| Current Designation/Job Title | |
| Current job responsibilities | |
| Proposed Role in the Project | |
| Proposed Responsibilities in the Project | |
| Academic Qualifications:<br>• Degree<br>• Academic institution graduated from<br>• Year of graduation<br>• Specialization (if any)<br>• Key achievements and other relevant information (if any) | |
| Professional Certifications (if any) | |
| Total number of years of experience | |
| Number of years with the current company | |
| Summary of the Professional/Domain Experience | |
| Number of complete life cycle implementations carried out | |
| The names of customers (Please provide the relevant names) | |
| Past assignment details (For each assignment provide details regarding name of organizations worked for, designation, responsibilities, tenure)<br><br>Prior Professional Experience covering:<br>• Organizations worked for in the past<br>• Duration and dates of entry and exit<br>• Designation Location(s)<br>• Key responsibilities | |

| | |
|---|---|
| Prior project experience<br><br>• Project name<br>• Client<br>• Key project features in brief<br>• Location of the project<br>• Designation<br>• Role<br>• Responsibilities and activities<br>• Duration of the project<br><br>Please provide only relevant projects. | |
| Proficient in languages (Against each language listed indicate speak/read/write) | |

### *Form 12: Deployment of Personnel*

| # | Name of Staff | Staff input in Months (in the form of a bar chart)[2] | | | | | | | | | | | | | Full Time | Part Time | Total staff man-months proposed |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | n | | | Total |
| 1 | | | | | | | | | | | | | | | | | |
| 2 | | | | | | | | | | | | | | | | | |
| 3 | | | | | | | | | | | | | | | | | |
| N | | | | | | | | | | | | | | | | | |
| | | | | | | | | | | | Total | | | | | | |

For professional staff the input should be indicated individually; for support staff it should be indicated by category

Months are counted from the date of signing of contract.

## *Form 13: Manufacturers/Producers' Authorisation Form*

(This form has to be provided by the OEMs of the products proposed)

No.:

Date:

To:

OEM Authorisation Letter

Dear Sir:

**Ref:** Your RFP Ref: dated

We who are established and reputable manufacturers/producers of having factories/development facilities at (address of factory/facility) do hereby authorize M/s (Name and address of Agent) to submit a Bid, and sign the contract with you against the above Bid Invitation.

We hereby extend our full guarantee and warranty for the Solution, Products and services offered by the above firm against this Bid Invitation.

We hereby declare that we are not insolvent, in receivership, bankrupt or being wound up, our affairs are not being administered by a court or a judicial officer, our business activities have not been suspended and we are not the subject of legal proceedings for any of the foregoing.

We also undertake to provide any or all of the following materials, notifications, and information pertaining to the Products manufactured or distributed by the Supplier:

a) Such Products as the Bank may opt to purchase from the Supplier, provided, that this option shall not relieve the Supplier of any warranty obligations under the Contract; and in the event of termination of production of such Products:

   i. advance notification to the Bank of the pending termination, in sufficient time to permit the Bank to procure needed requirements; and

   ii. Following such termination, furnishing at no cost to the Bank, the blueprints, design documents, operations manuals, standards, source codes and specifications of the Products, if requested.

We duly authorize the said firm to act on our behalf in fulfilling all installations, Technical support and maintenance obligations required by the contract.

Yours faithfully,

(Name)

(Name of Producers)

Note: This letter of authority should be on the letterhead of the manufacturer and should be signed by a person competent and having the power of attorney to bind the manufacturer. The Concessioner in its Bid should include it.

## *Form 14: Undertaking on Service Level Compliance*

No.

Date:

To,

<insert name and address>

Dear Sir,

**Subject:** Undertaking on Service Level Compliance

1. I/We as Concessioner do hereby undertake that we shall monitor, maintain, and comply with the service levels stated in the RFP to provide quality service to JSCL

Yours faithfully,

(Signature of the Authorized signatory of the Bidding Organisation)

Name :

Designation :

Date :

Time :

Seal :

Business Address :

## *Form 15: Undertaking on Exit Management and Transition*

No.

Date:

To,

<insert name and address>

Dear Sir,

**Subject:** Undertaking on Exit Management and Transition

1. I/We hereby undertake that at the time of completion of our engagement with the Department, either at the End of Contract or termination of Contract before planned Contract Period for any reason, we shall successfully carry out the exit management and transition of this Project to the JSCL or to an agency identified by JSCL to the satisfaction of the Department. I/We further undertake to complete the following as part of the Exit management and transition:

    a) We undertake to complete the updation of all Project documents and other artefacts and handover the same to JSCL before transition.

    b) We undertake to design standard operating procedures to manage system (including application and IT systems), document the same and train JSCL personnel on the same.

    c) If Department decides to take over the operations and maintenance of the Project on its own or identifies or selects any other agency for providing operations & maintenance services on this Project, then we shall provide necessary handholding and transition support, which shall include but not be limited to, conducting detailed walkthrough and demonstrations for the IT Infrastructure, handing over all relevant documentation, addressing the queries/clarifications of the new agency with respect to the working/performance levels of the infrastructure, conducting Training sessions etc.

2. I/We also understand that the Exit management and transition will be considered complete on the basis of approval from JSCL.

Yours faithfully,

(Signature of the Authorized signatory of the Bidding Organisation)

Name :

Designation :

Date :

Time :

Seal :

Business Address :

## *Form 16: Declaration for opening of office in Jabalpur*

Place:

Date:

To,

<insert name and address>

**Ref:** "Selection of Concessioner for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model".

**Bid Reference No:**

**Sub:**UndertakingtoOpenanOfficeinJabalpur

DearSir,

We hereby undertakethat:

WearewillingtoopenanofficeinJabalpurwithin1monthincasewe aredeclared successful inthebiddingProcess.

Wehavecarefullyreadandunderstoodtheentiretenderdocument.Wedoagreetoall thetermsandconditionsmentioned in theRFP.

Yours faithfully,

Signature:

Name:

Designation:

Address:

Date:

Company Seal

## *Form 17: Declaration that the Concessioner has not been blacklisted*

(To be submitted on the Letterhead of the responding Concessioner)

Place:

Date:

To,

<name and address>

**Ref:** RFP Notification no dated

**Subject:**Declaration of Concessioner being not blacklisted

Dear Sir,

We confirm that our company, is not blacklisted in any manner whatsoever by any of the State/UT and/or central government in India on any ground including but not limited to indulgence in corrupt practice, fraudulent practice, coercive practice, undesirable practice or restrictive practice.

Place :

Date :

Concessioner's Company Seal :

Authorized Signatory's Signature :

Authorized Signatory's Name and Designation:

## *Form 18: Consortium MoU/Joint Bidding Agreement*

<To be printed on a stamp paper and signed by authorized signatories of the Lead Concessioner and Consortium Members>

This Memorandum of Understanding is made in _____ on the __ Day of ___, 20 _____

By and Between

M/s _____ having its registered office at _____ (hereinafter referred to as_____) acting as the Lead Partner of the first part,

And

M/s _____ having its registered office at _____ (hereinafter referred to as _____) in the capacity of a Joint Partner of the other part

And

M/s _____ having its registered office at _____ (hereinafter referred to as _____) in the capacity of a Joint Partner of the other part

And

M/s _____ having its registered office at _____ (hereinafter referred to as _____) in the capacity of a Joint Partner of the other part

The expressions of _____ and _____ shall wherever the context admits, mean and include their respective legal representatives, successors-in-interest and assigns and shall collectively be referred to as “the Parties” and individually as “the Party”

WHEREAS:

Jabalpur Smart City Ltd(JSCL) [hereinafter referred to as “Purchaser”] has invited bids forSelection of Concessioner for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model’.

NOW, THEREFORE, THE PARTIES AGREE AS FOLLOWS:

The following documents shall be deemed to form and be read and construed as an integral part of this MOU.

i. RFP comprising

ii. Any corrigendum/addendum issued by Purchaser

iii. The bid submitted on our behalf jointly by the Lead Partner

The ‘Parties’ have studied the documents and have agreed to participate in submitting a ‘bid’ jointly.

M/s _____ shall be the lead partner of the Consortium for all intents and purpose and shall represent the Consortium in its dealing with the Purchaser. For the purpose of submission of bid proposals, the parties agree to nominate _____ as the Leader duly authorized to sign and

submit all documents and subsequent clarifications, if any, to the Purchaser. However M/s _____ shall not submit any such proposals, clarifications or commitments before securing the written clearance of the other partner which shall be expeditiously given by M/s _____, M/s _____and M/s _____to M/s _____.

The lead partner shall be authorized to incur the liabilities and receive instructions for and on behalf of any and all partners of consortium. The lead partner will be solely responsible for the entire project implementation.

The 'Parties' have resolved that the following distribution of responsibilities will be followed in the event that the Consortium Bid is accepted by JSCL.

a) Lead Partner share ____ %;

Responsibilities

i. --

ii. --

iii. --

b) Consortium Partner 1 share ____ %;

Responsibilities

i. --

ii. --

iii. –

c) Consortium Partner 2 share ____ %;

Responsibilities

i. --

ii. --

iii. –

d) Consortium Partner 3 share ____ %;

Responsibilities

i. --

ii. --

iii. –

**Assignment and Third Parties**

The parties shall co-operate throughout the entire period of this MOU on the basis of exclusivity and neither of the Parties shall make arrangement or enter into agreement either directly or

indirectly with any other party or group of parties on matters relating to the Project except with prior written consent of the other party and Purchaser.

**Responsibilities**

Lead Concessioner will be responsible for the overall execution of the project, while the consortium partners will be responsible only for their part of execution during the concession period.

**Executive Authority**

The said Consortium through its authorized representative shall receive instructions, payments from the Purchaser. The management structure for the project shall be prepared by mutual consultations to enable completion of project to quality requirements within permitted cost and time.

**Guarantees and Bonds**

Till the award of the work, the lead partner shall furnish bid bond and all other bonds/guarantees to the Purchaser on behalf of the Consortium which shall be legally binding on all the partners of the Consortium.

**Bid Submission**

Each Party shall bear its own cost and expenses for preparation and submission of the bid and all costs until conclusion of a contract with the Purchaser for the Project. Common expenses shall be shared by both the parties in the ratio of their actual participation.

**Indemnity**

Each party hereto agrees to indemnify the other party against its respective parts in case of breach/default of the respective party of the contract works of any liabilities sustained by the Consortium.

For the execution of the respective portions of works, the parties shall make their own arrangements to bring the required finance, plants and equipment, materials, manpower and other resources. All the payments from JSCL will be received by the Lead partner.

**Documents and Confidentiality**

Each Party shall maintain in confidence and not use for any purpose related to the Project all commercial and technical information received or generated in the course of preparation and submission of the bid.

**Arbitration**

Any dispute, controversy or claim arising out of or relating to this agreement shall be settled in the first instance amicably between the parties. If an amicable settlement cannot be reached as above, it will be settled by arbitration in accordance with the Indian Arbitration and Conciliation Act 1996 or any amendments thereof. The venue of the arbitration shall be Jabalpur.

**Validity**

This Agreement shall remain in force till the occurrence of the earliest to occur of the following, unless by mutual consent, the Parties agree in writing to extend the validity for a further period.

a) The bid submitted by the Consortium is declared unsuccessful, or

b) Cancellation/shelving of the Project by the Purchaser for any reasons prior to award of work

c) Execution of detailed Consortium agreement by the parties, setting out detailed terms after award of work by the Purchaser.

This MoU is drawn in ____ number of copies with equal legal strength and status.

This MoU shall be construed under the laws of India.

**Notices**

Notices shall be given in writing by fax confirmed by registered mail or commercial courier to the following fax numbers and addresses:

| Lead Partner | Consortium Partner 1 | Consortium Partner 2 | Consortium Partner 3 |
|---|---|---|---|
| _____ | _____ | _____ | _____ |
| _____ | _____ | _____ | _____ |
| (Name & Address) | (Name & Address) | (Name & Address) | (Name & Address) |

IN WITNESS WHEREOF, THE PARTIES have executed this MOU the day, month and year first before written.

| | | | |
|---|---|---|---|
| M/s_____ | M/s_____ | M/s_____ | M/s_____ |
| (Seal) | (Seal) | (Seal) | (Seal) |

Witness

1. _____(Name & Address)
2. _____(Name & Address)

## *18.2 Annexure II: Financial Proposal Template*

### *Form 1: Covering Letter*

To:

<name and address>

**Subject:**

Dear Sir,

We, the undersigned, offer to provide the Implementation services for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model in accordance with your Request for Proposal dated <Date> and our Proposal (Technical and Financial Proposals). Our attached Financial Proposal is for the sum of <Amount in words and figures>. This amount is inclusive of the local taxes.

**1. Price & Validity**

- All the prices mentioned in our Tender are in accordance with the terms as specified in the RFP documents. All the prices and other terms and conditions of this Bid are valid for a period of 180 days from the date of submission of Bid.
- We hereby confirm that our prices include all taxes. However, all the taxes are quoted separately under relevant sections.
- We understand that the actual payment would be made as per the existing indirect tax rates during the time of payment.

**2. Unit Rates**

We have indicated in the relevant forms enclosed, the unit rates for the purpose of on account of payment as well as for price adjustment in case of any increase to/decrease from the scope of work under the contract.

**3. Deviations**

We declare that all the services shall be performed strictly in accordance with the Tender documents except for the variations and deviations, all of which have been detailed out exhaustively in the following statement, irrespective of whatever has been stated to the contrary anywhere else in our bid.

Further we agree that additional conditions, if any, found in the Tender documents, other than those stated in deviation schedule, shall not be given effect to.

**4. Tender Pricing**

We further confirm that the prices stated in our bid are in accordance with your Instruction to Concessioner included in Tender documents.

**5. Qualifying Data**

We confirm having submitted the information as required by you in your Instruction to Concessioner. In case you require any other further information/documentary proof in this regard before evaluation of our Tender, we agree to furnish the same in time to your satisfaction.

**6. Bid Price**

We declare that our Bid Price is for the entire scope of the work as specified in the RFP. These prices are indicated Commercial Bid attached with our Tender as part of the Tender.

**7. Bank Guarantee**

We hereby declare that in case the contract is awarded .to us, we shall submit the Bank Guarantee as per Annexure III of the RFP document.

Our Financial Proposal shall be binding upon us subject to the modifications resulting from Contract negotiations, up to expiration of the validity period of the Proposal, i.e., [Date].

We understand you are not bound to accept any Proposal you receive.

We hereby declare that our Tender is made in good faith, without collusion or fraud and the information contained in the Tender is true and correct to the best of our knowledge and belief.

We understand that our Tender is binding on us and that you are not bound to accept a Tender you receive.

Thanking you,

We remain,

Yours sincerely,

Authorized Signature :

Name and Title of Signatory :

Name of Firm :

Address :

## *Form 2 Financial Bid Format*

Concessioner need to fill the price in the following format;

A. Capital Investment

| # | Brief Item Description | Unit | Quantity | Unit Price | Amount |
|---|---|---|---|---|---|
| 1. | Smart LED | | | | |
| | Sub Total | | | | |
| 2. | Intelligent Poles | | | | |
| | Sub Total | | | | |
| 3. | Wi-Fi Services | | | | |
| | Sub Total | | | | |
| 4. | Optical Fiber | | | | |
| | Sub Total | | | | |
| 5. | Surveillance | | | | |
| | Sub Total | | | | |
| 6. | Smart Bill Board | | | | |
| | Sub Total | | | | |
| 7. | Centralized Command and Control Centre | | | | |
| | Sub Total | | | | |
| 8. | Environmental Sensors | | | | |
| | Sub Total | | | | |
| | Ground Based Masts | | | | |
| | Sub Total | | | | |
| A | Total Cost (1+2+3+4+5+6+7+8) | | | | |
| 9. | Contingencies | | | | |
| 10. | Taxes, Works Tax etc | | | | |
| 11. | Supervision and implementation Costs | | | | |
| | Total CAPEX (A+9+10+11) | | | | |

Note:

- The Concessioner is required to break up the aforementioned smart components and provide the cost of each of the unit component separately

B. Operation and Maintenance Cost for 14 years

| Brief Item Description | Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 | Year 14 |
| Smart LED | | | | | | | | | | | | | | |
| Intelligent Poles | | | | | | | | | | | | | | |
| Wi-Fi Services | | | | | | | | | | | | | | |
| Optical Fiber | | | | | | | | | | | | | | |
| Surveillance | | | | | | | | | | | | | | |
| Smart Bill Board | | | | | | | | | | | | | | |
| Centralized Command and Control Centre | | | | | | | | | | | | | | |
| Environmental Sensors | | | | | | | | | | | | | | |
| Any other Cost | | | | | | | | | | | | | | |
| Total OPEX | | | | | | | | | | | | | | |

C. Grant (Gb) required from the Authority

| Grant | Amount (in figures and words) |
|---|---|
| | |

D. Revenue from the project

| Revenue | Year | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 | Year 7 | Year 8 | Year 9 | Year 10 | Year 11 | Year 12 | Year 13 | Year 14 |
| Revenue Shared with JSCL | | | | | | | | | | | | | | |
| Revenue shared with Client (INR) | | | | | | | | | | | | | | |
| NPV | | | | | | | | | | | | | | |

Note:

- The amount should be INR
- The NPV will be calculated as;
  - 1/(1+rd)^n, where rd is the discounting factor and n is year of calculation
- The rate of discounting factor is 10%

## *18.3 Annexure III: Template for Bank Guarantee*

Form 1: Bank Guarantee

To,

<insert name address>

Whereas, <name of the supplier and address> (hereinafter called "the Concessioner") has undertaken, in pursuance of contract no. <Insert Contract No.> dated. <Date> to provide Implementation services for 'Selection of Concessioner for Implementing Intelligent Poles for Smart City Projects in Jabalpur on BOOT model' to Jabalpur Smart City Ltd (hereinafter called "the beneficiary")

And whereas it has been stipulated by in the said contract that the Concessioner shall furnish you with a bank guarantee by a recognized bank for the sum specified therein as security for compliance with its obligations in accordance with the contract;

And whereas we, <Name of Bank> a banking company incorporated and having its head /registered office at <Address of Registered Office> and having one of its office at <Address of Local Office> have agreed to give the supplier such a bank guarantee.

Now, therefore, we hereby affirm that we are guarantors and responsible to you, on behalf of the supplier, up to a total of INR <Insert Value> (Rupees <Insert Value in Words> only) and we undertake to pay you, upon your first written demand declaring the supplier to be in default under the contract and without cavil or argument, any sum or sums within the limits of INR<Insert Value> (Rupees <Insert Value in Words> only) as aforesaid, without your needing to prove or to show grounds or reasons for your demand or the sum specified therein.

We hereby waive the necessity of your demanding the said debt from the Concessioner before presenting us with the demand.

We further agree that no change or addition to or other modification of the terms of the contract to be performed there under or of any of the contract documents which may be made between you and the Concessioner shall in any way release us from any liability under this guarantee and we hereby waive notice of any such change, addition or modification.

This Guarantee shall be valid until <Insert Date>)

Notwithstanding anything contained herein:

I. Our liability under this bank guarantee shall not exceed INR. <Insert Value> (Rupees <Insert Value in Words> only).

II. This bank guarantee shall be valid up to <Insert Expiry Date>)

III. It is condition of our liability for payment of the guaranteed amount or any part thereof arising under this bank guarantee that we receive a valid written claim or demand for payment under this bank guarantee on or before <Insert Expiry Date>) failing which our liability under the guarantee will automatically cease.

(Authorized Signatory of the Bank)

Seal:

Date:

## *18.4 Annexure IV: Checklist*

Following is the check list for Concessioner's reference;

| # | Particulars | Included in the Proposal Yes/No |
|---|---|---|
| **Annexure 1** | | |
| **1.** | Form 1: Technical Proposal Covering Letter | |
| **2.** | Form 2: Power of Attorney | |
| **3.** | Form 3: Undertaking on Total Responsibility | |
| **4.** | Form 4: Particulars of the Concessioner | |
| **5.** | Form 5: Bank Guarantee for Earnest Money Deposit | |
| **6.** | Form 6: Project Citation Format | |
| **7.** | Form 7: Proposed Solution | |
| **8.** | Form 8: Technical Compliance: FRS | |
| **9.** | Form 9: Proposed Implementation Work Plan | |
| **10.** | Form 10: Team Composition | |
| **11.** | Form 11: Curriculum Vitae (CV) of Key Personnel | |
| **12.** | For 12: Deployment of Personnel | |
| **13.** | Form 13: Manufacturers Authorisation Form | |
| **14.** | Form 14: Undertaking on Service Level Compliance | |
| **15.** | Form 15: Undertaking on Exit Management & Transition | |
| **16.** | Form 16: Office Undertaking | |
| **17.** | Form 17: Declaration of non-blacklist | |
| **18.** | Form 18: Consortium MoU | |
| **Annexure II** | | |
| **19.** | Form 1: Covering Letter | |
| **20.** | Form 2: Financial Proposal | |
| **Annexure III** | | |
| **21.** | Form 1: Bank Guarantee | |

## *18.5 Annexure VI*

### 18.5.1 Existing Street Lights

| # | Type of Fittings | Watt | Number of Lights |
|---|---|---|---|
| 1. | Sodium Vapor | 150 | 10982 |
| 2. | | 250 | 2782 |
| 3. | Tube Light | 40 | 12600 |
| 4. | CFL | 2*36 | 460 |
| 5. | | 85 | 1973 |
| 6. | | 65 | 45 |
| 7. | MH | 400 | 499 |
| 8. | | 250 | 344 |
| 9. | Halogen | 500 | 37 |
| 10. | LED | 120 | 62 |
| 11. | | 110 | 2000 |
| 12. | | 90 | 960 |
| 13. | | 45 | 160 |
| 14. | | 70 | 57 |
| 15. | | 24 | 2400 |
| 16. | | 103 | 100 |

### 18.5.2 Locations of Intelligent Poles

Will be provided by JSCL to Concessioner before pre-bid meeting.

| # | Locations | Total Number of Intelligent Poles |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |

### 18.5.3 Locations of Environmental Sensors

| # | Locations | Total Number of Environmental Sensors |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |

### 18.5.4 List of locations for Wi-Fi hot spots

| # | Type of Location | Location | Size of the area |
|---|---|---|---|
| 1. | Bus Stops | Damohnaka | |
| 2. | | Chanchlabai | |
| 3. | | Ranital | |
| 4. | | Madanmahal | |
| 5. | | HomeScience | |
| 6. | | Shashtri Bridge | |
| 7. | | LabourChowk | |
| 8. | | Adhartaal | |
| 9. | | AmbedkarChowk | |
| 10. | | DeendayalChowk | |
| 11. | | SBI Chowk | |
| 12. | | AhinsaChowk | |
| 13. | | Chhotti line | |
| 14. | | EktaChowk | |
| 15. | | PSM | |
| 16. | | Income tax Chowk | |
| 17. | | Medical College | |
| 18. | | Engineering College | |
| 19. | | Agricultural College | |
| 20. | | Gwarighat road | |
| 21. | Parking | ShrinathkiTalaiya | .782ha |
| 22. | | MalviyaChowk | |
| 23. | | TilakBhomikitalaiya | 0.054ha |
| 24. | Recreational | Bhavartal | 4.62 ha |
| 25. | | Nehru Garden | .433 ha |
| 26. | | Golbazar | 3.07 ha |
| 27. | | Devtal | 212m |
| 28. | | Madanmahal | |
| 29. | | Supatal | 1.12km (perimeter) |
| 30. | | Civic Center garden | 1.06ha |
| 31. | | Gwarighat | |
| 32. | | ShailparnUdhyan | |
| 33. | | Ranital Stadium | 29.6ha |
| 34. | | Right town Stadium | 3.49ha |
| 35. | | Robertson Lake | 5.21km(perimeter) |
| 36. | Market/CBD | Mahila Market | |
| 37. | | Kamania Gate | |
| 38. | | ChhotaFuwara | |
| 39. | | Lord Ganj | |
| 40. | | Hawker Zone | |
| 41. | Institutional | GhandhiBhawan | |
| 42. | | Ranidurgawati Museum | |

### 18.5.5 CCTV Locations

| # | Locations | Total Number of Camera |
|---|---|---|
| 1. | | |
| 2. | | |
| 3. | | |