# Madhya Pradesh Metro Rail Corporation Limited (MPMRCL)

(A Joint Venture of Government of India and Government of Madhya Pradesh)

**CIN: U75100MP2015SGC034434**

**2nd Floor, Smart City Development Corporation Limited Office Building,**

**Kalibadi Road, BHEL, Sector A, Berkheda, Bhopal – 462022, Madhya Pradesh, India**

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## Corrigendum – 3

**No.: 0006/MPMRCL/2022** **Date: 05.01.2022**

With reference to Tender Notification No.: 1427/MPMRCL/2021/Package BH&IN-02, Date: 02.11.2021, regarding "Design, Manufacture, Supply, Installation, Testing, Commissioning and Training of Standard Gauge Passenger Rolling Stock Cars (with 15 Years Comprehensive Maintenance) – 81 Cars for Bhopal and 75 Cars for Indore, including Signalling & Train Control and Telecommunication Systems (with 7 Years Comprehensive Maintenance)" for Bhopal Metro Rail Project and Indore Metro Rail Project, following corrigendum are issued in pursuant to clause 3.5 of Volume I – ITT. The corrigendum will be part of the said tender document.

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
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| 1 | Volume I, Part 1: NIT | 1.2, Table, 5th row (8 of 239) | Tender Fee as cost of Tender documents:<br>INR 50,000 (Inclusive of GST) Non- Refundable.<br>Payment of Tender Fee/ Cost of Tender Document | Tender Fee as cost of Tender documents:<br>INR 50,000 (Inclusive of GST) Non- Refundable.<br>Payment of Tender Fee/ Cost of Tender Document |

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| | | | is to be made only by RTGS, NEFT or IMPS. No other mode of payment will be accepted. The detail of bank account of MPMRCL is mentioned in para 1.10 of NIT. The Tenderers are required to upload scanned copies of transaction of payment (clearly indicating tender number i.e., BH&IN-02 in the remarks or description column) of Tender Document cost/ Tender Fee at the time of online bid submission.<br>(Copy of GST registration no. to be provided along with Tender document cost/tender fee)<br>[Refer para 1.10 of NIT for details.] | is to be made only by RTGS, NEFT or IMPS. No other mode of payment will be accepted. The detail of bank account of MPMRCL is mentioned in para 1.10 of NIT. The Tenderers are required to upload scanned copies of transaction of payment (clearly indicating tender number i.e., BH&IN-02 in the remarks or description column) of Tender Document cost/ Tender Fee at the time of online bid submission.<br>(Copy of GST registration no. may be provided along with Tender document cost/tender fee)<br>[Refer para 1.10 of NIT for details.] |
| 2 | Volume I, Part 1: NIT | 1.10, 2nd paragraph, last sentence<br>(11 of 239) | Copy of GST registration number to be provided along with Tender document cost/tender fee. | Copy of GST registration number may be provided along with Tender document cost/tender fee. |
| 3 | Volume I, Part 2: ITT | 4.4.3<br>(26 of 239) | In case of Joint Venture/ Consortium, the JV/ Consortium member based on whose experience and strength, the tenderer has qualified for this tender, shall be responsible for overall quality of manufacture, testing, commissioning and DNMP. | In case of Joint Venture/ Consortium, the JV/ Consortium member based on whose experience and strength, the tenderer has qualified for this tender, shall be responsible for overall quality of manufacture, testing, commissioning and DLCMP. |
| 4 | Volume I, Part 2: ITT | 6.5.5.2<br>(39 of 239)<br>(Newly added) | *New paragraph added at last* | The Minimum Local Content for "Design Manufacture, Supply, Installation, Testing, Commissioning and Training" need to be compiled without DLCMP portions for "Class-I Local Supplier" and "Class-II Local Supplier" as mentioned above, |

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| | | | | in case of availing Purchase Preference. |
| 5 | Volume I, Part 2: ITT | 6.6.2 (40 of 239) | Tenderer's attention is directed to the list of items/ components as confirmed in Annexure – 10 to ITT, for which sufficient local capacity and competition are available in India. The successful tenderer (the Contractor) shall procure such items/ components locally (from indigenous suppliers) only. | Tenderer's attention is directed to the list of items/ components as confirmed in Annexure – 10 to ITT, for which sufficient local capacity and competition are available in India. The successful tenderer (the Contractor) shall procure such items/ components locally (from indigenous suppliers – i.e., from "Class-I Local Suppliers") only. |
| 6 | Volume I, Part 2: ITT | Annexure – 1, Attachment – 1.2H: Form SUB (129 of 239) | *[All proposed Sub-contractors must meet the required credentials for respective activities/ Equipment's as provided in Annexure – 10 to ITT and as per other Tender provision, if any Tenderers are free to propose more than one for each item.]* | *[All proposed Sub-contractors must meet the required credentials for respective activities/ Equipment's as provided in Annexure – 12 to ITT and as per other Tender provision, if any Tenderers are free to propose more than one for each item.]* |
| 7 | Volume I, Part 2: ITT | Annexure – 1, Attachment – 1.2H: Form SUB (129 of 239) | *Note:*<br>*The Tenderer shall submit item wise details of proposed subcontractor/ manufacturer, in the form annexed with this Form SUB, meeting the required credentials for Subcontractors/ Manufacturers (Annexure – 10).* | *Note:*<br>*The Tenderer shall submit item wise details of proposed subcontractor/ manufacturer, in the form annexed with this Form SUB, meeting the required credentials for Subcontractors/ Manufacturers (Annexure – 12).* |
| 8 | Volume I, Part 2: ITT | Annexure – 10, 1st paragraph and Tables 10.1A & 10.1B (149 of 239) | In case of requirement of following items/ components, the successful tenderer (the Contractor) shall procure such items/ components locally (from indigenous suppliers) only.<br>Table 10.1A: List of Items/ Components for Rolling Stock (Mandatory) | Refer Attachment – 1 to Corrigendum – 3 for amended "1st paragraph and Tables 10.1A & 10.1B". |

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| | | | Table 10.1B: List of Items/ Components for Rolling Stock (Recommended) | |
| 9 | Volume I, Part 2: ITT | Annexure – 10, Table 10.3, header row only (151 of 239) | Table 10.3: List of Items/ Components for Telecommunication | Table 10.3: List of Items/ Components for Telecommunication (Recommended)<br>The Tenderer/ Contractor are encouraged for localisation from local suppliers. |
| 10 | Volume I, Part 2: ITT | Annexure – 11 (153 of 239) | Annexure – 11 to ITT: Guarantee for Safe Custody | Annexure – 11 to ITT: [Not Used] |
| 11 | Volume I, Part 3: EQC | 8.1.5, (c) (160 of 239) | However, in case of consortium/ JV between companies and their subsidiaries or subsidiaries/associates (which are under the same parent/holding company), where either the parent or the subsidiary/associate company or both is/are (an) Indian company/ companies registered in India, parent company shall be eligible to bid on the basis of credentials of their owned subsidiaries/associates. Subsidiaries/Associates (which are under the same parent/holding company) shall be eligible to bid on the basis of credentials of their parent company/subsidiaries/associates. Here it will be mandatory that the bidders must enter into a consortium/JV agreement with a token participation of such parent/ subsidiary/associate company, whose credentials are being sought to be used. This consortium/ JV agreement should clearly stipulate that the individual companies (i.e. the | However, in case of consortium/ JV between companies and their subsidiaries where either the parent or the subsidiary or both is/are (an) Indian company/ companies registered in India, parent company shall be eligible to bid on the basis of credentials of their owned subsidiaries. Subsidiaries shall be eligible to bid on the basis of credentials of their parent company. Here it will be mandatory that the bidders must enter into a consortium/JV agreement with a token participation of such parent/ subsidiary whose credentials are being sought to be used. This consortium/ JV agreement should clearly stipulate that the individual companies (i.e., the parent and the JV) shall be jointly and severally responsible and liable for the timely execution of the contract and failure to do so will make all of the them liable to the penal conditions of the contract. In such case there will be no requirement of the minimum |

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| | | | parent/subsidiary/associate company and the JV) shall be jointly and severally responsible and liable for the timely execution of the contract and failure to do so will make all of the them liable to the penal conditions of the contract. In such case there will be no requirement of the minimum threshold of 15% participation by each member of the consortium/JV. | threshold of 15% participation by each member of the consortium/JV. |
| 12 | Volume I, Part 3: EQC | 8.1.7 (161 of 239) (Newly added) | *New sub-clause added* | Values if any in foreign currency, shall be converted to equivalent Indian Rupees at the Exchange Reference Rate of the Financial Benchmarks India Pvt. Ltd. (www.fbil.org.in) recognised by Reserve Bank of India, on the day as specified in particular criteria. If FBIL rates are not available for that day, rate given on www.xe.com shall be considered. |
| 13 | Volume I, Part 3: EQC | 10.2.1, Notes: (v) (166 of 239) | In case the work is executed for a private client the following shall be submitted: copy of the work order(s), bill of quantities, details of payments received, T.D.S. certificates for all payments received and copy of the final/last bill paid. | [Not Used] |
| 14 | Volume I, Part 3: EQC | 10.2.2, Notes: iii (167 of 239) | The Tenderer (each member in case of JV/ Consortium) shall compile a list showing their previous experience of similar contract of last ten years. The Tenderer (Concerned Partner in case of JV/ Consortium) shall submit details of Work Experience previously executed by them during last ten years in the proforma of Appendix –15C and 15D | The Tenderer shall submit details of Work Experience previously executed by them to be considered qualified in the proforma of Appendix – 15C.1, 15C.2 and 15D of LOT. |

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| | | | of LOT respectively. | |
| 15 | Volume I, Part 3: EQC | 10.2.2, Notes: (iv) (167 of 239) | In case the work is executed for a private client the following shall be submitted: copy of the work order(s), bill of quantities, details of payments received, T.D.S. certificates for all payments received and copy of the final/last bill paid. | [Not Used] |
| 16 | Volume I, Part 3: EQC | 10.3.1, 1st paragraph (167 of 239) | The tenderers will be qualified only if they satisfy the minimum eligibility criteria (a) or (b) or (c), and (d) as given below within the past 7 (seven) years ending on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above). | The tenderers will be qualified only if they satisfy the minimum eligibility criteria (a) or (b) or (c), and (d) as given below within the past 15 (fifteen) years ending on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above). |
| 17 | Volume I, Part 3: EQC | 10.3.1, (d), 2nd column (168 of 239) | Integration of Signalling and Train Control System including major subsystems (Interlocking, ATP, ATS and Radio), with other subsystems (Telecommunication systems, Rolling stock, Track, Traction & Power Supply, Platform screen door, etc) in at least one similar work, out of the work(s) submitted in support of above criteria (a) or (b) or (c) | Integration of Signalling and Train Control System including major subsystems (Interlocking, ATP, ATS and Radio), with other subsystems (Telecommunication systems, Rolling stock, Track, Traction, Platform screen door, etc.) in at least one "Similar Work" ** |
| 18 | Volume I, Part 3: EQC | 10.3.1, (d), 4th column (168 of 239) | Not Applicable | Must meet |
| 19 | Volume I, Part 3: EQC | 10.3.1, Notes: (vi) (169 of 239) | In case the work is executed for a private client the following shall be submitted: copy of the work order(s), bill of quantities, details of payments | [Not Used] |

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| | | | received, T.D.S. certificates for all payments received and copy of the final/last bill paid. | |
| 20 | Volume I, Part 3: EQC | 10.3.1, Notes: (xi) (170 of 239) (Newly added) | *New note added* | xi. The Tenderer (Single Entity or JV/ Consortium) or proposed subcontractor must meet these criteria of (a) or (b) or (c) and (d). The Signalling & Train Control System Integrator shall be either the Tenderer (Single Entity or Concerned Partner of the JV/ Consortium, as the case may be) or proposed subcontractor. The subsystems like CBI, ATO/ UTO, ATP, ATS and major safety related subsystems shall not be sublet further. The overall responsibility for the systems including the system and software integration of all the Signalling & Train Control System/ sub-system (with other Sub-Systems including Telecommunication, Rolling Stock, Track, Traction, Platform Screen Door etc.) will vest with the tenderer (Single Entity or Concerned Partner of the JV/ Consortium or proposed subcontractor, as the case may be); who should have necessary expertise for the same. “Concerned Partner” criteria shall not be applicable, in case of proposed subcontractor. A consent letter/MOU from the proposed subcontractor shall be submitted by the Tenderer stating that they will work with the Tenderer, in case the work is awarded to the Tenderer, failing which the bid shall be treated as non-responsive. The same provision of subcontractor shall be applicable for satisfying EQC |

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| | | | | criteria 10.3.2 (a) and (b) also. |
| 21 | Volume I, Part 3: EQC | 10.3.1, Notes: (xii) (170 of 239) (Newly added) | *New note added* | xii. Further to Note (xi) above, in case, the proposed Specialist Subcontractor is in the form of JV/Consortium, then the credentials of Subsidiary Company/ Parent Company within their Specialist Subcontractor JV/ Consortium may be used as per provisions of Sub-Clause 8.1.5 [Participation by Subsidiary Company / Parent Company with credential of other Company]. The Tenderer must submit the Specialist Subcontractor JV/ Consortium agreement in this regard, which should clearly indicate the roles and responsibilities assigned to each member of proposed Specialist Subcontractor JV/ Consortium. |
| 22 | Volume I, Part 3: EQC | 10.3.1, Notes: (xiii) (170 of 239) (Newly added) | *New sub-clause added* | xiii. Tenderers may propose more than one Subcontractor to satisfy these criteria 10.3 [Work Experience for Signalling & Train Control] in tender submission. Each proposed Subcontractor(s) shall be evaluated and the qualified proposed Subcontractor(s) shall be terms as “Specialist Subcontractor”. In case, none of the proposed Subcontractor(s) in tender submissions is meeting these criteria, then the Tender shall be treated as nonresponsive and no alternative proposal shall be considered during tender evaluations. However, the Tenderer/ Contractor shall be free to choose any of the qualified Specialist Subcontractor, or |

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| | | | | alternatively may propose any new Specialist Subcontractor (after award of the Contract) than those proposed at tender stage, which shall be subject to meeting these criteria and with written approval of the Employer. Quoted rates and prices shall be deemed inclusive for whichever Specialist Subcontractor(s) is(are) appointed, and no adjustment of the rates and prices shall be permitted. |
| 23 | Volume I, Part 3: EQC | 10.3.1, Notes: (xiv) (170 of 239) (Newly added) | *New sub-clause added* | xiv. In case of the submitted client certificate for any claimed experience, indicates the combined amount of work done with respect to the "Similar Work" of criteria 10.3.1 for Signalling & Train Control and 10.4.1 for Telecommunication, then the combined value of the claimed work must meet at least the combined values of both the criteria alternatively.<br>*(For clearance of doubt: Each of such claimed experience to meet the combined value of at least INR 580 Crore for criteria (a) above, INR 362 Crore for criteria (b) above or, INR 290 Crore for criteria (c) above. At the same time, they also need to meet other requirements of criteria 10.3. The Tenderer may claim in combination as well, for example under criteria (b) above; one work of at least INR 225 Crore or more showing separate value and another combined work value of at least INR 362 Crore or more.)* |

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| 24 | Volume I, Part 3: EQC | 10.3.2, 1st paragraph (170 of 239) | The Tenderer will be qualified only if they satisfy the following requirements as given below within last 7 (seven) years ending on the Credential Cut-off Date (as confirmed in EQC para 8.1.6 above). | The Tenderer will be qualified only if they satisfy the following requirements as given below within last 15 (fifteen) years ending on the Credential Cut-off Date (as confirmed in EQC para 8.1.6 above). |
| 25 | Volume I, Part 3: EQC | 10.3.2, Notes: (v) (170 of 239) | In case the work is executed for a private client the following shall be submitted: copy of the work order(s), bill of quantities, details of payments received, T.D.S. certificates for all payments received and copy of the final/last bill paid. | [Not Used] |
| 26 | Volume I, Part 3: EQC | 10.4.1, 1st paragraph (171 of 239) | The tenderers will be qualified only if they satisfy the minimum eligibility criteria (a) or (b) or (c), and (d) as given below within the past 7 (seven) years ending on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above). | The tenderers will be qualified only if they satisfy the minimum eligibility criteria (a) or (b) or (c), and (d) as given below within the past 15 (fifteen) years ending on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above). |
| 27 | Volume I, Part 3: EQC | 10.4.1, Notes: (i)-(b) (172 of 239) | (b) Fiber optic transmission system (FOTS) based on Gigabit Ethernet (GE) network, | (b) Fiber optic transmission system (FOTS), |
| 28 | Volume I, Part 3: EQC | 10.4.1, Notes: (vii) (173 of 239) | In case the work is executed for a private client the following shall be submitted: copy of the work order(s), bill of quantities, details of payments received, T.D.S. certificates for all payments received and copy of the final/last bill paid. | [Not Used] |
| 29 | Volume I, Part 3: EQC | 10.4.1, Notes: (xii) (174 of 239) | *New note added* | xii. Further to Note (iii) above, in case, the proposed Specialist Subcontractor is in the form of |

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| | | (Newly added) | | JV/Consortium, then the credentials of Subsidiary Company/ Parent Company within their Specialist Subcontractor JV/ Consortium may be used as per provisions of Sub-Clause 8.1.5 [Participation by Subsidiary Company / Parent Company with credential of other Company]. The Tenderer must submit the Specialist Subcontractor JV/ Consortium agreement in this regard, which should clearly indicate the roles and responsibilities assigned to each member of proposed Specialist Subcontractor JV/ Consortium. |
| 30 | Volume I, Part 3: EQC | 10.4.1, Notes: (xiii) (174 of 239) (Newly added) | *New sub-clause added* | xiii. Tenderers may propose more than one Subcontractor to satisfy these criteria 10.4 [Work Experience for Telecommunication] in tender submission. Each proposed Subcontractor(s) shall be evaluated and the qualified proposed Subcontractor(s) shall be terms as “Specialist Subcontractor”. In case, none of the proposed Subcontractor(s) in tender submissions is meeting these criteria, then the Tender shall be treated as nonresponsive and no alternative proposal shall be considered during tender evaluations. However, the Tenderer/ Contractor shall be free to choose any of the qualified Specialist Subcontractor, or alternatively may propose any new Specialist Subcontractor (after award of the Contract) than those proposed at tender stage, which shall be subject to meeting these criteria and with written |

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| | | | | approval of the Employer. Quoted rates and prices shall be deemed inclusive for whichever Specialist Subcontractor(s) is(are) appointed, and no adjustment of the rates and prices shall be permitted. |
| 31 | Volume I, Part 3: EQC | 10.4.1, Notes: (xiv) (174 of 239) (Newly added) | *New sub-clause added* | xiv. In case of the submitted client certificate for any claimed experience, indicates the combined amount of work done with respect to the "Similar Work" of criteria 10.3.1 for Signalling & Train Control and 10.4.1 for Telecommunication, then the combined value of the claimed work must meet at least the combined values of both the criteria alternatively.<br>*(For clearance of doubt: Each of such claimed experience to meet the combined value of at least INR 580 Crore for criteria (a) above, INR 362 Crore for criteria (b) above or, INR 290 Crore for criteria (c) above. At the same time, they also need to meet other requirements of criteria 10.4. The Tenderer may claim in combination as well, for example under criteria (b) above; one work of at least INR 137 Crore or more showing separate value and another combined work value of at least INR 362 Crore or more.)* |
| 32 | Volume I, Part 3: EQC | 10.5.1, Notes: (i) (174 of 239) | Financial data for last five financial years has to be submitted by the Tenderer in Appendix – 18 of LOT along with audited financial statements. All such documents reflect the financial data of the Tenderer | Financial data for last five financial years has to be submitted by the Tenderer in Appendix – 18 of LOT along with audited financial statements. All such documents reflect the financial data of the Tenderer |

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| | | | or member in case of JV/ Consortium, and not of sister, subsidiary or Parent Company. Works in Hand showing existing commitments to be submitted by the Tenderer in Appendix – 19 of LOT. The financial data in the prescribed format of Appendix – 18 and 19 of LOT shall be endorsed / signed in original and stamped by a Chartered Accountant along with the CA's membership number. In case audited balance sheet of the last financial year is not made available by the Tenderer, then such Tenderer have to submit an affidavit certifying that 'the balance sheet has actually not been audited so far'. In such a case the financial data of previous '4' audited financial years will be taken into consideration for evaluation. If audited balance sheet of any year other than the last year is not submitted, the tender may be considered as non-responsive; subject to following Note ii. | or member in case of JV/ Consortium, and not of sister, subsidiary or Parent Company. Works in Hand showing existing commitments to be submitted by the Tenderer in Appendix – 19 of LOT. The financial data in the prescribed format of Appendix – 18 and 19 of LOT shall be endorsed / signed in original and stamped by a Chartered Accountant along with the CA's membership number or in case of foreign parties; by an Independent Chartered Accountant/ Certified Public Accountant/ Auditor. In case audited balance sheet of the last financial year is not made available by the Tenderer, then such Tenderer have to submit an affidavit certifying that 'the balance sheet has actually not been audited so far'. In such a case the financial data of previous '4' audited financial years will be taken into consideration for evaluation. If audited balance sheet of any year other than the last year is not submitted, the tender may be considered as non-responsive; subject to following Note ii. |
| 33 | Volume I, Part 3: EQC | 10.5.1, Notes: (iii) (175 of 239) | C = all available credits including lines of credit, overdraft facilities and other financial means Letter(s) (as per proforma given in Annexure – 6 of ITT) from Scheduled Bank(s) in India (meaning a bank which has been included in the Second Schedule of Reserve Bank of India Act, 1934, with subsequent amendments if any; including Scheduled Commercial Foreign | C = all available credits including lines of credit, overdraft facilities and other financial means Letter(s) (as per proforma given in Annexure – 6 of ITT) from Scheduled Bank(s) in India (meaning a bank which has been included in the Second Schedule of Reserve Bank of India Act, 1934, with subsequent amendments if any; including Scheduled Commercial Foreign |

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| | | | Banks with branch in India), excluding Cooperative Banks, should clearly substantiate the amount of lines of credit, overdraft facilities and other financial means, as on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above). | Banks with branch in India), excluding Cooperative Banks or in case of foreign members Letter(s) (as per proforma given in Annexure – 6 of ITT) in English language from the principal bank(s) in its country of incorporation or registration, should clearly substantiate the amount of lines of credit, overdraft facilities and other financial means, as on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above). |
| 34 | Volume I, Part 3: EQC | 10.6.1, Notes: (i) (176 of 239) | Financial data for latest last five financial years has to be submitted by the tenderer in Appendix – 18 of LOT along with audited financial statements. The financial data in the prescribed format shall be endorsed /signed in original and stamped by a Chartered Accountant along with the CA's membership number. | Financial data for latest last five financial years has to be submitted by the tenderer in Appendix – 18 of LOT along with audited financial statements. The financial data in the prescribed format shall be endorsed /signed in original and stamped by a Chartered Accountant along with the CA's membership number or in case of foreign parties; by an Independent Chartered Accountant/ Certified Public Accountant/ Auditor. |
| 35 | Volume I, Part 3: EQC | 10.6.1, Notes: (ii) (177 of 239) | The value of existing commitments for on-going works during the period 50 months period with effect from the next day of the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above) has to be submitted by the tenderer in Appendix – 19 of LOT. This data shall be certified by a Chartered Accountant with his stamp and signature in original and with his membership number. | The value of existing commitments for on-going works during the period 50 months period with effect from the next day of the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above) has to be submitted by the tenderer in Appendix – 19 of LOT. This data shall be certified by a Chartered Accountant with his stamp and signature in original and with his membership number or in case of |

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| | | | | foreign parties; by an Independent Chartered Accountant/ Certified Public Accountant/ Auditor. |
| 36 | Volume I, Part 4: LOT | Appendix – 15C (203 of 239) | Appendix – 15C: Work Experience | Refer Attachment – 2 to Corrigendum – 3 for amended "Appendix – 15C.1: Work Experience (General Experience) and Appendix 15C.2: Work Experience (Propulsion Equipment)". |
| 37 | Volume I, Part 4: LOT | Appendix – 15D (206 of 239) | Appendix – 15D: Summary of Information provided in Appendix – 15C | Refer Attachment – 3 to Corrigendum – 3 for amended "Appendix – 15D: Summary of Information provided in Appendix – 15C.2". |
| 38 | Volume I, Part 4: LOT | Appendix – 16C, table, 9th row (210 of 239) | 1st column:<br>Role in Contract<br>(Individual or prime/ lead Member of JV/ Consortium)<br>3rd column:<br>Prime/ Lead Member of JV/ Consortium | 1st column:<br>Role in Contract<br>(Individual or Member of JV/ Consortium)<br>3rd column:<br>Member of JV/ Consortium |
| 39 | Volume I, Part 4: LOT | Appendix – 18, (vi) (219 of 239) | This Appendix – 18 of LOT shall be duly certified by Chartered Accountant / Statutory Auditor in original under his signature, stamp and membership number. | This Appendix – 18 of LOT shall be duly certified by Chartered Accountant in original under his signature, stamp and membership number or in case of foreign parties; by an Independent Chartered Accountant/ Certified Public Accountant/ Auditor. |
| 40 | Volume I, Part 4: LOT | Appendix – 19, Note: (ii) | The financial data in above prescribed format shall be certified by Chartered Accountant / Statutory Auditor in original under his signature & stamp & | The financial data in above prescribed format shall be certified by Chartered Accountant in original under his signature & stamp & membership number |

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| | | (221 of 239) | membership number. | or in case of foreign parties; by an Independent Chartered Accountant/ Certified Public Accountant/ Auditor. |
| 41 | Volume I, Part 4: LOT | Appendix – 26<br>(229 of 239) | Appendix – 26: Undertaking for Corporate Debt Restructuring | Refer Attachment – 4 to Corrigendum – 3 for amended "Appendix – 26: Undertaking for Corporate Debt Restructuring". |
| 42 | Volume II, PC, Part A: Contract Data | Serial No. 2<br>(147 of 244) | Defects Notification and Comprehensive Maintenance Period:<br>15 Years for Rolling Stock and 7 Years for Signalling & Train Control and Telecommunication Systems (i.e., separately for Bhopal Metro Rail Project System and Indore Metro Rail Project System).<br>This period shall apply to each Rolling Stock Trainset separately and to each stretch of Signalling & Train Control and Telecommunication Systems separately; and shall commence from Taking-Over. | Defects Liability and Comprehensive Maintenance Period:<br>DLCMP shall be 15 Years for Rolling Stock and 7 Years for Signalling & Train Control and Telecommunication Systems (i.e., separately for Bhopal Metro Rail Project System and Indore Metro Rail Project System).<br>This period of 15 Years for Rolling Stock shall commence from Revenue Operations of first Train-set and shall end on completion of 15 Years, subject to extension of period if any in accordance with Conditions of Contract Sub-Clause 13.3.1.<br>The period of 7 Years shall apply to each stretch of Signalling & Train Control and Telecommunication Systems separately; and shall commence from Revenue Operation of each stretch respectively.<br>Unless otherwise stated in the Employer's Requirements, Defect Liability Period shall be 730 days (i.e., 2 Years) separately for Bhopal and Indore. The Defect Liability Period shall commence |

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| | | | | from Taking-Over of first Train-set for Rolling Stock and of first Section for S&T, and shall end on completion 730 days from Taking-Over of last Train-set for Rolling Stock and of last Section for S&T. The Defect Liability Period shall be in concurrent to DLCMP. |
| 43 | Volume II, PC, Part A: Contract Data | Serial No. 6<br>(147 of 244) | Time for Completion:<br>1526 days from the Commencement Date of the Works (excluding DLCMP Period); and<br>15 Years for DLCMP of Rolling Stock and 7 Years for DLCMP of Signalling & Train Control and Telecommunication Systems, such period shall apply to each Rolling Stock Trainset separately and to each stretch of Signalling & Train Control and Telecommunication Systems separately. | Time for Completion:<br>1526 days from the Commencement Date of the Works (excluding DLCMP Period); and<br>15 Years for DLCMP of Rolling Stock and 7 Years for DLCMP of Signalling & Train Control and Telecommunication Systems, such period shall apply as per Contract Data listed at Serial No. 2 above. |
| 44 | Volume II, PC, Part A: Contract Data | Serial No. 13<br>(148 of 244) | Limitation of Liability:<br>One hundred percent (100%) of the Contract Price. | Limitation of Liability:<br>One hundred percent (100%) of the Contract Price; separately as confirmed below:<br>(1) One hundred percent (100%) of the Contract Price for “Design, Manufacture, Supply, Installation, Testing, Commissioning and Training” portion of Rolling Stock, Signalling & Train Control and Telecommunication systems. That is equivalate to aggregate of Sections ‘BHRS’, ‘INRS’, ‘BHST’ and ‘INST’.<br>(2) One hundred percent (100%) of the Contract |

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| | | | | Price for "Defect Liability and Comprehensive Maintenance Period" portion of Rolling Stock. That is equivalate to aggregate of Sections 'BHRSDLCMP', 'INRSDLCMP'.<br>(3) One hundred percent (100%) of the Contract Price for "Defect Liability and Comprehensive Maintenance Period" portion of Signalling & Train Control and Telecommunication systems. That is equivalate to aggregate of Sections 'BHSTDLCMP', 'INSTDLCMP'. |
| 45 | Volume II, PC, Part A: Contract Data | Serial No. 16, last sentence<br>(149 of 244) | Performance Security:<br>The Performance Security shall remain valid and enforceable at least six (6) months longer than the anticipated expiry date of Defect Liability Period or Defect Liability and Comprehensive Maintenance Period (as applicable). | Performance Security:<br>The Performance Security shall remain valid and enforceable at least six (6) months longer than the anticipated expiry date of Defect Liability and Comprehensive Maintenance Period. |
| 46 | Volume II, PC, Part A: Contract Data | Serial No. 17<br>(149 of 244) | The Contractor under no circumstances shall sublet the entire Works.<br>No more than fifty percent (50%) of the Accepted Contract Amount individually for Rolling Stock and Signalling & Train Control and Telecommunication shall be subcontracted. | The Contractor and Specialist Subcontractor (the one if any proposed at tender stage) under no circumstances shall sublet the entire Works. |
| 47 | Volume II, PC, Part A: Contract | Serial No. 26, last column, (A), 2nd paragraph | <u>(A) Advance Payment for Rolling Stock:</u><br>The Advance Payment shall be paid in two equal instalments, as mentioned below. | <u>(A) Advance Payment for Rolling Stock:</u><br>The Advance Payment shall be paid in two instalments, as mentioned below. |

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| | Data | (150 of 244) | | |
| 48 | Volume II, PC, Part A: Contract Data | Serial No. 26, last column, (B)<br>(151 of 244) | (B) Advance Payment for Signalling & Train Control and Telecommunication Systems:<br>Five percent (5%) of the respective Accepted Contract Amount (excluding amount of DLCMP), for mobilisation and design, payable in the currencies and proportions of the Accepted Contract Amount.<br>The Advance Payment shall be paid in two equal instalments, as mentioned below.<br>i. The first instalment of two and half percent (2.5%) shall be paid upon start of mobilisation. It shall be paid against an Advance Payment Certificate, under Sub-Clause 14.2.2.<br>ii. Upon satisfactory utilisation of first instalment, the second instalment of two and half percent (2.5%) shall be paid after the Engineer's approval of the Detailed Baseline Programme (GC Sub-clause 8.3). The Contractor shall submit utilisation statement supported or endorsed by certified Chartered Accountant under their seal and stamp. It shall be paid against an Advance Payment Certificate, under Sub-Clause 14.2.2. | (B) Advance Payment for Signalling & Train Control and Telecommunication Systems:<br>Fifteen percent (15%) of the respective Accepted Contract Amount (excluding amount of DLCMP), for mobilisation and design, payable in the currencies and proportions of the Accepted Contract Amount.<br>The Advance Payment shall be paid in two instalments, as mentioned below.<br>i. The first instalment of ten percent (10%) shall be paid upon start of mobilisation. It shall be paid against an Advance Payment Certificate, under Sub-Clause 14.2.2.<br>ii. Upon satisfactory utilisation of first instalment, the second instalment of five percent (5%) shall be paid after the Engineer's approval of the Detailed Baseline Programme (GC Sub-clause 8.3). The Contractor shall submit utilisation statement supported or endorsed by certified Chartered Accountant under their seal and stamp. It shall be paid against an Advance Payment Certificate, under Sub-Clause 14.2.2. |
| 49 | Volume II, PC, Part A: | Serial No. 33<br>(152 of 244) | Minimum Amount of Interim Payment Certificates:<br>One percent (1%) of the Accepted Contract Amount | Minimum Amount of Interim Payment Certificates:<br>Not applicable |

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| | Contract Data | | in the currency(ies) and proportions of the Accepted Contract Amount. | |
| 50 | Volume II, PC, Part A: Contract Data | Serial No. 35 (153 of 244) | Period of Interim Payment:<br>For eighty percent (80%) of the amount certified in each IPC: within Forty-two (42) days and<br>For balance twenty percent (20%) of the amount certified in each IPC: within fifty-six (56) days.<br>However next interim payment shall be made only after one hundred percent (100%) of the preceding amount of IPC has been paid. | Period of Interim Payment:<br>For eighty percent (80%) of the amount certified in each IPC: within Forty-two (42) days and<br>For balance twenty percent (20%) of the amount certified in each IPC: within fifty-six (56) days. |
| 51 | Volume II, PC, Part A: Contract Data | Serial No. 42 (153 of 244) | List of risks which shall not be excluded from the insurance arising from Exceptional Events:<br>All the Exceptional Events under Sub-Clause 18.1 of the General Conditions. | List of risks which shall not be excluded from the insurance arising from Exceptional Events:<br>The Exceptional Events under Sub-Clause 18.1 of the General Conditions, as listed below:<br>b. terrorism;<br>c. riot, commotion or disorder by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors;<br>d. strike or lockout not solely involving the Contractor's Personnel and other employees of the Contractor and Subcontractors; and<br>f. natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon. |

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| 52 | Volume II, PC, Part A: Contract Data | Annexure – 1 to Part A – Contract Data, Annexure 1.1, Notes on Key Dates: 11<br>(165 of 244) | Delay Damages levied will not be refunded even if the other key dates or overall completion date is adhered to. | Any imposition of Delay Damages on account of delay in accomplishing Minor Key Date (except Key Dates 'RSKDBH1.2', 'RSKDBH3.3', 'RSKDIN1.2' and 'RSKDIN3.3') will be waived and Delay Damage amount if deducted will be returned (without interest) provided; the Contractor is able to accomplish corresponding Major Key Date(s) and overall Completion Date. |
| 53 | Volume II, PC, Part A: Contract Data | Annexure – 1 to Part A – Contract Data, Annexure 1.2<br>(174 of 244) | Key Date: 'STKDIN10.13'<br>Train Set Number 24 and 25<br>224 Weeks | Key Date: 'STKDIN10.13'<br>Train Set Number 24 and 25<br>218 Weeks |
| 54 | Volume II, PC, Part A: Contract Data | Annexure – 1 to Part A – Contract Data, Annexure 1.2, Notes on Key Dates: 11<br>(178 of 244) | Delay Damages levied will not be refunded even if the other key dates or overall completion date is adhered to. | Any imposition of Delay Damages on account of delay in accomplishing Minor Key Date (except Key Dates 'STKDBH01', 'STKDBH02', 'STKDIN01' and 'STKDIN02') will be waived and Delay Damages if any deducted will be returned (without interest) provided; the Contractor is able to accomplish corresponding Major Key Date(s) and overall Completion Date. |
| 55 | Volume II, PC, Part A: Contract Data | Annexure – 1 to Part A – Contract Data, Annexure 1.2, Notes on Key Dates: 12 | Delay Damages to Key Date (KD) 17 will be levied in addition to any Delay Damage levied for Key Dates 1 to 16. | The Key Dates 'STKDBH16.1', 'STKDBH17', 'STKDIN16.1' and 'STKDIN17' are major key dates and the rest Key Dates are minor key dates. |

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| | | (178 of 244) | | |
| 56 | Volume II, PC, Part A: Contract Data | Annexure – 2 to Part A – Contract Data<br>(179 of 244) | Schedule of Access Dates | Refer Attachment – 5 to Corrigendum – 3 for amended "Schedule of Access Dates ". |
| 57 | Volume II, PC, Part B: Special Provisions | PC 1.18<br>(191 of 244) | 1.18.2 The Contractor shall procure items/ components within the Country, as included in the list of items/ components confirmed in Annexure – 11 of Instructions to Tenderer (Volume I), for which sufficient local capacity and competition are available in India. | 1.18.2 The Contractor shall procure items/ components within the Country, as included in the list of items/ components confirmed in Annexure – 10 of Instructions to Tenderer (Volume I), for which sufficient local capacity and competition are available in India. |
| 58 | Volume II, PC, Part B: Special Provisions | PC 2.1, 3rd and 4th paragraph<br>(192 of 244) | If the Contractor suffers delay as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall be entitled to only a reasonable extension of time and no monetary claims whatsoever shall be paid or entertained on this account.<br>However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the applicable Contractor's Documents, the Contractor shall not be entitled to such EOT and/or Cost Plus Profit. | If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, then following shall apply.<br>(a) The Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT only.<br>(b) No monetary claims whatsoever shall be paid or entertained. However, in case of cumulative EOT is beyond 182 days, then the Contractor shall also be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to payment of such Cost only on account of the following as the case may be. Any other Costs suffered by |

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| | | | | the Contractor shall be deemed included in the Accepted Contract Amount.<br>i. Maintenance of all insurances for which the Contractor is responsible.<br>ii. Extension of all bank guarantees and equipment warranties.<br>iii. Idling if any of the Contractor's Personnel deployed at Bhopal/ Indore in connection with the Works, with prior approval of the Engineer. The deployment of the Contractor's Personnel shall be governed by the Engineer based on the Site conditions and requirements. The decision of the Engineer in this regard shall be final and binding on the Contractor.<br>iv. Idling if any of the Contractor's Equipment and Temporary Works (which shall not be forming part of the Permanent Works) deployed at Bhopal/ Indore in connection with the Works, with prior approval of the Engineer. The deployment of the Contractor's Equipment and Temporary Works shall be governed by the Engineer based on the Site conditions and requirements. For the purpose of this matter, such idling charges shall be seventy percent (70%) of the actual hire charges or half percent (0.5%) per month |

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| | | | | of the average depreciated value, whichever is less. The decision of the Engineer in this regard (also including the reasonability of hire charges and depreciated value) shall be final and binding on the Contractor.<br>v. Storage of, if any additional loading and/or unloading of Rolling Stock Trains (or Cars as the case may be) at the Contractor's, Employer's and/or any other place(s), with prior approval of the Engineer.<br>However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the applicable Contractor's Documents, the Contractor shall not be entitled to such EOT, Cost and/or Profit. |
| 59 | Volume II, PC, Part B: Special Provisions | PC 4.4, 1st paragraph only (195 of 244) | *Add following at the end of Sub Clause 4.4:*<br>The Contractor under no circumstances shall sublet the entire Works. No more than fifty percent (50%) of the Accepted Contract Amount (excluding the amount for Detailed Design Services and Provisional Sums; if any) shall be subcontracted. | *Add following at the end of Sub Clause 4.4:*<br>[Deleted] |
| 60 | Volume II, PC, Part B: Special | PC 4.4, 4th paragraph (196 of 244) | The terms and conditions of sub-contracts and the payments that are made to all sub-contractors and suppliers shall be the sole responsibility of the | The terms and conditions of sub-contracts and the payments that are made to all sub-contractors and suppliers shall be the sole responsibility of the |

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| | Provisions | | Contractor. Payments to be made to such sub-contractors and suppliers will be deemed to have been included in the Contract Price. | Contractor. Payments to be made to such sub-contractors and suppliers will be deemed to have been included in the Contract Price. However, if actual progress is too slow due to substantial delay in payment to the Specialist Subcontractor(s) by the Contractor, the Employer shall be entitled to take reasonable remedial measures at the Contractor's risk and cost. The Contractor shall bear the cost of all remedial measures required under this Sub-Clause. |
| 61 | Volume II, PC, Part B: Special Provisions | PC 4.23<br>(201 of 244) | *Replace the last paragraph of Sub-Clause 4.23:*<br>"If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of such Cost."<br>*with;*<br>"If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions, the Contractor shall not be entitled to EOT and/or payment of such Cost." | *Replace the last paragraph of Sub-Clause 4.23:*<br>"If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of such Cost."<br>*with;*<br>"If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of Cost only under sub-paragraph (b) of Sub-Clause 2.1." |
| 62 | Volume II, PC, Part B: Special | PC 7.4<br>(207 of 244) | "The Engineer shall give a Notice to the Contractor of not less than 72 hours of his/her intention to attend the tests. If the Engineer does not attend at | "The Engineer shall give a Notice to the Contractor of not less than 72 hours of his/her intention to attend the tests. If the Engineer does not attend at |

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| | Provisions | | the time and place stated in the Contractor's Notice under this Sub-Clause, the Contractor may proceed with the tests, unless otherwise instructed by the Engineer, which tests shall then be deemed to have been made in the Engineer's presence. If the Contractor suffers delay and/or incurs Cost from complying with any such instruction or as a result of a delay for which the Employer is responsible, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to reasonable EOT only and the Contractor shall not be entitled for any payment of Cost and/or Profit." | the time and place stated in the Contractor's Notice under this Sub-Clause, the Contractor may proceed with the tests, unless otherwise instructed by the Engineer, which tests shall then be deemed to have been made in the Engineer's presence. If the Contractor suffers delay and/or incurs Cost from complying with any such instruction or as a result of a delay for which the Employer is responsible, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to reasonable EOT and/or payment of Cost only under sub-paragraph (b) of Sub-Clause 2.1." |
| 63 | Volume II, PC, Part B: Special Provisions | PC 8.10<br>(211 of 244)<br>(Newly added) | *New Sub-Clause PC 8.10 added* | *Replace the last paragraph of Sub-Clause 4.23:*<br>"If the Contractor suffers delay and/or incurs Cost from complying with an Engineer's instruction under Sub-Clause 8.9 [Employer's Suspension] and/ or from resuming the work under Sub-Clause 8.13 [Resumption of Work], the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of such Cost Plus Profit."<br>*with;*<br>"If the Contractor suffers delay and/or incurs Cost from complying with an Engineer's instruction under Sub-Clause 8.9 [Employer's Suspension] and/ or from resuming the work under Sub-Clause 8.13 [Resumption of Work], the |

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| | | | | Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of such Cost only under sub-paragraph (b) of Sub-Clause 2.1." |
| 64 | Volume II, PC, Part B: Special Provisions | PC 13.3.1, (1) (215 of 244) (Newly added) | *New paragraph added at last* | The Employer is entitled to vary about increase of the Comprehensive Maintenance Period to enable the Contractor for completion of major overhaling of Rolling Stock systems/ sub-systems as per scheduled maintenance programme, subject to maximum of 5 (five) years, each for Bhopal and Indore. The Employer's decision about the period of extension shall be final and binding on the Contractor. The Employer may exercise the option on any day before 180 days of the scheduled completion of DLCMP. The Contractor shall be required to executed extended DLCMP at the contracted terms & conditions and at the price of last year. |
| 65 | Volume II, PC, Part B: Special Provisions | PC 13.3.1, (2), 1st paragraph (215 of 244) | (2) Variations in case of Signalling & Train Control and Telecommunication:<br>The Contractor shall be bound to carry out and complete the stipulated work as instructed by the Engineer, irrespective of the magnitude of variations including additions or deletions in the Bill of Quantities. | (2) Variations in case of Signalling & Train Control and Telecommunication:<br>The Contractor shall be bound to carry out and complete the stipulated work as instructed by the Engineer, irrespective of the magnitude of variations including additions or deletions in the Bill of Quantities, subject to an upper limit of twenty-five percent (25%) on positive side. |

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| 66 | Volume II, PC, Part B: Special Provisions | PC 13.6<br>(216 of 244) | *Add following at the end of Sub-Clause 13.6:*<br>Notwithstanding anything above to the contrary contained herein, any changes in existing taxes and/or imposition of new taxes (also including any royalties, levies, cess, duties, etc.) on supply of materials/services/works etc. other than those excluded under Sub-Clause 14.1 [The Contract Price], shall not be considered as "change in Laws" and its impact(s) shall be deemed to be included either in Sub-Clause 13.7 [Adjustments for Changes in Cost] and/or in the Accepted Contract Amount/ Contract Price. | *Replace the first paragraph of Sub-Clause 13.6*<br>"Subject to the following provisions of this Sub-Clause, the Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from a change in:<br>a. the Laws of the Country (including the introduction of new Laws and the repeal or modification of existing Laws);<br>b. the judicial or official governmental interpretation or implementation of the Laws referred to in sub-paragraph (a) above;<br>c. any permit, permission, license or approval obtained by the Employer or the Contractor under sub-paragraph (a) or (b), respectively, of Sub-Clause 1.13 [Compliance with Laws]; or<br>d. the requirements for any permit, permission, licence and/or approval to be obtained by the Contractor under sub-paragraph (b) of Sub-Clause 1.13 [Compliance with Laws],<br>made and/or officially published after the Base Date, which affect the Contractor in the performance of obligations under the Contract. In this Sub-Clause "change in Laws" means any of the changes under sub-paragraphs (a), (b), (c) and/or (d) above."<br>*with;* |

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| | | | | "Subject to the following provisions of this Sub-Clause, the Contract Price shall be adjusted to take account of any increase or decrease in Cost resulting from:<br>a. a change in the central, state, local taxes, duties, levies, cess (including Labour cess) and GST as applicable in the Employer's Country on the Plants, Materials and/or Works;<br>b. the introduction of new and the repeal of those referred to in sub-paragraph (a) above; or<br>c. a change in the judicial or official governmental interpretation or implementation of those referred to in sub-paragraph (a) above;<br>made and/or officially published after the Base Date, which affect the Contractor in the performance of obligations under the Contract. In this Sub-Clause "change in Laws" means any of the changes under sub-paragraphs (a), (b) and/or (c) above only. Other changes (including introduction of new and repeal or modification thereof) if any, shall not be considered as "change in Laws" and its impact(s) shall be deemed to be included either in Sub-Clause 13.7 [Adjustments for Changes in Cost] and/or in the Accepted Contract Amount/ Contract Price." |

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| 67 | Volume II, PC, Part B: Special Provisions | PC 14.4, last paragraph (221 of 244) | For the purposes under sub-paragraph (a) above, if these Schedule of Payments include any instalments (and/or milestones) of "manufacture and delivery", then the Contractor shall be entitled for such payment(s) only after the Employer has received Safe Custody Bank Guarantee(s). The aggregate amount of such Safe Custody Bank Guarantee(s) shall be equivalent to ninety-five percent (95%) of such instalment(s) (and/or milestone(s)), in the same currencies and proportions. Such Safe Custody Bank Guarantee(s) shall remain valid until the Plant and Materials are installed and tested to the satisfaction of the Employer, as certified by the Employer /Engineer (which may initially valid until the Time for Completion). Accordingly, respective amount may be available (if any) for further supplies, equivalent to the earlier delivered Plant and Materials are installed and tested to the satisfaction of the Employer, as certified by the Employer /Engineer. This Bank Guarantee shall be in the form annexed as Annexure – 12 to Instruction to Tenderers (Volume I) and issued by a Scheduled Bank in India (meaning a bank which is included in the Second Schedule of Reserve Bank of India Act, 1934, and includes Scheduled Commercial Foreign Banks with an Indian branch), excluding Cooperative Banks, payable in Bhopal/ Mumbai/ New Delhi. | For the purposes under sub-paragraph (a) above, if these Schedule of Payments include any instalments (and/or milestones) of "manufacture and delivery", then the Contractor shall be entitled for such payment(s) only after the Employer has received Indemnity Bond(s). The aggregate amount of such Indemnity Bond(s) shall be equivalent to hundred percent (100%) of such instalment(s) (and/or milestone(s)), in the same currencies and proportions. Such Indemnity Bond(s) shall remain valid until the Plant and Materials are installed and tested to the satisfaction of the Employer, as certified by the Employer /Engineer. This Indemnity Bond(s) shall be in the form acceptable to the Employer. |

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| 68 | Volume II, PC, Part B: Special Provisions | PC 14.9 (222 of 244) | "After the latest of the expiry dates of the DLCMP, the Contractor shall include the second half of the Retention Money in a Statement promptly after such latest date, and the second half of the Retention Money shall be released upon expiration of 365 days after the latest of the expiry dates of the DLCMP or final payment, whichever is earlier, on certification of the Engineer. If a Taking-Over Certificate was (or was deemed to have been) issued for a Section, the Contractor shall include the second half of the Retention Money in a Statement promptly after the latest of the expiry dates of the DNPs for the Sections." | "After the latest of the expiry dates of the DLCMP, the Contractor shall include the second half of the Retention Money in a Statement promptly after such latest date, and the second half of the Retention Money shall be released upon expiration of 365 days after the latest of the expiry dates of the DLCMP or final payment, whichever is earlier, on certification of the Engineer. If a Taking-Over Certificate was (or was deemed to have been) issued for a Section, the Contractor shall include the second half of the Retention Money in a Statement promptly after the latest of the expiry dates of the DLCMPs for the Sections." |
| 69 | Volume II, PC, Part B: Special Provisions | PC 17.2 (224 of 244) | Liability for Care of the Works<br>*Replace Sub-Clause 17.2 (e)*<br>"(e) any of the events or circumstances listed under sub-paragraphs (a) to (f) of Sub-Clause 18.1 [Exceptional Events]; and/or"<br>with<br>"(e) [Not Used]; and/or" | [Deleted] |
| 70 | Volume II, PC, Part B: Special Provisions | PC 18.4 (224 of 244) | Consequences of an Exceptional Event<br>*Replace entire Sub-Clause 18.4 with following:*<br>"If the Contractor is the affected Party and suffers delay and/or incurs Cost by reason of the Exceptional Event of which he/she gave a Notice under Sub-Clause 18.2 [Notice of an Exceptional | Consequences of an Exceptional Event<br>*Replace sub-paragraph (b) :*<br>"b. if the Exceptional Event is of the kind described in sub-paragraphs (a) to (e) of Sub-Clause 18.1 [Exceptional Events] and, in the case of sub-paragraphs (b) to (e) of that Sub- |

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| | | | Event], the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to reasonable EOT and no monetary claims whatsoever shall be paid or entertained on this account." | Clause, occurs in the Country, payment of such Cost."<br>*with*<br>"b. if the Exceptional Event is of the kind described in sub-paragraphs (a) to (e) of Sub-Clause 18.1 [Exceptional Events] and, in the case of sub-paragraphs (b) to (e) of that Sub-Clause, occurs in the Country, payment of such Cost only under sub-paragraph (b) of Sub-Clause 2.1." |
| 71 | Volume III, Part 1: ERGS-RS | 1.2.1<br>(12 of 397) | For manufacturing of cars, following mandatory conditions has to be fulfilled… | Refer Attachment – 6 to Corrigendum – 3 for amended sub-clause "1.2.1". |
| 72 | Volume III, Part 1: ERGS-RS | 1.2.2 & 1.2.3<br>(13 of 397) | To facilitate ease in maintenance and easy availability of spares, MPMRCL is keen in standardisation…<br>MPMRCL also expects contractor to Indigenize items given in Table 1.2… | Refer Attachment – 7 to Corrigendum – 3 for amended sub-clause "1.2.2 and 1.2.3". |
| 73 | Volume III, Part 1: ERGS-RS | 11.2.1<br>(62 of 397) | Subject to availability and requirement, the Contractor can be provided covered space at nominated Depots (at Bhopal & Indore) for the setting up of Contractor's Site Offices and Stores. | The Contractor will be provided with constructed building for setting up of office, maintenance, repair and storage facility at nominated Depots (at Bhopal & Indore) for the Testing & commissioning and maintenance related activity under DLCMP. Any change/modifications in handed over facilities shall be got approved from MPMRCL. |

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| | | | | During design phase, contractor has to maintain their own Project office in which they have to provide space to the Engineer as per Chapter 24 of ERGS-RS. However, the same can be shifted to the depot in T&C and DLCMP phase once facility at depot is available. |
| 74 | Volume III, Part 1: ERGS-RS | 11.2.3 & 11.2.4 (62 of 397) | 11.2.3 and 11.2.4 | Both clauses have been deleted. |
| 75 | Volume III, Part 1: ERGS-RS | Chapter 20 (101 of 397) | Entire Chapter | Entire Chapter has been deleted. |
| 76 | Volume III, ERGS, Part 1: ERGS-RS | 24.1 last line (113 of 397) | The details of the accommodation and other facilities are as under: | The Engineer office can be shared between Rolling Stock, Signalling and Telecom team in Bhopal & Indore. The details of the accommodation and other facilities are as under: |
| 77 | Volume III, Part 1: ERGS-RS | 25.6.4 (118 of 397) | Contractor shall provide a list of the spare parts (including UES), consumables, special tools, special equipment and ordinary tools / equipment which is intended to form the basis of the Spare Parts Stock to be supplied by the Contractor in the technical bid and further develop it during the design stage as per the requirement and satisfaction of the Engineer. However, the list of minimum UES to be maintained by the Contractor has been attached in Appendix VII | In the bid, Contractor shall submit the list along with the quantity of consumables, maintenance & overhauling spares, ordinary tools, special tools, jigs, fixtures, gauges, test benches, T&C equipment, diagnostic equipment, Unit Exchange Spares / Emergency spares (as per Appendix VIII), proposed deliverables as mentioned in the end of each chapter of ERTS and depot M&Ps (as per Appendix XII) which is intended to be supplied by the |

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| | | | of this specification. | Contractor as part of the contract in the technical bid. This list along with the quantity and its schedule of supply shall be finalized during the design stage as per the requirement and satisfaction the Engineer. |
| 78 | Volume III, Part 1: ERGS-RS | 25.6.9 (119 of 397) | The Contractor shall remove any working / healthy equipment / components / sub-systems / systems from any train available at any of the depot for any reason whatsoever without specific approval in writing from the Engineer or Engineer's authorized representative in the depot. | Contractor shall not remove any working/ healthy equipment/ components/ sub-systems/ systems from any train available at any of the depot for any reason whatsoever without specific approval in writing from the Engineer or Engineer's authorized representative in the depot. |
| 79 | Volume III, Part 1: ERGS-RS | Attachment 1 (3) (127 of 397) | The Contractor shall maintain an adequate inventory of Payable Spares and shall supply every Payable Spare within a period of 4 (four) hours from the time a notice is delivered by the Employer to the Contractor, at the Maintenance Depot specified therein; provided, however, that in case of Payable Spares that were required in quantities of 12 (twelve) units or less during the immediately preceding Year, the period of delivery hereunder shall be 48 (forty-eight) hours. | The Contractor shall maintain an adequate inventory of Payable Spares and shall supply every Payable Spare within a period of 4 (four) hours from the time a notice is delivered by the Employer to the Contractor, at the Maintenance Depot specified therein; provided, however, that in case of Payable Spares that were required in quantities of 12 (twelve) units or less during the immediately preceding Year, the period of delivery hereunder shall be 48 (forty-eight) hours. However, for the spares which are not part of the deliverables at depot as per contract, delivery period can be decided with mutual consent. |
| 80 | Volume III, Part 1: | 26.1.5 (133 of 397) | Any M&Ps (apart from what is mentioned in Appendix XI), ordinary tools, special tools, jigs, | Any M&Ps (apart from what is mentioned in Appendix XI), ordinary tools, special tools, jigs, |

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| | ERGS-RS | | fixtures, gauges, test benches, T&C equipment, diagnostic equipment, maintenance & overhauling spares, consumables, Unit Exchange Spares (UES) / Emergency spares and deliverables (as mentioned in the end of each chapter of ERTS) in accordance with the Employer's Requirements required for fulfilment of obligations under the Comprehensive Maintenance of Trainsets shall be provided by the Contractor at both the depot (Bhopal & Indore) and the cost of the same shall be included in the contract. Expected list of M&P/depot equipment to be supplied and maintained by the contractor has been specified in Appendix XII. | fixtures, gauges, test benches, T&C equipment, diagnostic equipment, maintenance & overhauling spares, consumables, Unit Exchange Spares (UES) / Emergency spares and deliverables (as mentioned in the end of each chapter of ERTS) in accordance with the Employer's Requirements required for fulfilment of obligations under the Comprehensive Maintenance of Trainsets shall be provided by the Contractor and the cost of the same shall be included in the contract. Employer expects Contractor to provide test benches, jigs and fixtures of all the sub systems required for overhauling in both the depot (Bhopal as well as Indore). However, if Contractor thinks that it is more economical and beneficial to develop overhauling facilities of some sub systems only in one of the depots then contractor can define their strategy accordingly keeping in mind all the associated cost and risk like transportation cost, damage to equipment in transportation, sufficient number of UES, meeting availability target etc. Expected list of M&P/depot equipment to be supplied and maintained by the contractor has been specified in Appendix XII. |
| 81 | Volume III, Part 1: ERGS-RS | 26.1.6<br>(133 of 397) | The M&Ps, ordinary tools, special tools, jigs, fixtures, gauges, test benches, T&C equipment, diagnostic equipment, maintenance & overhauling spares, consumables, Unit Exchange Spares (UES) / Emergency spares and deliverables (as mentioned | The M&Ps, ordinary tools, special tools, jigs, fixtures, gauges, test benches, T&C equipment, diagnostic equipment, maintenance & overhauling spares, consumables, Unit Exchange Spares (UES) / Emergency spares and deliverables (as mentioned |

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| | | | in the end of each chapter of ERTS) as proposed by the Bidder in the technical bid and hence supplied at both the depots shall be sufficient to undertake regular repair, maintenance and overhauling of all equipment of the train sets e.g., bogies, car body, wheelset assemblies, traction motors etc. in depot. | in the end of each chapter of ERTS) as proposed by the Bidder in the technical bid and hence supplied at both the depots shall be sufficient to undertake regular repair, maintenance and overhauling of all the equipment of the train sets e.g., bogies, car body, wheelset assemblies, traction motors etc. in depot. Employer expects contractor to provide overhauling facility for Coupler also within the depot but if contractor thinks that it is more economical and beneficial to outsource it then they can develop their strategy accordingly. |
| 82 | Volume III, Part 1: ERGS-RS | 26.1.7<br>(133 of 397) | Bidder shall also provide, in the bid, the make, model, OEM / Vendor details along with quantities of the propose deliverables as mentioned in the end of each chapter of ERTS, ordinary tools, special tools, jigs, fixtures, gauges, test benches, T&C equipment, diagnostic equipment, maintenance & overhauling spares, consumables and Unit Exchange Spares (UES) / Emergency spares, M&Ps he intends to provide during maintenance for the items | Contractor will furnish complete details during contract execution (detailed design stage) as noted below for all the consumables, maintenance & overhauling spares, ordinary tools, special tools, jigs, fixtures, gauges, test benches, T&C equipment, diagnostic equipment, Unit Exchange Spares (UES) / Emergency spares, proposed deliverables as mentioned in the end of each chapter of ERTS and depot M&Ps he intends to provide during DLCMP:<br>1. Names, addresses, telephone numbers and other particulars of manufacturers and their local representatives;<br>2. Models and part numbers<br>3. Full description of spares including a note whether it is sealed unit or an assembly or sub-assembly, which can be broken down into component parts; |

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| | | | | 4. Quantity installed in the system;<br>5. Overall dimensions and weight including minimum packing (if any) for shelf space purposes;<br>6. Designed and shelf life;<br>7. Interchangeability or otherwise with similar parts;<br>8. Normal manufacturing and shipment lead times;<br>9. Purchase Technical Specification with relevant drawings<br>The information as above shall also be given for all other components/equipment etc. which may have to be changed/replaced during maintenance and overhauling based on the proposed maintenance practices of the contractor. |
| 83 | Volume III, ERGS, Part 1: ERGS-RS | APPENDIX X, 8, 2nd para (391 of 397) | Moreover, sufficient number of all type of licenses shall be provided to the Engineer/Employer as asked (to be finalised during design stage). | Minimum 50 nos. of licenses (Business level – 30, Full access level – 10, Technician level – 10) shall be provided to the MPMRCL.<br>However, license for MPMRCL staff under the administrative control of Contractor is the responsibility of Contractor. |
| 84 | Volume III, Part 1: ERGS-RS | APPENDIX XIII (396 of 396) (Newly added) | - | Refer Attachment – 8 to Corrigendum – 3 for newly added “APPENDIX XIII Speed restriction”. |
| 85 | Volume III, ERGS, Part | 12.10, 1st paragraph | Independent Safety Assessor (ISA):<br>Employer will engage an Independent Safety | Independent Safety Assessor (ISA):<br>Employer will engage an Independent Safety |

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| | 2: ERGS-ST | (172 of 233) | Assessor (ISA) who will certify Safety Assurance for the subsystems of Signalling & Train Control, Public Address System (PAS) at stations, including their interfaces. For other subsystems the Engineer will ensure that the Contractors comply with the requirements of EN 50126, EN 50128, EN 50129 & the guidelines as per International Engineering Safety Management. | Assessor (ISA) who will certify Safety Assurance for the sub 0systems of Signalling & Train Control system and their interfaces. However, ISA may verify Public Address System (PAS) and their Interfaces at stations. This needs to be complied by the contractor. For other subsystems the Engineer will ensure that the Contractors comply with the requirements of EN 50126, EN 50128, EN 50129 & the guidelines as per International Engineering Safety Management. |
| 86 | Volume III, ERGS, Part 2, ERGS-ST | 13.7.4 (193 of 233) | All test equipment must be capable of operating from the mains supply (230V AC 50Hz). | All test equipment must be capable of operating from the mains supply (230V / Three Phase 415V AC, 50Hz). |
| 87 | Volume III, ERGS, Part 2: ERGS-ST | 16.3.4 (209 of 233) | The Contractor shall supply one copy of the requirements management software to the Engineer for the Engineers sole use, together with training in its use for four (4) people. The Contractor may use Dynamic Object-Orientated Requirements System (DOORS) or similar software for the RMS. | The Contractor shall supply one copy of the requirements management software to the Engineer for the Engineers sole use, together with training in its use for four (4) people. |
| 88 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 12, 5.4.4.2 (22 of 45) | In order to meet the predicted long-term ridership, trains will capable of operating frequent services at short headways down to 2 minutes (120s). The minimum design headway is 90 Seconds. This will allow the metro system to offer an ultimate transport capacity of 53,553 (Purple Line), 34,548(Red Line) PPHPD with 4 car trains (at 6 pax / m2). | In order to meet the predicted long-term ridership, trains will capable of operating frequent services at short headways down to 2 minutes (120s). The minimum design headway is 90 Seconds. |

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| 89 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 13, N4, ST/TRS-01 (81 of 134) | Contractor B (TS):<br>Contractor B shall furnish the details of Earth Conductor and Buried Earth Conductor along with OPC in mainline, at grade section, and depot. Contractor B shall design the bonds accordingly. | Contractor B (TS):<br>Contractor B shall furnish the details of Earth Conductor and Buried Earth Conductor along with Third Rail in mainline and depot. Buried Earth Conductor shall be provided by Third Rail Traction Contractor for Main Line and Depot. |
| 90 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 19, 1.1 (03 of 06) | The Contractor shall provide all facilities and the services for such facilities for the exclusive use of the Employer, Engineer and any other parties directed by the Employer, on the Site or at other locations agreed with and to the satisfaction of the Engineer. The site office at Bhopal and Indore will be separate and having same facility in each position to be provided. | The Contractor shall provide all facilities and the services for such facilities for the exclusive use of the Employer, Engineer and any other parties directed by the Employer, on the Site or at other locations agreed with and to the satisfaction of the Engineer. The site office at Bhopal and Indore will be separate and having same facility, shall be shared between Rolling stock, Signaling and Telecomm contractor as per contractual requirements. |
| 91 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 19, 2.5 (03 of 06) | The Contractor shall provide a fully functioning local server, with network software and 16T minimum of hard drive space. The Contractor shall provide network connectivity, a minimum 30mbps to the office, to all desks and wi-fi connection throughout the office. The Contractor will not be expected to provide laptops, Desktops and Plotters. | The Contractor shall provide a fully functioning local server, with network software and 16T minimum of hard drive space. The Contractor shall provide network connectivity, a minimum 50 mbps to the office, to all desks and wi-fi connection throughout the office. The Contractor will not be expected to provide laptops, Desktops and Plotters. |
| 92 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 19, 3 Note: | Note below table is added newly | Note: Row no 4 to 8 provisions shall be shared with Rollingstock site office facilities as mentioned in ERGS Rolling Stock Clause - 24.1.18. |

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| | | (04 of 06)<br>(Newly added) | | |
| 93 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, 5.5.1<br>(9 of 40) | The contractor shall deploy mobile & web-based SW platform (Maximo) for the management of the activities as given in this contract for maintenance of facilities, refer S&T Volume III clause no 8.14. | The contractor shall deploy mobile & web-based SW platform (Maximo) OR any similar Computer Maintenance Management System for the management of the activities as given in this contract for maintenance of facilities, refer S&T Volume III clause no 8.14. The above MMS supplied by the contractor shall be handed over to the Employer after expiry of comprehensive maintenance period. |
| 94 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, 6.6<br>(11 of 40) | Employer shall provide about 25% of the total manpower being engaged by the Contractor for Maintenance obligation (tentative as defined below) personnel, 4 weeks before the likely date of Revenue Operation. Total counterpart personnel provided by the Employer shall be distributed amongst supervisors and technician in the ratio of 30:70 respectively along with 2 from executive level. | Employer shall provide about 25% of the total manpower being engaged by the Contractor for Maintenance obligation (tentative as defined below Table 6.9) personnel, 12 weeks before the likely date of Revenue Operation. Total counterpart personnel provided by the Employer shall be distributed amongst supervisors and technician in the ratio of 30:70 respectively along with 2 from executive level. This condition shall be applicable for the proposed personnel by contractor with qualification and experience as per the table of 6.1 respectively for Bhopal and Indore separately. |
| 95 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, 6.1<br>(11 of 40) | The employees shall conform to the following requirements: Table | Refer Attachment – 9 to Corrigendum – 3 for amended “Sub-Clause 6.1”. |

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| 96 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, 8.1 (13 of 40) | The contractor shall complete the recruitment process before 4 weeks from the date of start of the revenue service. | The contractor shall complete the recruitment process before 16 weeks from the date of start of the revenue service. |
| 97 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, 8.3 (13 of 40) | The batch of freshers shall start on 5th week from the date of ROD | The batch of freshers shall start on 14th week before the date of ROD. |
| 98 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, 8.5 (13 of 40) (Newly added) | New paragraph added | 8.5 Trained Staff shall be made available by the contractor at least 2 weeks before ROD. |
| 99 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, 17 (19 of 40) | Maintenance applicable penalty | Refer Attachment – 10 to Corrigendum – 3 for amended “Sub-Clause 17: Maintenance applicable penalty”. |
| 100 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, 18 (20 of 40) | Table: Availability damage (different scenarios) | Refer Attachment – 11 to Corrigendum – 3 for amended “Table: Availability damage (different scenarios)”. |
| 101 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, Appendix 4, Note (33 of 40) | Note: The maximum allowable logistics or Access time from the time of reporting of failure to reach the failure location (Depot/Station/Train) is 30 minutes. | Notes:<br>1. The maximum allowable logistics or Access time from the time of reporting of failure to reach the failure location (Depot/Station/Train) is 30 minutes.<br>2. The MTTR shall be calculated after the safe access to the site / equipment and Time taken for granting maintenance block. |

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| 102 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, Appendix 4, Table, S. No. 2<br>(33 of 40) | Signalling System: Track side equipments<br>MTTR in Minutes: 30 | Signalling System: Track side equipment except Point Machine<br>MTTR in Minutes: 30 |
| 103 | Volume III, ERGS, Part 2: ERGS-ST | APPENDIX 20, Appendix 4, Table, S. No. 6<br>(33 of 40)<br>(Newly added | - | Signalling System: Point Machine<br>MTTR in Minutes: 60 |
| 104 | Volume IV, Part 1: ERTS-RS | 1.1.1<br>(11 of 492) | This specification establishes the requirements for the design, development, manufacture, supply, testing, delivery, commissioning, integrated testing, training of the necessary operations and maintenance personnel and comprehensive maintenance for 15 years (from the handover of first trainset) for the light weight, fully equipped, modern passenger trains with microprocessor control 3-phase induction motor drive suitable for Unattended train operation in Bhopal and Indore Metro Rail Projects of MPMRCL. The corridors comprise of elevated and underground sections having ballast less track and train depots having ballasted track. The trains shall be designed to meet the performance requirements given in this specification. The track gauge shall be Standard Gauge (1435 mm). | This specification establishes the requirements for the design, development, manufacture, supply, testing, delivery, commissioning, integrated testing, training of the necessary operations and maintenance personnel and comprehensive maintenance for 15 years (starting from the date of revenue operation of first trainset) for the light weight, fully equipped, modern passenger trains with microprocessor control 3-phase induction motor drive suitable for Unattended train operation in Bhopal and Indore Metro Rail Projects of MPMRCL. The corridors comprise of elevated and underground sections having ballast less track and train depots having ballasted track. The trains shall be designed to meet the performance requirements given in this specification. The track gauge shall be Standard Gauge (1435 mm). |

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| 105 | Volume IV, Part 1: ERTS-RS | 2.7.2 (23 of 492) | The Contractor shall comply with the guidelines of IEC 60300-1, IEC 60300-2 and IEC 60571 for electronic equipment, and IEC 60300-3-5 in meeting the reliability, availability and maintainability requirements of equipment. | The Contractor shall comply with the guidelines of EN 50126 (all parts), IEC 60300-1, IEC 60300-2 and IEC 60571 for electronic equipment, and IEC 60300-3-5 or equivalent international standards in meeting the reliability, availability and maintainability requirements of equipment." |
| 106 | Volume IV, Part 1: ERTS-RS | 2.9.1 (xii) & (xiii) (25 of 492) | Available Trainset: Refer 2.12.6<br>Non-Available Trainset: Refer 2.12.7 | Available Trainset: Refer 2.11.1<br>Non-Available Trainset: Refer 2.11.2 |
| 107 | Volume IV, Part 1: ERTS-RS | 2.10.2 (iv) (28 of 492) | Maximum Availability Target at any given day at any given time as per 2.9.1 (i) shall be as per the following table (the "Availability Targets"): | Maximum Availability Target at any given day at any given time as per 2.10.2 (i) shall be as per the following table (the "Availability Targets"): |
| 108 | Volume IV, Part 1: ERTS-RS | 2.11 (28 of 492) | Availability and Availability Damages: | Refer Attachment – 12 to Corrigendum – 3 for amended sub-clause "2.11: Availability and Availability Damages". |
| 109 | Volume IV, Part 1: ERTS-RS | 2.22.2 (i) (48 of 492) | The Contractor shall submit a Noise and Vibration Assurance Plan for 3-Car and 6-Car Trainset as specified in the Employer's Requirements: General Specifications for review by the Engineer. | The Contractor shall submit a Noise and Vibration Assurance Plan for 3-Car Trainset as specified in the Employer's Requirements: General Specifications for review by the Engineer.<br>The Contractor has to perform testing for noise and vibration in both 3car as well as 6car trainset. |
| 110 | Volume IV, Part 1: | 2.22.3 (iii) (49 of 492) | All measurements to be made along the car centre-line 1500mm above the floor and not less than | All measurements to be made along the car centre-line 1400mm above the floor and not less than |

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| | ERTS-RS | | 600mm from the end of the vehicle. | 600mm from the end of the vehicle. |
| 111 | Volume IV, Part 1: ERTS-RS | 2.27 (55 of 492) | Cyber Security Assurance | Refer Attachment – 13 to Corrigendum – 3 for amended sub-clause "2.27 Cyber Security Assurance". |
| 112 | Volume IV, Part 1: ERTS-RS | 3.11.1, Table 3.1, 7th row (65 of 492) | Maximum Wind speed - 120 kmph | Maximum Wind speed - 100 kmph |
| 113 | Volume IV, Part 1: ERTS-RS | 3.17.1, Table 3.4, 6th row (70 of 492) | Distance between track centre and platform edge:<br>Underground Corridor - 1525mm (max) and 1515mm (min)<br>Elevated Corridor - 1530mm (max) and 1520mm (min) | Distance between track centre and platform edge:<br>Underground Corridor - 1525mm (max) and 1515mm (min) (Tentative)<br>Elevated Corridor - 1535mm (max) and 1525mm (min) (Tentative) |
| 114 | Volume IV, Part 1: ERTS-RS | 3.22.1 (viii) (74 of 492) | Tractive and braking effort shall be defined and calculated for the 3-car and 6-car metro train in the limit of the wheel rail adhesion ratio (18% in tunnel and 16 % at grade and super-elevated structures, adhesion values will be finalized during the design stage) by the Bidder in order to achieve the operation performances of 3-car and 6-car Trainset. | Tractive and braking effort shall be defined and calculated for the 3-car and 6-car metro train in the limit of the wheel rail adhesion ratio (adhesion values will be finalized during the design stage by the Engineer Engineer) by the Bidder in order to achieve the operation performances of 3-car and 6-car Trainset. |
| 115 | Volume IV, Part 1: ERTS-RS | 3.23.1 (iii), (iv) & (v) (74 of 492) | (iii) AW2: Fully loaded vehicle weight. This weight is the sum AW1 plus the weight of standees at 65 kg each and 4 standee/m², <br>(iv) AW3: Crush loaded vehicle weight. This weight | (iii) AW2: This weight is the sum AW1 plus the weight of standees at 65 kg each and 4 standee/m², <br>(iv) AW3: Crush loaded vehicle weight. This weight is the sum of AW1, plus weight of standees at 65 kg |

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| | | | is the sum of AW1, plus weight of standees at 65 kg each and 6 standee/m². (Car body weighing and passenger capacity calculation shall be based on AW4 loading)16<br>(v) AW4: Exceptional Crush loaded vehicle weight. This weight is the sum of AW1, plus weight of standees at 65 kg each and 8 standees/m². | each and 6 standee/m.<br>(v) AW4: Fully loaded vehicle / Exceptional Crush loaded vehicle weight. This weight is the sum of AW1, plus weight of standees at 65 kg each and 8 standees/m². (Car body weighing and passenger capacity calculation shall be based on AW4 loading). |
| 116 | Volume IV, Part 1: ERTS-RS | 3.24.1, Table 3.7, 4th row<br>(79 of 492)<br>&<br>Annexure-1/D, Table, 3rd row<br>(474 of 492) | Minimum Design Average Acceleration rate for AW3 train on level tangent track shall be as:<br>0 kmph to 40 kmph: 1.2 m/s$^2$<br>0 kmph to 60 kmph: 0.65 m/s$^2$<br>0 kmph to 80 kmph: 0.35 m/s$^2$ | Minimum Operational Average Acceleration rate for AW3 train on level tangent track shall be as:<br>0 kmph to 35 kmph: 1.2 m/s$^2$<br>0 kmph to 60 kmph: 0.65 m/s$^2$<br>0 kmph to 80 kmph: 0.35 m/s$^2$ |
| 117 | Volume IV, Part 1: ERTS-RS | 4.3.3<br>(100 of 492) | Car max. height (rail top to roof top) with Air-conditioning unit: 3800mm to 3980mm within the limits of the kinematic envelops given in Volume V. (This is tentative and can be adjusted/finalized during design phase after finalization of finished tunnel Dia. In interface with tunnel contractor). | Car max. height (rail top to roof top) with Air-conditioning unit, Antenna etc.: 4080mm within the limits of the kinematic envelops given in Volume V. (This is tentative and can be adjusted/finalized during design phase after finalization of finished tunnel Dia. In interface with tunnel contractor). |
| 118 | Volume IV, Part 1: ERTS-RS | 4.12.10<br>(107 of 492)<br>(Newly added) | New clause added. | Any inspection covers provided in the car shall be robust and designed for quick and easy removal / replacement and have secondary retention to prevent dropping. Inspection openings shall be as large as possible to facilitate inspection and |

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| | | | | maintenance. Equipment box covers shall be provided with simple secure locking devices, with easily visible markings to indicate locked position. 24V DC LED based lighting arrangement shall be provided in the inverter box for maintenance purpose. Its fail-safe interlocking with the box cover shall be ensured. Contractor shall submit the detail document for Engineer's review during design stage. |
| 119 | Volume IV, Part 1: ERTS-RS | 4.14.3.8 (108 of 492) | The couplers shall incorporate longitudinal resilience sufficient to absorb shock loads during the transmission of traction and braking forces. The longitudinal stiffness characteristic of all couplers shall be identical. | The couplers shall incorporate longitudinal resilience sufficient to absorb shock loads during the transmission of traction and braking forces. The longitudinal stiffness characteristic of all couplers of similar type shall be identical. |
| 120 | Volume IV, Part 1: ERTS-RS | 4.14.4.3 (109 of 492) | The semi-permanent coupler and draft-gear shall, in conjunction with the inter-car gangway, be capable of gathering, engaging and coupling units on all track conditions detailed in the chapter 3. Under these track conditions, coupling shall be achieved with the most adverse mismatch of car height, caused by wheel wear, passenger loading, air spring deflection, and service tolerances. | Deleted. |
| 121 | Volume IV, Part 1: ERTS-RS | 4.14.6 (109 of 492) | All the coupler (Auto coupler & Semi permanent coupler) shall have the shear-off functionality. Wearing parts / plates of the gangway and couplers shall give a service life of minimum fifteen years. | All the couplers (Auto, semi-permanent) shall have the shear-off functionality. Supplier can propose a better alternative design which shall meet performance as per EN 15227 and the same need |

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| | | | | to be approved by the Engineer. Wearing parts/plates of couplers shall give a service life of minimum ten years. |
| 122 | Volume IV, Part 1: ERTS-RS | 4.16.3 (x) (110 of 492) | LED Back lit MPMRCL Metro Logo shall be provided / placed over the wind screen just below the flasher light assembly. Design etc. shall be finalized during design stage. | LED Back lit MPMRCL Metro Logo shall be provided at an appropriate place at the front of the train. Location of the same shall be finalised with the approval of Engineer. |
| 123 | Volume IV, Part 1: ERTS-RS | 4.17.2 (ii) (112 of 492) | A 120° horizontal visibility in sitting position shall be allowed by the windscreen and the windows. The dead angle between the windscreen and the windows shall be reduced as much as possible. Horizontal and vertical angles visibility shall be described by the tender. The design will allow clear external sight lines such that all drivers can meet the vision requirements. | The dead angle between the windscreen and the windows shall be reduced as much as possible. Horizontal and vertical angles visibility shall be described by the tender. The design shall allow clear external sight lines such that all drivers can meet the vision requirements in sitting position. The design shall meet UIC 651 standard. |
| 124 | Volume IV, Part 1: ERTS-RS | 4.19 (123 of 492) | EN 16286 (latest version) or equivalent shall be used for design of the gangways. Double piece, double skin with interior panel gangway suitably protected from heat and dust (subject to Engineer's approval) with suitable clamping and jointing arrangement on both ends with saloon end walls shall be provided within the unit. The attenuation of outside noise through the gangway shall not be less than 33dB. In case of separation of cars, the gangways shall have secured arrangement and shall not get damaged or de-shaped. Suitable from | EN 16286 (latest version) or equivalent shall be used for design of the gangways. Double/Single piece, double skin with interior panel gangway suitably protected from heat and dust (subject to Engineer's approval) with suitable clamping and jointing arrangement on both ends with saloon end walls shall be provided within the unit. In case of separation of cars, the gangways shall have secured arrangement and shall not get damaged or de-shaped. Suitable from of guiding pin / plate etc. shall be provided so that the coupling / uncoupling |

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| | | | of guiding pin / plate etc. shall be provided so that the coupling / uncoupling of gangways can be carried out by one person. | of gangways can be carried out by one person. |
| 125 | Volume IV, Part 1: ERTS-RS | 4.19.2 (ix) (124 of 492) | The elements of the gangway shall give a service life of minimum fifteen years except those susceptible to wear and deterioration, such as gangway flexible elements, which may give a service life of 10 years. | The elements of the gangway shall give a service life of minimum fifteen years except those susceptible to wear and deterioration, such as gangway flexible elements, which may give a service life of 8 years. |
| 126 | Volume IV, Part 1: ERTS-RS | 4.19.3 (v) (124 of 492) | The rubber / elastomer elements of the gangway shall give a service life of minimum ten years. However, bellows shall give the service life of minimum fifteen years. | The rubber / elastomer elements of the gangway shall give a service life of minimum 8 years. However, bellows shall give the service life of minimum fifteen years. |
| 127 | Volume IV, Part 1: ERTS-RS | 4.19.5 (125 of 492) | Wearing parts / plates of the gangway and couplers shall give a service life of minimum fifteen years. | Wearing parts / plates of the gangway shall give a service life of minimum eight years. |
| 128 | Volume IV, Part 1: ERTS-RS | 5.4.1, 1st line (133 of 492) | The Contractor shall submit a proposal for the proven primary suspension system. | The Contractor shall submit a proposal for the proven helical / conical rubber primary suspension system. |
| 129 | Volume IV, Part 1: ERTS-RS | 5.4.5, 4th Para (134 of 492) | The minimum clearance of car body mounted equipment from rail level for a fully loaded (AW4) car under worst conditions* (*worst condition means wheels with maximum tread wear and primary springs with maximum deflection and with deflected Air Spring) shall not be less than 102 mm in static | The minimum clearance of car body mounted equipment from rail level for a fully loaded (AW4) car under worst conditions* (*worst condition means wheels with maximum tread wear and primary springs with maximum deflation and with deflated Air Spring) shall not be less than 102 mm in static |

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| | | | condition. | condition. |
| 130 | Volume IV, Part 1: ERTS-RS | 5.4.15 (136 of 492) | The design life of secondary suspension air bags (all inclusive) shall not be less than 12 years. The air bags and its components shall not crack / shear / balloon / burst or deteriorate in its performance during its design life. | The design life of secondary suspension air bags (all inclusive) shall not be less than 10 years. The air bags and its components shall not crack / shear / balloon / burst or deteriorate in its performance during its design life. |
| 131 | Volume IV, Part 1: ERTS-RS | 5.6.3 (137 of 492) | The number of seated passengers shall be taken as one per seat, and standing passengers as 10/m2 for all the above-mentioned strength analysis except for fatigue test. The fatigue load shall be decided based on actual loading which shall correspond to AW3 loading conditions. The loading cycles shall be as specified in respective UIC. There shall not be any crack at the end of any stage of loading cycles. The passenger weight for this calculation shall be taken as 65kg/person. | The number of seated passengers shall be taken as one per seat, and standing passengers as 10/m2 for all the above-mentioned strength analysis except for fatigue test. The fatigue load shall be decided based on actual loading which shall correspond to AW3 loading conditions. The loading cycles shall be as specified in respective UIC. There shall not be any crack at the end of first 2 cycle stage of loading cycles. The passenger weight for this calculation shall be taken as 65kg/person. |
| 132 | Volume III, ERGS, Part 1: ERGS-RS | 26.3.1.24, 2nd para, 3rd line (138 of 397) | Sufficient number of licenses as asked shall be provided to the MPMRCL for the same. | Minimum 50 nos. of licenses (Business level – 30, Full access level – 10, Technician level – 10) shall be provided to the MPMRCL.<br>However, license for MPMRCL staff under the administrative control of Contractor is the responsibility of Contractor. |
| 133 | Volume IV, Part 1: ERTS-RS | 5.11.15 (140 of 492) | The Contractor shall furnish the extreme maintenance limits for wheels according to UIC standard. The maintenance limits for wheels shall | The Contractor shall furnish the extreme maintenance limits for wheels according to UIC standard. The maintenance limits for wheels shall |

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| | | | be within limits recommended in UIC 510-2 OR and SOD adopted by MPMRCL. Regarding wheel life, objective is that the cars shall achieve approximate of 300000 kilometres before re-profiling of the wheels is necessary, whilst operating on the routes as specified in both corridors of Bhopal and Indore Metro. The Contractor shall provide a reprofiling program in order to optimize the life span during the design stage and it shall be verified during the operation. | be within limits recommended in UIC 510-2 OR and SOD adopted by MPMRCL. Regarding wheel life, objective is that the cars shall achieve approximate of 200000 kilometres before re-profiling of the wheels is necessary, whilst operating on the routes as specified in both corridors of Bhopal and Indore Metro. The Contractor shall provide a reprofiling program in order to optimize the life span during the design stage and it shall be verified during the operation. |
| 134 | Volume IV, Part 1: ERTS-RS | 5.11.25<br>(141 of 492) | Temperature monitoring of axle box bearing:<br>Provision shall be made to monitor the temperature of each axle box bearing through TCMS. Indication shall be available in TCMS in case of temperature breaching the specified limits. Details shall be finalized during design stage. | Deleted. |
| 135 | Volume IV, Part 1: ERTS-RS | 5.11.26<br>(141 of 492) | Contractor shall provide one system each in the Depot for the automated wayside wheel profile measurement and on-line temperature monitoring of axle box bearing along with calibration tools. It shall be possible to identify the train/car automatically through suitable means. The parameter under measurement through wheel profile equipment shall be wheel profile, flange thickness, flange height, flange width, back-to-back distance, diameter etc. Ingress protection for wayside equipment shall be IP67. The cost of these systems shall be deemed to | Contractor shall provide one automated wayside wheel profile measurement and at least two axle box bearing temperature monitoring system for each Bhopal & Indore along with all calibration tools. The proposed system shall be proven for the similar metro railway application. Location for the installation of the wayside equipment shall be decided in consultation with Engineer. The parameter under measurement through wheel profile equipment shall be wheel profile, flange thickness, flange height, flange width, back-to-back |

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| | | | be included in quoted price. The analysed data of the system(s) shall be accessible to PPIO/RS controller through Depot server. All safety alerts / messages shall be transferred to OCC/BCC.<br>The Contractor shall interface with Designated Contractor(s) for Installation and commissioning of such systems in depot and mainline. Detail design of this system(s) shall be discussed and finalized during design stage. | distance, diameter etc. The RFID sensors/other suitable means shall be installed on each axle box & other required places of all the trains to identify the asset. The wayside equipment and sensors shall have IP68 protection rating, vandal proof and have UV & outdoor resistant housing. It shall also withstand shock and vibration as per International Standard for Railway Application. The cost of these systems shall be deemed to be included in quoted price. The analysed data of the system(s) shall be accessible to PPIO/RS controller through Depot server. All safety alerts / messages shall be transmitted to the OCC which shall process the data and generate custom warnings, alarms for the Employer's maintenance team with sensors unique ID and other relevant environmental data/common mode parameters such as ambient temperature, loading conditions, location etc. The Contractor shall interface with Designated Contractor(s) for Installation and commissioning of such systems in depot and mainline. Detail design of this system(s) shall be discussed and finalized during design stage.<br>Wayside equipment shall not infringe to Kinematic envelope of Rolling Stock. Installation arrangement of wayside equipment shall be approved by the Engineer. The system shall comply to the EMC requirements. |

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| 136 | Volume IV, Part 1: ERTS-RS | 5.14.4 (143 of 492) | Provision shall also be made in bogies to permit fitment of dry type flange lubricator on 50% axles in a train. The complete arrangement of dry type flange lubricator shall be provided by the Contractor on 50% axles in a train. Details shall be discussed during design and got approved from the Engineer. | The complete arrangement of dry type flange lubricator shall also be provided by the Contractor on 50% axles in a train. |
| 137 | Volume III, ERGS, Part 1: ERGS-RS | Attachment 3, 1st para, 1st line (147 of 397) | Employer shall provide about 25% of the total manpower being engaged by the Contractor for Maintenance obligation (tentative numbers as defined below) personnel, 4 weeks before the likely date of Revenue Operation of First Trainset. | Employer shall provide about 25% of the total manpower being engaged by the Contractor for Maintenance obligation personnel (tentative numbers for each depot as defined in table below), 4 weeks before the likely date of Revenue Operation of First Trainset. |
| 138 | Volume IV, Part 1: ERTS-RS | 6.2.3, 1st line (147 of 492) | Air compressor shall be proven design in metro train operations for at least 5 years and shall be of Oil free reciprocating type. | Air compressor shall be proven design in metro train operations for at least 3 years and shall be of Oil free reciprocating type. |
| 139 | Volume IV, Part 1: ERTS-RS | 6.3.5, 1st Para (149 of 492) | The grade of filtration at rated pressure shall be minimally as follows:<br>• Particle removal down to :1 micron<br>• Liquid water removal :> 95%<br>• Dew point depression at 10 kg/cm2: Minimum 25ºC | The grade of filtration at rated pressure shall be minimally as follows:<br>• Particle removal down to :1 micron<br>• Liquid water removal :> 95%<br>• Dew point depression at 10 kg/cm2: Minimum 25ºC<br>However, any deviation in above condition shall be subject to review and its acceptance by Engineer, whose decision shall be final and binding. |
| 140 | Volume IV, | 6.4.6 | Reservoirs shall also be provided with manual | Reservoirs shall be provided with manual draining |

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| | Part 1: ERTS-RS | (150 of 492) | draining arrangement which shall normally be automatically locked and secured. | arrangement which shall normally be self- locked and secured. |
| 141 | Volume IV, Part 1: ERTS-RS | 6.12.1, 2nd line (153 of 492) | The brake components, valves etc. shall have been in use and have established their satisfactory performance and reliability on at least three mass rapid transit systems in revenue service over a period of last five years or more (in each MRTS) outside the country of origin in three different countries or in an MRTS in India. | The brake components, valves etc. shall have been in use and have established their satisfactory performance and reliability on at least three mass rapid transit systems in revenue service over a period of last three years or more (in each MRTS) outside the country of origin in three different countries or three different metro projects in India. |
| 142 | Volume IV, Part 1: ERTS-RS | 6.12.4 (153 of 492) | The EP brake shall be so designed that its control function including Wheel Slide Protection (WSP) can be taken over by the other redundant control elements even in the case of failure of individual electronic or electrical control elements. Bogie level control shall be provided for Brake electronics while WSP shall be controlled at axle level. | The EP brake shall be so designed that its control function can be taken over by the other redundant control elements even in the case of failure of individual electronic or electrical control elements. Bogie level control shall be provided for Brake electronics while WSP shall be controlled at axle level.<br>Redundant power supply and processor card for hot stand by in the control unit and spare slots for I/O cards shall be ensured. However, any other suitable design for redundancy of EP Brake control function may be proposed by the Contractor subject to approval of the Engineer. |
| 143 | Volume IV, Part 1: ERTS-RS | 6.12.24 (156 of 492) | All the pneumatic control equipment, safety valves, governors, switches, sensors etc. in the underframe shall be provided minimum in IP53 or higher compliant lockable boxes for dust control. These | All the pneumatic control equipment and valves for one car shall be mounted in the enclosed lockable boxes, made of stainless steel/Aluminium(anodized) having IP 65 protection. |

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| | | | boxes shall be made of stainless steel / aluminium (anodized). | |
| 144 | Volume IV, Part 1: ERTS-RS | 6.12.28 (156 of 492) | Following minimum SIL levels at train level shall be complied for the brake system<br>Emergency brakes: SIL 3<br>WSP (Wheel Slip Slide Protection): SIL 3<br>The Contractor shall submit relevant certifications for the SIL levels as above. | Following minimum SIL levels at train level shall be complied for the brake system<br>Emergency brakes: SIL 4<br>WSP (watchdog / safety timer - SIL4)<br>Service brake - SIL2<br>Holding Brake application and feedback - SIL2<br>The Contractor shall submit relevant certifications for the SIL levels as above. |
| 145 | Volume IV, Part 1: ERTS-RS | 6.12.31 (i) (157 of 492) | not used for service brake application and; | can be used for service brake application if deemed necessary to achieve brake performance as well as agreed by the Signalling Contractor and; |
| 146 | Volume IV, Part 1: ERTS-RS | 6.13.11 (158 of 492) | Brake system design shall ensure that in event of isolation of 33% bogie brake, train can safely work at least up to the maximum speed of 80 Kmph. In case of two bogie isolation (33%) Contractor shall ensure that no braking distance shall be affected as long as train controlling is being done by signalling system for 3-Car and 6-Car Trainset. | Deleted. |
| 147 | Volume IV, Part 1: ERTS-RS | 6.14.2 (159 of 492) | Parking brakes shall be applied in the event of loss of the main compressed air supply. The parking brakes shall be capable of release from within the cab when the compressed air supply is present. | Parking brakes shall be applied in the event of loss of the main compressed air supply. The parking brakes shall be capable of release from within the cab when the compressed air supply is present. |

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| | | | With no compressed air supply available, it shall be possible to release individual parking brake actuators manually from saloon (cubicle). Application and release of parking brakes shall also be controllable from the driving console and remotely from OCC (to be finalized during design stage). | With no compressed air supply available, it shall be possible to release individual parking brake actuators manually from inside the saloon. Application and release of parking brakes shall also be controllable from the driving console and remotely from OCC (to be finalized during design stage). |
| 148 | Volume IV, Part 1: ERTS-RS | 6.14.10 (159 of 492) | The parking brake force on individual axles shall not be so large as to inhibit emergency train recovery or to give rise to locked wheels during recovery. The maximum wheel/rail adhesion level to be assumed for the “push-out” requirement shall be 0.1. Under conditions of a dragging parking brake for a minimum distance<br>of 3 kms, no damage shall be caused to the braking system or any bogie component, with the exception of abnormal shoe wear. Detailed figures to be provided during preliminary design stage. | Deleted. |
| 149 | Volume IV, Part 1: ERTS-RS | 6.15.5 (160 of 492) | Wheel slide protection shall be available during emergency braking. Any failure in the wheel slide protection in emergency braking shall result in the application of full brake force and deactivation of the spin/slide system. | Wheel slide protection shall be available during emergency braking. Any failure in the wheel slide protection in emergency braking shall result in the application of brake force depending on the load in the car and deactivation of the slip/slide system. |
| 150 | Volume IV, Part 1: ERTS-RS | 6.15.9 (161 of 492) | The Contractor shall furnish the maximum braking distance for AW4 load condition from a speed of 80 kmph to stop, under emergency brake application. | The Contractor shall furnish the maximum braking distance for AW4 load condition from a speed of 80 kmph to stop, under emergency brake application |

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| | | | The guaranteed maximum braking distance shall satisfy the requirements specified in Table 15.1.B and 15.16.4 emergency brake application for 3-Car and 6-Car Trainset | for 3-car and 6-car trainset. The guaranteed maximum braking distance shall satisfy the requirements specified in Table 15.1B for emergency brake application for 3-Car and 6-Car Trainset. |
| 151 | Volume IV, Part 1: ERTS-RS | 6.15.10 1st Para (161 of 492) | The Contractor shall provide the guaranteed emergency brake de-acceleration rate to Signalling Contractor during interface. The Guaranteed Emergency Brake rate shall be decided on the basis of minimum initial adhesion of 6% on Bhopal and Indore Metro network, one car brake isolated and with maximum 15% emergency brake distance extension (for adhesion from 8% to 6%) due to wheel sliding for 3- Car and 6-Car Trainset. | The Contractor shall provide the guaranteed emergency brake de-acceleration rate to Signalling Contractor during interface. The Guaranteed Emergency Brake rate shall be decided on the basis of minimum initial adhesion of 6% on Bhopal and Indore Metro network. During Guaranteed Emergency Brake Rate (GEBR) one bogie shall be isolated for a 3-car trainset and one car brake shall be isolated in a 6-car trainset and with maximum 15% emergency brake distance extension (for adhesion from 8% to 6%) due to wheel sliding for 3-Car and 6-Car Trainset. |
| 152 | Volume IV, Part 1: ERTS-RS | 6.21.2 (166 of 492) | Wheel slide protection with gradual slide correction shall be provided in all braking modes, on all cars. Slide detection and correction shall be on a per axle basis. The slide protection scheme provided shall be capable of detecting the severity of the slide and provide the appropriate level of slide correction. | Wheel slide protection with gradual slide correction shall be provided in all braking modes, on all cars. The slide detection shall be performed per axle and the correction per bogie. The slide protection scheme provided shall be capable of detecting the severity of the slide and provide the appropriate level of slide correction. |
| 153 | Volume IV, Part 1: | 6.21.4 (v) (166 of 492) | The wheel slide system shall detect the onset of slip/slide by either an axle deceleration exceeding a | The wheel slide system shall detect the onset of slide by (a) an axle deceleration exceeding a pre-set |

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| | ERTS-RS | | pre-set parameter, or detection of a difference between the relative speeds of the axles of any one axle of any bogie. | parameter, and/or (b) detection of a difference between the relative speeds of the axles. A proven speed sensor mounted on each axle shall be provided to detect the speed of associated wheels for implementing wheel slide protection scheme. Wheel slide indication shall be displayed through TCMS in the driving console. The Contractor shall submit full details of wheel slide protection scheme and equipment. Dump valves shall be monitored for their correct functioning by brake electronic control and corresponding status shall be relayed to TCMS. System shall ensure correct functioning of dump valves as pre-test before train is dispatched from depot or initialized |
| 154 | Volume IV, Part 1: ERTS-RS | 6.21.4 (vii), (viii), (ix)<br>(166 of 492) | vii. Wheel slip/slide indication shall be made available in the driving cab through TCMS system.<br>viii. Dump valves shall be monitored for their correct functioning and shall be monitored by TCMS. System shall ensure correct functioning of dump valves as pre-test before train is dispatched from depot or initialized.<br>ix. The Contractor shall submit full details of wheel slide protection scheme and equipment. | Deleted. |
| 155 | Volume IV, Part 1: ERTS-RS | 7.2.1 (xx), Para 2<br>(171 of 492) | Power supply to DCUs shall be in such a loop that the redundancy can be ensured in case of breakage of any one wire. The Contractor shall ensure that the system shall not be affected in single point failure. In | Power supply to DCUs shall be in such a loop that the redundancy can be ensured in case of breakage of any one wire. The Contractor shall ensure that the system shall not be affected in single point failure. |

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| | | | case of EDCU transmission error, manual reset of EDCU shall be avoided and reset function shall be implemented through TCMS. Details shall be submitted for review of Engineer. | Details shall be submitted for review of Engineer. |
| 156 | Volume IV, Part 1: ERTS-RS | 7.3.1 last sentence (180 of 492) | The clear width of the door way and ramp when operated shall not be less than 1100mm with a headroom not less than 1900mm so that two files of passengers can be simultaneously detrained without supervision. | The clear width of the door way and ramp when operated shall be sufficient to demonstrate evacuation of all passenger in AW4 conditions with Indian anthropology (male) data within 30 min without supervision and with its headroom not less than 1900mm. |
| 157 | Volume IV, Part 1: ERTS-RS | 8.1.12 (187 of 492) | Complete map of spectrum of harmonics generated by the unit / train in traction and regeneration mode shall be submitted during design. The same shall be verified during system test and validated during line test. Harmonics emitted by the train and complete fleet operating in the system, including feed extended zone shall be compatible with the voltage distortion limits specified in relevant IEC & IEEE and shall be validated as type test. All traction units shall be suitably interlaced to minimize the effect harmonics in the power system. The overall harmonic current levels viewed at Current Collector shall not exceed 2% of the fundamental component under all modes of operation including regeneration with multiple number of trains in operation. The Tenderer shall also furnish the specification of Power Quality for the regenerated energy including | Deleted. |

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| | | | its harmonic analysis confirming to Indian Electricity Grid Code. | |
| 158 | Volume IV, Part 1: ERTS-RS | 8.5.8 (192 of 492) | The surge arrestor shall be tested to EN 50124 - 2. | The surge arrestor shall be tested to EN 50124 - 2 or equivalent standard (subject to approval of the Engineer). |
| 159 | Volume IV, Part 1: ERTS-RS | 8.7.1, 2nd paragraph, last sentence (193 of 492) | Gasket shall have minimum life of 12 years. | Gasket shall have minimum life of 4 years. |
| 160 | Volume IV, Part 1: ERTS-RS | 8.7.11, 1st sentence (194 of 492) | The box for the power traction inverter shall be of stainless steel/Anodized Aluminium) so as to avoid any corrosion in service on any account and the box shall last for the lifetime of the traction inverter unit without needing any attention. | The box for the power traction inverter shall be of stainless steel/Anodized Aluminium) so as to avoid any corrosion in service on any account and the box shall last for the lifetime of the traction inverter unit without needing any attention. Alternate superior proposal such as painted aluminium with riveting structure may be accepted subject to the condition that proven ness requirements are satisfied in accordance with ERTS 3.2.3. |
| 161 | Volume IV, Part 1: ERTS-RS | 8.7.22 (196 of 492) | For maintenance purpose, there shall be additional bypass ground switch in Inverter box duly interlocked with safety locks. Contractor shall submit the detail document for Engineer's review during design stage. | For maintenance purpose, there shall be additional bypass ground switch in Inverter box duly interlocked with safety locks. It shall be ensured that in no case it shall be possible to close the inverter box with ground switch at earthed position. Mechanical interlocking shall be provided. Contractor shall submit the detail document for |

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| | | | | Engineer's review during design stage. |
| 162 | Volume IV, Part 1: ERTS-RS | 8.8.3, 1st sentence (197 of 492) | Evaluation of the insulation system for sealing against moisture shall be made in accordance with IEEE 429. | Evaluation of the insulation system for sealing against moisture shall be made in accordance with IEEE 1776. |
| 163 | Volume IV, Part 1: ERTS-RS | 8.8.10, last sentence (198 of 492) | The motor bearing maintenance inspection interval (excluding lubrication if required) shall exceed 1 million kms and the bearing shall have a design life of minimum 2.1 million kms. Lubrication of motor and gearbox bearings shall be accessible without the need of equipment removal. Calculations supporting the choice of bearings shall be submitted for review. Two sets of portable system (one for each depot) with all arrangements shall be provided to monitor Traction motor performance in any train as required (to be finalized during design stage) equipped with data logger for data recording. | The motor bearing maintenance inspection interval (excluding lubrication if required) shall exceed 1.2 million kms and the insulated bearing shall have a design life of minimum 2.1 million kms. Lubrication of motor and gearbox bearings shall be accessible without the need of equipment removal. Calculations supporting the choice of bearings shall be submitted for review. Minimum four traction motors shall be fully wired on four different trains on each line fully equipped with data logger for data recording and sensors / thermocouple. The data logger shall be able to record temperature at various points of traction motor at various speeds. The detailed location of sensors in traction motor shall be as per the test bed scheme as finalized during design stage. |
| 164 | Volume IV, Part 1: ERTS-RS | 8.8.22 (199 of 492) | Any inspection covers provided shall be robust and designed for quick and easy removal / replacement and have secondary retention to prevent dropping. Inspection openings shall be as large as possible to facilitate inspection and maintenance. Equipment box covers shall be provided with simple secure | Deleted. |

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| | | | locking devices, with easily visible markings to indicate locked position. 24V DC LED based lighting arrangement shall be provided in the inverter box for maintenance purpose. Its fail-safe interlocking with the box cover shall be ensured. Contractor shall submit the detail document for Engineer's review during design stage. | |
| 165 | Volume IV, Part 1: ERTS-RS | 8.9.3 (200 of 492) | For the commutation and power line filter capacitors, suitable sized and rated discharge resistors shall be fitted to ensure that the total capacitor terminal voltage shall be at a safe working level of 45 V within 2 minutes of removal of the voltage. | For the commutation and power line filter capacitors, suitable sized and rated discharge resistors shall be fitted to ensure that the total capacitor terminal voltage shall be at a safe working level of 50 V within 2 minutes of removal of the voltage. |
| 166 | Volume IV, Part 1: ERTS-RS | 8.10.8 (200 of 492) | Brake resistor shall be naturally cooled and may be mounted under the motor cars. If they are located on the roof, precautions must be taken against overheating. Adequate heat shields shall be provided to protect the car structure. Resistor design shall be based on a non-receptive line. | Brake resistor shall be naturally or forced cooled and may be mounted under the motor cars. If they are located on the roof, precautions must be taken against overheating. Adequate heat shields shall be provided to protect the car structure. Resistor design shall be based on a non-receptive line. |
| 167 | Volume IV, Part 1: ERTS-RS | 9.2.4, 3rd and last sentences (205 of 492) | The component cooling system shall be designed to ensure the control electronics temperature inside auxiliary inverter shall not exceeds its maximum temperature rating with sufficient margin of at least -20°C under specified conditions after due consideration of proximity effect.<br>Gasket shall have minimum life of 12 years. | The component cooling system shall be designed to ensure the control electronics temperature inside auxiliary inverter shall not exceeds its maximum temperature rating with sufficient margin of at least -10°C under specified conditions after due consideration of proximity effect. However, the ambient condition shall be considered as 47°C as mentioned in the contract. |

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| | | | | Gasket shall have minimum life of 4 years. |
| 168 | Volume IV, Part 1: ERTS-RS | 9.2.12, 1st two sentences (207 of 492) | The box for auxiliary inverter shall be such that to avoid any corrosion throughout the service life on any account and the box shall last for the lifetime of the auxiliary inverter unit without needing any attention. The box shall be of stainless steel / anodized aluminium. | The box for auxiliary inverter shall be such that to avoid any corrosion throughout the service life on any account and the box shall last for the lifetime of the auxiliary inverter unit without needing any attention. The box shall be of stainless steel / anodized aluminium. However, if painted aluminium is proposed, it shall comply to ERTS 3.2.3 requirements and may be accepted with the approval of engineer. |
| 169 | Volume IV, Part 1: ERTS-RS | 9.2.17 (208 of 492) | Heat detectors / LHD shall be provided in Auxiliary Power Supply System and status shall be linked to TCMS / Fire detection & Control unit so that their status is monitored. | Heat detectors / LHD shall be provided in Auxiliary Power Supply System and status shall be linked to TCMS / Fire detection & Control unit (refer ERTS clause 2.24) so that their status is monitored. |
| 170 | Volume IV, Part 1: ERTS-RS | 9.4.12, (iv) (211 of 492) | Battery fuses are to mounted in such a way that fuse blown indicator to be visible from outside at the time of maintenance work inspection. | Battery fuses are to mounted in such a way that fuse blown indicator to be visible from outside at the time of maintenance work inspection as well as its failure shall be logged on TCMS. |
| 171 | Volume IV, Part 1: ERTS-RS | 10.2.2 (218 of 492) | Ethernet Consist Network (ECN)<br>Ethernet Consist Network with dual-homing ladder-type topology / dual-homing ring-type topology (compliant with IEC 61375-3-4:2014) shall be adopted. The ECN shall maintain redundant active communication links to the ETB. The redundancy | Ethernet Consist Network (ECN)<br>Ethernet Consist Network with dual-homing ladder-type topology / dual-homing ring-type topology (compliant with IEC 61375-3-4:2014) shall be adopted. The ECN shall maintain redundant active communication links to the ETB (if provided). The |

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| | | | shall be maintained at system level (PA/PIS, TCMS/CU & LU, BECU, NVR, EVR, ATC etc.). | redundancy shall be maintained at system level (PA/PIS, TCMS/CU & LU, BECU, NVR, EVR, ATC etc.). |
| 172 | Volume IV, Part 1: ERTS-RS | 10.7.2, (ix)<br>(228 of 492) | VDU Display Information<br>Push Button record: All operations of Train operator including pressing of push buttons etc. shall be recorded with time stamp and be made available on VDU. | VDU Display Information<br>Push Button record: All operations of Train operator including pressing of any hardware push buttons, switches etc. shall be recorded with time stamp and be made available on VDU. |
| 173 | Volume IV, Part 1: ERTS-RS | 10.7.5<br>(229 of 492) | VDU Access Control Levels<br>The level of access to distinct screens shall be controlled for the train operator and maintenance personnel. At least three levels shall be defined which shall be user name and password protected. The details shall be reviewed by the Engineer. | VDU Access Control Levels<br>The level of access to distinct screens may be controlled for the train operator and maintenance personnel. At least three levels viz, Operator Login, Maintenance Login and Parameter Setting Login, shall be defined which may be user name and password protected. The details may be reviewed by the Engineer. |
| 174 | Volume IV, Part 1: ERTS-RS | 10.7.8<br>(229 of 492) | CCTV Display Redundancy<br>Full redundancy shall be available between VDU of TCMS and CCTV. In case of failure of TCMS VDU full functionality of TCMS VDU shall be available in CCTV VDU and vice-versa. CCTV images can be displayed on the TCMS VDU on demand or event generated. The TCMS VDU shall have provision of displaying multiple screens as per the requirements. | CCTV Display<br>CCTV images shall also be displayed on the TCMS VDU on demand or event generated. The TCMS VDU shall have provision of displaying multiple screens as per the requirements. Contractor shall provide a robust hardware with adequate memory and RAM in order to cater the requirements of both TCMS and CCTV. |

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| 175 | Volume IV, Part 1: ERTS-RS | 10.11.5, (v) (234 of 492) | The trip specific data shall be dumped at the end of each trip. This data should be sent via S&T network, for which suitable interface to be ensured with the designated Contractor. | The trip specific data as mentioned in ERTS 10.15.2 shall be dumped at the end of each trip. This data should be sent via S&T network, for which suitable interface to be ensured with the designated Contractor. |
| 176 | Volume IV, Part 1: ERTS-RS | 10.14 (237 of 492) | Wayside Wireless Communication System: | Refer Attachment – 14 to Corrigendum – 3 for amended sub-clause "10.14: Wayside Wireless Communication System". |
| 177 | Volume IV, Part 1: ERTS-RS | 10.15.3 (i) (240 of 492) | Measurement Accuracy<br>i. Accuracy:<br>All energy measurements shall have accuracy within ±3 % of the measurements made with Standard Wattmeter and Standard Instrument Transformers connected at appropriate test point in the Vehicle Control Circuit. This shall be validated during type tests. | Measurement Accuracy<br>i. Accuracy:<br>All energy measurements, shall have accuracy within ±3 % of the measurements made with Standard Wattmeter and Standard Instrument Transformers connected at appropriate test point in the Vehicle Control Circuit. For CCD, at low current consumption this accuracy requirement will not be applicable. This shall be validated during type tests. |
| 178 | Volume IV, Part 1: ERTS-RS | 10.16.2 (240 of 492) | RSC VDU<br>The Rolling Stock Controller (RSC) in OCC shall have facility of full TCMS functionality of any train on his workstation on demand through signalling network. Development of the VDU application in RSC workstation shall be responsibility of Rolling Stock Contractor. | RSC VDU<br>The Rolling Stock Controller (RSC) in OCC shall have facility of monitoring of full TCMS of any train on his workstation on demand through signalling network. Development of the VDU application in RSC workstation shall be the responsibility of Rolling Stock Contractor. RSC GUI shall have following features: |

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| | | | | 1. GUI shall have the capability to monitor the information of all trains within the network. The status of various subsystems, MCBs, Relays & Switches, Train Lines shall be displayed on GUI and it shall be possible to acknowledge faulty trains immediately. It shall be possible to identify cause of events/Alarms on GUI and generate possible guidance action for the OCC/RSC to troubleshoot.<br>2. GUI shall make available both current faults and historical fault records with provision of sorting and filtering the list.<br>3. User friendly Troubleshooting Directory (TSD) shall also be made available on RSC GUI.<br>4. Train Operation Data (TOD) shall contain train status data and faults/alarms/information etc. to be displayed on GUI. The TOD shall have a refresh rate of minimum 1 second.<br>5. A separate GUI shall also be provided at RS maintenance office at depots without actionable command.<br>6. Any other feature as envisaged important during design stage.<br>Detail shall be submitted during design for the |

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| | | | | approval of Engineer. |
| 179 | Volume IV, Part 1: ERTS-RS | 11.2.5 (244 of 492) | The system shall automatically control the temperature and relative humidity throughout the passenger area up to 25°C and relative humidity of 60% RH respectively, for ambient temperatures of 35°C 65% RH and 47°C 33% RH. | The system shall automatically control the temperature and relative humidity throughout the passenger area up to 25°C and relative humidity of 60% RH respectively, for ambient temperatures of 35°C 65% RH and 44°C 33% RH.<br>Temperature and humidity sensors for fresh air, return air and supply air, shall be inbuilt in the HVAC unit. All the data shall be logged in TCMS and shall be retrievable on demand from TCMS. |
| 180 | Volume IV, Part 1: ERTS-RS | 11.2.8 (245 of 492) | Temperature sensors for fresh air, return air, supply air, condenser inlet and condenser outlet air shall be inbuilt in the HVAC unit. Temperature sensor to monitor ambient condition shall be mounted on car body roof at a suitable distance from HVAC unit so that there shall not be any effect of condenser exhaust air on its readings. All the data shall be logged in TCMS and retrieval on demand from TCMS. | Temperature sensors for fresh air, return air and supply air shall be inbuilt in the HVAC unit. Temperature sensor to monitor ambient condition shall be mounted on car body roof at a suitable distance from HVAC unit so that there shall not be any effect of condenser exhaust air on its readings. All the data shall be logged in TCMS and retrieval on demand from TCMS. |
| 181 | Volume IV, Part 1: ERTS-RS | 11.2.13 (246 of 492) | In the event of the failure of both HVAC on a car, an emergency ventilation system (at least 1 hour with battery supply) shall operate automatically to admit fresh air directly into car to maintain the required oxygen level in the fully laden car, in accordance with ASHRAE 62. The induction outside fresh air shall not be less than 10m3/h/passenger, under fully | In the event of the failure of both HVACs on a car, an emergency ventilation system shall operate automatically to admit fresh air directly into the car to maintain the required CO2 level fully laden car in accordance with ASHRAE 62. The induction of outside fresh air shall not be less than 15 m3/h/ person, under fully loaded train conditions. The |

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| | | | loaded train condition. The emergency ventilation fans in the saloon shall be fed from the 110V DC supply through dedicated inverter provided in each car in the event of non-availability of normal 415V ac supply from single inverter provided in each car. It shall be possible to stop the working of emergency ventilation system in the depot through TCMS when 750V DC supply is not available. | emergency ventilation fans in the saloon shall be fed from the 110V DC supply in the event of non-availability of 415V AC supply from single inverter(s) provided in each car/HVAC unit. Emergency ventilation for 60 minutes, or the time needed to fully evacuate AW4 passengers from the train from one side front egress door, whichever is higher of the two, should be provided. It shall be possible to stop the working of emergency ventilation system in the depot through TCMS when 750V DC supply is not available. |
| 182 | Volume IV, Part 1: ERTS-RS | 11.2.14 (246 of 492) | The method for cleaning the filters and expected life of filter shall be furnished during detail design stage. Minimum expected life of filter provided shall be 5,00,000 kms. Differential pressure measurement across fresh air/return air filter shall be used to send alert to clean/change the filters. Better alternatives may be suggested during design. Suitable 'Automatic filter cleaning machine' with inbuilt drier facility shall be designed and provided by the Contractor in each Depot so that it shall be possible to clean and dry filters of 3-car trainset within two-hour. | The method for cleaning the filters and expected life of filter shall be furnished during detail design stage. Minimum expected life of filter provided shall be 5,00,000 kms. Suitable 'Automatic filter cleaning machine' with inbuilt drier facility shall be designed and provided by the Contractor in each Depot so that it shall be possible to clean and dry filters of 3-car trainset within two-hour. |
| 183 | Volume IV, Part 1: ERTS-RS | 11.2.20 (247 of 492) | Employer expects that an energy efficient system comparable with the best available in the market shall be provided. Good energy efficiency shall be achieved in cooling and de-humidification | Employer expects that an energy efficient system comparable with the best available in the market shall be provided. Good energy efficiency shall be achieved in cooling and de- humidification |

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| | | | operations of the HVAC. Contractor shall furnish<br>energy efficiency ratio (EER) for the offered system. In cooling mode, the Coefficient of performance (COP) of HVAC shall not be less than 2.5 in Summer ambient conditions under all loading conditions from AW0 to AW4 which may be achieved by utilizing variable frequency control (if required) of compressors or any other<br>control mechanism. The COP shall be validated as per IS8148, ASHRAE 37 or any other relevant standard, as agreed by the Engineer. The Contractor shall submit the record of proven system already functional in any metros with the specified COP. The Contractor shall furnish expected power consumption of the HVACs per car for peak Summer, Monsoon and Winter ambient conditions for AW0, AW1, AW2, AW3<br>and AW4 passenger loads | operations of the HVAC. Contractor shall furnish Energy Efficiency Ratio (EER) for the offered system. In cooling mode, the Coefficient of Performance (COP) of HVAC shall be at least 2.5 in summer ambient conditions under AW4 loading conditions which may be achieved by utilizing variable frequency control (if required) of compressors or any other control mechanism. The COP shall be validated as per IS 8148, ASHRAE 37 or any other relevant standard, as agreed by the Project Manager. The Contractor shall submit the record of proven system already functional in any metros with the specified COP. The Contractor shall furnish expected COP, cooling capacity and power consumption of the HVACs per car for peak Summer, Monsoon and Winter ambient conditions for AW1, AW2, AW3 & AW4 passenger loads |
| 184 | Volume IV, Part 1: ERTS-RS | 11.3.4,<br>(iii), (iv), (vi)<br>(249 of 492) | iii) In the event of a loss of the emergency power supply, the dampers keep the “Closed” position.<br>iv) The dampers shall be reset by the train driver via the TCMS if the system resumes normal.<br>vi) Operation of the smoke mode ventilation shall be reported to the TCMS. | iii) In the event of a loss of the emergency power supply, the dampers keep the “Closed” position.<br>Fresh air damper shall be spring closed and electrically open type. The closing time of the fresh air damper shall preferably be less than 10 seconds from the receipt of smoke signal to avoid ingress of large quantity of smoke inside the car. Location of the smoke detectors and the logic for smoke signal shall be designed in such a way that possibility of |

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| | | | | false alarm is avoided.<br>iv) The dampers shall be reset by the train driver via the TCMS in non UTO and via OCC in UTO mode, if the system resumes normal.<br>vi) Operation of the smoke mode ventilation shall be reported to the TCMS and OCC. Provision shall be available to bypass/reset the smoke detectors though TCMS & OCC.<br>Full details of the proposed system shall be submitted to the Engineer for its approval. |
| 185 | Volume IV, Part 1: ERTS-RS | 11.6.13, 2nd line (251 of 492) | LP and HP switches, filter replacement, data downloading by PTU, electrical connection cubicle, control panel cubicle etc. shall be easily accessible from inside of saloon to the maintenance personnel, but not to the passengers. | Filter replacement, data downloading by PTU, electrical connection cubicle, control panel cubicle etc. shall be easily accessible from inside of saloon to the maintenance personnel, but not to the passengers. |
| 186 | Volume IV, Part 1: ERTS-RS | 11.7.6 (252 of 492) | A model of the proposed duct made of plywood or any other suitable material shall be prepared to evaluate the design parameters, including air velocity from the outlets and air distribution inside the car. | Deleted. |
| 187 | Volume IV, Part 1: ERTS-RS | 11.7.7 2nd line (252 of 492) | Air turbulator shall be provided in the driving console, signalling cubicles and electrical cabinets to achieve uniform cooling. | Air turbulator/fan shall be provided in the driving console, signalling cubicles and electrical cabinets to achieve uniform cooling. Air turbulators/fan shall be monitored in TCMS. In the Signalling cubicles, air turbulators shall be operating continuously even during sleep mode. Contractor shall carry out |

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| | | | | thermal analysis to prove the efficacy of the air turbulator arrangement. RS Contractor shall interface with Signalling contractor to meet all the requirements of onboard Signalling equipment in this regard. |
| 188 | Volume IV, Part 1: ERTS-RS | 11.9.1<br>(252 of 492) | The Contractor shall provide hermetic scroll compressors (minimum two) with step less VVVF control proven for sufficiently long time in Metro service. Scroll compressor shall be suitable for continuous operation at high ambient temperatures of up to 50C and limited operation at 58C ambient. The compressor shall be provided with Inverter based VVVF drive (to optimize the energy efficiency and improved controls in view of the varying passenger loads) and complete details of the same shall be provided. Full details of the compressor and its experience in Metro train application, particularly in high temperature, dusty and high humid environment shall be furnished. Unloading of compressor shall be linked with the HP setting.<br>References of the inverter-controlled HVAC system shall be submitted with the bid to verify the proven design and supplies to metro trains. | The Contractor shall provide hermetic scroll compressors (minimum two) proven for sufficiently long time in Metro service. Scroll compressor shall be suitable for continuous operation at high ambient temperatures of up to 50 ºC and limited operation at 58 ºC ambient. The HVACs shall not shut down up to 58ºC of ambient temperature with the fresh air dampers fully open for AW4 passenger load. Full details of the compressor and its experience in Metro train application, particularly in high temperature, dusty and high humid environment shall be furnished. Unloading of compressor shall be linked with the HP setting.<br>The compressor may be provided with Inverter based VVVF drive (to optimize the energy efficiency and improved controls in view of the varying passenger loads) and complete details of the same shall be provided during design stage.<br>Reduced air flow due to clogging of air filters, icing on evaporator coil or otherwise shall not result in failure of compressor(s). Adequate protection to avoid compressor failure shall be provided. |

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| 189 | Volume IV, Part 1: ERTS-RS | 11.10.1 (253 of 492) | The condenser and evaporator coils shall be of copper refrigerant tubes with copper fins or with pre-coated aluminium, mechanically bonded to the tubes, having proven experience in metro applications. The coating shall ensure extended cleaning periodicity and corrosion resistance. In Evaporator there shall be a split feed requiring two coils and expansion valves to regulate the cooling capacity. Condenser fins spacing shall be no closer than 3mm and evaporator fins shall be 2.5 mm or more apart, in order to prevent dirt/dust build up. Condenser and evaporator fins shall be of sufficient strength so that it shall not bend and damage while cleaning. The coils shall have copper alloy stainless steel end plates set in the casing to minimize stress from vibration, expansion and the external pipe couplings. Cleaning of condenser and evaporator coils should not be required earlier than 1.5 lakh-km running. The frequency of cleaning of coils in Bhopal and Indore climate shall be furnished. | The condenser and evaporator coils shall be of copper refrigerant tubes with copper fins or with pre-coated aluminium, mechanically bonded to the tubes, having proven experience in metro applications. The coating shall ensure extended cleaning periodicity and corrosion resistance. The thickness of fins shall be minimum 0.2mm and in case of aluminium it shall be approved by the Engineer. Condenser fins spacing shall be no closer than 3mm and evaporator fins shall be 2.5 mm or more apart, in order to prevent dirt/dust build up. Condenser and evaporator fins shall be of sufficient strength so that it shall not bend and damage while cleaning. The coil assembly shall be mounted in a stainless steel / copper alloy frame. Cleaning of condenser and evaporator coils should not be required earlier than 0.75 lakh-km running. The frequency of cleaning of coils in Bhopal and Indore climate shall be furnished. |
| 190 | Volume IV, Part 1: ERTS-RS | 11.10.2, (253 of 492) | The condenser fan shall provide for adequate airflow over the coils at the design condition. The fan shall be direct driven by an ac induction motor (3ph 415V ac) rated for continuous duty, with two-stage speed. Inbuilt temperature sensors shall be provided in these motors linked to the TCMS. There shall be separate MCBs for condenser fan and supply air fan. The compressor, unloading device, | The condenser fan shall provide for adequate airflow over the coils at the design condition. The fan shall be direct driven by an ac induction motor (3phase, 415V ac, 50Hz) rated for continuous duty, with two-stage speed. There shall be separate MCBs for condenser fan and supply air fan. The compressor and motors shall have at least IP56 whereas pressure switches shall have at least IP65 |

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| | | | motors and pressure switches shall be weatherproof of IEC 60529 IP65. | protection as per IEC 60529.<br>Any deviation in above requirement will be accepted only after the approval of the Engineer. |
| 191 | Volume IV, Part 1: ERTS-RS | 11.10.6<br>(254 of 492) | Gauge Ports: High and low side gauge connections shall be provided. Each connection shall have a manual shut off valve and a self-sealing connection for a refrigeration service gauge set. | Deleted. |
| 192 | Volume IV, Part 1: ERTS-RS | 11.11.2<br>(255 of 492) | A sight glass shall be fitted in the refrigerant liquid line to show the refrigerant flow and be easy visible from the saloon area through an inspection hole. | A sight glass shall be fitted in the refrigerant liquid line to show the refrigerant flow and be easy visible either from the saloon area through an inspection hole or on the roof without opening the condenser covers. |
| 193 | Volume IV, Part 1: ERTS-RS | 11.13.3<br>(256 of 492) | Temperature sensors for the return air and other controls shall be solid state. The controls for the two air conditions shall be coordinated such that as the cooling load reduces, the unit can be unload in stages from full to half capacity to one unit being shut off except for the ventilation blower. | Temperature sensors for the return air and other controls shall be solid state. |
| 194 | Volume IV, Part 1: ERTS-RS | 11.13.11<br>(256 of 492) | Compressor unloading device shall be provided to cater for part load conditions and relief of high refrigerant pressure due to the ambient temperature exceeding the tunnel temperature. | Deleted. |
| 195 | Volume IV, Part 1: | 11.13.12<br>(256 of 492) | In the event that all conditions revert to normal without malfunction in the system, the unloading | Deleted. |

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| | ERTS-RS | | device shall be reset and the system shall load up automatically. | |
| 196 | Volume IV, Part 1: ERTS-RS | 11.13.16, 1st line (257 of 492) | The microprocessor shall have extendable memory permitting logging of faults and system events in its memory for sufficiently long durations. | The microprocessor shall have enough memory to permit logging of faults and system events in its memory for sufficiently long durations. |
| 197 | Volume IV, Part 1: ERTS-RS | 11.13.23 (iii) (258 of 492) | Saloon over-temperature (rising at 33ºC). A sensor shall be provided in each return air grille. | Saloon over-temperature (rising at 33ºC). |
| 198 | Volume IV, Part 1: ERTS-RS | 11.13.25 (258 of 492) | New added. | The electrical and electronic equipment such as DC reactor etc. shall not be directly exposed to environment. |
| 199 | Volume IV, Part 1: ERTS-RS | 15.24.3 (369 of 492) | Fresh air flow rate shall also be verified by using dummy passengers as per full passenger load and measuring interior CO2 levels with doors closed and doors open-close situation in all different types of cars. | Fresh air flow rate shall also be verified by simulating Co2 level as per full passenger load and measuring interior CO2 levels with doors closed and doors open-close situation in the car decided by the Engineer for climatic chamber tests. Procedure needs to be finalized with the approval of the Engineer. |
| 200 | Volume IV, Part 1: ERTS-RS | 12.2.10 (271 of 492) | The Emergency Brake Push button (mushroom type) operation shall actuate emergency brakes without interrupting line circuit breakers and current collector. In order to ensure that train is not stalled in the section due to defect in emergency brake application circuit, provision shall be made to by- | The Emergency Brake Push button (mushroom type) operation shall actuate emergency brakes without interrupting HSCB and current collector. In order to ensure that train is not stalled in the section due to defect in emergency brake application circuit, provision shall be made to by-pass the brake loop |

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| | | | pass the brake loop and drive the train with limited speed in either direction. Separate push button (protected against inadvertent operation) for opening Circuit Breaker shall be provided on driver desk. | and drive the train with limited speed in either direction. Separate push button (protected against inadvertent operation) for opening HSCB shall be provided on driver desk. |
| 201 | Volume IV, Part 1: ERTS-RS | 12.2.13 (271 of 492) | A minimum provision of spare 10% relays, contactors, MCBs terminal blocks and contacts shall be made in the respective circuits and at their locations. These shall be duly wired up to terminal blocks. Sufficient margin may be taken by Contractor during design so that above criteria is met at the end of DLCMP. | A minimum provision of spare 10% relays, contactors, MCBs terminal blocks and contacts may be made in the respective circuits and at their locations. These may be duly wired up to terminal blocks. Sufficient margin may be taken by Contractor during design so that above criteria is met at the end of DLP. |
| 202 | Volume IV, Part 1: ERTS-RS | 12.3.1, 1st two sentences (272 of 492) | Electrical contact blocks, mounted on the semi-permanent coupler shall be provided. When the automatic couplers are mechanically coupled, automatic pneumatic coupling shall be affected between the mating couplers. | Electrical contact blocks, mounted on the semi-permanent coupler shall be provided. Alternately, jumper cables can also be provided. When the automatic couplers are mechanically coupled, automatic pneumatic coupling shall be affected between the mating couplers. |
| 203 | Volume IV, Part 1: ERTS-RS | 12.5.5 (276 of 492) | The minimum cross-sectional area of control cables for connections between equipment shall preferably be 2.5 mm2. Any deviation from this requirement, in exceptional cases, will be subject to review by Engineer in design stage. | The minimum cross-sectional area of control cables for connections between equipment shall preferably be 1.5 mm2. |
| 204 | Volume IV, Part 1: | 13.10.14, 1st paragraph | Provision shall be made and tested to store relayed CCTV images to dedicated server at OCC and depot | Provision shall be made and tested to store relayed CCTV images to dedicated server at OCC and BCC |

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| | ERTS-RS | (313 of 492) | in case of emergency or on demand for at least 30 nos. of 3-car trains and for minimum 30 days of period. Storage device shall be of SSD type. Separate server for this purpose shall be provided by the contractor. CCTV server for this purpose shall be provided by the Signalling Contractor. The radio communication used for CBTC / CCTV may be used for relaying the images as above. As a minimum, the images should be selectable for a time or time interval as required. Final scheme shall be worked out during design. Necessary coordination with Signalling contractor in relation to TD 6.2.12 shall be ensured. | in case of emergency or on demand for at least 30 nos. of 3-car trains and for minimum 30 days of period. Storage device shall be of SSD type. CCTV server for this purpose shall be provided by the Signalling Contractor. The radio communication used for CBTC / CCTV may be used for relaying the images as above. As a minimum, the images should be selectable for a time or time interval as required. Final scheme shall be worked out during design. Necessary coordination with Signalling contractor in relation to TD 6.2.12 shall be ensured. |
| 205 | Volume IV, Part 1: ERTS-RS | 13.13.7<br>(317 of 492) | Provision of displaying live news, sports etc. shall be ensured suitably. Each train shall have an independent server to capture live TV channel through internet. The captured TV channel data shall be live streaming in to the train infotainment screen. Contractor shall provide all necessary arrangements like server, antenna, router, modem etc. required for the purpose of displaying news, sports etc. The video display shall be with audio, with its control option at driver desk. The control option shall be able to play or mute the audio of video display. Details of content (Scrolling news headlines, Audio Visual advertisement from TV channel etc.) to be displayed shall be discussed during the detailed design stage. | Deleted. |

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| 206 | Volume IV, Part 1: ERTS-RS | 8.8.15, 9.3.5, 14.11.8 | (refer ERTS clause 2.20) | (refer ERTS clause 2.24) |
| 207 | Volume IV, Part 1: ERTS-RS | 14.12.1 (iv) (332 of 492) | New clause added. | In case, if any alternate (material or standard) is proposed then Engineer approval need to be taken. |
| 208 | Volume IV, Part 1: ERTS-RS | 14.12.2 (i) (332 of 492) | Aluminium alloys shall conform to the composition, strength, quality requirements, and corrosion resistance requirements of EN 458, EN 573 and EN 755 1 to 9. Any exposed unpainted aluminium surfaces in the interior of the vehicle shall have a clear anodic coating thickness of 0.02mm and a minimum coating weight of 0.054 mg/sq.mm. Proper allowance shall be made for the effects of fatigue, and for column and plate stability effects. Aluminium alloys used for structural purposes shall be limited to the 5000 and 6000 series of alloys. | Aluminium alloys shall conform to the composition, strength, quality requirements, and corrosion resistance requirements of EN 485, EN 573 and EN 755 1 to 9. Any exposed unpainted aluminium surfaces in the interior of the vehicle shall have a clear anodic coating thickness of 0.02mm and a minimum coating weight of 0.054 mg/sq.mm. Proper allowance shall be made for the effects of fatigue, and for column and plate stability effects. Aluminium alloys used for structural purposes shall be limited to the 5000 and 6000 series of alloys. |
| 209 | Volume IV, Part 1: ERTS-RS | 14.12.2 (ii) (332 of 492) | Castings Aluminium alloy castings shall conform to the requirements of EN 573 or equivalent. Castings shall be free from blowholes, cracks, shrinkage, and other defects that will prevent the attainment of the required life. | Castings Aluminium alloy castings shall conform to the requirements of relevant EN standard. Castings shall be free from blowholes, cracks, shrinkage, and other defects that may prevent the attainment of the required life. |
| 210 | Volume IV, Part 1: ERTS-RS | 15.24.2 (iii), 1st bullet, 1st arrow point | Pre-cooling (with full passenger occupancy heat load) – Set temperature should be achieved in 30 minutes. | Pre-cooling (with no passenger occupancy heat load) – Set temperature should be achieved in 30 minutes. |

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| | | (368 of 492) | | |
| 211 | Volume IV, Part 1: ERTS-RS | APPENDIX TF (26)<br>(492 of 492) | VCB<br>➢ Failure of any VCB (only if the faulty VCB is not reset).<br>➢ Frequent undesired tripping of VCB | HSCB<br>➢ Failure of any HSCB (only if the faulty HSCB is not reset).<br>➢ Frequent undesired tripping of HSCB |
| 212 | Volume IV, Part 1: ERTS-RS | APPENDIX TF (29)<br>(492 of 492) | new point added | Water Ingress<br>➢ Water ingress inside car from door, windows, HVAC etc. |
| 213 | Volume IV, Part 1: ERTS-RS | 12.2.2.2(iii), 12.2.3.3.1(iv), 12.2.3.10.9, TD6.3.3.1(iv), TD6.3.9.7 | (±250 mm with PSD) | This requirement has been deleted from all the mentioned clauses. |
| 214 | Volume IV, ERTS, Part 2: ERTS-SIG | 1.1.6<br>(8 of 238) | Contractor shall comply to latest standards / functionality that would be published at design stage also MRGR 2020. Decision of Engineer shall be final for S&TC. | Contractor shall comply to latest standards / functionality that would be published at bidding stage and also MRGR 2020. Decision of Engineer shall be final for S&TC. |
| 215 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.1.3<br>(14 of 238) | Special considerations shall be made by contractor as the air quality in Bhopal and Indore especially underground is humid and polluted like other places in India hence the Contractor shall ensure that Components of Signalling systems must be compliant but not limited to ISO 9227, ASTM B117, ISO 1461 & EN 12944-6. | Special considerations shall be made by contractor as the air quality in Bhopal and Indore especially underground is humid and polluted like other places in India hence the Contractor shall ensure that Components of Signalling systems must be compliant but not limited to ISO 1461, EN 12944-6 and EN 50125-3. |

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| 216 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.2.3 (15 of 238) | Maintenance actions shall include hardware failure requiring a repair or software reboot/reconfiguration/reloading. | Maintenance actions shall include preventive and hardware failure requiring a repair or software reboot/reconfiguration/reloading (corrective). |
| 217 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.6, 2nd paragraph (19 of 238) | Relevant Standards for compliance: -<br>a. ISO 13335<br>b. ISO 27005<br>c. ISO 31000<br>d. ISO 15408<br>e. ISO 27032<br>f. IEC 62443-2<br>g. Any other relevant standard | Relevant Standards for compliance: -<br>a. ISO 27005<br>b. IEC 62443<br>c. TS 50701<br>In line with other Metro Organisations Worldwide operating in GoA4 (UTO) and shall cover as a minimum, Cyber Security measures such as, Backup and Disaster recovery, Antivirus, perimeter security devices (firewall, IPS/IDS, Proxy), Active Directory and Domain server, Encryption for data transmission and SAN storage server on a Centralised network. Also, shall cover Identity and Access Management, Application Security, threat and vulnerability management. |
| 218 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.7.3.1 (20 of 238) | Train Type<br>The Signalling and Train Control System shall provide for the safe operation of all Train types including, Train Consist of<br>a. of 3 and 6 cars<br>b. Empty Rakes<br>c. Engineers Train, Tower wagons, Light Locomotives. Accident Relief Train or any other | Train Type<br>The Signalling and Train Control System shall provide for the safe operation of all Train types including, Train Consists of<br>a. of 3 and 6 cars<br>b. Empty Rakes<br>c. Engineers Train, Tower wagons, Light Locomotives. Accident Relief Train or any other |

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| | | | special purpose vehicles which may be introduced for operational or maintenance needs. | special purpose vehicles which may be introduced for operational or maintenance needs.<br>6 car Rakes shall be formed in the Depot only.<br>On-board system of Maintenance vehicle (RRV – 01 no., and Loco - 01 no. each for Indore and Bhopal respectively) shall ensure movement in both directions with GOA-1. Provision of MMI shall be required for both the cabs but on-board CBTC equipment redundancy not required.<br>Details of vehicle characteristics and Battery Voltage shall be provided during Design Stage. |
| 219 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.8.1<br>(20 of 238) | Notwithstanding the service capacity requirement above the Signalling and Train Control System shall provide a minimum designed signalled Headway of 90 Seconds & shall be able to achieve operational headway of 120 Seconds using 6-car Trains with 30-second dwells at intermediate stations and a minimum 2-minute layover at the terminal stations (minimum 30-second layover when front crossover is used), The Headway calculation will include PSD Operation time. | Notwithstanding the service capacity requirement above the Signalling and Train Control System shall provide a minimum designed signalled Headway of 90 Seconds & shall be able to achieve operational headway of 120 Seconds using 6-car Trains with 30-second dwells at intermediate stations and a minimum 2-minute layover at the terminal stations (minimum 30-second layover when front crossover is used), The Headway calculation will include PSD Operation time.<br>Refer track-layouts and Volume III, Part 1: ERGS-RS, APPENDIX XIII for calculation and simulation of Design Headway. |
| 220 | Volume IV, ERTS, Part | 2.13.1<br>(24 of 238) | The wayside ATP equipment shall conform to CENELEC standards EN50121-2 & 4 and | The wayside ATP equipment shall conform to CENELEC standards EN50121-2, EN50121-3 -2 & |

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| | 2: ERTS-SIG | | EN50082-2. For radiated Emissions & conducted EMI the system shall meet the requirements of CENELEC standards EN 50081-2. | EN50121-4 and EN 61000-6-2. For radiated Emissions & conducted EMI the system shall meet the requirements of CENELEC standards EN 61000-6-4. |
| 221 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.13.2 (24 of 238) | ATP onboard equipment shall conform to IEC 571-1, CENELEC standards EN 50155, EN50121-2 & 4, EN50121-3 and EN50082-2. For radiated Emissions & conducted EMI the system shall meet the requirements of CENELEC standards EN 50081-2. | ATP onboard equipment shall conform to IEC 60571-1, CENELEC standards EN50155, EN50121-2, EN50121-3 -2 & EN50121-4 and EN 61000-6-2. For radiated Emissions & conducted EMI the system shall meet the requirements of CENELEC standards EN 61000-6-4. |
| 222 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.14.1 (24 of 238) | The contractor is required to conduct full EMC tests and the tests to be conducted shall include but not limited to satisfying standards as follows:<br>a. EN50121-1<br>b. EN50121-2<br>c. EN50121-4 | The contractor is required to conduct full EMC tests and the tests to be conducted shall include but not limited to satisfying standards as follows:<br>Overall Compliance:<br>a. EN50121-2<br>b. EN50121-3 -2<br>c. EN50121-4<br>d. EN 61000-6-2 |
| 223 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.14.2.1, (a) and (b) (25 of 238) | The following specific EMC requirements shall be met by the design of the Signalling and Train Control System:<br>a. Radiated Emissions: As a minimum requirement, the maximum levels of radiated electro-magnetic interference (EMI) of the installation shall not exceed the levels specified in EN50081-2; | The following specific EMC requirements shall be met by the design of the Signalling and Train Control System:<br>a. Radiated Emissions: As a minimum requirement, the maximum levels of radiated electro-magnetic interference (EMI) of the installation shall not exceed the levels specified in EN 61000-6-4; |

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| | | | b. Conducted EMI: The maximum levels of conducted EMI of the installation shall not exceed the levels specified in EN50081-2; and | b. Conducted EMI: The maximum levels of conducted EMI of the installation shall not exceed the levels specified in EN 61000-6-4; and |
| 224 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.14.5, (b) (26 of 238) | As a minimum requirement, the equipment must be immune to field strength of 20V/m in the frequency range of 27 to 2000 MHz | As a minimum requirement, the equipment must be immune to field strength of 20 V/m in the frequency range of 27 to 80 MHz and shall meet the provisions stipulated in CENELEC standards in the frequency range from 80 to 6000 MHz. |
| 225 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.14.6 (26 of 238) | Conducted Immunity Levels<br>The equipment supplied shall continue to operate correctly with no degradation in performance, when subject to the levels of conducted interference set out in the European Standard EN50082-2 in the frequency range of 150 kHz to 30 MHz | Conducted Immunity Levels<br>The equipment supplied shall continue to operate correctly with no degradation in performance, when subject to the levels of conducted interference set out in the European Standard EN61000-6-2 in the frequency range of 150 kHz to 30 MHz |
| 226 | Volume IV, ERTS, Part 2: ERTS-SIG | 2.16.1 (27 of 238) | The contractor shall ensure that all the Train control & Signalling equipment are designed and constructed in accordance with the latest issues or versions of internationally recognised EMC standards, including but not limited to EN50081, EN50082, EN50121, EN50123, IEC571, EN50155, IEC 61000 to ensure proper functioning. | The contractor shall ensure that all the Train control & Signalling equipment are designed and constructed in accordance with the latest issues or versions of internationally recognised EMC standards, including but not limited to EN61000-6, EN50121, EN50123, IEC60571, EN50155, IEC 61000 to ensure proper functioning. |
| 227 | Volume IV, ERTS, Part 2: ERTS-SIG | 3.1.8.4 (32 of 238) | Initialization of UTO operation after system start-up must be possible without any manual intervention in the Train, or any OCC operator command. Initialization of UTO operation after a global system | Initialization of UTO operation after system start-up must be possible without any manual intervention in the Train, or any OCC operator command. Initialization of UTO operation, after a global system |

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| | | | failure should be possible without manual intervention in each Train, nor shall require OCC operator command to be made for each Train. Transition between UTO and ATO/ATP/RM/ROS modes, must be possible continuously and anywhere on the running line and in the yards. | failure restoration, should be possible without manual intervention in each Train, nor shall require OCC operator command to be made for each Train. Transition between UTO and ATO/ATP/RM/ROS modes, must be possible continuously and anywhere on the running line and in the yards. |
| 228 | Volume IV, ERTS, Part 2: ERTS-SIG | 3.3.1 (34 of 238) | Minimizing the effects of failure so that the Train service may continue during times of equipment failure is of paramount importance. Consequently, the area of railway affected by the failure of an item of Wayside ATC equipment, which causes the use of RM/ROS mode of operation, shall not be greater than the area between two adjacent stations or between the halfway points on either side of the station. In any case this RM/ ROS operation area shall not be longer than 200m in the normal direction of travel. | Minimizing the effects of failure so that the Train service may continue during times of equipment failure is of paramount importance. Consequently, the area of railway affected by the failure of an item of Wayside ATC equipment, which causes the use of RM/ROS mode of operation, shall not be greater than the area between two adjacent stations or between the halfway points on either side of the station. In any case this RM/ ROS operation area shall not be longer than 400m in the normal direction of travel. |
| 229 | Volume IV, ERTS, Part 2: ERTS-SIG | 3.8.3.3 (45 of 238) | On-board system of Maintenance vehicle shall ensure movement in both directions with GOA-1 and on-board redundancy not required. Provision of MMI shall be for both the cabs. | On-board system of Maintenance vehicle (RRV – 01 no., and Loco - 01 no. each for Indore and Bhopal respectively) shall ensure movement in both directions with GOA-1 and on-board redundancy not required. Provision of MMI shall be for both the cabs.<br>Details of vehicle characteristics and Battery Voltage shall be provided during Design Stage. |
| 230 | Volume IV, ERTS, Part | 3.25.1 (58 of 238) | The Contractor shall provide suitable display system for OCC/BCC for Signalling as well as Power | The Contractor shall provide suitable display system for OCC/BCC for Signalling as well as Power |

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| | 2: ERTS-SIG | | SCADA system. The technology for the projection system shall be a Laser based video wall display system. The Resolution shall be 1920 x 1080 full HD with 16.7 million colours or Higher; the matrix shall be made of 70-inch cubes. | SCADA system. The technology for the projection system shall be a Laser based video wall display system. The Resolution shall be 1920 x 1080 full HD with 16.7 million colours or Higher; the matrix shall be made of 70-inch cubes. The tentative nos are given below for different Rooms:<br>1. For OCC 64 nos cube of 70 inch.<br>2. For BCC 10 nos cube of 70 inch<br>3. For DCC 4 nos cube of 70 inch.<br>These figures are tentative and shall be finalised after ergonomic study by contractor during detail design stages. |
| 231 | Volume IV, ERTS, Part 2: ERTS-SIG | 3.25.6 (59 of 238) | Redundant processors and redundant Controller with auto testing facility shall be used in the design of projection system so that no single failure of any of modules shall result in the failure / blanking of a zone on the display board. | Redundant processors, redundant Controller and redundant power supply with auto testing facility shall be used in the design of projection system so that no single failure of any of modules shall result in the failure / blanking of a zone on the display board. |
| 232 | Volume IV, ERTS, Part 2: ERTS-SIG | 3.33.2.6 (77 of 238) | The stopping accuracy on the stabling lines shall be in the range of ± 1m. | The stopping accuracy on the stabling lines shall be in the range of ± 500mm. |
| 233 | Volume IV, ERTS, Part 2: ERTS- | 3.34.3 (79 of 238) | The S&T contractor shall provide the radio infrastructure for bi-directional transmission of data/ at OCC, DCC, BCC. Redundant radio units shall be | The S&T contractor shall provide the radio infrastructure for bi-directional transmission of data/ at OCC, DCC, BCC. Redundant radio units shall be |

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| | SIG | | provided on Train and wayside for On-board CCTV transmission which shall be different from the radio units used for CBTC transmission. On-board CCTV and CBTC shall each use one of the available ISM bands (2.4 GHZ, 5.8 GHZ). The data transmission from wayside to OCC may use same switching network, The Network shall be configured such that CBTC traffic will always have priority over VTS traffic. The technology used to stream On-Board CCTV Video shall be based on IEEE 802.11n, 802. 11ac or latest radio standards. The compression algorithms and frame transfer rate shall be put up to Engineer for review. | provided on Train and wayside for On-board CCTV transmission which shall be different from the radio units used for CBTC transmission. The Onboard CCTV system, i.e., VTS (Video Transmission System) shall use 2.4 GHz ISM band / 5 GHz band. CBTC system shall use 5.8 GHz ISM band preferably or any other delicensed frequency band by Ministry of Communication, Government of India with network redundancy for both VTS and CBTC.<br>There shall be separate data transmission (Switching network) from wayside to OCC for CBTC traffic. Also, there shall be separate data transmission (Switching network) from wayside to OCC for VTS system.<br>The technology used to stream On-Board CCTV Video shall be based on IEEE 802. 11ac or latest radio standards. The compression algorithms and frame transfer rate shall be put up to Engineer for review. |
| 234 | Volume IV, ERTS, Part 2: ERTS-SIG | 4.5.1, (a)<br>(85 of 238) | A list of project submittals shall be delivered as part of the System Safety Management Requirements. The deliverables shall include but not limited to the following: -<br>a. Safety Assurance (RAMS) Management Plan as defined in GS Vol III Appendix 7. | A list of project submittals shall be delivered as part of the System Safety Management Requirements. The deliverables shall include but not limited to the following: -<br>a. Safety Assurance Management Plan as defined in GS Vol III Appendix 7. |

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| 235 | Volume IV, ERTS, Part 2: ERTS-SIG | 4.7.3, (a), (c) and (e)<br>(86 of 238) | a. IP 67 for equipment enclosure/cabinet, disconnection box and fibre optic cable splice box to be installed in cable trough, trench floor mounted, track mounted including Point machine, Axle counter, etc.<br>c. IP 65 for trackside Signalling equipment.<br>e. IP 52 for enclosures to be installed in equipment rooms with inert gas protection. | a. IP 67 for equipment enclosure/cabinet, disconnection box and fibre optic cable splice box to be installed in cable trough or trench floor mounted, track mounted including Point motor (In Depots) and Axle counter detection point.<br>c. IP 65 for trackside Signalling equipment other than Point motor (In Depots) and Axle counter detection point.<br>e. IP 52 for enclosures to be installed in equipment rooms with inert gas protection. |
| 236 | Volume IV, ERTS, Part 2: ERTS-SIG | 9.2.12.1.2<br>(117 of 238) | The responsibility for the provision of supervision of maintenance shall be based on the number of man-months mentioned in) Pricing Document. The actual utilization of these man-months shall be at the Engineer discretion which may be on date of issuing of the Performance Certificate. | [Deleted] |
| 237 | Volume IV, ERTS, Part 2: ERTS-SIG | 9.6.7<br>(124 of 238) | Porting of MMS data and information of S&TC system to centralised Asset management software platform being implemented by MPMRCL. For details of Asset management software shall be decided on latter stage. | Porting of MMS data and information of S&TC system to centralised Asset management software platform being implemented by MPMRCL. Details of Asset management software including protocol details shall be decided during Design stage. |
| 238 | Volume IV, ERTS, Part 2: ERTS-SIG | 11.1.2<br>(129 of 238) | The Contractor shall submit a Training plan not later than 180 days prior to the issue of the Completion Certificate for the Works to the Engineer for a notice of no objection. | The Contractor shall submit a Training plan not later than 240 days prior to the issue of the Completion Certificate for the Works to the Engineer for a notice of no objection. |

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| 239 | Volume IV, ERTS, Part 2: ERTS-SIG | APPENDIX A2, 4.3.4 (144 of 238) | The ATO/UTO system shall accept coasting commands from the ATS system. The ATO/UTO system shall operate the Train within the parameters set by the ATP system. As a Train approaches a station, the ATO/UTO system shall reduce speed and control the stop to within ± 250 mm. When the Train is properly berthed, the ATO/UTO system shall initiate a command to open the Train doors as well as Platform screen doors. In UTO system the Train shall automatically initiate closing of Train doors and Platform screen doors. | The ATO/UTO system shall accept coasting commands from the ATS system. The ATO/UTO system shall operate the Train within the parameters set by the ATP system. As a Train approaches a station, the ATO/UTO system shall reduce speed and control the stop to within ± 300 mm. When the Train is properly berthed, the ATO/UTO system shall initiate a command to open the Train doors as well as Platform screen doors. In UTO system the Train shall automatically initiate closing of Train doors and Platform screen doors. |
| 240 | Volume IV, ERTS, Part 2: ERTS-SIG | APPENDIX A10, Table, 2nd row (191 of 238) | Average acceleration rate for crush loaded Train on level tangent track shall be as under:<br>0 Kmph to 40 Kmph<br>0 to 60 Kmph<br>0 to 80 Kmph | Average acceleration rate for fully loaded Train on level tangent track shall be as under:<br>0 Kmph to 40 Kmph<br>0 to 60 Kmph<br>0 to 80 Kmph |
| 241 | Volume IV, ERTS, Part 2: ERTS-SIG | APPENDIX A10, Table, 3rd row (191 of 238) | Service braking rate from 80 kmph to 0 Kmph for crush loaded (AW3) Train on level tangent track | Service braking rate from 80 kmph to 0 Kmph for fully loaded (AW3) Train on level tangent track |
| 242 | Volume IV, ERTS, Part 2: ERTS-SIG | APPENDIX A11, 2.2.2 (195 of 238) | 2.2 Scope of supply<br>2.2.1 S&TC System: S&TC System interface equipment as per above clause 2.1.14<br>2.2.2 PSD/PED System: All PSD/PED equipment including wiring up to S&TC System Interface | 2.2 Scope of supply<br>2.2.1 S&TC System Contractor: S&TC System interface equipment as per above clause 2.1.14<br>2.2.2 PSD/PED System Contractor: All PSD/PED equipment including wiring up to S&TC System |

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| | | | equipment. | Interface equipment. |
| 243 | Volume IV, ERTS, Part 3: ERTS-TEL | 1.1<br>(2 of 279) | Scope and Purpose<br>This document specifies the Functional and Technical requirements of the Telecommunication systems, this must be read in conjunction with Vol III Appendices. | Scope and Purpose<br>This document specifies the Functional and Technical requirements of the Telecommunication systems to be supplied, installed and commissioned, etc. separately for Bhopal Metro and Indore Metro. This document must be read in conjunction with Vol III Appendices. |
| 244 | Volume IV, ERTS, Part 3: ERTS-TEL | 2.1.2<br>(12 of 279) | All type of switches shall be carrier grade standards and end equipment switches shall be gigabit with all port POE functionality. Outdoor switches shall be Industrial grade. | All type of switches shall be carrier grade standards and Outdoor switches shall be Industrial grade.<br>End-equipment switches shall be gigabit with all port POE functionality, used for equipment as specified in respective chapters of Telecommunication TS document. |
| 245 | Volume IV, ERTS, Part 3: ERTS-TEL | 2.4.7<br>(16 of 279) | The Core Network switches shall have passive backplane and independent processing and switching modules. | Core Switch will have active/passive backplane for seamless data processing between network modules. |
| 246 | Volume IV, ERTS, Part 3: ERTS-TEL | 2.5.7, (c) (i)<br>(18 of 279) | IEEE802.2p | IEEE802.2 |
| 247 | Volume IV, ERTS, Part | 2.6.12<br>(19 of 279) | The Layer-2 access switches shall support the following management Standards: | The Layer-2 access switches shall support the following management Standards: |

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| | 3: ERTS-TEL | | a. SNMPv1/2/3<br>b. MIB II: RFC1213<br>c. IF Table Extension MIB: RFC1595 | a. SNMPv1/2/3<br>b. MIB II: RFC1213<br>c. Deleted |
| 248 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.1.1 (b)<br>(30 of 279) | In the Station (CER-BCC) the fully redundant Back-up Master TDS is referred to as primary and secondary. | In the designated BCC building CER, the fully redundant Back-up Master TDS is referred to as primary and secondary. |
| 249 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.2.4<br>(31 of 279) | The contractor shall design the Master TDS on basis of internal quartz oscillator such that during loss of GNSS reception, the Master clock accuracy is better than 1x10-9 (deviation of 86µs/24h), and Master TDS to maintain the time-of-day within 10mS per 24-hours. | The contractor shall design the Master TDS on basis of internal quartz oscillator such that during loss of GNSS reception, the Master clock accuracy is better than 1x10-9 (deviation of 86µs/24h). |
| 250 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.3.3<br>(31 of 279) | The Contractor shall design the TDS to provide NTPv4 per IETF RFC 5905. | The Contractor shall design the TDS to provide NTPv3 and NTPv4 as per IETF RFC 5905. |
| 251 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.3.5<br>(31 of 279) | The Contractor shall design the TDS to provide all display clocks and NTP service to automatically provide GNSS time-of-day corrected to Bhopal/Indore time without human intervention. | The Contractor shall design the TDS to provide all display clocks and NTP service to automatically provide GNSS time-of-day corrected to Indian Standard Time (IST) without human intervention. |
| 252 | Volume IV, ERTS, Part 3: ERTS- | 3.3.7<br>(31 of 279) | The Contractor shall design the TDS system so that the database(s) at the OCC are continually updated at the BCC during OCC operations. | The Contractor shall design the entire TDS system so that, it is possible to update system configuration / system firmware on need basis during future |

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| | TEL | | | operations at OCC and BCC. |
| 253 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.3.11.5 (32 of 279) | The Contractor shall design the TDS NMS to report, TDS failure of back-up battery. | The Contractor shall design the TDS NMS to report, TDS power supply failure. |
| 254 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.5.2 (34 of 279) | The Contractor shall design the TDS with slave clocks of high quality and blending into the architecture of the area in which they are located. All slave clocks shall be programmable both for 12 hours and 24 hours (Hour: Minute). The contractor shall design the TDS with the following display clocks. The exact location shall be determined during the design. | The Contractor shall design the TDS with slave clocks of high quality and blending into the architecture of the area in which they are located. All digital slave clocks shall be programmable both for 12 hours and 24 hours (Hour: Minute). The contractor shall design the TDS with the following display clocks. The exact location shall be determined during the design. |
| 255 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.5.2, (a) (34 of 279) | Two hours-minutes Analog display clocks in IP65 or better ceiling or wall mounted housing 500mm to 600mm or larger on each station platform with operating temperature of 10°C to 60°C 95% RH. | Two hours-minutes Analog display clocks in IP65 ceiling or wall mounted housing with 600mm dial diameter or larger on each station platform with operating temperature of 10°C to 60°C 95% RH. |
| 256 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.5.2, (b) (34 of 279) | Two hours-minutes Analog display clocks in IP65 or better ceiling or wall mounted housing 500mm to 600mm or larger on each station concourse with operating temperature of 10°C to 60°C 95% RH. | Two hours-minutes Analog display clocks in IP65 ceiling or wall mounted housing with 600mm dial diameter or larger on each station concourse with operating temperature of 10°C to 60°C 95% RH. |
| 257 | Volume IV, ERTS, Part 3: ERTS- | 3.5.2, (c) (34 of 279) | One hours-minutes Analog display clock in IP65 or better ceiling or wall mounted housing 500mm to | One hours-minutes Analog display clock in IP65 ceiling or wall mounted housing with 600mm dial diameter or larger at each station entrance with |

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| | TEL | | 600mm or larger at each station entrance with operating temperature of 10°C to 60°C 95% RH. | operating temperature of 10°C to 60°C 95% RH. |
| 258 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.5.2, (p) (35 of 279) | One hours-minutes Analog display clock in IP4 or better wall mounted housing 350mm or larger in each depot office room (all Depot buildings) | One hours-minutes Analog display clock in IP54 wall mounted housing with 400mm or larger dial diameter in each depot office room (all Depot buildings). |
| 259 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.5.2, (q) (35 of 279) | One hours-minutes Analog display clock in IP54 or better wall mounted housing 600mm or larger in Depot Administration Building lobby room. | One hours-minutes Analog display clock in IP54 wall mounted housing with 600mm dial diameter or larger in Depot Administration Building lobby room. |
| 260 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.5.2, (t) (35 of 279) | Automatic turn on / turn off illumination feature at selected hours for Analogue slave clock, Illumination shall be evenly distributed across the dial diameter in the analogue clock by means of LEDs. All clocks shall support PoE /PoE+ for illumination and synchronization. | Automatic turn on / turn off illumination feature at selected hours for outdoor Analog slave clock, shall be required. Illumination shall be evenly distributed across the dial diameter in the Analog clock by means of LEDs. All clocks shall support PoE /PoE+ for illumination and synchronization. |
| 261 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.5.2, (v) (35 of 279) | Outdoor Facade clocks, 1, 2 meter diameter shall have IP65 rating. | Outdoor Facade clocks 1 - 2 meters diameter shall have IP65 rating, with design as per station architecture as well as aesthetics and specifications as given below: (4 nos. Bhopal, 4 no. for Indore)<br>1. Synchronised Motor Movement<br>2. Illumination tube or LED in background with illumination switch |

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| | | | | 3. Hands driven by power supply 240V AC, consumption less than 25VA.<br>4. Temperature Range: -10 to +55 deg. C<br>5. Internal battery to keep internal time.<br>6. 2 units per city - 1 meter Dial Diameter<br>& 2 units per city - 2 meter Dial Diameter |
| 262 | Volume IV, ERTS, Part 3: ERTS-TEL | 3.10.3<br>(38 of 279) | For TDS display clocks in stations and depot buildings, The Contractor shall include in the test plan requirement of manual offset of Master TDS (for instance the time zone) and for each display clock, record the time required for the display clock to acquire the offset time. Then, reset the Master TDS. | For TDS display clocks in stations and depot buildings, The Contractor shall include in the test plan requirement of manual offset of Master TDS (for instance the time zone) and for each display clock, record the time required for the display clock to acquire the offset time. |
| 263 | Volume IV, ERTS, Part 3: ERTS-TEL | 4.1.4<br>(40 of 279) | The Contractor shall design the Telephone System with voice recording for all OCC telephone calls and BCC telephone calls by the Voice Recording System (VRS) so that all operational calls will be recorded. | The Contractor shall design the Telephone System with voice recording for all OCC, BCC telephone calls including all users and SCR telephone calls by the Voice Recording System (VRS) so that all operational calls will be recorded. |
| 264 | Volume IV, ERTS, Part 3: ERTS-TEL | 4.3.6.5<br>(43 of 279) | The Contractor shall design the TEL NMS to report any TEL power supply problem | The Contractor shall design the FRS (Fault Reporting System) to report any TEL power supply problem |
| 265 | Volume IV, ERTS, Part | 6.7.1, (bb)<br>(91 of 279) | All CCTV cameras shall have feature to secure Telnet command. | All CCTV cameras shall have feature to secure Telnet command or SSH or any protocol proven in |

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| | 3: ERTS-TEL | | | Metro Rail Telecom networks. |
| 266 | Volume IV, ERTS, Part 3: ERTS-TEL | 6.7.1, (cc) (91 of 279) (Newly added) | - | The Contractor shall provide Camera having Certification of CE, FCC, RoHS, UL or Indian equivalent certification EN/IEC/IS, or any Indian Standard Certificates shall also be acceptable, subject to approval of the Engineer. |
| 267 | Volume IV, ERTS, Part 3: ERTS-TEL | 6.10.7 (101 of 279) (Newly added) | - | 6.10.7 Cameras and Video Management Software shall support video/data encryption, based on AES-128 or better. |
| 268 | Volume IV, ERTS, Part 3: ERTS-TEL | 8.6.2 (132 of 279) | The Contractor shall design the PIDS displays to provide single sided and double-sided displays at public areas on platforms, concourses and entrances of stations, sized and located for optimal viewing by the public. PIDS for entrances is required for Passenger Interchange location tentatively for 10 stations. | The Contractor shall design the PIDS displays to provide single sided and double-sided displays at public areas on platforms, concourses and entrances of stations, sized and located for optimal viewing by the public. PIDS for entrances is required for Passenger Interchange location tentatively for 2 stations in Indore and 3 stations in Bhopal. |
| 269 | Volume IV, ERTS, Part 3: ERTS-TEL | 8.6.8.1 (132 of 279) | The Contractor shall design the PIDS display signs with IP64 rating for Station. | The Contractor shall design the PIDS display signs with IP64 rating for Station Concourse and other areas. |
| 270 | Volume IV, ERTS, Part | 8.6.8.2 (132 of 279) | The Contractor shall design the PIDS display signs with IP66 rating for Station. | The Contractor shall design the PIDS display signs with IP66 rating for Station Platforms. |

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| | 3: ERTS-TEL | | | |
| 271 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.1.11 (137 of 279) | The Contractor shall design the Radio System architecture of Master Switch Office (MSO) in Depot and BTS in station site. Also, shall have hot redundancy in Master Switch Office (MSO) and BTS levels without interrupting any type of Radio services. | The Contractor shall design the Radio System architecture of Centralised Core Server and Switching Centre in Depot and BCC. Also, the Radio System shall have hot redundancy in Core Server and Switching Centre in both the places. Also provide Redundant BTS in all TETRA sites at Bhopal and Indore Metro for uninterrupted and seamless Radio services. |
| 272 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.2.3.2 (141 of 279) | Each Radio Maintenance Workstation shall be supplied with its own monitor and the Radio Maintenance Workstation shall be a laptop configuration. | Each Radio Maintenance Workstation shall be supplied with its own monitor and shall also supply one laptop each for Bhopal and Indore for maintenance purposes. |
| 273 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.2.5 (142 of 279) | Mobile Radio in Maintenance Vehicles | Maintenance vehicle (RRV – 01 no., and Loco - 01 no. each for Indore and Bhopal respectively) |
| 274 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.4.5 (146 of 279) (Newly added) | New paragraph added | 9.4.5 The Radio system shall be designed to achieve coverage redundancy in such a way that mainline locations including stations of the required coverage areas are covered by at least two Base Stations so that failure of any one Base Station shall not put any TETRA user outside coverage. |

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| 275 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.5.3 (146 of 279) | The Contractor shall design the wayside cables with LSZH and rodent protection except for the leaky coax antenna. | The Contractor shall design the RADIO System to use cables with FRLS type and UV resistance and rodent protection for Outdoor installations, and use LSZH cables with rodent protection in Underground and indoor installations. |
| 276 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.5.4.5 (146 of 279) | The Contractor shall design the RADIO NMS to report loss of link with TCMS. | The Contractor shall design the RADIO System to report loss of link with TCMS on RADIO NMS and RCW (Radio Control Workstation). |
| 277 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.5.4.6 (146 of 279) | The Contractor shall design the RADIO NMS to report loss of link with Rolling Stock public address system | The Contractor shall design the RADIO System to report loss of link with Rolling Stock public address system on RADIO NMS and RCW (Radio Control Workstation). |
| 278 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.5.4.7 (147 of 279) | The Contractor shall design the RADIO NMS to report loss of link with train radio in Rolling Stock with rake number and train radio number. | The Contractor shall design the RADIO System to report loss of link with train radio in Rolling Stock with rake number and train radio number on the RADIO NMS and the RCW (Radio Control Workstation). |
| 279 | Volume IV, ERTS, Part 3: ERTS-TEL | 9.5.4.11 (147 of 279) | The Contractor shall design the RADIO NMS to report failure of any tunnel antenna component including BDAs and combiners. | The Contractor shall design the RADIO system to report failure of any active tunnel antenna component including BDA in the BDA NMS. |
| 280 | Volume IV, ERTS, Part | 9.5.8 (147 of 279) | The Contractor shall provide a calculation of availability as part of the design. The calculation will | The Contractor shall provide a calculation of availability as part of the design. The calculation will |

| | | | | |
|---|---|---|---|---|
| | 3: ERTS-TEL | | include availability for each end-to-end link considering the MTBF and MTTR of each component. The RAM study will be in accordance with the | include availability for each end-to-end link considering the MTBF and MTTR of each component. The RAM study will be in accordance with the Availability Plan, the Reliability Plan and the Maintainability Plan. |
| 281 | Volume IV, ERTS, Part 3: ERTS-TEL | 10.1.22 (166 of 279) | VRS should be able to record Analog, digital phone, Analog phone extension recording through CP/IP and E1. | VRS should be able to record Analog, digital phone, Analog phone extension recording through TCP/IP and E1. |
| 282 | Volume IV, ERTS, Part 3: ERTS-TEL | 10.3.8, last paragraph (167 of 279) | The recorder head shall support at least 100,000 hours of continuous recording.<br>After this limit, the system will delete additional recording in FIFO manner | The recorder head shall support at least 100,000 hours of continuous recording. |
| 283 | Volume IV, ERTS, Part 3: ERTS-TEL | 11.1.18 (174 of 279) | At the three depot Access Control Buildings, The Contractor shall design the communications equipment to be powered from the nearest S&T UPS. | At the two (one each at Bhopal and Indore) depot Access Control Buildings, The Contractor shall design the communications equipment to be powered from the nearest S&T UPS. |
| 284 | Volume IV, ERTS, Part 3: ERTS-TEL | 11.4.1.1 (178 of 279) | The Contractor shall provide 05 portable digital Multimeters. The intent of this quantity is to deploy one Multimeter in each room containing S&T UPS for battery testing and the remaining Multimeters at the depot telecom workshop. | The Contractor shall provide one portable digital Multimeters in each Station UPS room and five Multimeters in each Depot, respectively in Indore and Bhopal |
| 285 | Volume IV, ERTS, Part | 11.6.1.6 (179 of 279) | Installation locations for S&T UPS are<br>a. S&T UPS Room of Depot Administration Building. | Installation locations for S&T UPS are<br>a. S&T UPS Room of Depot Administration Building. |

| | | | | |
|---|---|---|---|---|
| | 3: ERTS-TEL | | b. S&T UPS Room of Depot Maintenance Workshop & Central Store Building 1st Floor<br>c. S&T UPS Room of BCC, or, The Contractor may provide just one S&T UPS at Station S&T UPS Room with additional capacity to power the BCC servers and BCC workstations.<br>d. S&T UPS Room of each station<br>e. Relay and Control Panel Room of each RSS | b. Deleted<br>c. S&T UPS Room of BCC, or, The Contractor may provide just one S&T UPS at Station S&T UPS Room with additional capacity to power the BCC servers and BCC workstations.<br>d. S&T UPS Room of each station<br>e. Deleted |
| 286 | Volume IV, ERTS, Part 3: ERTS-TEL | 12.1.4<br>(183 of 279) | VTS transmission shall support MIMO, with at- least 2 x 2 Spatial Streams, final design shall be approved by Engineer. | VTS transmission shall support MIMO, with at least 2 x 2 Spatial Streams, for entire mainline and 3 x 3 Spatial Streams for entire Depot area. The wireless system shall support latest WPA encryption and EN 50155 standard with IP 65 or higher Ingress protection. The wireless Infrastructure shall have inbuilt intrusion detection mechanism (WIDS), or as advised by Engineer during finalization of detailed design stage, shall approved by Engineer. |
| 287 | Volume IV, ERTS, Part 3: ERTS-TEL | 12.1.5<br>(183 of 279) | The end-to-end Throughput for VTS over the air radio shall at-least 100 Mbps, and as per IEEE 802.11n standard or more per access point at any given condition for mainline, for Depot as per IEEE 802.11ac or as advised by Engineer during finalization of detailed design. Also 15 MBPS data shall be reserved for Rolling stock for TCMS data transfer.<br>As the traction system used in MPMRCL is 750 V | The end-to-end Throughput for VTS over the air radio shall at-least 100 Mbps, and as per IEEE 802.11ac standard or latest radio standards, per access point at any given condition for mainline, for Depot as per IEEE 802.11ac or latest radio standards, or as advised by Engineer during finalization of detailed design. Also 15 MBPS data shall be reserved for Rolling stock for TCMS data transfer. |

| | | | | |
|---|---|---|---|---|
| | | | DC traction system, contractor shall ensure complete compliance of VTS system with Traction for EMC compliance. | As the traction system used in MPMRCL is 750 V DC traction system, contractor shall ensure complete compliance of VTS system with Third Rail Traction for EMC compliance. |
| 288 | Volume IV, ERTS, Part 3: ERTS-TEL | 12.1.6, 1st paragraph (183 of 279) | The contractor shall provide the radio infrastructure for bi-directional transmission of data/ at OCC, DCC, BCC. Redundant radio units shall be provided on Train and wayside for On-board CCTV transmission. On-board CCTV and CBTC shall each use one of the available ISM bands (2.4 GHZ, 5.8 GHZ). CBTC should use preferably 2.4 GHZ band. The data transmission from wayside to OCC may use same switching network, the technology used to stream On-Board CCTV Video shall be based on IEEE 802.11n or latest radio standards. The compression algorithms and frame transfer rate shall be put up to Engineer for review. | The contractor shall provide the radio infrastructure for bi-directional transmission of data/ at OCC, DCC, BCC. There shall be separate Redundant radio units provided on Train and wayside for On-board CCTV transmission. Also, there shall be separate Redundant radio units provided on Train and wayside for CBTC transmission. The Onboard CCTV system, i.e., VTS (Video Transmission System) shall use 2.4 GHz ISM band / 5 GHz band. CBTC system shall use 5.8 GHz ISM band preferably or any other delicensed frequency band by Ministry of Communication, Government of India with network redundancy for both VTS and CBTC. There shall be separate data transmission (Switching network) from wayside to OCC for CBTC traffic. Also, there shall be separate data transmission (Switching network) from wayside to OCC for VTS system. The technology used to stream On-Board CCTV Video shall be based on IEEE 802.11ac or latest radio standards. The compression algorithms and frame transfer rate shall be put up to Engineer for review. |

| | | | | |
|---|---|---|---|---|
| 289 | Volume IV, ERTS, Part 3: ERTS-TEL | 14.5.2 (205 of 279) | The Contractor shall print photo ID of staff on Contactless Smart Cards for Metro staff use in ACIDS. 1000 smartcards will be supplied by AFC contractor. | The Contractor shall provide Card Personalisation Workstation along with printer to print photo ID of staff on Contactless Smart Cards for Metro staff use in ACIDS. 1000 smartcards will be supplied by AFC contractor for Bhopal and Indore. |
| 290 | Volume IV, ERTS, Part 3: ERTS-TEL | 14.8.29 (209 of 279) | The Contractor shall install Electric Door Strike in such a way and in such a location so as not to impair the operation of an emergency exit or panic hardware mounted on the door. | The Contractor shall install Electromagnetic lock in such a way and in such a location so as not to impair the operation of an emergency exit or panic hardware mounted on the door. |
| 291 | Volume IV, ERTS, Part 3: ERTS-TEL | 15.7.35, 1st sentence (219 of 279) | For cross passage enclosures, The Contractor shall provide and install an IP32 enclosure to allow heat dissipation for each L2 switch in cross passages. | For cross passage enclosures, The Contractor shall provide and install an IP65 enclosure to allow heat dissipation for each L2 switch in cross passages. |
| 292 | Volume IV, ERTS, Part 3: ERTS-TEL | APPENDIX IV, 1.4.1 (253 of 279) | The System shall be designed such that the MTTR figures for restoring the operation of the System from fault condition shall not be more than four hours (excluding time of travel). | The System shall be designed such that the MTTR figures for restoring the operation of the System from fault condition shall not be more than one hour (excluding time of travel). |
| 293 | Volume IV, ERTS, Part 3: ERTS-TEL | APPENDIX IV: 1.4.12, Table, SN 8 (255 of 279) | Table: MTBF of the major systems<br><br>8. CVRS<br>a. Servers >50,000 Hours | 8 VRS System<br>a. VRS Servers >50,000 Hours<br>b. VRS Workstations >50,000 Hours |
| 294 | Volume IV, ERTS, Part 3: ERTS- | APPENDIX IV: 1.4.12, | Ingress Button, Break Glass, Key Switch, Sensors > 60,000 Hours | Ingress Button, Key Switch, Sensors > 60,000 Hours |

| | | | | |
|---|---|---|---|---|
| | TEL | Table, SN 9c<br>(255 of 279) | | |
| 295 | Volume IV, ERTS, Part 3: ERTS-TEL | APPENDIX IV, 1.4.12, SN 10<br>(254 of 279)<br>(Newly added) | Table: MTBF of the major systems<br>Newly added SN 10. | 10 FRS System<br>a. Servers >50,000 Hours<br>b. Workstations >50,000 Hours<br>c. Printers >50,000 Hours |
| 296 | Volume VI, PD | 2.1.14<br>(5 of 47) | The Contractor shall submit a Safe Custody Bank Guarantee as per form annexed as Annexure – 11 to Instructions to Tenderer (Volume I) against payments made for the Plants and Materials dispatched from manufacturer's works for final delivery under the Contract. The amount of safe custody Bank Guarantee shall be equal to 95% percent of the amount due as per relevant Cost Centre wherever applicable. The value of the Safe Custody Bank Guarantee would be adjusted for the Rolling Stocks and/or Plants & Materials (respective Systems) already installed at site or in the Rolling Stock, and tested to the satisfaction of the Employer, in either case, as certified by the Employer /Engineer. | The Contractor shall submit a Indemnity Bond as per form acceptable to the Employer against payments made for the Plants and Materials dispatched from manufacturer's works for final delivery under the Contract. The amount of Indemnity Bond shall be equal to 100% percent of the amount due as per relevant Cost Centre wherever applicable. |
| 297 | Volume VI, PD | 2.1.16<br>(5 of 47) | The Lumpsum Prices quoted in the excel sheet "BoQ1" of the Financial Bid excel workbook shall match with the quoted Lumpsum Prices in the excel sheet "TT" (Financial Bid: Tender Total) of the | [Deleted] |

| | | | | |
|---|---|---|---|---|
| | | | Financial Bid excel workbook. In case of any mismatch the Lumpsum prices of the excel sheet "TT" (Financial Bid: Tender Total) of the Financial Bid excel workbook shall prevail. The excel sheet "BoQ1" of the Financial Bid (Financial Package) excel workbook and comparison generated by eProcurement portal shall not be considered for determining inter-se position of tenderers. | |
| 298 | Volume VI, PD | 2.1.18<br>(6 of 47)<br>(Newly added) | *New Sub-Clause added* | In case of the Contractor is a JV/ Consortium as defined under Sub-Clause 1.1.46 of General Conditions [Volume II], all the payments shall be made to the lead member of the JV/ Consortium; provided direct payment to individual members of the JV/ Consortium may also be made upon certification by the lead member. In the latter case Memorandum of Understanding or JV Agreement or JV Undertaking need to be submitted to the Employer signed by all members to this effect and separate invoices of respective JV/ Consortium members shall be submitted along with the lead member's certificate. The Contractor shall be subject to compliance with Laws and indemnify the Employer; in accordance with Sub-Clauses 1.13 of Conditions of Contract [Volume II]. However, any recovery that may become due to the Employer shall be from the JV/ Consortium members proportional to the share as stated in Memorandum of Understanding or JV Agreement or JV Undertaking. |

The other conditions will remain the same.

Further modifications/amendments (if any) regarding aforesaid tender will be uploaded as and when required.

**Managing Director**
**Madhya Pradesh Metro Rail Corporation Limited**
**Bhopal**

## Attachment – 1 to Corrigendum – 3

### Volume I, Part 2: ITT, Annexure – 10

**List of Items/ Components to be procured from indigenous suppliers**

In case of requirement of following items/ components, the successful tenderer (the Contractor) shall procure such items/ components locally (from indigenous suppliers – i.e., from "Class-I Local Suppliers") only.

| **Table 10.1A: List of Items/ Components for Rolling Stock (Mandatory)** |
|---|
| **The list of Items/ Components shall be as per Volume III, Part 1: ERGS-RS, 1.2.2, Table 1.1** |

| **Table 10.1B: List of Items/ Components for Rolling Stock (Recommended)** |
|---|
| **The list of Items/ Components shall be as per Volume III, Part 1: ERGS-RS, 1.2.3, Table 1.2** |

## Attachment – 2 to Corrigendum – 3

**Volume I, Part 4: LOT, Appendix – 15C**

# LETTER OF TENDER (LOT)

## Appendix – 15C.1

## Work Experience (General Experience)

**Tenderer's legal name:** ……..... **Date:** ……

**Member's/ Subcontractor's legal name:** …… **Page …. of …. pages**

| General Propulsion Experience | | | | |
|---|---|---|---|---|
| **Claimed Contract Sr. No.** | **Starting Month and Year** | **Ending Month and Year** | **Contract Identification** | **Role** |
| *1* | *[indicate month and year]* | *[indicate month and year]* | Contract Name: *[insert full name]*<br><br>Brief description of the contract performed by the Bidder: *[describe the contract performed briefly]*<br><br>Amount of Contract: *[insert amount in currency, mention currency used, exchange rate and INR equivalent]*<br><br>Name of Employer: *[insert full name]*<br><br>Address: *[insert mailing address]* | *[insert "single entity" or "JV member" or "Subcontractor"]* |
| 2 | | | | |
| 3 | | | | |
| … | | | | |
| … | | | | |
| … | | | | |

We do herby confirm that all above information provided are correct and in case of misrepresentation of fact will lead to disqualification of the Tender.

**Signature of authorized signatory on behalf of Tenderer**

**Note:**

1. Documentary evidences for each work to be submitted by concerned member(s) of JV/ Consortium or Subcontractor, as the case may be.

2. All such documentary evidences should be in English language. Any documentary evidences submitted in foreign language should be supported with English translation. All translation(s) shall be authenticated by Embassy or High Commission; however, Member Countries of the Hague Convention may submit this translation(s) with “Apostille” stamp.

## LETTER OF TENDER (LOT)

## Appendix – 15C.2

## Work Experience (Propulsion Equipment)

**Tenderer's legal name:** ……..... **Date:** ……

**Member's/ Subcontractor's legal name:** …… **Page …. of …. pages**

For works as stipulated under clause no. 10.2.2 (2) of EQC

| **Work Experience (Propulsion Equipment)** | | |
|---|---|---|
| Contract Number ____ out of _____ required | Information | |
| Contract Identification | | |
| Description of the similarity in accordance with Clause 10.2.2 (2) of EQC | *[Describe the similarity with detailed work activities]* | |
| Name and origin of claiming company (in case of group company) | | |
| Award date:<br>Completion date: | | |
| Employer's Name | | |
| Employer's Address:<br>Telephone / Fax number:<br>E Mail: | | |
| Country of executed works | | |
| Role in Contract<br>(Individual/ Consortium member/ Subcontractor) | Single Entity | JV/Consortium Member/ Subcontractor |
| Completion Cost/ Value of successfully executed work in case of ongoing work | Currency<br>Exchange Rate | In equivalent INR at *[Date]* ***** price level |
| If JV / Consortium member specifies percentage participation in contract & amount (Please refer Note-1) | % participation | In equivalent INR at *[Date]* ***** price level |

| | |
|---|---|
| Number of Cars (including both powered and non-powered), which have been supplied and under revenue operations satisfactorily for at least five years | *[mention the track km and describe]* |

**Signature of authorized signatory on behalf of Tenderer**

**Note:**

1. Refer Note (v) of EQC Para 10.2.2 for qualifying value/quantum of work(s).
2. Separate sheet for each work along with Clients Certificate to be submitted by concerned member(s) of JV/ Consortium or Subcontractor.
3. All such Client Certificate(s) should be in English language. Any Client Certificate(s) submitted in foreign language should be supported with English translation. All translation(s) shall be authenticated by Embassy or High Commission; however, Member Countries of the Hague Convention may submit this translation(s) with "Apostille" stamp.
4. * *[Date]* **–** Credential Cut-off Date (as confirmed in EQC para 8.1.6)

## Attachment – 3 to Corrigendum – 3

### Volume I, Part 4: LOT, Appendix – 15D

## LETTER OF TENDER (LOT)

## Appendix – 15D

## Summary of Information provided in Appendix – 15C.2

**Tenderer's legal name:** ……..... **Date:** ……

**Member's/ Subcontractor's legal name:** …… **Page …. of …. pages**

| Name of Tenderer (member in case of JV/ Consortium or subcontractor) | Name of Work with Contract No. and award date | % participation (in case of JV/Consortium member) | Country of executed works | Number of Cars (including both powered and non-powered), which have been supplied and under revenue operations satisfactorily for at least five years | Name and origin of claiming company (in case of group company under) |
|---|---|---|---|---|---|
| | | | | | |
| | | | | | |
| | | | | | |

**Signature of authorized signatory on behalf of Tenderer**

## Attachment – 4 to Corrigendum – 3

**Volume I, Part 4: LOT, Appendix – 26**

# LETTER OF TENDER (LOT)

## Appendix – 26

## Undertaking for Corporate Debt Restructuring

*Form 26A [Note iii]*

We do hereby undertake that we have not applied for/ obtained corporate debt restructuring in immediately preceding 36 months from the last date of online tender submission. A certificate to this effect from our statutory auditors is enclosed herewith.

**Enclosures: As above.**

**Stamp and Signature of Authorized Signatory**

**OR**

*Form 26B [Note iii]*

We have [obtained or applied for and are in the process of] [Note iv] corporate debt restructuring in immediately preceding 36 months from the last date of online tender submission.

And therefore, we do herby undertake that, our accounts are classified as “standard account” by our bankers associated for such corporate debt restructuring process. The certificates to this effect from our statutory auditors and the bankers are enclosed herewith.

**Enclosures: As above.**

**Stamp and Signature of Authorized Signatory**

**Note:**

i. In case of JV / Consortium, the undertaking shall be submitted by each member of the JV / Consortium.

ii. The undertaking shall be signed by respective authorized signatory of constituent members, counter signed by the authorized signatory of tenderer.

iii. Use either of the Form 26A or 26B as the case may be.

iv. Delete whichever is not applicable.

## Attachment – 5 to Corrigendum – 3

### Volume II, Part A: Contract Data, Annexure – 2

**Annexure – 2 to Part A – Contract Data**

**Schedule of Access Dates**

| 2.1: Schedule of Access Dates for Section: Bhopal Metro Rail Project System | | |
|---|---|---|
| **Access Date Ref.** | **Description** | **No of weeks from Commencement date** |
| ADBH01 | Shared Access in Depot Priority Corridor Area to all Underground Cable Boxes/Ducts. | 43 |
| ADBH02 | Shared Access to all S&T Rooms (Including SER, TER, PSD, Power Room, S&T UPS and OCC) in Depot Area | 69 |
| ADBH03 | Shared Access to Priority Corridor guideway from AIIMS to Subhash Nagar after track installation. | 54 |
| ADBH04.a | Shared Access for System Contractors in Technical Rooms (BoH) for following 3 stations (Subhash Nagar, MP Nagar zone 1 and AIIMS), | 55 |
| ADBH04.b | Shared Access for System Contractors in Technical Rooms (BoH) for next 02 stations (DB city mall and Rani Kamlpati station) | 59 |
| ADBH04.c | Shared Access for System Contractors in Technical Rooms (BoH) for balance 3 stations (Kendriya Vidyalaya, Habibganj Naka and Alkapuri) | 63 |
| ADBH05.a | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for following 3 stations (Subhash Nagar, MP Nagar zone 1 and AIIMS), | 72 |
| ADBH05.b | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for next 02 stations (DB city mall and Rani Kamlpati station) | 75 |
| ADBH05.c | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for balance 3 stations (Kendriya Vidyalaya, Habibganj Naka and Alkapuri) | 78 |

| 2.2: Schedule of Access Dates for Section: Indore Metro Rail Project System | | |
|---|---|---|
| **Access Date Ref.** | **Description** | **No of weeks from Commencement date** |
| ADIN01 | Shared Access in Depot Priority Corridor Area to all Underground Cable Boxes/Ducts. | 42 |
| ADIN02 | Shared Access to all S&T Rooms (Including SER, TER, PSD, Power Room, S&T UPS and OCC) in Depot Area | 69 |
| ADIN03 | Shared Access to Priority Corridor guideway from Gandhi Nagar to Mumtaj Bagh after track installation. | 58 |
| ADIN04.a | Shared Access for System Contractors in Technical Rooms (BoH) for two stations between ISBT/MR10 Station and Mumtaj Bag Colony (ISBT/MR10 and Radisson Square Stations) | 55 |
| ADIN04.b | Shared Access for System Contractors in Technical Rooms (BoH) for next two stations between ISBT/MR10 and Mumtaj Bag Colony (Chandragupta Square and Hira Nagar) | 59 |
| ADIN04.c | Shared Access for System Contractors in Technical Rooms (BoH) for balance three stations between ISBT/MR10 and Mumtaj Bag Colony (Bapat Square, Meghdoot Garden and Vijay Nagar Square) | 63 |
| ADIN04.d | Shared Access for System Contractors in Technical Rooms (BoH) for two stations between Gandhi Nagar and ISBT/MR10 Stations (Gandhi Nagar and Super Corridor 3) | 65 |
| ADIN04.e | Shared Access for System Contractors in Technical Rooms (BoH) for three stations between Gandhi Nagar and ISBT/MR10 Stations (Super Corridor 1, Bhawarsala Square and MR10 Road) | 70 |
| ADIN04.f | Shared Access for System Contractors in Technical Rooms (BoH) for balance four stations between Gandhi Nagar and ISBT/MR10 Stations (Super Corridor 6, Super | 72 |

| 2.2: Schedule of Access Dates for Section: Indore Metro Rail Project System | | |
|---|---|---|
| **Access Date Ref.** | **Description** | **No of weeks from Commencement date** |
| | Corridor 5, Super Corridor 4 and Super Corridor 2) | |
| ADIN05.a | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for two stations between ISBT/MR10 Station and Mumtaj Bag Colony (ISBT/MR10 and Radisson Square Stations) | 66 |
| ADIN05.b | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for next two stations between ISBT/MR10 and Mumtaj Bag Colony (Chandragupta Square and Hira Nagar) | 70 |
| ADIN05.c | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for balance three stations between ISBT/MR10 and Mumtaj Bag Colony (Bapat Square, Meghdoot Garden and Vijay Nagar Square) | 75 |
| ADIN05.d | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for two stations between Gandhi Nagar and ISBT/MR10 Stations (Gandhi Nagar and Super Corridor 3) | 70 |
| ADIN05.e | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for three stations between Gandhi Nagar and ISBT/MR10 Stations (Super Corridor 1, Bhawarsala Square and MR10 Road) | 75 |
| ADIN05.f | Shared Access for System Contractors in Technical Rooms (FoH) and common areas for balance four stations between Gandhi Nagar and ISBT/MR10 Stations (Super Corridor 6, Super Corridor 5, Super Corridor 4 and Super Corridor 2) | 78 |

**Notes on Access Dates:**

1. The access dates provided in the schedule of Table 2.1 above pertain to the Purple Line Priority Corridor Section viz. the Depot and the Subhash Nagar to AIIMS section of the Project. The access dates provided in the schedule of Table 2.2 above pertain to the

Yellow Line Priority Corridor Section viz. the Depot and from Gandhi Nagar to Mumtaj Bag Colony.

2. The Civil and the track work contracts for the balance corridors i.e., the Red Line (Bhadbhada Square to Ratnagiri Tiraha-Elevated), the Balance Purple Line in Bhopal (Subhash Nagar to Karond Circle- Elevated and Underground) each in Bhopal and Elevated sections from Mumtaj Bag to Indore Railway Station, the Underground Section from Gandhi Nagar to Indore Railway Station each in Indore are in the process of being tendered. Whereas, the Key Dates for these balance sections have been defined in the tender documents. However, the corresponding access dates will be intimated to the Contractor in due course of the time, for which adequate notice will be given. Also, the access dates thus indicated will be such, so as to enable the Contractor to complete the deliveries within the time frame laid down for the respective Key Dates.
3. The Employer reserves the right to make each site available to the Contractor any time before or after the Access Dates.
4. The Engineer will notify the Contractor of the actual Access Dates in advance for each part of the works. This Notice will specify the area to which it refers is accessible and in a sufficient state of completion to permit the Contractor to begin installation and testing therein. It shall not imply that the Contractor will enjoy exclusive use of the area or that the work of other Contractor's therein is complete.
5. The Contractor shall begin installation in each area by the actual Access Date, and shall complete all installation and testing in each area by the relevant Key Date. Notwithstanding the actual Access Date, whether before or after the stipulated Access Dates, the Employer shall not accept any increase in cost to the Employer, except specifically if any provided in Sub-Clause 2.1 of Conditions of Contract.

## Attachment – 6 to Corrigendum – 3

### Volume III, ERGS, Part 1: ERGS-RS, 1.2.1

Maximum number of 3-car trainsets that can be manufactured in the off-shore factory outside India is 13 trainset of 3-car each, i.e., 39 cars. Balance cars shall be manufactured in India (manufacture also includes assembly of Cars). For this, an essential condition for complying with the bid is that the Contractor shall establish facilities either independently or with an Indian Partner for local manufacture of coaches in India. In case local manufacture is undertaken in the facilities of the local partner, Quality control (total) and testing at works shall be the responsibility of the member of consortium based on whose credentials the bidder has qualified for this bid. The bidder shall submit detailed proposal indicating details of the Indian Partner (if any), the place of manufacture in India, work schedule etc in the bid. However, if not finalized at Pre-bid stage, the Contractor shall submit all these details within 06 (six) months of the Commencement date for approval by the Employer.

For the manufacture of cars in India in addition to the details submitted in the bid, the Contractor shall submit detailed proposal for approval by Employer within 6 (six) months of award of contract. The proposal must include complete details of Indian partner including details of technical capability and financial capability. Details of the Indian partner shall include, but not limited to, the following:

- MoU indicating scope of work
- Procedure for assuring Quality Standards
- Detailed plan for deployment of Contractor's personnel in Indian partner's works
- Qualification procedures for key personnel including welders, crimpers, fitters etc.
- Detailed method statements for each activity including supply, manufacture, testing and commissioning.
- Inspection procedures (stage as well as final) for sub-systems and complete car.
- Availability of M & P, jigs & fixtures etc.
- Details of transfer of technology to Indian partner.
- Details of transfer of Engineering and manufacturing drawings.
- Any other documents desired by Employer.

## Attachment – 7 to Corrigendum – 3

### Volume III, Part 1: ERGS-RS, 1.2.2:

To facilitate ease in maintenance and easy availability of spares, MPMRCL is keen in standardisation and expects contractor to make efforts to source maximum number of equipment and materials from India.

As per guidelines issued by Ministry of Housing and Urban Affairs, there is sufficient local capacity and competition and where public procurement shall be done only from local suppliers. The mandatory list of equipment/subsystems is included in Table 1.1.

The contractor (and the selected and approved OEMs) shall ensure that items listed in the Table 1.1 shall be mandatorily sourced from India either by establishing a wholly owned subsidiary in India or through a suitable Indian reputed manufacturer.

The Contractor as well as the OEMs (as the case may be) shall arrange granting of unqualified licenses to their chosen Indian partners to manufacture and sell such indigenised items for other than BH&IN-02 contract requirements also. The tenderer shall certify in its tender that the 'Local Content' (LC) shall meet the requirement for 'Class-I Local Supplier' as defined in the Order no. P-45021/2/2017-PP (BE-II) of Ministry of Commerce and Industry, Department for Promotion of Industry and Internal Trade, Government of India, dated 4$^{th}$ June 2020 for the items listed in Table1.1.

During vendor approval stage, the Contractor shall also submit a commitment from the approved vendors that in case of any future procurement action by MPMRCL, they shall quote directly to MPMRCL.

Contractor shall submit comprehensive proposal indicating details of the Indian Partner(s), the place of manufacture in India, work schedule etc. for the below identified items for indigenization within 6 months of the Commencement date for approval by the Employer. An approved comprehensive proposal for indigenisation of items indicated in 'Table–1.1' shall be a pre-requisite for finalisation of Final Design. Maintaining quality standards, ensuring performance requirements and timely delivery shall be the sole responsibility of the contractor.

Contractor shall ensure that indigenisation content in the train sets is progressively increased. MPMRCL expects that for all 156 cars for Bhopal & Indore metro the items given in Table 1.1 of Employer's Requirements-General Specifications shall be sourced from India.

In case of any deviation on above, the Employer at his sole discretion on representation by the Contractor giving detailed reasons for not achieving indigenisation as per above may accord approval for waiver subject to the condition that in case of non or partial accomplishment of indigenisation of any item(s) listed in Table 1.1 (except Consumables) for specified number of cars noted above, the contractor shall remit the cost of 60% of shortfall items (non-indigenised) to MPMRCL. For consumables the contractor shall remit cost of equivalent spares to MPMRCL.

| Table 1.1: Mandatory item list for Indigenization | |
|---|---|
| **Item No.** | **Description of Item** |
| 1 | HV cable and Surge arrestor |
| 2 | Electrical Coupler |
| 3 | Heating, Ventilation and Air-Conditioner (HVAC) |
| 4 | Driver Desk Panel |
| 5 | Ni-Cd Battery |
| 6 | Battery Box |
| 7 | Headlights |
| 8 | Luminaries |
| 9 | LED Head Light & Saloon Light |
| 10 | Stainless Steel sheets |
| 11 | Axle Brake System |
| 12 | Axle Bearing |
| 13 | Axle Box with earth return brush |
| 14 | Gear Drive |
| 15 | Bogie Frame |
| 16 | Wheel Flange lubricator |
| 17 | Pneumatic Piping - Stainless Steel |
| 18 | Air Reservoir for Secondary Suspension |
| 19 | FRP Panels |
| 20 | FRP Passenger Seats and Air Duct |
| 21 | All types of Glasses (Set of glasses of Door, Window & Windshield glass for 1 trainset) |

**1.2.3:**

MPMRCL also expects contractor to Indigenize items given in Table 1.2. Contractor shall put maximum efforts to source this equipment from local sources. In addition, the bidder is also advised to look for Indigenization of those items (in addition to the item given in table 1.1 & 1.2) that are regularly required for the routine maintenance of the sub systems of Rolling Stock.

| Table 1.2: Items for Indigenization | |
|---|---|
| **Item No.** | **Description of Item** |
| 1 | Current Collector, Dampers and other bogie mounted equipment |
| 2 | Wheel and Axles |
| 3 | Brake blocks/Brake disc pads |
| 4 | Traction motors |
| 5 | Traction Invertor |
| 6 | Electrical panels / cab panels |

| **Table 1.2: Items for Indigenization** | |
|---|---|
| **Item No.** | **Description of Item** |
| 7 | Application and release valve, relay valve, isolating cocks, safety valves and check valves |
| 8 | Consumables: lubricants, sealants, oils, greases etc. |
| 9 | Saloon door accessories |
| 10 | Floor cover |
| 11 | Floor board |
| 12 | Dampers |
| 13 | Steel sections |
| 14 | Insulation like glass wool etc. |
| 15 | Brake system |
| 16 | Couplers |
| 17 | Auxiliary motors |
| 18 | Gangways |
| 19 | Bearings |
| 20 | Wipers |
| 21 | Reservoirs |
| 22 | Primary and secondary springs |
| 23 | PCBs used in different equipment |
| 24 | Internal paneling |
| 25 | Public Address (PA) / Public Information System (PIS) / CCTV |
| 26 | Cab mask |
| 27 | Auxiliary Power Supply |

## Attachment – 8 to Corrigendum – 3

### Volume III, ERGS, APPENDIX XIII Speed restriction of Purple & Red line of Bhopal Metro and Yellow line of Indore Metro (Tentative):

**Table XIII.1: Purple Line (Bhopal Metro)**

| Sl No | Curve No. | Direction of curve | Chainage | | Circular curve length (m) | L (Length of transition in m) | Total curve length in m (TL) | Radius, R (m) | Speed potential of curve kmph | Actual Ca (in mm) | Actual Cd |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | From | To | | | | | V | Ca | Cd |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 16 | 17 |
| 1 | 1 | RH | 20485.830 | 20601.160 | 25.330 | 45.000 | 115.33 | 200 | **55** | **102** | **77** |
| 2 | 2 | RH | 20761.250 | 20880.230 | 58.980 | 30.000 | 118.98 | 1500 | **90** | **28** | **36** |
| 3 | 3 | LH | 21011.180 | 21275.306 | 174.126 | 45.000 | 264.13 | 125 | **40** | **102** | **49** |
| 4 | 4 | RH | 21299.404 | 21428.419 | 29.015 | 50.000 | 129.02 | 550 | **80** | **78** | **60** |
| 5 | 5 | LH | 21636.780 | 21704.490 | 37.710 | 15.000 | 67.71 | 5000 | **90** | **9** | **11** |
| 6 | 6 | RH | 22424.630 | 22660.100 | 115.470 | 60.000 | 235.47 | 150 | **35** | **15** | **82** |
| 7 | 7 | LH | 22723.190 | 22847.570 | 94.380 | 15.000 | 124.38 | 5000 | **90** | **9** | **11** |
| 8 | 8 | RH | 22984.320 | 23386.900 | 372.580 | 15.000 | 402.58 | 10000 | **90** | **4** | **5** |
| 9 | 9 | RH | 23594.910 | 23694.480 | 69.570 | 15.000 | 99.57 | 5000 | **90** | **9** | **11** |
| 10 | 10 | LH | 24117.900 | 24343.870 | 125.970 | 50.000 | 225.97 | 550 | **85** | **78** | **78** |
| 11 | 11 | RH | 24704.710 | 25029.950 | 225.240 | 50.000 | 325.24 | 275 | **67** | **114** | **80** |
| 12 | 12 | LH | 25990.660 | 26163.880 | 73.220 | 50.000 | 173.22 | 125 | **45** | **114** | **78** |
| 13 | 13 | LH | 26290.120 | 26415.340 | 25.220 | 50.000 | 125.22 | 350 | **74** | **105** | **80** |
| 14 | 14 | RH | 27487.690 | 27620.850 | 103.160 | 15.000 | 133.16 | 4000 | **90** | **11** | **13** |
| 15 | 15 | LH | 28125.330 | 28334.840 | 159.510 | 25.000 | 209.51 | 3000 | **90** | **14** | **18** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 16 | 16 | LH | 28465.360 | 28600.110 | 34.750 | 50.000 | 134.75 | 250 | **63** | **114** | **75** |
| 17 | 17 | RH | 28681.720 | 29060.030 | 278.310 | 50.000 | 378.31 | 220 | **60** | **114** | **80** |
| 18 | 18 | LH | 29553.990 | 30141.120 | 487.130 | 50.000 | 587.13 | 220 | **60** | **114** | **80** |
| 19 | 19 | RH | 30558.500 | 30845.450 | 186.950 | 50.000 | 286.95 | 225 | **61** | **114** | **82** |
| 20 | 20 | RH | 31120.980 | 31326.800 | 105.820 | 50.000 | 205.82 | 225 | **61** | **114** | **82** |
| 21 | 21 | RH | 31426.500 | 31758.630 | 240.130 | 46.000 | 332.13 | 125 | **44** | **105** | **79** |
| 22 | 22 | LH | 31777.850 | 32009.550 | 139.700 | 46.000 | 231.70 | 125 | **44** | **105** | **79** |
| 23 | 23 | LH | 32249.490 | 32316.940 | 27.450 | 20.000 | 67.45 | 1800 | **90** | **24** | **30** |
| 24 | 24 | LH | 32552.580 | 32822.990 | 200.410 | 35.000 | 270.41 | 2000 | **90** | **20** | **28** |
| 25 | 25 | LH | 32970.030 | 33054.340 | 24.310 | 30.000 | 84.31 | 700 | **90** | **55** | **82** |
| 26 | 26 | LH | 33198.100 | 33357.640 | 69.540 | 45.000 | 159.54 | 200 | **55** | **102** | **77** |
| 27 | 27 | RH | 33585.310 | 33791.040 | 95.730 | 55.000 | 205.73 | 250 | **66** | **125** | **81** |
| 28 | 28 | RH | 33866.310 | 34040.100 | 93.790 | 40.000 | 173.79 | 200 | **54** | **91** | **82** |
| 29 | 29 | LH | 34060.530 | 34241.300 | 108.770 | 36.000 | 180.77 | 200 | **52** | **82** | **78** |
| 30 | 30 | LH | 34401.250 | 34486.940 | 25.690 | 30.000 | 85.69 | 240 | **50** | **68** | **55** |
| 31 | 31 | RH | 34512.090 | 34648.200 | 56.110 | 40.000 | 136.11 | 400 | **76** | **91** | **80** |
| 32 | 32 | RH | 34680.740 | 34767.680 | 26.940 | 30.000 | 86.94 | 700 | **85** | **55** | **67** |
| 33 | 33 | LH | 34799.520 | 34914.540 | 55.020 | 30.000 | 115.02 | 1500 | **90** | **28** | **36** |

**Table XIII.2: Red Line (Bhopal Metro)**

| Sl No | Curve No. | Direction of curve | Chainage | | Circular curve length (m) | L (Length of transition in m) | Total curve length in m (TL) | Radius, R (m) | Speed potential of curve kmph | Actual Ca (in mm) | Actual Cd |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | From | To | | | | R | V | Ca | Cd |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 16 | 17 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 51 | RT | 50461.07 | 50611.16 | 40.0867 | 55 | 95.0867 | 300 | **70** | **114** | **80** |
| 2 | 52 | RT | 50722.31 | 50864.87 | 82.5522 | 30 | 112.552 | 1500 | **90** | **20** | **44** |
| 3 | 53 | RT | 50974.84 | 51256.79 | 231.9552 | 25 | 256.955 | 2250 | **90** | **15** | **28** |
| 4 | 51 | RT | 51350.18 | 51444.29 | 64.1067 | 15 | 79.1067 | 4000 | **90** | **11** | **13** |
| 5 | 55 | LT | 51936.73 | 52026.14 | 39.4089 | 25 | 64.4089 | 3000 | **90** | **14** | **18** |
| 6 | 56 | RT | 52971.44 | 53071.24 | 69.7972 | 15 | 84.7972 | 4000 | **90** | **11** | **13** |
| 7 | 57 | RT | 53301.9 | 53397.51 | 35.6103 | 30 | 65.6103 | 1500 | **90** | **28** | **36** |
| 8 | 58 | RT | 53619.17 | 53774.9 | 105.7374 | 25 | 130.737 | 2500 | **90** | **15** | **23** |
| 9 | 59 | LT | 54378.22 | 54598.92 | 120.6981 | 50 | 170.698 | 300 | **70** | **114** | **80** |
| 10 | 60 | LT | 55146.48 | 55292.52 | 46.0414 | 50 | 96.0414 | 300 | **70** | **114** | **80** |
| 11 | 61 | RT | 55314.83 | 55590.79 | 185.9634 | 45 | 230.963 | 125 | **43** | **102** | **73** |
| 12 | 62 | LT | 55618.59 | 55709.3 | 26.7121 | 32 | 58.7121 | 300 | **60** | **73** | **69** |
| 13 | 63 | RT | 55743.68 | 55900.73 | 47.0515 | 55 | 102.052 | 350 | **74** | **105** | **80** |
| 14 | 64 | LT | 56019.32 | 56128.21 | 52.8856 | 28 | 80.8856 | 400 | **65** | **64** | **62** |
| 15 | 65 | LT | 56352.04 | 56569.64 | 127.6045 | 45 | 172.605 | 130 | **45** | **102** | **82** |
| 16 | 66 | RT | 56755.45 | 56961.11 | 115.6587 | 45 | 160.659 | 130 | **45** | **102** | **82** |
| 17 | 67 | LT | 57030.7 | 57190.19 | 59.4905 | 50 | 109.491 | 600 | **85** | **71** | **72** |
| 18 | 68 | LT | 57317.78 | 57473.84 | 80.0546 | 38 | 118.055 | 200 | **53** | **86** | **80** |
| 19 | 69 | RT | 57705.59 | 58090.51 | 314.9222 | 35 | 349.922 | 1200 | **90** | **35** | **45** |
| 20 | 70 | LT | 58270.42 | 58358.09 | 57.6703 | 15 | 72.6703 | 2000 | **90** | **20** | **28** |
| 21 | 71 | RT | 58484.75 | 58602.06 | 47.3085 | 35 | 82.3085 | 1000 | **90** | **40** | **56** |
| 22 | 72 | LT | 58708.11 | 58818.61 | 50.4964 | 30 | 80.4964 | 1500 | **90** | **25** | **39** |
| 23 | 73 | RT | 59141.76 | 59241.21 | 29.4515 | 35 | 64.4515 | 350 | **69** | **80** | **82** |
| 24 | 74 | LT | 59414.47 | 59528.61 | 84.1401 | 15 | 99.1401 | 4000 | **90** | **11** | **13** |
| 25 | 75 | LT | 59854.53 | 59994.13 | 79.5965 | 30 | 109.597 | 1500 | **90** | **25** | **39** |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 26 | 76 | RT | 60039.81 | 60248.98 | 149.1695 | 30 | 179.17 | 3200 | **90** | **13** | **17** |
| 27 | 77 | RT | 60699.04 | 60829.66 | 100.6158 | 15 | 115.616 | 10000 | **90** | **4** | **5** |
| 28 | 78 | LT | 61233.27 | 61311.54 | 48.2751 | 15 | 63.2751 | 10000 | **90** | **4** | **5** |
| 29 | 79 | LT | 61577.37 | 61830.97 | 193.6039 | 30 | 223.604 | 1010 | **90** | **40** | **55** |
| 30 | 80 | LT | 61967.3 | 62135.25 | 57.9517 | 55 | 112.952 | 250 | **65** | **125** | **75** |
| 31 | 81 | RT | 62455.01 | 62625.94 | 60.9279 | 55 | 115.928 | 350 | **74** | **105** | **80** |
| | | | | | | | 3858.54 | | | | |

**Table XIII.2: Yellow Line (Indore Metro)**

| Sl No | Curve No. | Direction of curve | Chainage | | Circular curve length (m) | L (Length of transition in m) | Total curve length in m (TL) | Radius, R (m) | Actual Ca (in mm) | Actual Cd | speed potential of curve(kmph) |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | From | To | | | | | | | |
| 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 16 | 17 | 30 |
| 1 | 52 | **R** | 14652.54 | 14880.334 | 127.797 | 50 | 227.797 | **125** | 110 | 82 | 45 |
| 2 | 53 | **R** | 15498.81 | 15679.217 | 100.41 | 40 | 180.41 | **750** | 57 | 44 | 80 |
| 3 | 54 | **L** | 15719.86 | 16099.005 | 319.141 | 30 | 379.141 | **1010** | 42 | 33 | 80 |
| 4 | 55 | **R** | 16615.39 | 16924.671 | 229.283 | 40 | 309.283 | **730** | 58 | 45 | 80 |
| 5 | 56 | **R** | 18751.23 | 19078.317 | 294.291 | 16.4 | 327.091 | **1900** | 22 | 17 | 80 |
| 6 | 57 | **L** | 20647.17 | 20747.786 | 20.615 | 40 | 100.615 | **600** | 71 | 55 | 80 |
| 7 | 58 | **R** | 20780.52 | 20900.507 | 19.987 | 50 | 119.987 | **400** | 107 | 83 | 80 |
| 8 | 58A | **R** | 21192.79 | 21253.469 | 20.678 | 20 | 60.678 | **6000** | 7 | 6 | 80 |
| 9 | 59 | **R** | 21344.65 | 21429.837 | 25.192 | 30 | 85.192 | **1300** | 33 | 26 | 80 |
| 10 | 59A | **R** | 21479.86 | 21780.671 | 240.808 | 30 | 300.808 | **1150** | 37 | 29 | 80 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 11 | 60 | **L** | 21805.58 | 21917.526 | 31.951 | 40 | 111.951 | **500** | 85 | 66 | 80 |
| 12 | 61 | **R** | 22440.86 | 22938.273 | 397.418 | 50 | 497.418 | **720** | 59 | 46 | 80 |
| 13 | 62 | **L** | 23140.19 | 23199.075 | 18.886 | 20 | 58.886 | **425** | 45 | 133 | 80 |
| 14 | 63 | **R** | 23199.1 | 23377.28 | 67.181 | 55.5 | 178.181 | **125** | 110 | 82 | 45 |
| 15 | 64 | **R** | 23970.35 | 24023.956 | 23.602 | 15 | 53.602 | **5000** | 9 | 7 | 80 |
| 16 | 65 | **L** | 24343.91 | 24420.156 | 36.249 | 20 | 76.249 | **2000** | 21 | 17 | 80 |
| 17 | 66 | **R** | 24584.46 | 24675.745 | 61.282 | 15 | 91.282 | **12000** | 4 | 3 | 80 |
| 18 | 67 | **R** | 24865.06 | 24961.16 | 26.101 | 35 | 96.101 | **900** | 47 | 37 | 80 |
| 19 | 68 | **R** | 25296.99 | 25367.135 | 40.15 | 15 | 70.15 | **7000** | 6 | 5 | 80 |
| 20 | 1B | **L** | 25692.18 | 25744.681 | 22.499 | 15 | 52.499 | **7000** | 6 | 5 | 80 |
| 21 | 2 | **R** | 25837.23 | 25909.498 | 22.273 | 25 | 72.273 | **1200** | 36 | 28 | 80 |
| 22 | 3 | **L** | 26130.48 | 26313.985 | 63.508 | 60 | 183.508 | **195** | 110 | 81 | 56 |
| 23 | 4 | **R** | 26339.19 | 26477.564 | 18.379 | 60 | 138.379 | **200** | 110 | 83 | 57 |
| 24 | 5 | **L** | 26617.17 | 26723.316 | 26.145 | 40 | 106.145 | **650** | 66 | 51 | 80 |
| 25 | 6 | **L** | 26909.6 | 27038.276 | 48.678 | 40 | 128.678 | **250** | 91 | 85 | 61 |
| 26 | 7 | **R** | 27061.26 | 27220.311 | 59.051 | 50 | 159.051 | **250** | 110 | 84 | 64 |
| 27 | 8 | **R** | 27447.51 | 27611.915 | 54.401 | 55 | 164.401 | **230** | 110 | 82 | 61 |
| 28 | 9 | **L** | 27766.54 | 28032.374 | 213.832 | 26 | 265.832 | **800** | 53 | 41 | 80 |
| 29 | 10 | **L** | 28229.48 | 28387.5 | 62.022 | 48 | 158.022 | **155** | 109 | 82 | 50 |
| 30 | 11 | **R** | 30286.42 | 30365.383 | 18.96 | 30 | 78.96 | **1000** | 43 | 33 | 80 |
| 31 | 12 | **L** | 30415.4 | 30519.262 | 43.866 | 30 | 103.866 | **1000** | 43 | 33 | 80 |
| 32 | 13 | **R** | 30785.44 | 31021.514 | 136.073 | 50 | 236.073 | **125** | 110 | 82 | 45 |
| 33 | 14 | **L** | 32061.82 | 32129.058 | 27.238 | 20 | 67.238 | **2000** | 21 | 17 | 80 |
| 34 | 15 | **L** | 32395.73 | 32494.82 | 39.095 | 30 | 99.095 | **1000** | 43 | 33 | 80 |
| 35 | 16 | **L** | 32528.33 | 32673.39 | 95.065 | 25 | 145.065 | **950** | 45 | 35 | 80 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 36 | 17 | **L** | 32690.27 | 32886.993 | 96.725 | 50 | 196.725 | **450** | 95 | 74 | 80 |
| 37 | 18 | **R** | 33055.41 | 33203.079 | 87.674 | 30 | 147.674 | **600** | 68 | 58 | 80 |
| 38 | 19 | **L** | 33234.89 | 33411.829 | 116.939 | 30 | 176.939 | **800** | 53 | 41 | 80 |
| 39 | 20 | **L** | 33528.48 | 33610.638 | 22.161 | 30 | 82.161 | **1000** | 43 | 33 | 80 |
| 40 | 21 | **R** | 33662.56 | 33824.323 | 61.762 | 50 | 161.762 | **280** | 110 | 86 | 68 |
| 41 | 22 | **R** | 34030.17 | 34313.263 | 183.097 | 50 | 283.097 | **125** | 110 | 82 | 45 |
| 42 | 23 | **L** | 34337.47 | 34423.059 | 35.594 | 25 | 85.594 | **1010** | 42 | 33 | 80 |
| 43 | 24 | **R** | 34738.23 | 34783.933 | 15.704 | 15 | 45.704 | **17000** | 3 | 2 | 80 |
| 44 | 25 | **L** | 3687.956 | 3782.103 | 34.147 | 30 | 94.147 | **1000** | 43 | 33 | 80 |
| 45 | 26 | **R** | 3801.607 | 3923.352 | 21.745 | 50 | 121.745 | **300** | 110 | 84 | 70 |
| 46 | 27 | **R** | 4039.393 | 4172.675 | 33.282 | 50 | 133.282 | **125** | 110 | 82 | 45 |
| 47 | 28 | **L** | 4204.98 | 4375.442 | 80.462 | 45 | 170.462 | **125** | 102 | 81 | 44 |
| 48 | 29 | **R** | 4766.174 | 4878.071 | 21.897 | 45 | 111.897 | **155** | 102 | 81 | 49 |
| 49 | 30 | **L** | 4880.658 | 5041.503 | 65.645 | 47.6 | 160.845 | **155** | 108 | 83 | 50 |
| 50 | 31 | **R** | 5402.728 | 5462.918 | 30.19 | 15 | 60.19 | **5000** | 9 | 7 | 80 |
| 51 | 32 | **L** | 5721.227 | 5793.958 | 42.731 | 15 | 72.731 | **5000** | 9 | 7 | 80 |
| 52 | 33 | **R** | 6186.516 | 6278.047 | 31.531 | 30 | 91.531 | **1000** | 43 | 33 | 80 |
| 53 | 34 | **R** | 6426.688 | 6541.491 | 34.803 | 40 | 114.803 | **600** | 71 | 55 | 80 |
| 54 | 35 | **R** | 7007.542 | 7163.277 | 75.735 | 40 | 155.735 | **500** | 85 | 66 | 80 |
| 55 | 36 | **L** | 7225.332 | 7407.601 | 82.269 | 50 | 182.269 | **200** | 110 | 83 | 57 |
| 56 | 37 | **R** | 7430.871 | 7658.603 | 127.732 | 50 | 227.732 | **215** | 110 | 82 | 59 |
| 57 | 38 | **L** | 8057.771 | 8202.76 | 44.989 | 50 | 144.989 | **300** | 110 | 84 | 70 |
| 58 | 39 | **R** | 8277.073 | 8410.587 | 33.514 | 50 | 133.514 | **301** | 110 | 83 | 70 |
| 59 | 40 | **L** | 8610.999 | 8895.661 | 184.662 | 50 | 284.662 | **215** | 110 | 82 | 59 |
| 60 | 41 | **R** | 8896.413 | 9139.626 | 141.413 | 50.9 | 243.213 | **210** | 110 | 82 | 59 |

| | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 61 | 42 | **R** | 9511.495 | 9665.377 | 63.882 | 45 | 153.882 | **550** | 78 | 60 | 80 |
| 62 | 43 | **L** | 10134.84 | 10230.488 | 35.646 | 30 | 95.646 | **900** | 47 | 37 | 80 |
| 63 | 44 | **R** | 10280.55 | 10393.181 | 32.635 | 40 | 112.635 | **800** | 53 | 41 | 80 |
| 64 | 45 | **L** | 11093.77 | 11224.831 | 31.058 | 50 | 131.058 | **400** | 107 | 83 | 80 |
| 65 | 46 | **R** | 11295.76 | 11434.045 | 58.282 | 40 | 138.282 | **600** | 71 | 55 | 80 |
| 66 | 47 | **L** | 11559.74 | 11658.506 | 28.763 | 35 | 98.763 | **800** | 53 | 41 | 80 |
| 67 | 48 | **R** | 11775.14 | 11870.477 | 25.335 | 35 | 95.335 | **850** | 50 | 39 | 80 |
| 68 | 49 | **R** | 13181.19 | 13348.366 | 77.181 | 45 | 167.181 | **500** | 85 | 66 | 80 |
| 69 | 50 | **R** | 14124.48 | 14215.304 | 30.825 | 30 | 90.825 | **1000** | 43 | 33 | 80 |

## Attachment – 9 to Corrigendum – 3

### Volume III, Part 2: ERGS-S&T, Appendix 20, 6.1:

6.1 The contractor shall deploy following employees for maintenance of S&T Systems, separately for Bhopal and Indore.

| Sr. No. | Designation | Qualification (Ref 6.2 also) | Experience |
|---|---|---|---|
| 1 | Signalling Maintainer | 3-year Diploma or 2 Years ITI or Equivalent (Electrical / Electronic Trade) | 3 years of min experience in domain. |
| 2 | Telecommunication Maintainer | 3-year Diploma or 2 Years ITI or Equivalent (Electrical / Electronic Trade) | 3 years of min experience in domain. |
| 3 | Signalling supervisor | Engineering graduate or 3 Years Diploma (Electrical /Electronics) or Equivalent. | 3 years of min experience in domain. |
| 4 | TEL supervisor | Engineering graduate or 3 Years Diploma (Electrical /Electronics) or Equivalent. | 3 years of min experience in domain. |
| 5 | **Procurement Manager** | Engineering graduate or 3 Years Diploma (Electrical /Electronics) or Equivalent. | 3 years of min experience in domain. |
| 6 | Maintenance manager Signalling | Engineering graduate in Electrical/ Electronic Discipline | Min 8 years' experience in domain. |
| 7 | Maintenance manager Telecommunication | Engineering graduate in Electrical/ Electronic Discipline | Min 8 years' experience in domain. |
| 8 | PM (S&T) | Engineering graduate in Electrical/ Electronic Discipline | Min 15 years' experience in domain. |

## Attachment – 10 to Corrigendum – 3

### Volume III, Part 2: ERGS-S&T, Appendix 20, 17:

### 17 Maintenance applicable penalty

| Sr. No. | Name | Description/ checks | Non-compliance |
|---|---|---|---|
| **Preventive Maintenance** | | | |
| P1 | Master Schedule compliance | The master schedule duly meeting the maintenance periodicities need to be followed | Penalty for non-compliance |
| P2 | Quality | Failure of element due to improper PM. Quality audit by the employer. | Penalty for non-compliance |
| **Corrective Maintenance (Applicable for Depot)** | | | |
| C1 (L1) | Adherence to the Down time ceilings | The contractor needs to meet the ceiling limits of the down time (MTTR) per failure. | Penalty for non-compliance |
| C2 (L2) | Adherence to the Down time ceilings | The contractor needs to meet the ceiling limits of the down time (MTTR) per failure. | Penalty for non-compliance |

## Attachment – 11 to Corrigendum – 3

**Volume III, Part 2: ERGS-S&T, Appendix 20, 18, Table: Availability damage (different scenarios):**

**Table: Availability damage (different scenarios)**

| Sr. No. | Conditions | Penalty / Damage |
|---|---|---|
| 1. | Passenger De-boarding in mainline | Rs 15 Lakhs |
| **Trip Delay / Cancellation:** | | |
| 2.1 | > 59 seconds <= 5minutes (Trip Delay) | Rs 10000 |
| 2.2 | > 5 minutes (Trip Cancellation) | Rs 75000 / per trip cancellation |

## Attachment – 12 to Corrigendum – 3

### Volume IV, Part 1: ERTS-RS, 2.11

**2.11 Availability and Availability Damages:**

(i) A Trainset shall be considered as 'Available Trainset' if it is offered for revenue service before 30 minutes from its scheduled departure time as per Train Operation Plan. As far as possible, no train shall be inducted on mainline with any defect, but in case of emergency, if a train is inducted with minor fault/defect as per table 2.2(a) below, every effort shall be made to attend the fault on mainline or withdrawal of train shall be done in planned manner. Trains inducted with minor faults/defect as mentioned in table 3 below or where specific waiver has been obtained by RS contractor from MPMRCL shall be considered as available. PPIO will be a centralized cell which will be responsible for overall co-ordination with respect to train maintenance, arrival, departure, power block co-ordination etc.

**Table 2.2(a): Minor Train faults/defects which may be allowed at the time of train induction**

| Sr. No. | Minor fault/defect which may be allowed at the time of train induction subject to their subsequent attention on mainline/planned train withdrawal | Remarks |
|---|---|---|
| 1. | One door Inhibit/Faulty | With door isolation sticker |
| 2. | Auto announcement not working | Train induction will be done in non-UTO mode |
| 3. | One headlight is not working in either mode but other light is healthy in both full and half intensity. | |
| 4. | Wiper is not working | Only in non-rainy season |
| 5. | Either of TNI/DIF/PIB not working | |
| 6. | Train Operator seat defective in UTO mode | |
| 7. | Any of CCTV including its backup not working | Train induction will be done in non-UTO mode |
| 8. | Horn (any one High/Low tone must blow) | |
| 9. | One HVAC is not working in cool mode properly but working in ventilation mode | Except April-September |
| 10. | Partition door is closed but showing open on TCMS | |

| **Table 2.2(a): Minor Train faults/defects which may be allowed at the time of train induction** | | |
|---|---|---|
| **Sr. No.** | **Minor fault/defect which may be allowed at the time of train induction subject to their subsequent attention on mainline/planned train withdrawal** | **Remarks** |
| 11 | One Inverter is isolated (failure shall not result in trip delay/cancellation.) | |

**Note:**

1. Any fault/defect may be added/deleted in the above table at the sole discretion of MPMRCL.
2. The provision for seeking waiver from MPMRCL or utilizing the provision under table 3 for making train available with defect or deficiencies shall be used sparingly. If it is noted that contractor has made it a regular practice, MPMRCL at its sole discretion may impose penalty of maximum Rs 20000/train/day.
3. If the train is offered with defect/deficiency without specific waiver from MPMRCL, such incidence may invite penalty of Rs 20000 per incidence.

(ii) Trainset available with delay – A Trainset shall be considered as available with delay if such Trainset is: offered with delay that it effects its scheduled departure time as per the Train Operation Plan. Availability damage in such case shall be as per No. of trip(s) delayed/cancelled as defined in table 2.2(b) below. If another train is made available in place of this faulty train and the train is departed as per TOP then there shall be no penalty. Employer shall return the trains as per TOP ordinarily. However, if on account of MPMRCL, the delay in the returning of one or more train(s) to depot is more than 1 hour then Contractor shall be permitted to provide one or more such train(s) with same delays for revenue service Hours without any penalties. Contractor shall also have option to intimate MPMRCL in advance about the hour slots where it intends to provide trains with delays. It is however expected that Contractor shall try to minimize impact of any delayed arrival of train(s) duly utilizing the maintenance reserves available and make all efforts for timely departure of all trains to revenue service.

(iii) Non-Available Trainset: A trainset can be non-available on following accounts: If there is fault/defect (service failure/relevant failure) in the train(s) attributable to RS contractor and it cannot be utilized in revenue service then penalty corresponding to 3 of table 2.2(b) shall be applicable.

(iv) Detailed list of different conditions and corresponding penalty/damage shall be levied on the contractor is as mentioned below:

| **Table 2.2(b): Penalty/Availability Damage** | | |
|---|---|---|
| **S. No.** | **Conditions** | **Penalty/Damage** |
| 1. | Passenger De-boarding in mainline | Rs 15 Lakhs |

| **Table 2.2(b): Penalty/Availability Damage** | | |
|---|---|---|
| **S. No.** | **Conditions** | **Penalty/Damage** |
| **Trip Delay/Cancellation:** | | |
| 2 | > 59 seconds <= 5minutes (Trip Delay) | Rs 10000 |
| 3 | > 5 minutes (Trip Cancellation) | Rs 75000/per trip cancellation |
| **Note:**<br>1. Penalty/Damage figures as indicated above are for first year of train operation. From 2nd Year onwards these figures shall be escalated as per Price Adjustment stipulated for DLCMP.<br>2. Delay/Cancellation shall be recorded from the Time Table as noted at the destination station for one-way trip. MPMRCL's decision shall be final and binding on RS contractor in this regard.<br>3. Where both penalty scenarios 1 and 3 occur together, higher of the 1 and 3 of table 2.2(b) shall be applicable.<br>4. Where both penalty scenarios 2 and 3 occur together, penalty corresponding to higher of 2 & 3 of table 2.2(b) shall be applicable.<br>5. In case of partial trip cancellation, penalty corresponding to 3 of table 2.2(b) shall be applicable on pro-rata basis.<br>6. The damages mentioned above are damages per train and are in INR.<br>Stabilization period of 1 month for each train shall be provided for failures mentioned under 2 & 3 of table 2.2(b). | | |

(v) Penalties as defined in Table 2.2(b) shall not be applicable to RS contractor for delay/withdrawal/de-boarding due to faults in the equipment which are maintained by MPMRCL or other designated contractors viz. Signalling, Telecom etc.

(vi) Whenever any fault attributable to RS contactor is developed in the train and Train Operator is not able to troubleshoot or wrongly troubleshoots then the responsibility of the same shall still be with RS contractor only.

(vii) Penalty on account of service failure: If train is withdrawn from service as per withdrawal scenario present Appendix TF of ERTS-RS then penalty shall be imposed if the replacement is not provided on time resulting in trip delay and/or trip cancellation. The penalty amount shall be as per 2 and/or 3 of Table 2.2(b).

## Attachment – 13 to Corrigendum – 3

**Volume IV, ERTS, Part 1: ERTS-RS, 2.27:**

### 2.27 Cyber Security Assurance

Notwithstanding, the cyber security requirement defined elsewhere, the design of RS system should comply with ISO 27005, IEC62443 and TS50701, while designing and implementing the cybersecurity solution for the RS system.

The RS contractor has to ensure non-interference of security functionalities from safety. The RS contractor shall define procedures for assured operations and continuous monitoring of the security controls. The contractor must ensure a non-intrusive, passive, real time continuous monitoring of the Rolling Stock network (TCMS, PA/PIS and passenger wi-fi networks) has no negative impact on the operation of the system. The system should be capable of understanding the railway protocols, asset types in real time in rolling stock network.

The RS contractor has to ensure next-generation threat detection to safeguard the operational network and from emerging cyber threats and ensure regulatory compliance.

Major security objectives should include the following:

1. Restricting logical access to the network and network activity Restricting physical access to the network and devices.
2. Restricting unauthorized modification of data.
3. Detecting security events and incident.
4. Maintaining functionality during adverse conditions and restoring the system after an incident.
5. Restricting hacking, phishing, malware, DOS attack etc.

The Contractor shall be fully responsible for compliance with Cybersecurity standards and implementation of their System Safety & Cyber Security Assurance Plan. The Contractor shall be required to engage with designated Cyber Security Consultant at the early stage of design development. The Contractor shall consider the inputs of Cyber Security Consultant into their design and develop their system safety & Cyber Security Assurance Plan and submit the same to Engineer for approval. Cyber Security Consultant shall verify the implementation of the cyber security requirement as per international standards IEC62443, TS50701, ISO 27005 etc. Any cost associated with implementation of Cybersecurity guidelines shall be deemed to be included in the bid proposal.

## Attachment – 14 to Corrigendum – 3

**Volume IV, Part 1: ERTS-RS, 10.14:**

### 10.14 Wayside Wireless Communication System

#### 10.14.1 General

The contractor shall provide equipment and install the complete system for Bhopal as well as Indore metro to enable:

i. The contractor shall provide all equipment (hardware including server etc. & software) and install the system to enable remote wireless downloading of all the stored TCMS data, sub-system data, data recordings, environment data and linked files if any and Event recorder data. The downloading shall be real time/time interval actuated /fault actuated / manual triggered. The data as above shall be downloaded on a central server at OCC which shall then be linked to the redundant server at depot. The contractor shall supply the multiuser software(s) (along with hardware and software, if any including server) required for analysis of the faults and predictions / judgments on likely faults/failures. The specification of the software shall be got approved from the engineer.

ii. Remote access of TCMS and sub system data (including trace data) on trains present in mainline and depot(s).

iii. Remote downloading of TCMS data (data recorder logs, events logs stored on on-board TCMS memory and event data stored in event recorder) and other sub system data to Central server through wireless communication (Wi-Fi) network of signalling/telecom by dedicated port on the Onboard TCMS apart from the ports used for manual downloading. On availability of train in the depot, the recorded data in TCMS shall be transferred to the central server and subsequently to the Asset and Maintenance management system automatically. All interfacing between wayside communication system, server and Asset Management system shall be the responsibility of the contractor. The Contractor shall conduct necessary interface with S&T and shall be responsible for complete set up, commissioning and satisfactory working of the system throughout DLCMP.

The facilities of remote downloading shall be in addition to the hardwire downloading.

#### 10.14.2 Scope of Supply

Contractor shall supply:

(i) **Central server**

The data as above shall be downloaded on the Central server (to be provided by Rolling Stock Contractor at) Bhopal & Indore OCC which in turn shall be linked to server at each Depot (to be provided by Rolling Stock Contractor), terminal stations, intermediate terminals, OCC, BCC, DCC etc. Complete server set at OCC and depot, which includes server racks, UPS, Switch hub, User console, in rack networking etc as required shall be provided by the contractor. Specification and capacity of both the server shall be sufficient enough to handle

all the data and operation required. Details need to be submitted to Engineer for review. Communication link for the purpose, shall be provided by the S&T contractor. However, necessary interfacing devices shall be provided by the RS Contractor. Adequate number of ports shall be made available in the On-board TCMS to separately cater for wireless downloading, VTS interface and manual downloading using maintenance terminal. Necessary interfacing devices shall also be provided by the RS Contractor.

Any other networking equipment as defined in Appendix-TD shall also be in the scope

of Rolling Stock Contractor. Further details shall be worked out as approved by the Engineer during design stage.

| **Characteristics of Central server to be supplied at Bhopal & Indore** | | |
|---|---|---|
| **Sr. No.** | **Description** | **Requirement** |
| 1 | No. Trains to be handled by server | As per contract in Bhopal & Indore |
| 2 | The number of terminals accessed to server | 20 Nos. at Bhopal & Indore each |
| 3 | The number of users to be managed by server | 40 Nos. at Bhopal & Indore each |
| 4 | Storage capacity of server | 30 days at Bhopal & Indore each |

(ii) **On-board equipment**

Any on-board equipment / access point / switches / router / antenna etc. shall be provided by Rolling Stock Contractor. On availability of train in the depot and terminal stations (or as decided by the Engineer during design stage), the recorded data in TCMS shall be transferred to the central as well as depot server and subsequently to the Asset and Maintenance management system automatically. The data to be recorded in the central as well as depot server and to be integrated with the Asset and Maintenance management system shall be discussed and finalized in interface with Asset Management system supplier. The details shall be submitted for Engineer's review.

### 10.14.3 Required Features

i. Download Triggers

The triggers for remote downloading to central server shall be time interval actuated (time interval to be finalised in design stage with Engineer approval), fault actuated, manual triggered from OCC/BCC and force downloading remotely by authorized metro personnel.

ii. High-Integrity data transfer

Integrity of the data shall not be affected during remote download and in case of any interruption or otherwise the data shall be suitably secured and retrievable.

iii. Auto resume of downloading

Connection failure during data download shall not cause restart of download from the beginning. Rather, all downloads shall pickup from the point where connection was broken.

iv. Duplication of data in central / depot server shall be avoided. Whenever data downloading is initiated, it shall download only that data from On-board TCMS which has not been downloaded earlier to the central / depot server.

v. Asset Management System including hardware and software shall be provided by contractor as per the specification provided in Appendix-X to ERGS-RS. Asset Management System, issue of work orders etc. shall be linked with Multiuser software. The rolling stock failure and troubleshooting data/logs in TCMS shall be relayed to Asset Management System. Necessary hardware/software in rolling stock shall be provided by rolling stock contractor. The contractor shall connect its Asset Management System for issuance of work order etc seamlessly and carry out corrective maintenance based on the interface developed between remotely available data and Asset Management System. The contractor shall be responsible for complete set up and commissioning of the system. Integrity of the data shall not be affected during remote download and in case of any interruption or otherwise the data shall be suitably secured and retrievable. Remotely available data at central server, shall include but not limited to following:

1. Events/Faults with related information: Fault/event and logically associated parameters of all subsystems necessary for fault diagnostics and troubleshooting.
2. Real time data: All digital & analog input / output and system health parameters of onboard subsystem, i.e., TCMS, HVAC, High Voltage, Low Voltage, Control Systems, CCD monitoring, Track monitoring, Wayside equipment data etc. required for troubleshooting and condition-based monitoring.
3. Energy consumption.
4. Equipment's performance data: Such as running hours, no. of operations, operation cycle, etc.
5. On-board test results as decided by the Engineer during design.

Adequate encryption and data compression so as to optimally utilized CCTV wireless network bandwidth (preferably less than 1.5Mbps/train) provided by signalling contractor shall be ensured by RS contractor. Necessary interfacing tool/API at receiving end for decryption and decompression shall also be the responsibility of RS contractor.

vi. The Contractor shall supply the multiuser software(s) required for analysis of the faults and predictions/judgments on likely faults/failures. The specification of the software shall be got approved from the Engineer