Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
1.	Part 1	Section II - Bid Data Sheet (BDS)	ITB 4.7	Add a new Sub-Clause 4.7: Where the Bidder is a Joint Venture (JV), the Bidder shall submit the following additional information to meet the qualification criteria for (a) A Memorandum of Understanding / JV Agreement shall be provided. (b) Nomination of one of the Members of the Joint Venture to be in-charge ("Lead member"); and this authorization shall be covered in the Power of Attorney signed by the legally authorized signatories of all Members of Joint Venture. (c) Details of the intended percentage participation by each member shall be furnished with complete details of the work distribution of project execution responsibilities. (d) Authorized Representative of the JV shall be authorized to receive instructions for and on behalf of any or all Members of the Joint Venture. (e) All members of the Joint Venture shall be jointly and severally responsible for the execution of the Contract in accordance with the terms and conditions of the Contract. (f) The Letter of Technical Bid and the Letter of Price Bid and other forms wherever required shall be stamped & signed by the authorized representative of the JV and shall be legally binding on all the Members of the JV.	Add a new Sub-Clause 4.7: A JV/Consortium shall consist of a maximum of three members. Where the Bidder is a Joint Venture (JV), the Bidder shall submit the following additional information to meet the qualification criteria for (a) A Memorandum of Understanding / JV Agreement shall be provided. (b) Nomination of one of the Members of the Joint Venture to be in-charge ("Lead member"); and this authorization shall be covered in the Power of Attorney signed by the legally authorized signatories of all Members of Joint Venture. (c) Details of the intended percentage participation by each member shall be furnished with complete details of the work distribution of project execution responsibilities. (d) Authorized Representative of the JV shall be authorized to receive instructions for and on behalf of any or all Members of the Joint Venture. (e) All members of the Joint Venture shall be jointly and severally responsible for the execution of the Contract in accordance with the terms and conditions of the Contract. (f) The Letter of Technical Bid and the Letter of Price Bid and other forms wherever required shall be stamped & signed by the authorized representative of the JV and shall be legally binding on all the Members of the JV.
2.	Part 1	Section III - Evaluation and Qualification Criteria	2.3.1	The audited balance sheets or, if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, for the last (5) FIVE years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and its prospective long term profitability. As the minimum requirement, a Bidder's net worth calculated as the difference between total assets and total liabilities should be positive for any three years out of last five years. The financial year as applicable in the country of origin of the bidders would be considered. The 'last financial year' will be the latest financial year that ended before the date of issue of NIT for this tender. Single Entity: Must meet requirement In case of JV: All Parties Combined: N/A Each Member: Must meet requirement Lead Member: N/A	The audited balance sheets or, if not required by the law of the Bidder's country, other financial statements acceptable to the Employer, for the last (5) FIVE years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and its prospective long term profitability. As the minimum requirement, a Bidder's net worth calculated as the difference between total assets and total liabilities should be positive for any three years out of last five years. The financial year as applicable in the country of origin of the bidders would be considered. The 'last financial year' will be the latest financial year that ended before the date of issue of NIT for this tender. Single Entity: Must meet requirement In case of JV: All Parties Combined: N/A Each Member: Must meet requirement # Lead Member: N/A # In case the JV member is a wholly owned Indian Subsidiary of the Lead member, the criteria for each member requirement for the wholly owned Indian subsidiary will not be applicable, provided that they are part of JV

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
3.	Part 1	Section III - Evaluation and Qualification Criteria	2.3.2	Minimum average annual turnover of INR 82 crores calculated as total certified payments received for Contracts in progress and/or completed, within the last FIVE (5) years divided by FIVE (5) years. Single Entity: Must meet requirement In case of JV: All Parties Combined: Must meet requirement Each Member: Must meet minimum 25% of the requirement Lead Member: Must meet minimum 40% of the requirement	Minimum average annual turnover of INR 82 crores calculated as total certified payments received for Contracts in progress and/or completed, within the last FIVE (5) years divided by FIVE (5) years. Single Entity: Must meet requirement In case of JV: All Parties Combined: Must meet requirement Each Member: Must meet minimum 25% of the requirement # Lead Member: Must meet minimum 40% of the requirement # In case the JV member is a wholly owned Indian Subsidiary of the Lead member, apart from fulfilling the criteria for Lead member, the JV as a whole (All parties combined) has to fulfil the full requirements. In such a scenario, the criteria for each member requirement for the wholly owned Indian subsidiary will not be applicable, provided that they are part of JV.
4.	Part 1	Section III - Evaluation and Qualification Criteria	2.3.3	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the cash flow requirements estimated as INR 21 crores for the subject Contract(s) net of the Bidder's other commitments. Single Entity: Must meet requirement In case of JV: All Parties Combined: Must meet requirement Each Member: Must meet minimum 25% of the requirement Lead Member: Must meet minimum 40% of the requirement	(i) The Bidder shall demonstrate that it has access to, or has available, liquid assets, unencumbered real assets, lines of credit, and other financial means (independent of any contractual advance payment) sufficient to meet the cash flow requirements estimated as INR 21 crores for the subject Contract(s) net of the Bidder's other commitments. Single Entity: Must meet requirement In case of JV: All Parties Combined: Must meet requirement Each Member: Must meet minimum 25% of the requirement # Lead Member: Must meet minimum 40% of the requirement # In case the JV member is a wholly owned Indian Subsidiary of the Lead member, apart from fulfilling the criteria for Lead member, the JV as a whole (All parties combined) has to fulfil the full requirements. In such a scenario, the criteria for each member requirement for the wholly owned Indian subsidiary will not be applicable, provided that they are part of JV.
5.	Part 1	Section III - Evaluation and Qualification Criteria	2.4.1	Experience under Engineering contracts in the role of prime contractor (single entity or JV member), Subcontractor, or Specialist Sub contractor(i) for at least the last SEVEN (07) years starting 1st January 2015. Single Entity: Must meet requirement In case of JV: All Parties Combined: N/A Each Member: Must meet requirement Lead Member: N/A	Experience under Engineering contracts in the role of prime contractor (single entity or JV member), Subcontractor, or Specialist Sub contractor(i) for at least the last SEVEN (07) years starting 1st January 2015. Single Entity: Must meet requirement In case of JV: All Parties Combined: N/A Each Member: Must meet requirement # Lead Member: N/A # In case the JV member is a wholly owned Indian Subsidiary of the Lead member, the criteria for each member requirement for the wholly owned Indian subsidiary will not be applicable, provided that they are part of JV
6.	Part 1	Section III - Evaluation and Qualification Criteria	2.4.2(a)	"1. Experience in the capacity of Telecom System Integrator (without Specialist subcontractor) either as Single entity or JV member(iv)) OR 2. Experience in the capacity of Telecom System Integrator as Specialist Subcontractor(i) must have been substantially(iii) completed between 1st January 2012 and the bid submission deadline, A minimum number of; 1. One Telecommunication work involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects; of value INR 126 Cr.(ii) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work. Or 2. Two Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects; each of	"1. Experience in the capacity of Telecom System Integrator (without Specialist subcontractor) either as Single entity or JV member(iv) OR 2. Experience in the capacity of Telecom System Integrator as Specialist Subcontractor(i,iv) must have been substantially(iii) completed between 1st January 2012 and the bid submission deadline, A minimum number of; 1. One Telecommunication work involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects; of value INR 126 Cr.(ii,v) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work. Or 2. Two Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects;

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
				value INR 79 Cr.(ii) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work. "Or 3. Three Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects; each of value INR 63 Cr.(ii) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work. "Single Entity: Must meet requirement In case of JV: All Parties Combined: Must meet requirement Each Member: N/A Lead Member: Must meet minimum 60% of the requirement in terms of value, with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work."	each of value INR 79 Cr.(ii,v) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work. "Or 3. Three Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects; each of value INR 63 Cr.(ii,v) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work. "Single Entity: Must meet requirement In case of JV: All Parties Combined: Must meet requirement Each Member: N/A Lead Member: Must have substantially(iii) completed between 1st January 2012 and the bid submission deadline, minimum of one Telecommunication work involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects; of value INR 63 Cr.(ii,v) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work."
7.	Part-2	Section VIA General Specifications	4.4.9	"The Contractor shall have ERP/SAP for this Contract Management for all the related activities"	Deleted
8.	Part-2	Section VIA General Specifications	6.1.5	Additional Item	6.1.5 The contractor for each package will have to share proportionate cost for PMIS. The recovery of 0.05% of Accepted Contract Amount shall be made from all the Contractors' running bills on account of PMIS cost which includes software, implementation, service, training and maintenance, etc.
9.	Part-2	Section VIA General Specifications	6.2	Document Management System Attachment A2 – Transmittal Form Attachment A3 – DOCUMENT SUBMISSION STATUS REVIEW SHEET	Please find attached revised Attachment A2 and A3 in Annexure – B Revised Forms.
10.	Part-2	Section VIA General Specifications	6 Project Management and Information System	Additional Item	6.3 CONFIGURATION CONTROL The Contractor(s) shall keep the updated Configuration of the System. The Contractor shall implement a Configuration Control System, which scope shall cover documentation, materials and software pertaining to the Metro as a whole. The Configuration of the System shall record the authorized version of any part, piece of software and document related to the System. It shall also record the technical breakdown of the System, including specific configuration of similar items installed at different locations, or performing different functions in the System. This Configuration Control System shall feature all relevant procedures and tools to control and manage all evolutions and anomalies. Such procedures and tools shall be detailed within a Configuration Control Plan, due to be submitted no later than 1 month after the Commencement Date. The Configuration Control Plan should include software configuration, and also the following: • Configurations item definition • Configurations item breakdown • Reference configuration, associated schedule and documentation. A list of configuration items shall be produced as part of the Configuration Control plan, which shall detail, inter alia: • List of last valid specifications • List of valid drawings • List of control and testing procedures • List of valid software All documents shall be recorded featuring: • Title • ID number • Revision number • Validity date

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

<table>
<tr><th>S.No</th><th>Part</th><th>Section</th><th>Clause</th><th>Original Bid condition</th><th>Revised bid condition</th></tr>
<tr><td>11.</td><td>Part-2</td><td>Section VIA General Specifications</td><td>Section VIA General Specifications 12.14.3</td><td>The Contractor shall arrange for all equipment and systems manufactured for incorporation into the Permanent Works to undergo a Factory Acceptance Test (FAT)before shipment from the place of manufacture. Any particular requirements for inspection and testing by the Contractors, Manufacturer, Supplier, Engineer, or other third Party at the place of manufacture are prescribed in the Employer's
Requirements and shall be undertaken at the contractor's Cost</td><td>The Contractor shall arrange for all equipment and systems manufactured for incorporation into the Permanent Works to undergo a Factory Acceptance Test (FAT)before shipment from the place of manufacture. Any particular requirements for inspection and testing by the Contractors, Manufacturer, Supplier, Engineer, or other third Party at the place of manufacture are prescribed in the Employer's
Requirements and shall be undertaken at the contractor's Cost excluding the Travel ,accommodation, Visa and logistics cost of Employer, Engineer or their representative.</td></tr>
<tr><td>12.</td><td>Part-2</td><td>Section VIA Appendices of General Specifications</td><td>Appendix 10 - 1</td><td>Engineer's Main Office
<table>
<tr><th>SN</th><th>Site Offices</th><th>Type of Room</th><th>Size (m2)</th></tr>
<tr><td>1</td><td>Resident Engineer</td><td>1 Room for 1 person</td><td>20</td></tr>
<tr><td>2</td><td>Deputy Resident Engineer</td><td>1 Room for 1 person</td><td>20</td></tr>
<tr><td>3</td><td>Engineer/Employer-1</td><td>1 Room for 1 person</td><td>20</td></tr>
<tr><td>4</td><td>Engineer/Employer-2</td><td>1 Room for 1 person</td><td>20</td></tr>
<tr><td>5</td><td>Meeting Room</td><td>1 large with table</td><td>30</td></tr>
<tr><td>6</td><td>Engineers and Inspectors</td><td>1 Office for 4 persons</td><td>25</td></tr>
<tr><td>8</td><td>Pantry</td><td>1 x Room</td><td>10</td></tr>
<tr><td>9</td><td>Document storage room with Storage Cabinet</td><td>1 No</td><td>20</td></tr>
<tr><td>10</td><td>Toilets</td><td>Male; 2 Cubicles,3 Urinals,2 Sinks 1 Female ;1 Cubicle,2 Urinals ,1 Sink</td><td>30</td></tr>
<tr><td></td><td>Reception,Entrance, Corridors with internal staircase</td><td></td><td>35</td></tr>
<tr><td></td><td>Total</td><td></td><td>220</td></tr>
<tr><td></td><td>Parking for 6 Cars @ 8 m2/ car</td><td></td><td>48</td></tr>
</table>
Total area (Main Office) 268 sq m</td><td>Engineer's Main Office
<table>
<tr><th>S. No.</th><th>Type</th><th>Type of Room</th><th>Total Area m²</th></tr>
<tr><td>1</td><td>Resident Engineer</td><td rowspan="2">01 Room for 02 persons</td><td rowspan="2">10</td></tr>
<tr><td>2</td><td>Deputy Resident Engineer</td></tr>
<tr><td>3</td><td>Telecom Engineer 1</td><td>01 Room for 01 person</td><td>7.5</td></tr>
<tr><td>4</td><td>Telecom Engineer 2</td><td>01 Room for 01 person</td><td>7.5</td></tr>
<tr><td>5</td><td>Engineers and Inspectors</td><td>01 Office for 04 persons</td><td>20</td></tr>
<tr><td>6</td><td>Testing & Commissioning Engineer</td><td>01 Room for 02 persons</td><td>10</td></tr>
<tr><td>7</td><td>Rest Room</td><td>2 separate cubicles and one sink</td><td>7.5</td></tr>
<tr><td>8</td><td>Document Storage Room with Lockers</td><td>01 Room</td><td>15</td></tr>
<tr><td>9</td><td>Meeting Room</td><td>01 Room with Table</td><td>15</td></tr>
<tr><td>10</td><td>Kitchen/Pantry</td><td>01 Room</td><td>7.5</td></tr>
<tr><td>11</td><td>Parking for 06 cars @ 8 m² / car</td><td></td><td>48</td></tr>
</table>
Total area (Main Office) 148 m2</td></tr>
<tr><td>13.</td><td>Part-2</td><td>Section VIA Appendices of General Specifications</td><td>Appendix 10 - 22</td><td>Meeting rooms shall be fitted with flat screen 55in TVs with suitable video conferencing facility like Logitech Rally or Equivalent.</td><td>Meeting rooms shall be fitted with flat screen 55in TVs suitable for projection and video conferencing. Video conferencing facility (e.g.: Logitech Rally bar) and a supporting desktop computer shall also be provided in Meeting room.</td></tr>
<tr><td>14.</td><td>Part-2</td><td>Section VIA Appendices of General Specifications</td><td>Appendix 19 - 10.1 Authentication</td><td>10.1 Authentication
A. The system shall prevent simultaneous logins of a single user.
B. Users shall be automatically logged off after being idle for 15 (fifteen) minutes.
C. PKI-based (strong authentication) shall be implemented based on the environment addressed. For the different core network solutions, some of the following methods shall be used: OTP, token, PKI certificate, smartcard, biometric, machine certificates.
D. The System shall detect the number of consecutive unsuccessful authentication attempts and ignore any authentication attempts when the maximum number of authentication attempts defined by the administrator is reached, i.e., the user account shall be blocked.
E. Authentication attempts shall only be resumed after the administrator explicitly lifts the restriction, or after a predefined timeout.
F. A password policy that enforces, as a minimum, strength and complexity of passwords, as well as expiration time, shall be implemented for all systems.
G. Passwords should be changed frequently. Password history shall be used.
H. User/service authentication shall be based on individual accounts only. No shared accounts are allowed.
I. User authentication information shall not be exposed on any output.
J. No clear text login shall be permitted to any system. The login information shall be cryptographically protected on the network/communications level.</td><td>Deleted</td></tr>
</table>

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
15.	Part-2	Section VIA Appendices of General Specifications	Appendix 19 - 10.3 Authorization and Access Control	Authorization and Access Control K. Security Architecture a. Multi-layered and zone-based network architecture meeting updated industry standards shall be adopted to ensure secure and strong segregation between various environments. b. The various core networks shall be physically separated through a guaranteed one-way traffic mechanism. Logical segmentation for each network shall segregate the internal networks. c. Network segmentation within the various core networks shall be implemented based on the data flow, as will be described in the Concessionaire's Initial risk analysis. The segmentation shall be based on firewalls between the network segments. d. Further to the network segmentation within the core networks, VLANs, Private VLANs and ACLs shall be implemented for the individual operational services. For example, Directory services shall be in a VLAN, separated and filtered from the DLP services. e. Separation of development, test and production environments is required. Data transfer between environments shall be done in a controlled manner. f. Internet access from/to signalling and operational communication networks shall not be permitted. Any access to the Internet shall be achieved only from the ACN and through terminal-based computing (e.g., Citrix). g. Every wireless access network incorporated into the system's infrastructure shall be completely separated from all the core networks and from any other wireless network. h. The separation between the wireless and the core networks shall be obtained on all the levels of system's and include at least a physical separation, Firewall inspection, Dedicated cryptography and VPN tunneling – on the network transport level, communication inspection on the application level. The security measures and architecture of the wireless access networks shall be specifically approved by the CMRL.	Deleted
16.	Part-2	Section VIB Technical Specifications	1.5.8	Additional item	The proposed Manufacturer/OEMs for Telecom system shall have implemented end to end solutions in metro/rail/Airport (Tier-1 Metro Cities) environment. The System shall be currently functional and proof of satisfactory working for a year shall be in the form of a certificate, including details of system in form of supporting documents consisting of LOA, BOQ, Scope of work etc., from the Customer / End User who is presently using the network / for whom the network was set up shall be submitted to the Engineer for Notice of No Objection (NONO). The Manufacturer/OEMs shall be registered in India with service centre to provide after sales service support in India.
17.	Part-2	Section VIB Technical Specifications	1.6.5.1	Telecom Contractor will lay all kind of data cable, OFC and power cable or any other cable required for telecom equipments, third party telecom interfaces and for functioning of video wall, however supply of videowall shall not be under scope of this RFP.	1.6.5.1 Telecom Contractor will lay all kind of data cable, OFC and power cable or any other cable required for telecom equipment and, third party telecom interfaces
18.	Part-2	Section VIB Technical Specifications	1.6.7	Project Office & Storage Space The Contractor will be provided a space at suitable place for Contractor to set up its Site office cum Storage shed / building for storage of telecom equipment and material. The Contractor will construct the Site Office cum storage facility within 2 months of possession of land given by CMRL. The space will be available to the Contractor till end of Defect Liability Period. The Contractor shall be responsible for the erection of site offices. The Contractor shall arrange for the utilities and any facilities and resources necessary to operate the site. The Contractor shall be responsible for all costs of running the site offices, including but not limited to: utilities, consumables, office supplies, cleaning and maintenance.	Project Office & Storage Space The Contractor shall make his own arrangements ,at his own cost, for Project office and Storage facilities (exclusively)at project location for the CMRL Phase 2 Permanent Works, equipment and materials of all kinds intended for use in carrying out the Works or for incorporation into the Works throughout the contract period. The Contractor shall provide facilities (Near to project location) and resources necessary for the Engineer and the Employer in the site office as per GS Appendix 10 at his own cost throughout the contract period. The contractor shall be responsible for Security & Safety within designated areas provided. The Contractor shall be responsible for all costs of running the entire site offices, including but not limited to utilities, consumables, office supplies, cleaning, and maintenance.
19.	Part-2	Section VIB Technical Specifications	1.6.7.1	Telecom Contractor shall be required to set up project office at project location & necessarily have to station at this Project Site Office throughout the contract period. The key personnel for Project Management, Procurement, Design, implementation, Site-co-ordination, Interface, Quality & Assurance, Testing and Commissioning, Maintenance etc. shall also station at project office and shall submit a list for the same to review.	The key personnel for Project Management, Procurement, Design, implementation, Site-co-ordination, Interface, Quality & Assurance, Testing and Commissioning, Maintenance etc. shall station at project office throughout the contract period and shall submit a list for the same to review.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
20.	Part-2	Section VIB Technical Specifications	1.7.2.8	Additional Item	1.7.2.8 RAM Requirements Verification a. The achievement of the RAM requirements is measured during the Performance Checking Period. If the System does not prove during the Performance Checking Period its ability to satisfy the RAM requirements, the Performance Checking Period can be renewed by the Employer. In that case, the Contractor shall improve the System at no additional cost for the Employer until the System reaches the specified RAM requirements. b. For the purposes of Reliability and Availability calculations, the Contractor shall assume that the service operating hours are 19 hours per day (05:00 to 00:00) for 365 days a year. The availability of the Telecom Systems shall be demonstrated by the Contractor in accordance with the processes defined in the Specification. The Reliability and Availability figure as described in Para below shall be reached by the end of the stabilization period from revenue operation. The Reliability and Availability figures shall be calculated, after the stabilization period, and the contractor shall demonstrate that the figures are met over 6 consecutive months of observation. If the figure is not met over 6 consecutive months by the end of DLP period then the DLP for that section shall be extended by 1 month each for all Telecom Subsystems of that stage, every time till the requirement of achieving figures over 6 consecutive months is reached. c. Stabilization period for a fleet of Telecom system shall commence from the Revenue Operation Date till a maximum of 9 months. In the stabilization period, the system shall necessarily achieve minimum 33% of the reliability and availability targets consistently by the end of 3 months (maximum) from the Revenue operation data. At the end of 6 months (maximum), the system shall achieve minimum 66% of the reliability and availability targets consistently. The contractor shall notify the Engineer the end of the stabilization period so that the Reliability and Availability calculations for achieving the contractual targets.
21.	Part-2	Section VIB Technical Specifications	1.7.4.12	Table 1.4: MTBF of the Major Systems	Please find revised Table 1.4: MTBF of the Major Systems in Annexure-D MTBF Figures.
22.	Part-2	Section VIB Technical Specifications	1.9.8.4	1.9.8.4 All MMIs in the SCR, Security room, shall be extended through Line Extenders from their respective Severs / PCs / Workstations kept in the TERs/CERs.	1.9.8.4 Deleted.
23.	Part-2	Section VIB Technical Specifications	1.11.2 (d)	(d) A separate integrated test facility including all equipment's to be installed at Telecom lab at Depot. These small test set-ups should be capable to demonstrate various functionalities for all Telecom systems and meet our above requirements. This test set-up to be functional and should be handed-over to employer after integrated testing.	d) A separate integrated test facility including all equipment's to be installed at OCC (Offline integration test platform/Telecom Lab). These small test set-ups should be capable to demonstrate various functionalities for all Telecom systems and meet our above requirements. This test set-up to be functional and should be handed over to employer after integrated testing.
24.	Part-2	Section VIB Technical Specifications	1.14.1.20	Interior of cabinets or boxes, all exposed screws shall be Stainless steel flat or oval head.	Interior of cabinets or junction boxes, all exposed screws (flat or oval head) shall be Stainless steel
25.	Part-2	Section VIB Technical Specifications	1.14.1.24	All cable laying, cable termination, containment laying, fixture and equipment installation to be done as per approved method statements. CAT 6A STP Cable shall comply with all standards of structural cabling.	All cable laying, cable termination, containment laying, fixture and equipment installation to be done as per approved method statements. CAT 6 STP Cable shall comply with all standards of structural cabling.
26.	Part-2	Section VIB Technical Specifications	1.14.1.28	Additional Clause	Please refer Annexure-E Enclosure Specifications.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
27.	Part-2	Section VIB Technical Specifications	1.14.6.4	…. In Elevated / At-Grade Sections, in case Optic Fiber cable is laid on the viaduct in the cable duct, then the Contractor shall provide it in a rugged "permanently solid lubricated" HDPE telecom duct of minimum diameter of 40 mm (Outer) / 33 mm (Inner) with material characteristic as per TEC Specifications along with the accessories. HDPE Telecom duct as per TEC specifications shall be buried at a depth of 1.2 meters in the At Grade Sections or properly laid over Cable Hangers / Trenches and suitably supported / fixed on Elevated Sections (where the duct is not available).	In Elevated / At-Grade Sections/UG sections, the Primary cable containment along the track side is in the form of L angle support/Cable hangers (Viaduct and tunnel in every 600-700 mm interval) shall be provided in by Civil Contractor. Telecom contractor shall provide a rugged "permanently solid lubricated" HDPE telecom duct of minimum diameter of 40 mm (Outer) / 33 mm (Inner) with material characteristic as per TEC Specifications along with the accessories for laying the Telecommunication cable. HDPE Telecom duct as per TEC specifications shall be laid over Cable Hangers / L angle supports and suitably supported / fixed (where L angle support/Cable hangers are provided). The HDPE Duct shall be LSZH (low smoke zero halogen) type to install at the tunnel area underground section'.
28.	Part-2	Section VIB Technical Specifications	2.1.6	OCC & BCC PAS/PIDS and its application software shall not be in scope of this RFP and shall be provided by other Contractor	PAS/PIDS Software (Central software, Display application, PIDS/PAS HMI application, Management Software) deployed at OCC/BCC and Stations shall not be in scope of this RFP and shall be provided by another Contractor.
29.	Part-2	Section VIB Technical Specifications	2.1.7	2.1.7 PAS/PIDS system at stations shall be interfaced for integration with Centralised Management Software and station client application, which shall be provided by Other Designated contractor.	2.1.7 Contractor shall deploy the PIDS/PAS application provided by the OCC/BCC contractor on the PIDS/PAS HMI in stations.
30.	Part-2	Section VIB Technical Specifications	2.1.8	Station PAS/PIDS systems shall be interfaced on open API's seamlessly with central PAS/PIDS management software for Central system and station client application.	PIDS/PAS HMI application shall be interfaced with station PAS to broadcast system triggered and operator initiated clear and audible, live voice announcements, pre-recorded speech messages to individual zones or a combination of zones throughout station.
31.	Part-2	Section VIB Technical Specifications	2.1.12	This is Telecom Contractor's responsibility to interface with S&TC Contractor to realize integrated PAS / PIDS information for scenario based train movement e.g. bunching of Trains, Bi-directional Train Movement, short loop train movement, Non Stopping Trains, intermediate station as terminal station etc. The details shall be finalized during detailed design / interface design	This is Telecom Contractor's responsibility to interface with OCC/BCC Contractor with required APIs to realize integrated PAS / PIDS information for scenario-based train movement e.g. bunching of Trains, Bi-directional Train Movement, short loop train movement, Non Stopping Trains, intermediate station as terminal station etc. Contractor shall finalize interface requirements during the design.
32.	Part-2	Section VIB Technical Specifications	2.2.	OCC & BCC PAS/PIDS and its application software shall not be in scope of this RFP and shall be provided by other Contractor PIDS/PAS central server for all 3 Corridors of CMRL phase 2 shall be located in the OCC & BCC TER, which shall be connected to the PIDS/PAS Corridor server (for each corridor) and further to PAS/PIDS work station at station via the data transmission system. Details of Centralised Passenger Information System is given for reference in Appendix A of this TS.	OCC & BCC PAS/PIDS and its application software shall not be in scope of this RFP and shall be provided by another Contractor. PIDS/PAS central server for all 3 Corridors of CMRL phase 2 shall be located in the OCC & BCC TER. ASA-05 Contractor shall deploy the PIDS/PAS application provided by the OCC/BCC contractor on to PAS/PIDS workstation in SCR, which shall be connected to the PIDS/PAS central server at OCC/BCC via the data transmission system. Details of Centralised Passenger Information System is given for reference in Appendix A of this TS.
33.	Part-2	Section VIB Technical Specifications	2.2.1	Corridor Server shall be capable to provide redundancy for minimum three stations in case of station HMI fails.	Corridor Server is envisaged to manage the station PAS/PIDS during the failure of PAS/PIDS workstation. During the failure of PAS/PIDS workstation, Corridor servers shall handle the PAS interface and ensure broadcast of system triggered and operator (OCC/BCC) initiated announcements and messages in PAS and PIDS. Corridor server shall be capable to handle three concurrent failures of PAS/PIDS workstation. The PAS system and Corridor server hardware supplied under ASA-05 shall support implementation of this functionality. Any alternate solution, which can handle the single point failure of station PA/PIDS hardware without affecting the broadcast of system triggered and operator (OCC/BCC) initiated announcements and messages in PAS and PIDS interface is acceptable.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
34.	Part-2	Section VIB Technical Specifications	2.4.1	Scope of Supply for PAS System This System shall include, but not be limited to, the following: (a) Integrated PAS/PIDS control equipment (b) Audio switching matrix functionality (c) Digital voice announcers and recorders functionalities (d) PAS / PIDS integrated MMIs (e) PAS backup Goose Neck Desktop Microphone (f) PAS Control Panels (g) Microphones (h) Pre-amplifiers and power amplifiers (i) Digital Equalizer Functionality (j) Noise sensing devices and automatic level control equipment (k) Voice and data communication equipment (l) Loudspeakers and line impedance matching transformers (m) All software required for the operation of the PAS (n) Testing and commissioning (o) Distribution frames for Speaker Circuits (p) Equipment cabinets, racks and cubicles (q) Mounting brackets, 19" blank Plates and installation materials (r) All equipment power supplies, cables, connectors, accessories, cabling and earthing necessary for the works (s) Any other item to complete the scope of Telecom contract (t) Voltage Free Dry contacts for Fire Alarm System Integration	Scope of Supply for PAS System This System shall include, but not be limited to, the following: (a) Integrated PAS/PIDS control equipment (b) Audio switching matrix functionality (c) Digital voice announcers and recorders functionalities (d) PAS / PIDS integrated MMIs (e) PAS backup Goose Neck Desktop Microphone (f) PAS Control Panels (g) Microphones (h) Pre-amplifiers and power amplifiers (i) Digital Equalizer Functionality (j) Noise sensing devices and automatic level control equipment (k) Voice and data communication equipment (l) Loudspeakers and line impedance matching transformers (m) All software required for the operation of the PAS (n) Testing and commissioning (o) Distribution frames for Speaker Circuits (p) Equipment cabinets, racks and cubicles (q) Mounting brackets, 19" blank Plates and installation materials (r) All equipment power supplies, cables, connectors, accessories, cabling and earthing necessary for the works (s) Any other item to complete the scope of Telecom contract (t) Voltage Free Dry contacts for Fire Alarm System Integration (u) Audio-Frequency Induction-Loop Systems (AFILS)
35.	Part-2	Section VIB Technical Specifications	2.5.7.4	The PAS shall have two audio matrix switches/controller (as Matrix Switch A & Matrix Switch B) in at each node with each controller controlling separate PAS circuits	The PAS shall have minimum two audio matrix switches/controller (as Matrix Switch A & Matrix Switch B) in at each node with each controller controlling separate PAS circuits or matrix switches/controller shall be configured in redundant manner such that switch over between controllers shall not exceed 5 s for all required functionalities.
36.	Part-2	Section VIB Technical Specifications	2.7.1.8	(c) All Speakers should be complaint to IP 65 rating and installation to be done to protect inside circuitry and cable termination from water and dust ingress All speakers shall be compliant to following Room Speaker - IP 34, Indoor Speaker - IP 54 and Outdoor and Platform (Elevated Stations) Speaker -IP65 rating and installation to be done to protect inside circuitry and cable termination from water and dust ingress.	2.7.1.8 (C) All speakers shall be compliant to following: Room Speaker - IP 34, Indoor Speaker (areas with coverings like platforms, sheds etc.) - IP 54 and Outdoor Speaker - IP65 rating and installation to be done to protect inside circuitry and cable termination from water and dust ingress.
37.	Part-2	Section VIB Technical Specifications	2.7.2.1.9	The audio matrix switch shall be fail safe and shall be capable of being manually/automatically bypassed to maintain all zone broadcast availability, if necessary on failure of the audio matrix switch. There should be 2 Audio Matrix Switch at every station for redundancy.	The audio matrix switch shall be fail-safe and shall be capable of being manually/automatically bypassed to maintain all zone broadcast availability, if necessary, on failure of the audio matrix switch. There should be minimum 2 Audio Matrix Switch at every station for redundancy.
38.	Part-2	Section VIB Technical Specifications	2.7.2.8.2	A power amplifier shall be provided for each audio distribution line feeding alternate speakers in a zone.	Each PAS zone shall be fed by two separate and dedicated 'A' and 'B' distribution networks with each wired to independent amplifiers.
39.	Part-2	Section VIB Technical Specifications	2.7.2.12.5	In areas with coverings (Platforms, sheds etc.) the loudspeakers shall be dust proof and water proof to IP 54 standard. But in open areas where loudspeakers will be exposed to rain, the loudspeaker shall be dust proof and waterproof to IP 65 standard.	Deleted
40.	Part-2	Section VIB Technical Specifications	2.7.2.14.2	Suitable battery rack shall be provided in PAS rack even in the condition of total failure and Individual PAS rack shall be equipped with individual batteries.	The design of the Power supply arrangement of the PA/VA system shall comply with requirements of BSEN 54-4 Fire Detection and Fire Alarm Systems. Power Supply Equipment. High quality, Li-ion batteries to withstand 1 hour of Fire alarm announcement shall be provided which shall be suitable for continuous operation for a minimum period of 10 years in a tropical environment whilst maintaining the required load capacity as stated above in case batteries are used.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
41.	Part-2	Section VIB Technical Specifications	2.7.2.17	Additional Clause	Audio Frequency Induction Loops a) Audio-Frequency Induction-Loop Systems (AFILS) shall be provided and shall be installed for PA/VA System broadcasts in each of the following station areas: i) On each platform adjacent to the PIDS display. ii) In the Ticket Hall adjacent to the PIDS display. b) The Induction Loop facilities shall include the following: i) Compliance to BS EN 60118-4 Magnetic Field Strength in Audio-Frequency Induction Loops for Hearing Aid Purposes. ii) The Induction Loop facilities shall enable all PA/VA broadcasts including Emergency and Non-Emergency, live and pre-recorded, to be heard by those with impaired hearing and who are equipped with suitable hearing aids, switched to 'T'. iii) A wall mounted Signage of Induction loop symbol of size 1 meter x 0.5 meter shall be installed in each location with a functional audio induction loop on the perimeter. The Induction Loop amplifiers shall be positioned for ease of maintenance and access. iv) The Induction Loops at PIDS displays in the Ticket Hall and on platforms shall provide full coverage, in the listening plane for those standing and seated at one meter from the signage. The location of the Induction Loops shall enable customers to listen to the PA announcements whilst simultaneously reading the PIDS displays. c) The design of the Induction Loop installation shall take account the following factors: i) Shall be wall mounted subject to any constraints on loop operation and propagation. ii) Publicly recognized signage placed in a prominent place to clearly mark the information/requirements for those with impaired hearing. iii) Positioned to facilitate maintenance and avoid metalwork. iv) Positioned to avoid electrical interference from other equipment and/or cables. d) Installation Pre-requisites: i) Prior to finalizing the Induction Loop installation design, the Contractor shall provide a report from the findings of an EMC review to establish any potential interference, which the Induction Loop installation may cause to other railway equipment such as the Signalling Systems, etc. ii) The Contractor shall establish the most appropriate locations for the Induction Loops by reviewing the site layout and construction drawing. iii) The Contractor shall recommend the Induction Loop types, Induction Loop locations, installation details and power amplification required.
42.	Part-2	Section VIB Technical Specifications	3.2	3.2 Contractor's Scope of Supply and Services The Contractor shall design, supply, install, test and commission all stations and Depot equipment., cables, materials and interfaces required to complete the Works for the Passenger Information Display system, as described herein. OCC & BCC PAS/PIDS and its application software shall not be in scope of this RFP and shall be provided by other Contractor PAS/PIDS system at stations shall be interfaced for integration with Centralised Management Software and station client application, which shall be provided by Other Designated contractor.	OCC & BCC PAS/PIDS and its application software shall not be in scope of this RFP and shall be provided by another Contractor. PAS/PIDS system at stations shall be interfaced for integration with Centralised Management Software and station client application, which shall be provided by Other Designated contractor. ASA-05 and the other designated contractor shall share the required interface inputs such as API, DLL, Technical support etc. as per the respective scope of Supply.
43.	Part-2	Section VIB Technical Specifications	3.3.1.6	Corridor server shall act as redundant machine for station HMI and capable to provide redundancy for minimum 3 stations in case of station HMI fails PIDS/PAS Station Work Station/Client Terminal	Corridor Server is envisaged to manage the station PAS/PIDS during the failure of PAS/PIDS workstation. During the failure of PAS/PIDS workstation, Corridor servers shall handle the PAS interface and ensure broadcast of system triggered and operator (OCC/BCC) initiated announcements and messages in PAS and PIDS. Corridor server shall be capable to handle three concurrent failures of PAS/PIDS workstation. The PAS system and Corridor server hardware supplied under ASA-05 shall support implementation of this functionality. Any alternate solution, which can handle the single point failure of station PA/PIDS hardware without affecting the broadcast of system triggered and operator (OCC/BCC) initiated announcements and messages in PAS and PIDS interface is acceptable.
44.	Part-2	Section VIB Technical Specifications	3.3.2.3	52" or better TFT/LED Backlit LCD Full HD Display Panel to be housed in IP 65 housing with proper arrangement of power and data cable termination. Housing for TFT/LED Backlit LCD Full HD Display Panel to be certified by OEM. Housing must be having side/front openable panels so that each panels can be accessed during the installation & maintenance.	40" or better TFT/LED Backlit LCD Full HD Display Panel to be housed in IP 65 housing with proper arrangement of power and data cable termination. Housing for TFT/LED Backlit LCD Full HD Display Panel to be certified by OEM. Housing must be having side/front openable panels so that each panel can be accessed during the installation & maintenance.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
45.	Part-2	Section VIB Technical Specifications	3.3.14.2	3.3.14.2 One Local server will be installed at TERs in each station	Deleted
46.	Part-2	Section VIB Technical Specifications	3.3.14.3	(i)Indicative quantity of Display Boards to be provided at stations is as under: (a) 01 no double sided 52 " TFT/LED Backlit LCD Full HD of IP65 rating per Platform (b) 2 Nos. Single Sided, 52 " TFT/LED Backlit LCD Full HD of IP 54 rating for Station's any other areas such as Concourse /Mezzanine, TOM, Entry/Exit, with IP 54 Housing & Accessories (ii) Interchange/Double stack Station: (a) other than station's each platform and each concourse as per above (i) mentioned quantities ,01 single sided 52 " TFT/LED Backlit LCD Full HD of IP65 Displays at each walkways, entry/ exit,multimodal / other metro line transfer area/ interchange station Telecom Contractor to interface with other designated contractor (appointed by CMRL) to display information about multimode transport, other metro lines at interchange / transfer areas. Notes: 1. Number of display boards (single / double sided) along with exact location i.e. platform, other public areas, etc. shall comply with all visibility and other requirements and will be submitted by the Contractor for Employer's approval. 2. The HMIs for PIDS system will have remote operator access to the PIDS displays of all the stations. The HMI shall have a suitable GUI to select the PIDS display boards in following hierarchy: a) Line b) Station c) PIDS Display screens at OCC. 3. It shall also be possible to have individual HMIs for remote operator access to the PIDS displays for use by different controllers. 4. All HMI operations shall be tested from OCC and Station Control Rooms (SCR) prior to being brought into operational service.	(i) Indicative quantity of Display Boards to be provided at stations is as under: (a) 01 no double sided minimum 40" TFT/LED Backlit LCD Full HD of IP65 rating per Platform (b) 2 Nos. Single Sided, minimum 40" TFT/LED Backlit LCD Full HD of IP 54 rating for Station's any other areas such as Concourse /Mezzanine, TOM with IP 54 Housing & Accessories (ii) Interchange/Double stack Station: (a) other than station's each platform and each concourse as per above (i) mentioned quantities ,01 single sided minimum 40" TFT/LED Backlit LCD Full HD of IP65 Displays at each walkways, multimodal / other metro line transfer area/interchange station. Telecom Contractor to interface with other designated contractor (appointed by CMRL) to display information about multimode transport, other metro lines at interchange / transfer areas. Notes: 1. Number of display boards (single / double sided) along with exact location i.e., platform, other public areas, etc. shall comply with all visibility and other requirements and will be submitted by the Contractor for Employer's approval. 2. The HMIs for PIDS system will have remote operator access to the PIDS displays of all the stations. The HMI shall have a suitable GUI to select the PIDS display boards in following hierarchy: a) Line b) Station c) Individual or Combination of PIDS Display screens at OCC. 3. It shall also be possible to have individual HMIs for remote operator access to the PIDS displays for use by different controllers. 4. All HMI operations shall be tested from OCC and Station Control Rooms (SCR) prior to being brought into operational service.
47.	Part-2	Section VIB Technical Specifications	3.3.6.3	Additional Item	PIDS Management system shall have the provision to change the station names in PIDS display and Database by end user.
48.	Part-2	Section VIB Technical Specifications	3.3.15.16.3	Specifications of TFT/LED Backlit LCD Full HD Display Panel: a) Minimum size for active area of the PIDS display for concourse and platform shall be minimum 52 inches	Specifications of TFT/LED Backlit LCD Full HD Display Panel: a) Minimum size for active area of the PIDS display for concourse and platform shall be minimum 40 inches. The proposed display shall comply the Viewing distance of 15m for concourse and 35m for platform.
49.	Part-2	Section VIB Technical Specifications	3.3.15.24.2	This information shall be processed and communicated by the PAS/PIDS central server to the PAS/PIDS corridor servers and then to be dispatched to station's PAS/PIDS Client terminal following customer information to be displayed and announced at the appropriate locations throughout the stations.	This information shall be processed and communicated by the PAS/PIDS central server to the PAS/PIDS workstation and then to be displayed and announced at the appropriate locations throughout the stations.
50.	Part-2	Section VIB Technical Specifications	3.4.2.1	3.4.2.1 The PIDS management system shall be equipped with Linux/ WINDOWS based operating system to support the specified management functions. This is contractor's responsibility to commission., test and handover (after DLP) the system with latest Operating system, firm wares and software versions as scope of work.	3.4.2.1The PIDS management system shall be equipped with Linux/ WINDOWS based operating system to support the specified management functions. This is contractor's responsibility to commission, test and handover (after DLP) the system with functional OS/firmware/software versions requirements, as per scope of work.
51.	Part-2	Section VIB Technical Specifications	4.1.2.3(d)	Long range PTZ/Fixed CCTV cameras with night vision facility shall be provided at the edge of the platforms with SOD Compliance which would be pointing towards the viaduct covering min. 150 mtrs. on each side of via duct/tunnel of station.	Long range PTZ/Fixed CCTV cameras with night vision facility shall be provided at the edge of the platforms with SOD Compliance which would be pointing towards the viaduct covering min. 150 mtrs. on train entering side of via duct of station. Similar cameras shall be provided at the start of the Tunnel, both entering and exit side of the tunnel, with SOD Compliance which would be pointing towards the Tunnel covering min. 150 mtrs

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
52.	Part-2	Section VIB Technical Specifications	4.1.2.4	4.1.2.4 The station (including RSS, Parking & specifically identified theft prone track area) surveillance CCTV system both live and recorded videos shall be accessed simultaneously from the following locations as a minimum: (a) At station from Station Control Room & Station Security Control Room (b) At OCC/BCC from OCC/BCC controllers (traffic controllers / Chief Controller / Asst Chief Controllers etc.) & Security Controller of the concerned OCC / BCC Failure of one of them shall not affect the monitoring at the others. For efficient space management inside control rooms, Workstations with integrated CPU and monitor shall be preferred else items such as workstation (CPU) shall be located only in the TER or CER and the videos to SCR/ SSCR/ Controllers are to be extended by using suitable KVM extender without compromising the video quality	4.1.2.4 "The station (including RSS, Parking & specifically identified theft prone track area) surveillance CCTV system both live and recorded videos shall be accessed simultaneously from the following locations as a minimum. (a) At station from Station Control Room & Station Security Control Room (b) At OCC/BCC from OCC/BCC controllers (traffic controllers / Chief Controller / Asst Chief Controllers etc.) & Security Controller of the concerned OCC / BCC Failure of one of them shall not affect the monitoring at the others.
53.	Part-2	Section VIB Technical Specifications	4.1.3.2.1 - 22	The scope of supply for the IP based CCTV system shall include, but not be limited to the following: 22. Vehicle Depot Entry/Exit CCTV cameras with ANPR facility and it shall be monitor and record information of entry/exit of vehicles.	4.1.3.2.1 (22) - Deleted
54.	Part-2	Section VIB Technical Specifications	4.1.3.2.1 - 23	The scope of supply for the IP based CCTV system shall include, but not be limited to the following: 23. One UVSS camera at depot entry for visitor's vehicles.	4.1.3.2.1 (23) - Deleted
55.	Part-2	Section VIB Technical Specifications	4.1.3.2.1 - 24	The scope of supply for the IP based CCTV system shall include, but not be limited to the following: 24. Provision of CCTV Cameras at Depot – Mainline train Entry/Exit for UVSS (Under vehicle surveillance) facility both for up and down tracks.	4.1.3.2.1 (24) - Deleted
56.	Part-2	Section VIB Technical Specifications	4.1.3.3.2	4.1.3.3.2 For RSS connectivity, HDPE pipe / duct (2 x 100 mm diameter) shall be provided by Telecom contractor for laying of optical fiber cable from RSS to the nearest station for RSS CCTV video integration. Telecom contractor shall coordinate timely with electrical contractor for laying of fiber cables for the RSS connectivity. In case Telecom fails to coordinate / interface with electrical contractor, then trenching, ducting, road cutting and related approvals from the local authorities, for laying of optical fiber cable from RSS to the nearest station etc. to be done totally by Telecom as part of this contract	4.1.3.3.2 - Deleted
57.	Part-2	Section VIB Technical Specifications	4.1.3.3.5	CCTV Cameras (1 No. per zone) Shall be assigned to record ambience audio announcement.	CCTV Cameras (1 No. per audio zone as per PAS system design) Shall be assigned to record ambience audio announcement in the VMS. Camera specifications other than inbuilt mic shall be referred same as per clause 4.2.6.2.
58.	Part-2	Section VIB Technical Specifications	4.1.5.1.16	CCTV Camera resolution shall be automatically adjustable while selecting/deselecting screens in CCTV HMI.For single screen/Image ,full camera resolution shall be available for viewing at full HD HMI monitor and Video wall.	4.1.5.1.16 CCTV Camera resolution shall be both automatically and manually adjustable while selecting/deselecting screens in CCTV HMI. For single screen/Image, full camera resolution shall be available for viewing at full HD HMI monitor and Video wall.
59.	Part-2	Section VIB Technical Specifications	4.1.4.2	The Contractor shall ensure that the CCTV system equipment supplied under the Contract shall comply with the reliability figures here in: CCTV System Equipment MTBF(Hours) per unit Station and central equipment > 50,000 IP Fixed Cameras > 60,000 PTZ cameras > 25,000 Video recording equipment > 50,000 Video Display Units (monitors) > 35,000	4.1.4.2 The Contractor shall ensure that the CCTV system equipment supplied under the Contract shall comply with the reliability figures here in: CCTV System Equipment MTBF(Hours) per unit Station and central equipment > 60,000 IP Fixed Cameras > 60,000 PTZ cameras > 60,000 Video Display Units (monitors) > 50,000
60.	Part-2	Section VIB Technical Specifications	4.1.5.1.8	System shall use video signals from various types of indoor / outdoor IP cameras installed at different locations, process them for viewing on workstations / monitors simultaneously at Central Control Room (OCC & BCC) and local control rooms (SCR and at Station Security room) at each station. Network Video Recording system shall provide local recording at OCC itself and mirrored recording (at BCC) for all CMRL Corridor 4 stations. Joystick and mouse-keyboard controllers shall be used for Pan, Tilt, Zoom and other functions of desired PTZ cameras. The configuration of the cameras, monitors / workstations shall be provided from the OCC, BCC and any other locations simultaneously.	4.1.5.1.8 System shall use video signals from various types of indoor / outdoor IP cameras installed at different locations, process them for viewing on workstations / monitors simultaneously at Central Control Room (OCC & BCC) and local control rooms (SCR and at Station Security room) at each station. Network Video Recording system shall provide local recording at OCC itself and mirrored recording (at BCC) for all CMRL Corridor 4 stations. Mouse-keyboard controllers shall be used for Pan, Tilt, Zoom and other functions of desired PTZ cameras. The configuration of the cameras, monitors / workstations shall be provided from the OCC, BCC and any other locations simultaneously.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
61.	Part-2	Section VIB Technical Specifications	4.1.7	4.1.7 CCTV Standards 4.1.7.1 The TV standard to be employed shall be ITU-T, PAL, 30 frames per second with progressive scan.	4.1.7 CCTV Standards 4.1.7.1 The Display standard to be employed shall be 4K UHD of size minimum 40 inch for CCTV system.
62.	Part-2	Section VIB Technical Specifications	4.2.1.8	The CCTV system shall be designed for viewing simultaneously at the SCR, Security Room at the station. Depot Control Centre / Depot Security Control at the depot, Metro Headquarter and from the OCC / BCC at full frame rate. Frame rates shall be variable from 1 to 25 frames per second and resolution values shall be fully selectable to include CIF and 4CIF or better. The ability to select the frame rate (1 to25 fps) and resolution (1 to 4 CIF or better) will apply to monitoring as well as recording. The viewing shall be variable at 4CIF 25 fps or better. Camera recording resolution shall be at Full HD. The normal full HD 25 fps shall determine the size of the storage device. Recoding shall be mirrored at stand by site NVR at the same frame rate and resolution.	The CCTV system shall be designed for viewing simultaneously at the SCR, Security Room at the station. Depot Control Centre / Depot Security Control at the depot, Metro Headquarter and from the OCC / BCC at full frame rate. Frame rates shall be variable from 1 to 25 frames per second and resolution values shall be fully selectable from 1 CIF to Maximum resolution offered by the camera. The ability to select the frame rate (1 to25 fps) and resolution (1 CIF to Maximum resolution offered by the camera) will apply to monitoring as well as recording. The HMI shall automatically switch over from higher to lower quality streams when the user changes from single camera to multi-camera views duly honouring the 4K resolution of the HMI Display.
63.	Part-2	Section VIB Technical Specifications	4.2.5.4	All Cameras must have Alarm In/Out	Cameras specific to interface requirement shall have Alarm In/Out.
64.	Part-2	Section VIB Technical Specifications	4.2.5.5	All Cameras support 256 GB SD card Slot	Deleted
65.	Part-2	Section VIB Technical Specifications	4.2.6(i)	4.2.6 High Definition IP Fixed Box Camera (Day / Night): Supported Protocols:Telnet,FTP,TCP/IP, UDP/IP(Unicast, Multicast IGMP), IPv4/IPv6, SNMP, SNT, RSTP, ONVIF etc. or as required to fulfill the functional requirement of project.	4.2.6 High Definition IP Fixed Box Camera (Day / Night): (i) FTP, TCP/IP, UDP/IP (Unicast, Multicast IGMP), IPv4/IPv6, SNMP, SNT, RTSP, ONVIF etc. or as required to fulfil the functional requirement of project.
66.	Part-2	Section VIB Technical Specifications	4.2.6	4.2.6 High Definition IP Fixed Box Camera (Day / Night): Table:4.4 F.Data Rate:64 Kbps to 8 Mbps	4.2.6 High-Definition IP Fixed Box Camera (Day / Night): F. Data Rate:64 Kbps to 4 Mbps
67.	Part-2	Section VIB Technical Specifications	4.2.6.1	4.2.6.1 High Definition IP Fixed Dome Camera (Day/Night); Table:4.5 6.Data Rate :64Kbps to 8Mbps	4.2.6.1 High-Definition IP Fixed Dome Camera (Day/Night); Table:4.5 6. Data Rate :64Kbps to 4Mbps
68.	Part-2	Section VIB Technical Specifications	4.2.6.1	22. Storage Temp : -20°C to +70°C	22. Storage Temperature: 0°C to +60°C
69.	Part-2	Section VIB Technical Specifications	4.2.6 - E	Video resolution - Minimum 5 Mega pixels for 16:9 format, it shall be possible to configure camera in lower resolution	4.2.6 High-Definition IP Fixed Box Camera (Day / Night): E. Video resolution - Minimum 5 Mega pixels for 4:3 and 3.7 MP for 16:9 format, it shall be possible to configure camera in lower resolution
70.	Part-2	Section VIB Technical Specifications	4.2.6.2	4.2.6.2 High Definition IP Fixed Bullet Camera (Day / Night): Table:4.6 E.Data Rate-64Kbps to 8Mbps	4.2.6.2 High-Definition IP Fixed Bullet Camera (Day / Night): Table:4.6 E. Data Rate-64Kbps to 4Mbps
71.	Part-2	Section VIB Technical Specifications	4.2.6.2	Angular Filed of View H : 180.° ~ 35° / V : 70° ~ 25.0° / D : 120.0° ~ 45°	Angular Filed of View minimum H: 88° ~ 26° / V: 65° ~ 20.0° / D: 90.0° ~ 55°

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
72.	Part-2	Section VIB Technical Specifications	4.2.6.3	Lens Focal Length Angular Filed View 5.0~100 mm or better. H : 60°(Wide) ~ 3°(Tele) / V : 35°(Wide) ~ 1.75°(Tele)	Lens Focal Length 5.0~100 mm or better. Angular Filed View minimum H: 55.3°(Wide) ~ 3°(Tele) / V: ~32.2°(Wide) ~ 1.8° (Tele)
73.	Part-2	Section VIB Technical Specifications	4.2.6.3	4.2.6.3 High Speed, High Definition IP PTZ Dome Camera (Day / Night); Table :4.7 F.Data Rate:512 Kbps to 8 Mbps	4.2.6.3 High Speed, High-Definition IP PTZ Dome Camera (Day / Night); Table :4.7 F. Data Rate:64Kbps to 4Mbps
74.	Part-2	Section VIB Technical Specifications	4.3.	4.3 CCTV Video analytics.	Please find Annexure I for the revised section 4.3 CCTV Video analytics.
75.	Part-2	Section VIB Technical Specifications	5.1.1.8	A highly secure and reliable Access Control and Intrusion Detection System, with fast response times, shall be installed throughout the Metro premises. Vehicular and pedestrian barrier - Each depot entries & exits shall be provided with vehicular and pedestrian barriers (as required). Size, number of barrier / specifications shall be decided at the time of detail design;	Deleted
76.	Part-2	Section VIB Technical Specifications	5.1.2.6	Low Security Zone In the low security zone, railway company staff/visitor shall enter buildings through the security gate with holding the staff pass / visitor's IC card. The visitor's IC card shall be collected at the time of exit.	Low Security Zone In the low security zone, railway company staff/visitor shall enter Depot buildings through the security gate with holding the staff pass / visitor's pass. The contractor shall provide network provisions (OAIT and FOTS ports) and Power provisions for implementation of Vehicular and pedestrian barrier adjacent to the Depot Main Entry and Exit gates by Employer at later stage.
77.	Part-2	Section VIB Technical Specifications	5.1.2.7	Middle Security Zone In the middle security zone, railway company staff/visitor shall enter facilities/rooms in accordance with the security permission given in advance. The security permission shall be set in the staff pass/visitor's IC card.	Middle Security Zone In the middle security zone, railway company staff shall enter facilities/rooms in accordance with the security permission given in advance. The security permission shall be set in the smart card. The entry to the rooms shall be restricted with smart card.
78.	Part-2	Section VIB Technical Specifications	5.1.2.8	High Security Zone In the high security zone, railway company staff shall be restricted with security permission in advance in staff/visitor's IC card and/or a biometric authentication such as fingerprint authentication. The biometric authentication shall be equipped in a. SCR (Station Control Room), b. Station's SER, c. Station's CER d. ASS/TSS room of each station, e. ASS/TSS rooms at each Depot f. Entrance & Peripheral Gates in Depot g. RSS buildings h. DCC (Depot Control Centre) room i. CER at Depot j. SER at Depot k. Tunnel portal l. Telecom Closet rooms at stations	High Security Zone In the high security zone (Critical equipment and control rooms like Station/Depot Control room, TER/CER, SER, TSS, ASS and UPS room railway company staff shall be restricted with smart card, fingerprint and smart card with fingerprint authentication.
79.	Part-2	Section VIB Technical Specifications	5.2.1.5	The contractor shall provide Biometric reader, key and card at TER,SER,TSS,ASS and UPS room and Station Control rooms and remaining access rooms shall be provided with card and key.	The contractor shall provide BIC card and/or a biometric authentication such as fingerprint authentication at Station/Depot Control room, TER/CER, SER, TSS, ASS and UPS room and remaining access rooms shall be provided with card.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
80.	Part-2	Section VIB Technical Specifications	5.2.2.2	The intrusion detection system (part of ACS system) shall include commercially available Sensor Controller with discrete initiating devices to provide supervised monitoring of access doors and, gates, etc.	5.2.2.2 The intrusion detection system (part of ACS system) shall include commercially available Sensor Controller with discrete initiating devices to provide supervised monitoring of access doors and, gates, Sensors/Devices etc.
81.	Part-2	Section VIB Technical Specifications	5.3.1	Scope of Supply The scope of supply for each of the Station, Technical rooms, Depot, Maintenance Centre in OCC and BCC building shall include, but not be limited to the following items: (a) Exit push buttons. (b) Enclosures for smart card readers, override key- System functionality shall be- achieved with central server in redundant mode. Contractor shall submit design & RAMs calculation for final approval. (c) Centralised Access Management System including OCC/BCC Software application and Station HMI client software application shall not be in scope of this RFP and shall be provided by other designated OCC/BCC contractor as Integrated Security Management System(ISMS). (d) Sensor controllers /modules & software (e) Override key-switch to access equipment rooms and shall be installed inside each SCR. (f) switches, egress equipment and power supply equipment. All access point facilities shall be vandal resistant and tamper proof. Access point controller and Battery shall be properly housed in an enclosure having IP rating of IP 54 for indoor installation and having IP rating of IP 65 for installation at outdoor/exposed to rain and sunlight. Contractor to ensure aesthetics view of the station / OCC & BCC / depot area where ACID system will be deployed. Exposed cabling, conducting, cable containment is not allowed. Contractor to interface with civil works contractor to ensure timely deployment of secondary containment so that cable laying can be done. Door equipment like I/O box, battery Boxes, CPUs shall not be exposed. This equipment to be installed above false ceiling or below false floor to ensure easy maintenance. Card reader, door sensor and EM lock assembly will have IP rating of IP 54 for indoor installation and having IP rating of IP 65 for installation at outdoor /exposed to rain & sunlight (g) All power supply equipment required for ACS system (h) All test equipment required for the system into verification and validation. (i) The Metro employees' and sub Contractors' ID contact-less smart cards. (to be supplied by AFC vendor & coordinated accordingly) (j) The writing system for the Metro employees' and sub Contractors' ID contactless smart cards (k) All local power and other cables for the system to perform as per specifications contained herein (l) Magnetic Locks based access control system which requires minimum grooving in the room door's frame /door	5.3.1 Scope of Supply The scope of supply for each of the Station, Technical rooms, RSS and Depot shall include, but not be limited to the following items: (a) Access Controller (b) Card Reader (c) Magnetic Locks based access control system which requires minimum grooving in the room door's frame /door (d) Exit Push Button (e) Emergency Break Glass (f) Door Contacts (g) Emergency Release Key Switch shall be installed inside each SCR. (h) Override key-switch to access the room in which Access Controller is housed (i) The Metro employees' and sub Contractors' ID contact-less smart cards (Mifare Desfire cards 1000 Nos). (j) All power supply equipment required for ACS system (k) All local power and other cables for the system to perform as per specifications contained herein. (l) The writing system for the Metro employees' and sub Contractors' ID contactless smart cards (m) Fiber based Intrusion detection devices (n) Beam sensors (o) Intrusion detection cameras Contractor to ensure aesthetics view of the station / RSS / depot area where ACID system will be deployed. Exposed cabling, conducting, cable containment is not allowed. Contractor to interface with civil works contractor to ensure timely deployment of secondary containment so that cable laying can be done. Door equipment like I/O box, battery Boxes, CPUs shall not be exposed. Card reader, door sensor and EM lock assembly will have IP rating of IP 54 for indoor installation and having IP rating of IP 65 for installation at outdoor /exposed to rain & sunlight. All test equipment required for the system into verification and validation.
82.	Part-2	Section VIB Technical Specifications	5.4.2	5.4.2 It shall be able to perform its function standalone in case of communication failure with the central ISMS server in the OCC & BCC. The system shall be able to detect sensor failure and damage of wire.	5.4.2 The ACS Local equipment at every station shall be able to perform its function standalone in case of communication failure with the Access control software central ISMS server in the OCC & BCC. The system shall be able to detect sensor failure.
83.	Part-2	Section VIB Technical Specifications	5.4.5	The Access Control System shall be used primarily to enable staff, or their authorized representatives, to gain access to all, or selected areas of buildings and sites by the use of proximity identification cards working in conjunction with smart card readers.	The Access Control System shall be used primarily to enable staff, or their authorized representatives, to gain access to all, or selected areas of buildings and sites by the use of proximity identification cards/biometric working in conjunction with smart card readers/Biometric readers.
84.	Part-2	Section VIB Technical Specifications	5.4.6	5.4.6 Smart Cards used for the Access control System shall be compatible with the Automatic Fare Collection system and shall be provided by AFC contractor such that the card can serve the dual purpose of Access control as well as Employee Pass for travel on the metro System.	5.4.6 Smart Cards used for the Access control System shall be compatible with the Automatic Fare Collection system and shall be provided by AFC contractor such that the card can serve the dual purpose of Access control as well as Employee Pass for travel on the metro System. However, 1000 number of cards shall be provided by Telecom Contractor as part of tender requirement.
85.	Part-2	Section VIB Technical Specifications	5.5.3.1(b)	5.5.3.1 General (b) All access point facilities shall be vandal resistant and tamper proof	5.5.3.1 General (b) All access point facilities shall be vandal resistant and tamper resistant

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
86.	Part-2	Section VIB Technical Specifications	5.5.3.1(d)	The access card reader shall have suitable internal memory for data storage for fast access and operation of system in fallback mode.	The Biometric reader shall have suitable internal memory for data storage for fast access and operation of system in fallback mode.
87.	Part-2	Section VIB Technical Specifications	5.5.1.1	5.5.1.1 Site / Station HMI for local operator control and monitoring: (a) Support standalone operation of Station HMI while communication failure with central server (b) A stand-alone Workstation (in the depot and OCC & BCC only) to facilitate issue of new access control cards/modify and cancel access entitlements, etc.	5.5.1.1 Site / Station HMI for local operator control and monitoring: (a) Station ACID HMI software loaded along with ISMS of all station and depot to control and monitor the access control. (b)A software application (in the CSS works station at OCC & BCC) to facilitate issue of new access control cards/modify and cancel access entitlements, etc.
88.	Part-2	Section VIB Technical Specifications	5.5.2.2 (g)	Degraded mode of operation shall be defined and finalized during the design stage, whereas for clarity Controller may be treated as Control Sever where local controller should work as independently in case of degraded mode of operation. Access point Controller should be POE, POE+ enabled capable of battery charging, powering up readers etc. may be accepted.	Degraded mode of operation shall be defined and finalized during the design stage, whereas for clarity Controller may be treated as Control Sever where local controller should work as independently in case of degraded mode of operation. Access point Controller should be POE, POE+ enabled with battery charging, powering up readers etc or separate Power Supply with battery charging may be accepted.
89.	Part-2	Section VIB Technical Specifications	5.5.3.6.4	Consideration shall be given as to the distances over which a proximity ID is required to operate to cover pedestrian access at gates, vehicular access at barriers and door access, such as based on ISO 14443 for communications at distances up to 10 cm or ISO 15693 for distances up to 50 cm.	Consideration shall be given as to the distances over which a proximity ID is required to operate door access, such as based on ISO 14443 for communications at distances up to 10 cm.
90.	Part-2	Section VIB Technical Specifications	5.5.3.7	Additional Clause	Access Control Readers Access Control Readers shall be provided as per the specifications mentioned in Table 5.1 (attached in Annexure J) as minimum.
91.	Part-2	Section VIB Technical Specifications	5.5.4.1	Intrusion Detection facilities shall be installed. For Depot perimeter intrusion detection system, the solution shall be provided as per the list below and shall be finalized during design stage. Contractor shall obtain the approval from Engineer accordingly. (a) In station areas to prevent public access to Back of House & Track areas. (b) Around the vehicular and pedestrian entry & exits at depot. (c) Details of sites/location to be provided with IDS facility shall be finalized during detailed design stage. (d) The detection techniques / modalities shall include one or more of the following, all of which shall operate in conjunction with each other and the CCTV System, to continuously track intrusions within and across zones and all areas within the confines of the site. (e) Motion detection cameras, with associated special software and software licenses (f) Vibration detection (g) Infra-red beam detectors (h) Microwave beam detectors (i) Beam interruption sensors for Depot gates (j) Fence mounted sensors (k) Door relay (l) The contractor shall provide the door sensors at the fire exit doors to monitor the door open/close status	Intrusion Detection facilities shall be installed. a) For Depot perimeter intrusion detection system, the solution shall be provided as per the list below .The detection techniques / modalities shall be a combination of the following (i) Fiber Optic Intrusion Detection System around the boundary wall with accuracy of +/- 10 m. (ii)Motion detection cameras suitable for day/night operation, with associated special software and software licenses (iii)Beam interruption sensors for Depot gates b) The contractor shall provide the door sensors at the fire exit/Fireman and cross passage doors to monitor the door open/close status. c) The contractor shall provide intrusion detection cameras at ramp section (between Kodambakkam power House and Kodambakkam Flyover metro) suitable for day/night operation, with associated special software and software licenses. d) The contractor shall provide intrusion detection cameras at depot (10 fixed cameras, 02 long range PTZ) to detect entry to the restricted area (UTO area). All of which shall operate in conjunction with each other and the CCTV System, to continuously track intrusions within and across zones and all areas within the confines of the site.
92.	Part-2	Section VIB Technical Specifications	5.5.4.2	The contractor shall provide electrical pulsed fences at RSS Building.	The contractor shall provide the following at RSS building (excluding the RSS in Depot which is already protected by depot perimeter). (i) Fiber Optic Intrusion Detection System around the boundary wall with accuracy of +/- 10 m. (ii)Intrusion detection cameras suitable for day/night operation, with associated special software and software licenses (iii)Beam interruption sensors for main gates

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
93.	Part-2	Section VIB Technical Specifications	5.5.8.4	5.5.8.4 Depot Complexes (a) Building Entrances and Exits and peripheral gates (b) Doors providing access to Plant Rooms (c) Doors providing access to Equipment Rooms (d) Doors providing access to Control Rooms (e) Pedestrian gates and vehicular barriers at depot entrances and exits (f) Operational offices. (g)CCTV monitoring shall be possible for under vehicle inspection of visitors vehicle at Depot entry/exit gates	5.5.8.4 Depot Complexes (a) Building Entrances and Exits and peripheral gates (b) Doors providing access to Plant Rooms (c) Doors providing access to Equipment Rooms (d) Doors providing access to Control Rooms (e) Operational offices.
94.	Part-2	Section VIB Technical Specifications	5.5.10.1 (a)	Automatic self-test facility, automatic detection and automatic configuration	Deleted
95.	Part-2	Section VIB Technical Specifications	5.6.1.3	5.6.1.3 Any card reading equipment removed from site, by unauthorized means, shall be automatically barred from future access to the system.	5.6.1.3 - Deleted.
96.	Part-2	Section VIB Technical Specifications	5.7	"It shall be possible to expand ACS by additional 30% into the Access Control System / network without affecting the performance of the Access Control System / network. Any limits on this requirement, shall be specified by the Contractor for review by the Employer."	5.7 (2) (c) "It shall be possible to expand ACS by additional 30% into the Access Control System / network without affecting the performance of the Access Control System / network by adding required Hardware and software. Any limits on this requirement, shall be specified by the Contractor for review by the Employer."
97.	Part-2	Section VIB Technical Specifications	6.7.2.3 (c)	Display digital clock at various locations shall display 4 characters viz.time in HH:MM format and date in DD:MM format.	Display digital clock at various locations shall display 4 characters viz. time in HH:MM format.
98.	Part-2	Section VIB Technical Specifications	7.1.4.2	7.1.4.2 After 6 months of revenue operation, the Contractor shall compile and submit performance report to the Engineer/Employer for approval. The Contractor shall be responsible where necessary for re-configuring the network and providing additional hardware to ensure maintenance of the specified minimum equipped reserve capacity and additional spare capacity at no extra cost to CMRL.	7.1.4.2 After 6 months of revenue operation, the Contractor shall compile and submit performance report to the Engineer/Employer for approval. The Contractor shall be responsible where necessary for re-configuring the network and providing additional hardware as per Tender requirement to ensure maintenance of the specified minimum equipped reserve capacity and additional spare capacity at no extra cost to CMRL.
99.	Part-2	Section VIB Technical Specifications	7.1.4.4	7.1.4.4 The trenching involved for the connectivity of RSSs shall be carried out by E&M Contractor. The Telecom System Contractor shall be responsible for necessary co-ordination with E&M and shall provide all material required for the connectivity and other works involved like OFC laying, termination to the respective RSS.	7.1.4.4 - Deleted
100.	Part-2	Section VIB Technical Specifications	7.2.1.1	7.2.1.1(a)24 core fiber optic for station other tail connectivity.	7.2.1.1 (a) - Deleted
101.	Part-2	Section VIB Technical Specifications	7.2.1.5	7.2.1.5 The transmission system used as the backbone for operational communications will be a GE based IP network consisting of carrier grade IP elements. The system shall be based on duplicated Fiber optic ring structure with necessary IP protocols and suitable ring protection mechanism (< 50ms) to provide tolerance in the network to multiple faults in the OFC back bone.	The transmission system used as the backbone for operational communications will be a GE based IP network consisting of carrier grade IP elements. The system shall be based on duplicated Fiber optic ring structure with necessary IP protocols and suitable ring protection mechanism (< 150ms) to provide tolerance in the network to multiple faults in the OFC back bone.
102.	Part-2	Section VIB Technical Specifications	7.2.5.1	7.2.5.1 The Giga Ethernet backbone shall be based on suitable protection to achieve convergence time of < 50ms in event of any link failure and or any network disruptions along with conditions defined in above paras.	The Giga Ethernet backbone shall be based on suitable protection to achieve convergence time of < 150ms in event of any link failure and or any network disruptions along with conditions defined in above paras.
103.	Part-2	Section VIB Technical Specifications	7.2.4.2	7.2.4.2 The Optic Fiber Cable (OFC) infrastructure shall be formed and provided by Contractor by laying144 core FO and two single mode optical Fiber cables, laid along two physically distinct routes, one alongside the up-track and the other alongside the down-track for entire Corridor 4 Stations and Depot.	7.2.4.2 Telecom Contractor shall supply Single mode optical fibre cable network of 144 cores. The Optic Fiber Cable (OFC) infrastructure shall be formed and provided by telecom contractor by laying144 core single mode optical Fiber cables, laid along two physically distinct routes, one alongside the up-track and the other alongside the down-track for entire Corridor 4 Stations and Depot.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

<table>
<tr><th>S.No</th><th>Part</th><th>Section</th><th>Clause</th><th>Original Bid condition</th><th>Revised bid condition</th></tr>
<tr><td>104.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.2.6.2 (a)</td><td>(a) This equipment shall provide interfaces to site LANs and other IP devices like IP telephony. In case any system having interface on other protocol then convertor for same will be provisioned by Telecom Contractor</td><td>7.2.6.2 (a) This equipment shall provide interfaces to site LANs and other IP devices like IP telephony.</td></tr>
<tr><td>105.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.2.9.1.7 Page 173 of 336</td><td>If Contractor shall fail to interface successfully, Integration shall be done by providing his own NMS at OCC & BCC and interfacing at NMS level with Common NMS without any additional cost.</td><td>7.2.9.1.7 If Contractor fails to interface with NMS supplied by the OCC/BCC Telecom Contractor, ASA-05 shall supply and install NMS for the Network equipment supplied under the scope without any additional cost. The above NMS shall integrate with T-SCADA for alarm Integration.</td></tr>
<tr><td>106.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.8.1.3</td><td>7.8.1.3 The maximum traffic interruption time on any circuit due to link, node or any other failure shall be less than 50 ms for the FOTS network. This shall include the time duration for protection switching completion in accordance with the sequence of events below:
(a) from the onset of a failure detection to the completion of protection switching.
(b) from the clearing of a failure to the completion of protection switching restoration in case of revertive switching.
(c) from the activation of the restoration command to the completion of protection switching restoration in case of non-revertive switching; and
(d) reframing time required by FOTS equipment</td><td>7.8.1.3 The maximum traffic interruption time on any circuit due to link, node or any other failure shall be less than 150 ms for the FOTS network. This shall include the time duration for protection switching completion in accordance with the sequence of events below:
(a) from the onset of a failure detection to the completion of protection switching.
(b) from the clearing of a failure to the completion of protection switching restoration in case of revertive switching.
(c) from the activation of the restoration command to the completion of protection switching restoration in case of non-revertive switching; and
(d) reframing time required by FOTS equipment</td></tr>
<tr><td>107.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.8.1.4</td><td>7.8.1.4 The maximum traffic interruption time on any circuit due to link, node or any other failure shall be less than 50 ms by using suitable open standard Ring protection protocols.</td><td>7.8.1.4 The maximum traffic interruption time on any circuit due to link, node or any other failure shall be less than 150 ms by using suitable open standard Ring protection protocols.</td></tr>
<tr><td>108.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.9.2.1(h)</td><td>(h) All the Network Switching Devices/NMS should support Open Flow Protocol for SDN technology</td><td>7.9.2.1 (h) - Deleted</td></tr>
<tr><td>109.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.9.3.3</td><td>The WAN (Distribution Switch) switches should be equipped for the interfaces given below as a minimum:
<table>
<tr><th>SN</th><th>Interface</th><th></th><th>Stations/depot Layer-3 switches</th></tr>
<tr><td>1</td><td>10G optical uplink interface(Distribution Switch)</td><td></td><td>2</td></tr>
<tr><td>2</td><td>1G optical uplink interface(Access switch)</td><td></td><td>4</td></tr>
<tr><td>3</td><td>10/100/1000 Base T port</td><td></td><td>20</td></tr>
</table></td><td>The WAN (Distribution Switch) switches should be equipped for the interfaces given below as a minimum:
<table>
<tr><th>SN</th><th>Interface</th><th>Stations/Depot Ports per Switch (Layer-3) as minimum</th></tr>
<tr><td>1</td><td>10G optical uplink interface (Distribution Switch)</td><td>2</td></tr>
<tr><td>2</td><td>1G optical uplink interface (Access Switch)</td><td>4</td></tr>
<tr><td>3</td><td>10/100/1000 Base T port</td><td>20</td></tr>
</table></td></tr>
<tr><td>110.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.9.5 (e)</td><td>Layer 2 Features : 802.3x - Flow Control, Layer 2 Ping, Layer 2 Traceroute and Connectivity Fault Management</td><td>Layer 2 Features: 802.3x - Flow Control, Layer 2/3 Ping, Layer 2/3 Traceroute and Connectivity Fault Management</td></tr>
<tr><td>111.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.9.6 (p)</td><td>7.9.6 Layer 3 Features:(p) MPLS VPN</td><td>Layer 3 features: (p)MPLS VPN / VRF-Lite</td></tr>
<tr><td>112.</td><td>Part-2</td><td>Section VIB Technical Specifications</td><td>7.9.7 (f)</td><td>7.9.7 Quality of Service Features
(f) Scheduling IP precedence, 802.1p and ISL priority, three transmit queues on a per port basis, WRR, Strict Priority Queue TOS<->COS mapping</td><td>7.9.7 Quality of Service Features
7.9.7 (f) Scheduling IP precedence, IEEE 802.1p /ISL priority, and IEEE 802.1q, three transmit queues on a per port basis, WRR, Strict Priority Queue TOS<->COS mapping</td></tr>
</table>

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
113.	Part-2	Section VIB Technical Specifications	7.9.12 (e)	Layer 2 Features : 802.3x - Flow Control, Layer 2 Ping, Layer 2 Traceroute and Connectivity Fault Management	Layer 2 Features: 802.3x - Flow Control, Layer 2/3 Ping, Layer 2/3 Traceroute and Connectivity Fault Management
114.	Part-2	Section VIB Technical Specifications	7.9.14 (f.)	7.9.14 Quality of Service Features (f) Scheduling IP precedence, 802.1p and ISL priority, three transmit queues on a per port basis, WRR, Strict Priority Queue TOS<->COS mapping	7.9.14 (f) Scheduling IP precedence, IEEE 802.1p /ISL priority, and IEEE 802.1q, three transmit queues on a per port basis, WRR, Strict Priority Queue TOS<->COS mapping
115.	Part-2	Section VIB Technical Specifications	8.1.1.1	8.1.1.1 The Telephone System shall provide the CMRL Phase II, Corridor 4 staff with voice, fax and data communications between CMRL personnel internally and also externally to the PSTN on IP PBX Exchange. Objective is to use the network infrastructure which is redundant. The infrastructure shall be used on a separate CAT 7 CAT 6A STP LSZH cable or latest.	The Telephone System shall provide the CMRL Phase II, Corridor 4 staff with voice, fax and data communications between CMRL personnel internally and also externally to the PSTN on IP PBX Exchange.
116.	Part-2	Section VIB Technical Specifications	8.1.1.5.1	The Direct Line Telephone Communication System shall provide control telephone lines for train operation, traction power supply control and maintenance telephone lines for track, rolling stock, signalling and telecommunication. The system shall ensure instant, uninterruptible, communication between key points, which shall include, but not be limited to: (1) Between OCC & BCC and different key locations like all Station Control Rooms (SCR), BCC, Depot Control Centre (DCC), Traction Substation (TSS), Receiving Sub Stations (RSSs), Auxiliary Sub Station (ASS), each signalling equipment room, telecom equipment room at stations and depot. (2) Between adjacent / interfacing station control rooms; (3) Between adjacent interlocked station control room and DCC; (4) Passenger Help Line at middle of the Platform: Help Points mainly for passengers to ask for assistance in platform/ public areas. Help Point call made shall be configured as per time bound escalation and can be made to transfer automatically from SCR to OCC & BCC Chief Controller in case the call is not answered by Station Controller (5) Between RSSs and State Electricity Board Control room, OCC & BCC control room through leased PSTN (BSNL/MTNL/Private Operator) telephone lines; The leased line shall be arranged by Telecom contractor but paid for the initial cost & recurring cost by CMRL. (6) Between OCC & BCC / Head Quarter and security control rooms at stations, depot.	The Direct Line Telephone Communication System shall provide control telephone lines for train operation, traction power supply control and telephone lines for all maintenance rooms. The system shall ensure instant, uninterruptible, communication between key points, which shall include, but not be limited to: (1) Between OCC & BCC and different key locations like all Station Control Rooms (SCR), BCC, Depot Control Centre (DCC), Traction Substation (TSS), Receiving Sub Stations (RSSs), Auxiliary Sub Station (ASS), each signalling equipment room, telecom equipment room at stations and depot. (2) Between adjacent / interfacing station control rooms; (3) Between adjacent interlocked station control room and DCC; (4) Passenger Help Line at middle of the Platform: Help Points mainly for passengers to ask for assistance in platform/ public areas. Help Point call made shall be configured as per time bound escalation and can be made to transfer automatically from SCR to OCC & BCC Chief Controller in case the call is not answered by Station Controller (5) Between RSSs and State Electricity Board Control room, OCC & BCC control room through leased PSTN (BSNL/MTNL/Private Operator) telephone lines; The leased line shall be arranged by Telecom contractor but paid for the initial cost & recurring cost by CMRL. (6) Between OCC & BCC / Head Quarter and security control rooms at stations, depot.
117.	Part-2	Section VIB Technical Specifications	8.1.1.8.2	It shall be possible to select any one additional PABX phone conversation for recording purposes from the HMI. CDRS shall be provided as part of the Telecom Contract and it shall be the responsibility of Telecom Contractor to coordinate, finalize the number and type of channels, interface, test and commission the recording of Telephone Communication in the CDRS. All Direct Line Telephone communication from and to all the Direct Line Consoles in the OCC & BCC, Stations and depot shall be recorded in the CDRS. The interface between Telephone system and CDRS should be on IP. The number of channels has to be accordingly finalized by Telecom Contractor.	It shall be possible to select any one additional PABX phone conversation for recording purposes from the HMI. CDRS shall be provided as part of the other designated Telecom Contract and it shall be the responsibility of ASA-05 Contractor to coordinate, finalize the number and type of channels, interface, test and commission the recording of Telephone Communication in the CDRS. All Direct Line Telephone communication from and to all the Direct Line Consoles in the OCC & BCC, Stations and depot shall be recorded in the CDRS. The interface between Telephone system and CDRS should be on IP. The number of channels has to be accordingly coordinated and finalized.
118.	Part-2	Section VIB Technical Specifications	8.1.1.8.3	The Telephone System shall be interfaced with a Centralized Digital Recording System for recording of free space voice conversations of all Controllers in SCR and DCC Room, The microphones shall be so placed in SCR and DCC to enable clear recording of all controller positions without any mixing / disturbance.	Centralized Digital Recording System for recording of free space voice conversations of all Controllers in DCC Room, the micro phones of free space voice recorder (supplied by ASA-06) shall be so placed in DCC to enable clear recording of all controller positions without any mixing / disturbance.
119.	Part-2	Section VIB Technical Specifications	8.3.1.1.4	PoE switch shall be provided in airconditioned rooms and i Industrial POE switch, shall be provided in non-Air-conditioned rooms. i) at depot throughout CMRL boundary including other buildings (like ancillary buildings of Corridor 4 of CMRL Phase II (TSS, RSS, police station, etc.)) inclose proximity Depot Inside Depot for various buildings, analogue phones lines shall be designed for bulk users including remote buildings Suitable armoured cables for analog subscribers are to be laid TER/CER at Depot to the different locations inside and around Depot. Cables are to be terminated at MDF/IDF.	PoE switch shall be provided in airconditioned rooms and i Industrial POE switch, shall be provided in non-Air-conditioned rooms. i) at depot throughout CMRL boundary including other buildings (like ancillary buildings of Corridor 4 of CMRL Phase II (TSS, RSS, police station, etc.)) in close proximity Depot Inside Depot for various buildings, analogue phone lines shall be designed for bulk users including remote buildings. In addition to the telephone considered in each room in Depot, Analog Phones shall be considered for all desk positions in Open Office Area as indicated in the drawing. Suitable armoured cables for analog subscribers are to be laid TER/CER at Depot to the different locations inside and around Depot. Cables are to be terminated at MDF/IDF.

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
120.	Part-2	Section VIB Technical Specifications	8.3.2.1.4	8.3.2.1.4 The Direct Line Telephones shall be single button selection connected to OCC & BCC so that an audible alarm is sounded and the location of the calling telephones is displayed on appropriate console at OCC & BCC. At the locations other than the OCC & BCC, Direct Line Telephones shall be terminated on Digital/IP telephone sets. Consoles shall be provided with single button selection for each direct line connection.	The Direct Line Telephones shall be single button selection connected to OCC & BCC so that an audible alarm is sounded, and the location of the calling telephones is displayed on appropriate console at OCC & BCC. At the locations other than the OCC & BCC, Direct Line Telephones shall be terminated on IP telephone sets. Consoles shall be provided with single button selection for each direct line connection.
121.	Part-2	Section VIB Technical Specifications	8.3.2.5	Emergency Phone with Blue Light (as per NFPA 130-2007) a) Another type of DLT connected to SCR and OCC b) Powered by the Layer-2/Layer-3 (POE) switch Emergency Telephones at cross passages in Tunnels. Call originated from Emergency Telephones from tunnel area shall be landed in nearest station's SCR phone, incase phone in SCR gets unattended in defined and configurable time duration then same call will be re-routed to controller's phone in OCC /BCC. Telecom Contractor to provision respective interface in IPABX system to connect Emergency Telephone to the network. Contractor may propose either IP Emergency phone or may make provision of necessary sub systems /Interface Card to integrate Analogue Emergency Telephone with IP Based EPABX network	8.3.2.5 Emergency Phone with Blue Light (as per NFPA 130-2007) a) Another type of DLT connected to SCR and OCC b) Powered by the Layer-2/Layer-3 (POE) switch Emergency Telephones at cross passages in Tunnels. Call originated from Emergency Telephones from tunnel area shall be landed in nearest station's SCR phone, in case phone in SCR gets unattended in defined and configurable time duration then same call will be re-routed to controller's phone in OCC /BCC. Telecom Contractor to provision respective interface in IPABX system to connect Emergency Telephone to the network. Contractor shall provide Analogue Emergency Telephones inside tunnels for which Media Gate way with long line cards shall be provided by other designated ASA 06 Contractor at Light House, Thirumayilai, Boat club, Kodambakkam Metro stations
122.	Part-2	Section VIB Technical Specifications	8.3.2.7	8.3.2.7 Main Nodes IP PBX at OCC shall form the main node with backup at BCC . This main node shall be connected with central switches (1+1 hot standby) at OCC/BCC and through Ethernet links to the station managed switches (L2 Managed POE) in Star and Ring Topology. The IP phones at OCC & BCC and stations will connect to POE switches. The above arrangement has to be commissioned providing dedicated link to maintain connectivity.	8.3.2.7 - Deleted.
123.	Part-2	Section VIB Technical Specifications	8.4.2.2.2	The Telephone Network Management Systems shall provide facilities for users to run diagnostics on the control, voice and data circuitry without causing interruption to the operation of the system	The Telephone Network Management Systems supplied by the other designated contractor shall provide facilities for users to manage the Telephone system devices like Call server, Media Gateway, IP phones etc without causing interruption to the operation of the system.
124.	Part-2	Section VIB Technical Specifications	9.2.2	Networking hardware for the OA and IT system. The scope of Communication Contractor shall be provision of OA/IT System (including design, supply, installation, testing, commissioning and integration). All personal computers, printers and servers for data storage and related application software are not included in scope of the communication Contractor.	Networking hardware for the OA and IT system. The scope of Communication Contractor shall be provision of OA/IT System (including design, supply, installation, testing, commissioning and integration). All personal computers, printers and servers for data storage and related application software are not included in scope of the communication Contractor except one number of workstation per SCR.
125.	Part-2	Section VIB Technical Specifications	9.3.1	The Contractor shall provide two 24 port switches at each station, one in TER and one in SCR and 5 No's of 24 port switches at Depot .	The Contractor shall provide one number of workstation in SCR, two 24 port switches (one in TER and one in SCR) at each station. Inside Depot for various buildings, OA/IT ports shall be designed for bulk users including remote buildings. In addition to the OA/IT ports considered in each room in Depot, ports shall be considered for all desk positions in Open Office Area as indicated in the drawing.
126.	Part-2	Section VIB Technical Specifications	9.3.2	Hardware firewalls with redundancy solution shall be provided for internet service for OA/IT	9.3.2 - Deleted
127.	Part-2	Section VIB Technical Specifications	9.4.1	Telecom Contractor shall provide All the OA & IT servers, OA/IT PCs, and printers, required for administration works of the Rail System shall be connected on the dedicated OA / IT GE network.	Telecom Contractor shall provide networking services for all the OA & IT servers, OA/IT PCs, and printers, required for administration works of the Rail System.
128.	Part-2	Section VIB Technical Specifications	9.4.2	The OA / IT network shall be extended to all locations / rooms in stations, Depots, RSS and provided with voice network. OA&IT Network shall have separate Distribution/ and access layer. The contractor to ensure system fall back redundancy and to ensure that there should not be any single point of failure. The Contractor shall provide minimum Two 24-port switch at each station, and 5 nos. 24 port switch at each depot (all L-3 Switches with 10/100/1000mbps ports) for OA/IT network. Specifications of the switch shall be as provided in the FOTS specification. A separate NMS for OA/IT with all hardware and software shall also be supplied.	The OA / IT network shall be extended to all locations / rooms in stations, Depots, RSS. Contractor shall also provide 2 spare ports at middle of each platform, 2 ports at each entrance, 2 ports in concourse area. OA&IT Network shall have separate Distribution/ and access layer as required. The contractor to ensure system fall back redundancy and to ensure that there should not be any single point of failure. The Contractor shall provide one number of workstation in SCR, two 24 port switches (one in TER and one in SCR all L-2) at each station. Inside Depot for various buildings, OA/IT ports shall be designed for bulk users including remote buildings. In addition to the OA/IT ports considered in each room in Depot,

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
					ports shall be considered for all desk positions in Open Office Area as indicated in the drawing. ASA-05 shall integrate their network seamlessly with the core switches supplied under ASA-06. If seamless integration of all functional requirements of FOTS like the ring protection/convergence/routing/etc is not possible, ASA-05 shall supply the Core/Equivalent switch (L3) infrastructure to handle all functional requirements of FOTS of respective stations/Depots under their scope and integrate with ASA-06 core switch for routing of traffic. Specifications of the switch (L-2) shall be as provided in the FOTS specification. A separate NMS for OA/IT with all hardware and software shall also be supplied.
129.	Part-2	Section VIB Technical Specifications	9.4.4	CAT 6E, STP data cables with flame retardant and LSZH properties combo termination point for telephone & data (RJ 45) connectivity shall be provided at every location including end-point socket. The CAT 6E STP cable shall be terminated in the combo termination point.	CAT 6, STP data cables with flame retardant and LSZH properties combo termination point for telephone & data (RJ 45) connectivity shall be provided at every location including end-point socket. The CAT 6 STP cable shall be terminated in the combo termination point.
130.	Part-2	Section VIB Technical Specifications	10.3.7.2	Shall be integrated with OCC/BCC Management software which shall be provided by other Designated Telecom Contractor. Contractor shall interface on open API's for successful integration.	10.3.7.2 The Telephone Common Network Management System (NMS) main at OCC and redundant at BCC with Maintenance Supervisory Console, Keyboard with common Log Printer Server and associated printers, shall be provided by other designated OCC/BCC Telecom Contractor. Corridor 3, 4 & 5 Telephone system and network shall be interfaced preferably with Common NMS by using open standards and all features and functionality supported by open protocols shall be ensured.
131.	Part-2	Section VIB Technical Specifications	11.2.1.8	The thickness of stainless-steel tape to alloy AISI 304 or 305 shall not be less than 0.125 mm. The height of the corrugation shall be minimum 0.6mm and the pitch shall be 2.5 mm maximum. Outer jacket of 1.8 mm minimum thickness HDPE shall be provided over the steel tape throughout the length of the cable.	The thickness of stainless-steel tape to alloy AISI 304 or 305 shall not be less than 0.125 mm. The height of the corrugation shall be minimum 0.6mm and the pitch shall be 2.5 mm maximum. Outer jacket of 1.8 mm minimum thickness HDPE (for the Elevated/At-Grade Section and for any Optical Fiber Cable being laid outside the station limits and which is either buried under the earth or is laid on the via-duct) or suitable LSZH (low smoke zero halogen) type (for tunnel area underground section) shall be provided over the steel tape throughout the length of the cable.
132.	Part-2	Section VIB Technical Specifications	11.7.3	11.7.3 Ethernet Cable Tester Table: Technical Specification for Ethernet Cable Tester Buttons: LCD touch-screen, Single momentary contact push button Remote Identifier: 2000 ft.(609.6 m) max distance	11.7.3 Ethernet Cable Tester: Table: Technical Specification for Ethernet Cable Tester Buttons: LCD touchscreen or Single momentary contact push button or equivalent arrangement Remote Identifier: 1500 ft. (457.2 m) max distance
133.	Part-2	Section VIB Technical Specifications	11.7.4	11.7.4 Optical Light Source Output Power: -4.0 dBm Output Stability: +/- 0.05dB after 15 mins,+/-0.03dB after 1 hour warm-up	11.7.4 Optical Light Source Output Power: -20.0 dBm Output Stability: ±0.05dB/15mins; ±0.1dB/ 8hours
134.	Part-2	Section VIB Technical Specifications	11.7.6	11.7.6 OTDR Visual Fault Locator: In-Built,3mW,650nm Fiber Analysis Software: Version 3.2	11.7.6 OTDR Visual Fault Locator: In-Built,1mW,650nm Fiber Analysis Software: latest version
135.	Part-2	Section VIB Technical Specifications	12.6.1.11.1	The Radio system shall interface with the Telephone system to permit selected Hand- portable radios to initiate radio-to-telephone calls and vice versa without the intervention OCC and also for Radio to PAS call through EPABX link.	The Radio system shall interface with the Telephone system to permit selected Hand-portable radios to initiate radio-to-telephone calls and vice versa without the intervention OCC and also for Radio to PAS call through EPABX link/ centralised PIS application.
136.	Part-2	Section VIB Technical Specifications	12.11.1.4 External interfaces	12.11.1.4.1 The external interface with T-SCADA is the following: UPS (Interfacing has to be done with MEP Contractor). Telecom contractor shall supply and install all required cables and equipment at stations, depot RSS etc. for smooth integration of station and depot system to OCC/BCC Telecom SCADA	Deleted
137.	Part-2	Section VIB Technical Specifications	12.11.1.4 External Interfaces	12.11.1.4.2 T-SCADA operators shall monitor the faults that occur at the UPS/SMPS through this interface. To receive all faults from this interface, T-SCADA has first to establish a connection with UPS. After the connection is established, UPS shall send information about the occurred fault to T-SCADA through protocol viz. MODBUS.	Deleted

Addendum-02
CMRL / PHASE – II / SYS / ASA05 / 2022
01-09-2022

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
138.	Part-2	Section VIB Technical Specifications	13.21.1.2	Interfaces between ASA 05 Communication (Telecom) – ASA 06 Telecom Contractor	Please find revised Interfaces between ASA 05 Communication (Telecom) – ASA 06 Telecom Contractor in Annexure-F Interface Matrix.
139.	Part-2	Section VIB Technical Specifications	13.21.1.3	Additional Clause.	Please find Annexure-G Scope Allocation Matrix.
140.	Part-2	Section VIB Technical Specifications	APPENDIX – B 1.11.2	1.11(2) It is possible to synchronize both databases ACIDS andCMRL. In order to ensure a correct synchronization between two databases, a bi-directional synchronization process is needed. The ACIDS database will receive all relevant information about theCMRL, employees, and in opposite direction, CMRL receives the time attendance of its employees. The time attendance data that are synchronized withCMRL, database are only the date/time of entrance and exit of the employee. All process about ACIDS and CMRL databases synchronization shall be discussed in detail, as part of the interface design with CMRL and AFC Contractor. Telecom contractor shall be lead contractor for this interface	Deleted
141.	Part-2	Section VIB Technical Specifications	APPENDIX – B 1.16.f ACIDS	(f) Integrated Access control system software (Central server, Corridor server and various stations ,OCC,BCC and Depot HMI clients shall be designed for minimum 130 stations which shall cover corridor 3,4 & 5 of CMRL phase 2.	(f) Integrated Access control system software (Central server, OCC, BCC and Depot HMI clients shall be designed for minimum 130 stations which shall cover corridor 3,4 & 5 of CMRL phase 2.
142.	Part-2	Section VIB Technical Specifications	APPENDIX - D	Contract Spares	Please find revised Appendix-D in Annexure-K Contract Spares and Network Management Terminal
143.	Part-2	Section VIB Technical Specifications	APPENDIX - F	SPECIFICATIONS OF CONFERENCE SYSTEM IN DEPOT MEETING ROOM	Please find revised Appendix-F in Annexure-L SPECIFICATIONS OF CONFERENCE SYSTEM IN DEPOT MEETING ROOM
144.	Part-2	Section VIB Technical Specifications	Appendix-G	6. Table 7. Any other material including equipment racks/ cubicles, ACDB, mounting brackets, fixtures, cables, MDF/ IDF, conduits, false floor base frame, under false floor trays/risers, power supplies, any other installation material required to complete the work and interfaces with EMF, Civil department for the same shall be included as part of this work.	6. Table updated as per Annexure H 7. Deleted

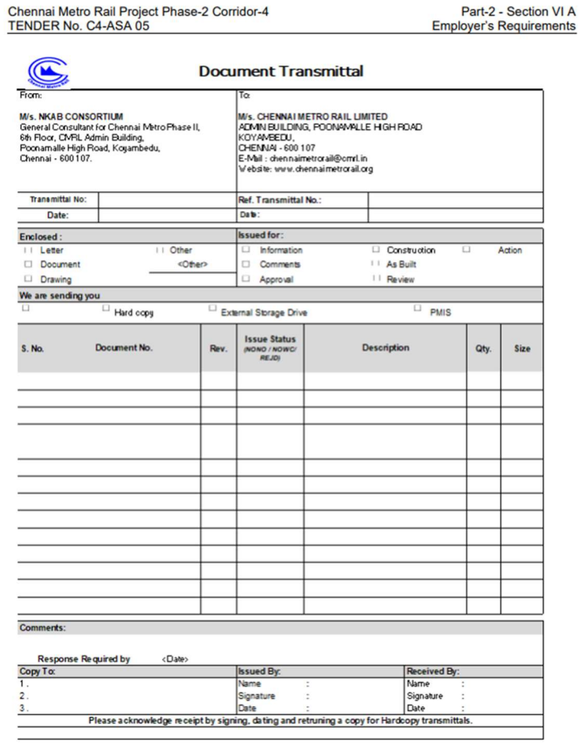
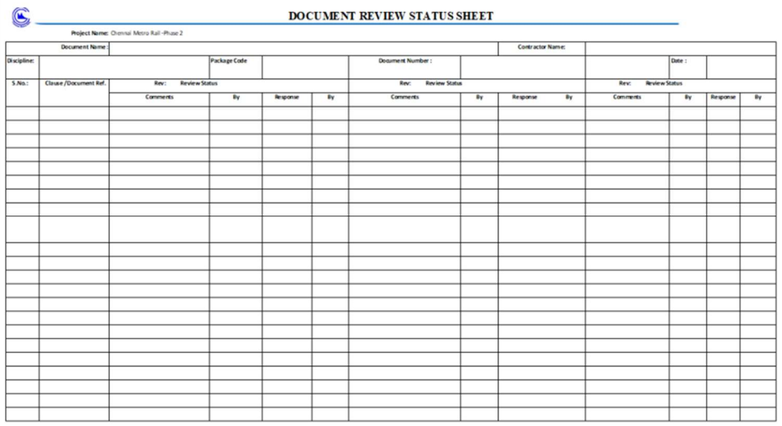
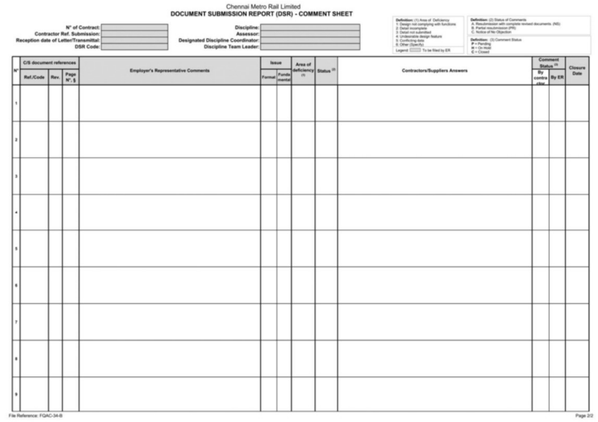
Enclosed:

1. Annexure A - STATION AND DEPOT BUILDING DRAWINGS
2. Annexure B- Revised Forms
3. Annexure C- Chainage details
4. Annexure-D MTBF Figures
5. Annexure-E Enclosure Specifications
6. Annexure-F Interface Matrix
7. Annexure-G Scope Allocation Matrix
8. Annexure-H Telecom Lab Scope Table
9. Annexure-I Video Analytics
10. Annexure-J Card Reader Specifications
11. Annexure-K Contract Spares and Network Management Terminal
12. Annexure-L SPECIFICATIONS OF CONFERENCE SYSTEM IN DEPOT MEETING ROOM

Annexure A

STATION AND DEPOT BUILDING DRAWINGS.rar

Annexure-B Revised Forms

S.No	Part	Section	Clause	Original Bid condition	Revised bid condition
1.	Part -2	Section VIA General Specifications	6.2 Attachment 2- Transmittal form	Additional Item (6.3 CONFIGURATION CONTROL)  Chennai Metro Rail Project Phase-2 Corridor-4 TENDER No. C4-ASA 05 Part-2 - Section VI A Employer's Requirements **Document Transmittal** From: M/s. NKAB CONSORTIUM General Consultant for Chennai Metro Phase II, 6th Floor, CMRL Admin Building, Poonamalle High Road, Koyambedu, Chennai - 600 107. To: M/s. CHENNAI METRO RAIL LIMITED ADMIN BUILDING, POONAMALLE HIGH ROAD KOYAMBEDU, CHENNAI - 600 107 E-Mail : chennaimetrorail@cmrl.in Website: www.chennaimetrorail.org Transmittal No: Date: Ref. Transmittal No.: Date: Enclosed : Letter, Document, Drawing, Other <Other> Issued for: Information, Comments, Approval, Construction, As Built, Review, Action We are sending you: Hard copy, External Storage Drive, PMIS S. No. / Document No. / Rev. / Issue Status (INCWO / NOWCI / REJD) / Description / Qty. / Size Comments: Response Required by <Date> Copy To: / Issued By: / Received By: 1. / Name : / Name : 2. / Signature : / Signature : 3. / Date : / Date : Please acknowledge receipt by signing, dating and returning a copy for Hardcopy transmittals.	Revised form  Chennai Metro Rail Project Phase-2 TENDER No. ASA07 Part-2 - Section VI A Employer's Requirements Chennai Metro Rail Limited **TRANSMITTAL FORM** CONTRACTOR NAME: TRANSMITTAL REF No.: CONTRACT No: DATE OF SUBMISSION: SIGNATURE: EMPLOYER'S REPRESENTATIVE NAME: We submit; Plans, Work plan & methodology, Design criteria, studies, Calculations, Drawings, Specifications, B.O.Q, Report, Prints, Samples, Seperately via, Items(to specify), Other(to specify): Stage of submission: Design, Execution, Tests SUBJECT: Date of document / No. of Copies / Document reference / Revision These are transmitted as checked below : For your information, First submission for Notice of No Objection, Resubmission with corrections for Notice of No Objection, Other(to specify) REMARKS ISSUING ENTITY : The document (s) hereby submitted have been properly reviewed according to our QA system, to confirm its completeness, accuracy, adequacy and validity. Signature: Name: Date: COPY TO: ACKNOWLEDGMENT OF RECEIPT : Signature: Name: Date: File Reference: FQAC-49-A Page 1/1
2.	Part -2	Section VIA General Specifications	ATTACHMENT A3 DOCUMENT SUBMISSION STATUS REVIEW SHEET	Additional Item (6.3 CONFIGURATION CONTROL)  DOCUMENT REVIEW STATUS SHEET Project Name: Chennai Metro Rail -Phase 2 Document Name: / Contractor Name: Discipline: / Package Code / Document Number : / Date : S.No.: / Clause /Document Ref. / Rev: Review Status / Comments / By / Response / By	 Chennai Metro Rail Limited DOCUMENT SUBMISSION REPORT (DSR) - COMMENT SHEET N° of Contract: Contractor Ref. Submission: Reception date of Letter/Transmittal: DSR Code: Discipline: Assessor: Designated Discipline Coordinator: Discipline Team Leader: N° / CIS document references (Ref./Code, Rev., Page N° §) / Employer's Representative Comments / Issue (Format, Partial Issue) / Area of deficiency (1) / Status (2) / Contractors/Suppliers Answers / Comment Status (3) (By Leader, After, By ER) / Closure Date File Reference: FQAC-34-B Page 2/2

ATTACHMENT A3

Chennai Metro Rail Limited

DOCUMENT SUBMISSION REPORT (DSR) - STATUS SHEET

ORIGINATOR
○ CMRL

N° of Contract:	
Reference of Letter/Transmittal:	
eception date of Letter/Transmittal:	

DSR Code:	
Discipline:	
Assessor:	
Discipline Coordinator:	
Discipline Team Leader:	

SUBJECT:

List of documents submitted

N°	Document reference	Revision	Date	Notification		
				A	B	C
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						

Notification

Definition of notification:

A. Objection. A complete resubmission is required

B. No Objection with comments.

C. Notice of No Objection

Area of Deficiency	Comment Items N° (Note)	
	Repeated Comments	New Comments
	N° of Comments in PR	N° of Comments in NS

PR=Partial Resubmission; NS=Next Submission

Discipline Team Leader

Printed name	Position	Date	Signature

The comments are given to ensure the submission conforms to the Contract provisions.

File Reference: FQAC-34-B

Page 1/2

Annexure - C

Revised Station Names

Corridor-3

			DN Line	UP Line
1	Madhavaram Milk Colony	MMC	0.000	0.000
2	Thapalpetti Metro	TPP	986.255	983.104
3	Madhavaram High Road Metro	MHR	1685.422	1677.305
4	Moolakadai Metro	MKD	2660.053	2646.036
5	Sembiyam Metro	SMB	**3470.445**	**3462.058**
6	Perambur Market Metro	PRM	4083.543	4080.938
7	Perambur Metro	PRB	5053.178	5046.782
8	Ayanavaram Metro	AYN	6058.999	6057.650
9	Otteri Metro	OTR	7260.177	7235.858
10	Pattalam Metro	PTL	7993.748	7988.330
11	Perambur Barracks Road Metro	PBR	8828.026	8829.135
12	Purasaiwakkam Metro	PWK	**10257.721**	**10274.573**
13	Kelleys Metro	KLY	10962.387	10967.411
14	Kilpauk Metro	SKM	11574.528	11569.545
15	Chetpet Metro	CHP	12409.939	12396.313
16	Sterling Road Metro	SRD	**13264.222**	**13254.473**
17	Nungambakkam Metro	NGM	14025.265	14009.555
18	Anna Flyover Metro	ANF	14644.674	14629.034
19	Thousand Lights Metro	STL	15745.143	15714.530
20	Royapettah Metor	RPT	16797.331	16789.249
21	Dr Radhakrishnan Salai Metro	RKS	17862.926	17849.209
22	Thirumayilai Metro	TML	**18913.481**	**18908.918**
23	Mandaiveli Metro	MDV	20054.810	20049.125
24	Greenways Road Metro	GWR	20986.766	20987.958
25	Adyar Junction Metro	ADJ	22359.200	22350.049
26	Adyar Depot Metro	ADD	23408.775	23400.618
27	Indira Nagar Metro	ING	24065.263	24071.330
28	Thiruvanmiyur Metro	TMY	24804.002	24788.208
29	Tharamani Metro	TMN	25735.018	25722.073
30	Nehru Nagar Metro	NNG	27015.072	27006.314
31	Kandanchavadi Metro	KCH	27787.177	27778.712
32	Perungudi Metro	PGD	29008.490	29000.074
33	Thoraipakkam Metro	TPK	29735.220	29726.827
34	Mettukuppam Metro	MTK	30619.738	30610.616
35	PTC Colony Metro	PTC	31610.863	31602.420
36	Okkiyampet Metro	OKP	32450.609	32440.880
37	Karapakkam Metro	KRP	33305.659	33296.005
38	Okkiyam Thoraipakkam Metro	OTP	34272.333	34263.067
39	Sholinganallur Metro	SHN	35370.448	35369.503
40	Sholinganallur Lake I Metro	SHL	36372.353	36371.108
41	Sholinganallur Lake II Metro	PON	37162.605	37161.318
42	Semmancheri I Metro	SBU	38431.114	38430.000
43	Semmancheri II Metro	SEM	39817.026	39816.477
44	Gandhi Nagar Metro	GAN	40711.856	40710.817
45	Navallur Metro	NAV	41539.061	41537.307
46	Siruseri Metro	SIR	42501.739	42499.755
47	Siruseri Sipcot I Metro	SIP	43681.548	43688.225
48	Siruseri Sipcot II Metro	SPT	44606.721	44601.086

Corridor-4

			DN Line	UP Line
1	Light House Metro	LIH	-79	-54
2	Kutchery Road Metro		1564	1565
3	Thirumayilai Metro	TML	2269	2276
4	Alwarpet Metro	AWP	3089	3094
5	Bharathidasan Road Metro	BOS	3832	3837
6	Boat Club Metro	BCL	5005	4993
7	Nandanam Metro	SCR	6024	6001
8	Panagal Park Metro	PPK	7077	7053
9	Kodambakkam Metro	KOD	8522	8489
10	Kodambakkam Flyover Metro	KOF	Deleted	
11	Kodambakkam Power House Metro	KPH	10314	10316
12	Vadapalani Metro	SVA	11064	11064
13	Saligramam Metro	SAG	11740	11741
14	Saligramam Ware House Metro	AVI	12667	12665
15	Alwarthiru Nagar Metro	ALT	13601	13604
16	Valasaravakkam Metro	VLV	14545	14547
17	Karambakkam Metro	KAR	15713	15718
18	Alapakkam Metro	ALP	16443	16444
19	Porur Jn Metro	PRJ	17240	17246
20	Porur Bypass Metro	PBP	18048	18051
21	Thelliyaragaram Metro	THL	18978	18981
22	Iyyapanthangal Metro	IYP	19740	19740
23	Kattupakkam Metro	KPM	20857	20857
24	Kumananchavadi Metro	KUC	21644	21645
25	Karayanchavadi Metro	KAC	22525	22527
26	Mullaithottam Metro	MUL	23512	23517
27	Poonamallee Metro	POO	24356	24360
28	Poonamallee Bypass Metro	POB	25779	25785
	Poonamallee Depot	POD		

Corridor-5

			DN Line	UP Line
1	Madhavaram Milk Colony	MMC	0.000	0.000
2	Madhavaram Depot Metro	MVD	765.818	783.524
3	Assissi Nagar Metro	ASI	1678.362	1696.507
4	Manjambakkam Metro	MJB	2668.118	2694.708
5	Velumurugan Nagar Metro	VMN	3469.784	3496.391
6	Madhavaram Bus Terminal Metro	MBT	4295.424	4321.970
7	Shastri Nagar Metro	SNG	5146.581	5173.118
8	Rettri Junction Metro	RJN	5934.787	5961.324
9	Kolathur Junction Metro	KJN	7325.406	7348.563
10	Srinivasa Nagar Metro	SVN	8512.861	8568.269
11	Villivakkam Metro	VVK	9522.800	9553.439
12	Villivakkam Bus Terminus Metro	VBT	10266.655	10304.664
13	Villivakkam MTH Road Metro	VMR	11247.053	11265.770
14	Anna Nagar	ANW	12453.074	12484.620
15	Thirumangalam Junction Metro	TMJ	13457.914	13489.675
16	Anna Nagar KV Metro	ANK	14256.603	14289.049
17	Koyembedu 100 Feet Road Metro	KBD	Deleted	
18	Puratchi Thalavi Dr. J. Jayalalitha CMBT Metro	CMB	**15427.329**	**15456.502**
19	Koyembedu Market Metro	GRM	**17056**	**17056**
20	Natesan Nagar Metro	SNB	17895	17895
21	Virugambakkam Metro	ELN	18712	18712
22	Alwarthiru Nagar Metro	ALT	19646	19646
23	Valasaravakkam Metro	VLV	20590	20590
24	Karambakkam Metro	KAR	21757	21757
25	Alapakkam Metro	ALP	22487	22487
26	Porur Jn Metro	PRJ	Deleted	
27	Mugalivakkam Metro	MUG	23855	23855
28	Ramapuram Metro	DLF	25121	25121
29	Manapakkam Metro	SNA	26155	26155
30	Chennai Trade Centre Metro	CTC	27357	27357
31	Butt Road Metro	BUT	28680	28680
32	Aringar Anna Alandur Metro	SAL	29783	29783
33	St. Thomas Mount Metro	STM	31057	31057
34	Adambakkam Metro	ADM	31788	31788
35	Vanuvampet Metro	VPT	32744	32744
36	Ullagaram Metro	PVM	33595	33595
37	Madipakkam Metro	MPM	34536	34536
38	Kilkattalai Metro	KKT	35605	35605
39	Echangadu Metro	ECG	36358	36358
40	Kovilambakkam Metro	KVM	37372	37372
41	Vellakkal Metro	VKL	38443	38443
42	Medavakkam I Metro	MKR	40100	40100
43	Medavakkam II Metro	KGS	41168	41168
44	Medavakkam III Metro	MDJ	Deleted	
45	Perumbakkam Metro	PBM	42246	42246
46	Classical Tamil Institute Metro	GLH	43245	43245
47	Elcot Park Metro	ELT	44424	44424
48	Sholinganallur Metro	SHN	Deleted	

Note:
1.Station names to be confirmed with final List
2.In corridor-5, the inter distance between CMBT and Koyambedu Market is 711 mtrs
3.The chainages are as on date received from all DDCs, may vary after final design.

Annexure D		
Table 1.4: MTBF of the major systems		
S.No.	**System/Equipment**	**MTBF(hours)**
1	**FOTS**	
a	Distribution and Core Switches	>250,000
b	Access Switch	>150,000
2	**CCTV**	
a	Camera	>60,000
3	**Telephone**	
a	Processor Module	>400000
b	Line and Trunk Interface Module	>100,000
c	Switching Module	>50,000
d	IP Cards	>100,000
e	Memory Module	>200000
f	Power Supply Equipment	>60,000
g	Multifunction direct line console	>50,000
h	Gateways	>200000
i	IP Phone	>200000
j	Analog Phone	>60000
4	**PIDS**	
a	PIDS Displays (All types)	>60,000
5	**PAS**	
a	System Controller	>50,000
b	Amplifier Redundancy Control Panel	>100,000
c	Power Amplifier	>50,000
d	Speaker	>100,000
e	Digital Voice Announcer Equipment	>50,000
f	Back up Console	>100,000
g	Noise Control Sensors	>50,000
h	Noise Logic Controllers	>100,000
i	Microphone	>60,000
6	**Clock**	
a	Slave Clocks	>70,000
7	**ACIDS**	
a	Controllers	>100,000
b	Door Control Card Readers	>100,000
c	Ingress Button, Break Glass, Key Switch, Sensors, Locks	>60,000
8	**Server/HMI and Monitors**	
a	Server/Workstations	>60000
b	HMI	>50000
c	Monitor	>50000
d	Storage	>100,000

Annexure - E

1.14.1.28 Telecom Contractor to ensure the following enclosure specifications at minimum which are not exhaustive but illustrative.

Table 1.6 : Enclosures Specifications

S.No.	Specification	Location	
		Outdoor	Indoor
1	Material	316 Stainless Steel or equivalent	Painted Carbon Steel or equivalent
2	Enclosure Type	Wall Mounted	Wall Mounted
3	IP rating	66 minimum	54 minimum
4	IK rating	10	7 minimum
5	NEEMA rating	4X	3/3S/13
6	Operational Temperature	-40 to 80 (deg Celcius)	-40 to 60 (deg Celcius)
7	Operational Humidity	max 95% non condensing	max 95% non condensing
8	Gasket	Silicon	Silicon
9	Door Sealing	Waterproof	Waterproof
10	Door Type	hinged	hinged
11	Door Lock	vandal resistant	vandal resistant
12	Bottom Plate, Back Plate	detachable, galvanised	detachable, galvanised
13	Coating	epoxy polyester powder	epoxy polyester powder

Annexure - F

13.21.1.2 Scope of Interface & Division of Responsibilities

The ASA 05 & ASA 06 Telecom Contractor shall co-ordinate interactively in order to achieve the functional and operational requirements of the system. The roles and activities of the two Contractors shall include minimum following but not limited to:

Interfaces between ASA 05 Communication (Telecom) – ASA 06 Telecom Contractor			
Interface Code	**Scope of Work**	**COMA ASA 05 contractor**	**ASA 06 Communication (Telecom) contractor**
COM A -COMB- 01	CCTV – ISMS Interface	• Shall prepare jointly ISMS- CCTV & ACIDS interface document and submit to Engineer. • Shall provide necessary inputs of CCTV stations and depot equipments (Camera,IP address etc). • Shall ensure ONVIF profile S,G&T of proposed CCTV cameras • Shall submit POC in coordination with ASA 06 Contractor for successful integration with provided ISMS. • Any other input information as required by ASA 06 contractor for successful integration. • Provide Station client hardware as per the Application requirement. • Shall coordinate with ASA 06 for integration of C4 stations ,depot,RSS etc Cameras recording in NVR system.	• Shall prepare jointly ISMS- CCTV & ACIDS interface document and submit to Engineer • Shall coordinate with ASA 05 contractor for successful integration of CCTV cameras with ISMS application for OCC & BCC. • Shall Submit POC for video analytics and successful integration with ISMS • Shall coordinate with ASA 05 contractor for successful integration of CCTV cameras with Station Client application. • Shall provide and install the ISMS station client in provided hardware machine in SCR. • Shall provide recording system and coordinate with ASA 05 for C4 stations ,depot,RSS etc Cameras recording in NVR system
	ACIDS- ISMS Interface	• Shall prepare jointly ISMS- CCTV & ACIDS interface document and submit to Engineer. • Shall provide necessary inputs of ACIDS equipments at stations and depot equipments (APIs,SDK's,IP address etc). • Shall ensure to provide SDK's (to ASA 06 Contractor) of proposed ACIDS Controllers and readers. • Shall submit POC in coordination with ASA 06 Contractor for successful integration with provided ISMS. • Any other input information as required by ASA 06 contractor for successful integration. • Provide Station client hardware as per the Application requirement. • Shall coordinate with ASA 06 for integration of C4 stations ,depot,RSS etc	• Shall prepare jointly ISMS- CCTV & ACIDS interface document and submit to Engineer • Shall coordinate with ASA 05 contractor for successful integration of all C4 ACIDS equipments with ISMS application for OCC & BCC. • Shall coordinate with ASA 05 contractor for successful integration of station & depot ACIDS equipments with Station Client application. • Shall provide and install the ISMS station client in provided hardware machine in SCR. • Shall provide recording system and coordinate with ASA 05 for C4 stations ,depot,RSS etc Cameras recording in NVR system
COM A -COM B- 02	Space proofing viaducts, tunnels, trays, stations	• Shall coordinate and avoid conflicts in positions as well as EMC requirements.	• Shall coordinate and avoid conflicts in positions as well as EMC requirements.
COM A -COM B- 03	Various areas of the Depot, including maintenance Zone	• Shall incorporate in the CCTV camera and ACIDS layout design and provide CCTV coverage and ACIDS installations accordingly.	• Shall coordinate and provide details • Shall integrate cctv & ACIDS with ISMS accordingly.
COM A - COM B- 04	PIDS & PAS interface with Central PIS	• Shall prepare jointly Central PIS- PIDS & PAS interface document and submit to Engineer. • Shall provide necessary inputs of PIDS & PAS at stations and depot equipments. • Shall submit POC in coordination with ASA 06 Contractor for successful integration with provided PIS application. • Any other input information as required by ASA 06 contractor for successful integration. • Provide Station client HMI/PIDS display hardware as per the Application requirement.	• Shall prepare jointly PIS- PIDS & interface document and submit to Engineer • Shall coordinate with ASA 05 contractor for successful integration of Station PIDS &PAS with PIS application for OCC & BCC and station client. • Shall submit POC for successful integration of Station PAS-PIDS system with provided PIS application. • Shall provide and install the PIS station client in provided hardware machine in SCR.
COM A - COM B - 05	PAS interface with Central PIS	• Shall coordinate and propose the communication protocol, communication links etc. Shall supply thePA controller API details to ASA-06 and support the ASA-06 during the inetface design.	• Shall comply and design PAS system for effective information display system for passengers. Shall develope the PAS/PIDS software based on the API details supplied by ASA-05.
COM A - COM B - 06	MCLK Interface with Station and depot clocks	• Shall receive NTP sysnchronisation from ASA 06 Telecom Contractor and extend to Corridor 4 Telecom systems.	• Telecom Contractor shall provide NTP channels for synchronization of Corridor 4 systems to ASA 05 Telecom Contractor shall provide Ethernet ports/OFC at FOTS equipment in the OCC and BCC.

COM A - COM B - 07	OCC -Station FOTS	• Shall interface for Corridor 4 FOTS to OCC/BCC Core switch by providing desired open standard to ASA 06 Telecom Contractor for successful integration.Shall prepare interface document jointly with ASA 06 and provide required open standard based interface for successful integration. •	• Shall integrate Corridor 4 FOTS with OCC/BCC Core switches by using open standards and coordinate with ASA 05 Contractor for writing interface document and listing desired inputs for successful integration. • Shall submit the POC jointly with ASA 05.
COM A-COM B - 08	Telephone System	• Shall interface for Corridor 4 Telephone system to OCC/BCC Central Telephone system by providing desired open standard to ASA 06 Telecom Contractor for successful integration.Shall prepare interface document jointly with ASA 06 and provide required open standard based interface for successful integration. • Shall Interface with ASA 06 for connecting Depot Analog phones with Media Gateway.	• Shall integrate Corridor 4 Telephone with OCC/BCC Central Telephone System by using open standards and coordinate with ASA 05 Contractor for writing interface document and listing desired inputs for successful integration. • Shall provide Media Gateway for depot to connect and interface Analog telephone in Depot premises.
COM A- COM - B - 09	CDRS	• Shall Interface with ASA 06 Contractor for integration of Corridor 4 Telecom system with CDRS in OCC/BCC.	• Shall provide CDRS in OCC/BCC and Interface with ASA 05 Contractor for integration of Corridor 4 Telecom system with CDRS in OCC/BCC.
COM A- COM - B - 10	Telecom SCADA	• Shall Interface with ASA 06 Contractor for integration of Corridor 4 Telecom system with Telecom SCADA in OCC/BCC.	• Shall provide Telecom SCADA system in OCC/BCC Interface with ASA 06 Contractor for integration of Corridor 4 Telecom system with Telecom SCADA in OCC/BCC.
COM A- COM B- 11	Joint testing ,commissioning on and training of Integration for the Centralised system	• Shall coordinate and jointly establish the integrated testing and commissioning plan and procedure along with Offline Integration Test Platform/Telecom Lab • Shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc) and Station ISMS. PIS application (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. • Shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	• Shall coordinate and jointly establish the integrated testing and commissioning plan and procedure along with Offline Integration Test Platform/Telecom Lab • Shall perform testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc) and Station ISMS. PIS application (PAT,SAT & Integrated tests) for first 2 stations of Corridor 4 and provide training to ASA 05 staff for performing testing and commissioning for rest of all the Corridor-4 stations and enable ASA 05 contractor for testing and commissioning of balance stations .
COM A- COM B- 12	Joint Construction methodology and installation sequencing	• Shall prepare any joint coordination required for construction methodology or installation sequencing	• Shall coordinate and provide inputs for the same
COM A- COM B - 13	Joint Testing plan (For every stage, which included offline integration test platform also)	• Joint testing plan shall be prepared and conducted to validate the design coordination and to check the requirements	• Shall coordinate to prepare the test document and participate in the test.
COM A- COM B - 14	Joint maintenance plan	• Shall prepare the joint maintenance plan	• Shall provide the inputs for the same

Lead Member: In reference to above scope Matrix, for Sr No 1 & 4 to 10, ASA 06 Contractor shall be the lead member while for Sr 2, 3, 11 to 14 ASA 05 shall be the lead member.

Annexure - G

S. No.	System	ASA-06 (OCC/BCC systems)								ASA-05 (Station and Depot)																			
		ISMS/Central Management ,Video analytics server			HMI		NMS OCC			HMI			Back End Equipment			Front End equipment			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
		HW	SW	Remarks	HW	SW	HW	SW	Remarks	HW	SW	Remarks	HW (recording servers)	SW (recording servers)	Remarks	HW (camera, Video Analytics Camera and Server)	SW (camera, Video Analytics Camera and Server)	Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
1	ISMS/CCTV	ASA-06	ASA-06		ASA-06	ASA-06	ASA-06	ASA-06		ASA-05	ASA-06		ASA-05	ASA-06		ASA-05	ASA-05		ASA-05	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA, FOTS, CDRS, Telephone, CCTV, PAS etc.) and Station ISMS. Centralised telecom systems (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-05	ASA-05/ASA-06	Defect liability will be the responsibility of ASA-05. For any interface related issue, ASA-05 shall do the first line investigation and coordinate with ASA-06 for respective items. ASA-06 shall be responsible for interface related issues arising out of his scope of supply.	ASA-05	ASA-05/ASA-06	RAMS demonstration will be the responsibility of ASA-05. ASA-06 shall be responsible for RAMS demonstration of the interface software supplied under his scope.
2	ISMS/ACID	ISMS/ACID Server			Common user Enrollment software!!		NMS OCC			HMI			Back End Equipment (Controller, DIU)			Front End equipment (Door equipment)			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
		HW	SW	Remarks	HW	SW	HW	SW	Remarks	HW	SW		HW	SW	Remarks	HW	SW	Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
		ASA-06	ASA-06	ASA-05 shall integrate their Access Control Equipment seamlessly with ISMS software application supplied by ASA-06 using open architecture controller or software level integration (through corridor server) by sharing API and SDK for alarm, control and user enrollment/management. If seamless integration of all functional requirements of ACID as envisaged in Appendix B is not possible, ASA-05 shall supply ACID software application to handle all functional requirements of ACID of respective stations/Depots under their scope and integrate with ISMS as a minimum for alarms, events and door open/close control.	ASA-06	ASA-06	ASA-06	ASA-05/ASA-06	In case ASA-05 architecture supports seamless NMS integration, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05 & 06 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 shall supply individual NMS. Virtualized environment shall be provided by ASA-06 for hosting all NMS software	ASA-05	ASA-05/ASA-06	ASA-05 shall integrate their Access Control Equipment seamlessly with ISMS software application supplied by ASA-06 using open architecture controller or software level integration (through corridor server) by sharing API and SDK for alarm, control and user enrollment/management. If seamless integration of all functional requirements of ACID as envisaged in Appendix B is not possible, ASA-05 shall supply ACID software application to handle all functional requirements of ACID of respective stations/Depots under their scope and integrate with ISMS as a minimum for alarms, events and door open/close control.	ASA-05	ASA-05		ASA-05	ASA-05		ASA-05	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc.) and Station ISMS. Centralised telecom systems (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-05	ASA-05/ASA-06	Defect liability will be as per scope of supply.	ASA-05	ASA-05/ASA-06	RAMS demonstration will be the responsibility of ASA-05. ASA-06 shall be responsible for RAMS demonstration of the interface software supplied under his scope.
3	PIDS	Central Server			HMI		NMS OCC			HMI			Back End Equipment (HMI cum Server)			Front End equipment (Displays, Controllers)			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
		HW	SW	Remarks	HW	SW	HW	SW	Remarks	HW	SW	Remarks	HW	SW	Remarks	HW	SW	Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
		ASA-06	ASA-06		ASA-06	ASA-06	ASA-06	ASA-06		ASA-05	ASA-06		ASA-05	ASA-06		ASA-05	ASA-06	The hardware for Corridor server, HMI such as PC / Workstation and the Passenger information Displays for Stations and Depot for hosting the PIDS applications including licensed windows OS shall be under scope of this contract. PIDS application (HMI and display) software shall be under scope of OCC/BCC Contractor.	ASA-05	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc.) and Station ISMS. Centralised telecom systems (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-05	ASA-05/ASA-06	Defect liability will be the responsibility of ASA-05. For any interface related issue, ASA-05 shall do the first line investigation and coordinate with ASA-06 for respective items. ASA-06 shall be responsible for interface related issues arising out of his scope of supply.	ASA-05	ASA-05/ASA-06	RAMS demonstration will be the responsibility of ASA-05. ASA-06 shall be responsible for RAMS demonstration of the interface software supplied under his scope.
4	Telephone	Central Server (EPBX, CDRS)			HMI		NMS OCC			HMI			Back End Equipment (Gate way)			Front End equipment (IP/Analog Telephone, Free Space Recording, Emergency Telephone, Help Point)			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
		HW	SW	Remarks	HW	SW	HW	SW	Remarks				HW	SW	Remarks	HW	SW	Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
		ASA-06	ASA-06		ASA-06	ASA-06	ASA-06	ASA-06		NA			ASA-06	ASA-06		ASA-05	ASA-05		ASA-05	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc) and Station ISMS. Centralised telecom systems (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-05	ASA-05/ASA-06	Defect liability will be the responsibility of ASA-05. For any interface related issue, ASA-05 shall do the first line investigation and coordinate with ASA-06 for respective items. ASA-06 shall be responsible for interface related issues arising out of his scope of supply.	ASA-05	ASA-05/ASA-06	RAMS demonstration will be the responsibility of ASA-05. ASA-06 shall be responsible for RAMS demonstration of the interface software supplied under his scope.
5	FOTS/OAIT	Core switch			HMI		NMS OCC			HMI			Back End Equipment (Distribution Switch)			Front End equipment (I/O port)			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
		HW	SW	Remarks	HW	SW	HW	SW	Remarks			Remarks	HW	SW	Remarks	HW	SW	Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
		ASA-06	ASA-06		NA		ASA-06	ASA-05/ASA-06	In case ASA-05 architecture supports seamless integration with ASA-06, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05 & 06 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 shall supply individual NMS. Virtualized environment shall be provided by ASA-06 for hosting all NMS software	NA			ASA-05	ASA-05	ASA-05 shall integrate their network seamlessly with the core switches supplied under ASA-06 .If seamless integration of all functional requirements of FOTS like the ring protection/convergence/routing/etc. is not possible, ASA-05 shall supply the Core/Equivalent switch infrastructure to handle all functional requirements of FOTS of respective stations/Depots under their scope and integrate with ASA-06 core switch for routing of traffic.	ASA-05	ASA-05		ASA-05	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc.) and Station ISMS. Centralised telecom systems (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-05	ASA-05/ASA-06	Defect liability will be the responsibility of ASA-05. For any interface related issue, ASA-05 shall do the first line investigation and coordinate with ASA-06 for respective items. ASA-06 shall be responsible for interface related issues arising out of his scope of supply.	ASA-05	ASA-05/ASA-06	RAMS demonstration will be the responsibility of ASA-05. ASA-06 shall be responsible for RAMS demonstration of the interface software supplied under his scope.
6	PAS						NMS/MS OCC			HMI			Back End Equipment (Controller)			Front End equipment (Peripherals)			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
							HW	SW	Remarks			Remarks	HW	SW	Remarks	HW	SW	Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
				NA			ASA-06	ASA-05/ASA-06	In case ASA-05 architecture supports seamless integration, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05 & 06 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 shall supply individual NMS. Virtualized environment shall be provided by ASA-06 for hosting all NMS software	NA			ASA-05	ASA-05		ASA-05	ASA-05		ASA-05	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc.) and Station ISMS. PIS application (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-05	ASA-05/ASA-06	Defect liability will be the responsibility of ASA-05. For any interface related issue, ASA-05 shall do the first line investigation and coordinate with ASA-06 for respective items. ASA-06 shall be responsible for interface related issues arising out of his scope of supply.	ASA-05	ASA-05/ASA-06	RAMS demonstration will be the responsibility of ASA-05. ASA-06 shall be responsible for RAMS demonstration of the interface software supplied under his scope.
7	CLK	Master Clock			HMI		NMS OCC			HMI			Back End Equipment			Front End equipment (Clocks)			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
		HW	SW	Remarks	HW	SW	HW	SW	Remarks			Remarks			Remarks	HW	SW	Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
		ASA-06	NA		NA		ASA-06	ASA-06		NA			NA			ASA-05	ASA-05		ASA-05	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc.) and Station ISMS. PIS application (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-05	ASA-05/ASA-06	Defect liability will be the responsibility of ASA-05. For any interface related issue, ASA-05 shall do the first line investigation and coordinate with ASA-06 for respective items. ASA-06 shall be responsible for interface related issues arising out of his scope of supply.	ASA-05	ASA-05/ASA-06	RAMS demonstration will be the responsibility of ASA-05. ASA-06 shall be responsible for RAMS demonstration of the interface software supplied under his scope.
8	T-SCADA	Central Server			HMI		NMS OCC			HMI			Back End Equipment			Front End equipment			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
		HW	SW	Remarks	HW	SW	HW	SW	Remarks			Remarks			Remarks			Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
		ASA-06	ASA-06		ASA-06	ASA-06	ASA-06	ASA-06		NA			NA			NA			NA	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc.) and Station ISMS. PIS application (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-06	ASA-06	Defect liability will be the responsibility of ASA-05. For any interface related issue, ASA-05 shall do the first line investigation and coordinate with ASA-06 for respective items. ASA-06 shall be responsible for interface related issues arising out of his scope of supply.			
9	Cyber security	Central Equipment			HMI		NMS OCC			End points			Back End Equipment			Front End equipment			Testing & Commissioning					DLP Obligation			RAMS Demonstration		
		HW	SW	Remarks	HW	SW	HW	SW	Remarks	HW	SW	Remarks			Remarks			Remarks	IAT	PAT	SAT	ITC	Remarks	HW	SW	Remarks	HW	SW	Remarks
		ASA-06	ASA-06		ASA-06	ASA-06	ASA-06	ASA-06		ASA-05	ASA-06	All Cyber security software including Firewalls, Anti-malware, anti-spam, anti-spyware, etc. along with required licenses shall be supplied by ASA-06. ASA-05 contractor shall configure the Endpoints in line with the centralised cyber security environment.	NA			NA			NA	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05/ASA-06	ASA-05 shall coordinate with ASA 06 for testing and commissioning with Centralised telecom systems (ISMS, PIS, Telecom SCADA,FOTS,CDRS etc.) and Station ISMS. PIS application (PAT, SAT & Integrated testing and commissioning) for first 2 stations which shall be done by ASA 06 Contractor. ASA-05 shall receive training during testing and commissioning of first 2 stations from ASA 06 and perform testing and commissioning of balance Corridor stations using his own resources.	ASA-06	ASA-06	Defect liability will be the responsibility of ASA-05. For any interface related issue, ASA-05 shall do the first line investigation and coordinate with ASA-06 for respective items. ASA-06 shall be responsible for interface related issues arising out of his scope of supply.			

Annexure - H

6. The contractor shall be responsible for supply, installation, testing, commissioning and integration of below systems:

S.No	Sub- System	Items to be supplied by ASA-05	Items to be supplied by ASA-06	Qty	Remarks
1	DTS	Distribution switch	Distribution switch	1 No	Each package's Distribution switch shall be connected to their respective sub-system mentioned in this table.
2	MCS	Digital Clock	Digital Clock	1 No	Wall Mounted
3	CCTV	Fixed Camera	Fixed Camera	1 No	Cameras installed with respective mounting arrangements
		PTZ Camera	PTZ Camera	1 No	
		workstation/HMI/ Server	workstation/HMI/ Server	1 No	
4	Telephone System	IP telephone	IP telephone	1 No	IP telephone with full functionality
5	PIDS	Display Controller	Display Controller	1 No	
		Display Monitor	Display Monitor	1 No	
		Microphone	Microphone	1 No	
6	PAS	PA Controller	PA Controller	1 No	
		Amplifier	Amplifier	1 No	
		Speaker	Speaker	1 No	shall be installed with respective mounting arrangements
		PSB	PSB	1 No	
		PA Control Panel	PA Control Panel	1 No	
7	ACID	Controller	Controller	1 No	
		Door Interface Unit	Door Interface Unit	1 No	
		Euipment for Access controlled door	Euipment for Access controlled door	01 set	
8	AC Distribution Board	NA	ACDB	As Applicable	
9	Rack and Furniture	NA	Rack		
			Furniture and Chairs		

Annexure - I

4.3 CCTV Video analytics

4.3.1 Requirements for CCTV Video Analytics for CCTV System

Analytics can be enabled or disabled on each unit individually without degrading video performance on the system

4.3.1.1 Intelligent Video Analytics shall be implemented on the proposed cameras. Different types of Video analytics feature shall include, but not limited to:

Table 4.8

S.NO	Video analytic function	Camera based /Server based	Cameras Qty per typical station/Location (Approx)	Location	Remarks
1	People attributes-	Server based	4 (One at each Entry and one at each Exit array)	AFC Gate Entry and exit array	Use case: This attribute will be used for Quick search functionality in the VMS. Gender- Men/Women/Child, Upper Wear- Long/short sleeves, Colour Lower wear - Long/short, Colour Bag -No bag/ Backpack/Handbag
2	Queuing detection	Server/Camera based	2 (One at each Exit array)	AFC gate Entry	Use case: This will be used to alert the station controller on VMS about abnormal queuing
3	Crowd estimation at platform	Server based	6 (Three at each platform)	Both the platforms	Use case: This will be used to extent the real time passenger occupancy data to Signalling system for dwell time control.
4	Motion (Intrusion) Detection	Server/Camera based	1.PTZ Day/Night cameras at depot perimeter (Camera QTY as required), Ramp (UG to elevated transition area QTY 2 cameras and RSS perimeter (Camera QTY as	Parking areas	1.Use case: Violation detected on Intrusion sensor shall trigger PTZ camera to its view for auto tracking of the violator/intruder. 2.Use case: Detect and track Human movement in UTO (Unattended train

			required). 2.Two Long range Day/Night IR PTZ Camera and 10 fixed cameras		operation) area. The Long range PTZ cameras shall be mounted on the locations like top of Admin building to cover over all depot UTO area. The fixed cameras are installed in locations segregating UTO and non UTO areas in workshop shed and stabling bay shed
5	Camera tampering alarm	Camera based	All cameras		

4.3.1.2 In case of edge-based analytics, it shall be provided by natively built-in feature of camera only.

4.3.1.3 Contractor shall provide POC for all Video analytics and integration with VMS as per ISMS specifications in Appendix B.

4.3.1.4 The Video Analytics shall not be bound to the MAC address of the device and hence any video analytics feature shall be possible to be deployed on any of the applicable cameras. This shall allow Employer to use CCTV / Video License independent of MAC Address of the camera/server/archiver/device.

4.3.2 Video Analytics shall be integrated with VMS (ISMS as per Appendix B) Software

4.3.3 Contractor shall implement Video Analytics as per rules specified in the Technical Specification as per table 4.8. Contractor is required to achieve accuracy 85% or better and demonstrate functionality satisfactorily to CMRL

.

Annexure - J

Table 5.1 : Card Reader Specifications			
S.No.	**Properties**	**Smart Card Reader**	**Biometric Reader**
1	Authentication	Card Access	Biometric Access and Card Access
2	Power	PoE/12VDC	PoE/12VDC
3	Ingress Rating	IP54 (Indoor) and IP65 (Outdoor)	IP54 (Indoor) and IP65 (Outdoor)
4	Impact Rating	IK08	IK08
5	Operating Temperature	(-30) to 60 (deg Celcius)	(-30) to 60 (deg Celcius)
6	Operating Humidity	0 - 95 % (non-condensing)	0 - 95 % (non-condensing)
7	Certifications	CE, FCC, RoHS	CE, FCC, RoHS
8	RAM	NA	512 MB Minimum
9	Compatibility	MIFARE/DESFire	MIFARE/DESFire
11	Interfaces	Ethernet, RS-485	Ethernet, RS-485
12	Communication	OSDP	OSDP
13	Capacity		
a	Transactions	NA	10,00,000
b	User (1:1)		50,000
c	Cardholders		up to 250,000

Annexure - K

APPENDIX – D

CONTRACT SPARES AND NETWORK MANAGEMENT TERMINAL

1.1 Contractor shall provide 10% of working population of each Line Replaceable unit (LRU) as per finally approved detailed design for each sub-system as contract spares.

1.2 Additional to the above clause 1.1, contractor shall provide the following as contractual spares:

S.N.	Items	Quantity
1.	OFC 144 Fiber Armoured Cable for Elevated/ Underground/At Grade section as per RDSO TEC Specifications	4 km
2.	OFC each type (Other than 144 C)	1 km Each
3.	Data Cable Cat 6	4 Km

1.3 10 Nos of Laptops each fully loaded with Network Management Software of all sub-systems and OEM applications.

Annexure - L

APPENDIX – F

SPECIFICATIONS OF CONFERENCE SYSTEM IN DEPOT MEETING ROOM

1. **General**

The Meeting room (size 10.180-meter x 7.980 meter) shall be equipped with Video Conference system equipment's as below.

- Video conference system of reputed brand (Logitech or equivalent) for minimum 40 users Capacity with Camera (4K PTZ rally camera or equivalent) , Mic Pod (Minimum 6), Speaker ,Smart Cabling and Content Sharing (With a Display Hub and Table Hub to minimize cross-room cabling) and remote control.
- LCD- Projection system and LED Monitors ergonomically suitable for room size of 10.180 meterx7.980 meter.
- Audio system with wireless speakers etc.
- Central Equipment's/units to control the systems shall be installed in 19-inch rack at the conference room.
- There should be minimum 20 locations with cable feed through with an AC power socket and a CAT-6 connector installed for multimedia connection.
- Telecom contractor to Interface with the furniture supplier to incorporate the LAN and Power provisions aesthetically.
- AC power sockets and the CAT-6 connectors supplied under this scope should be installed in the table and should be protected against spilled water.
- The overall setup shall be neat without any visible cabling.
- LAN with Wi Fi provision (40 concurrent users) shall be provisioned inside Conference room for networking the entire system

2. **RACK**

The rack should feature

1. Height of approx. 2 meters.
2. Rack shall be built of modern aluminum with roller.
3. Main voltage panel including a master switch (230 V AC) and circuit breakers (2-pole).
4. The rack shall have inbuilt provision of channels for managing wiring, stroke cablings.
5. Sound insulation when door closed.
6. Sufficient cooling for the equipment installed.
7. Connection panel for the LCD-monitors, keyboards, and mouse.

3. **Video conferencing system**

Logitech Rally plus or equivalent system with Camera (4K PTZ rally camera or equivalent), Mic Pod (Minimum 6), Speaker ,Smart Cabling and Content Sharing (With a Display Hub and Table Hub to minimize cross-room cabling) and remote control.

Contractor shall supply a meeting computer.Meeting computer should meet following minimum requirements:

SN	Device	Specifications
1	Processors	Intel Xeon Processor E2388G OR Intel i9 Processor latest Gen (16 MB Cache, 3.2 GHz) or better
2	Operating Systems	Genuine Windows / Linux latest Version

3	Chipset	Intel 600 Series or better
4	Memory (RAM)	SATA SSD or PCIe SDD or better (6 Gbps, 1 TB memory minimum)
5	Drive Controller	SATA or PCIe, 6 Gb/s controller
6	Networking	Dual Integrated GbE Controller
7	Keyboard	USB keyboard
8	Mouse	USB two - button optical mouse

Notwithstanding the above, the Video conference system shall seamlessly connect with external wireless speaker, projector and Led TV and contractor shall factor the hardware required for the above functionality.

4. LCD Projection systems for Conference room

Meeting room LCD-projector

1. The projector should feature a native resolution of at least SXGA 1400*1050, and should be able to display HDTV 1080/60p and all resolutions below:
2. The projector should feature network capability to be fully controllable by the multimedia matrix switcher.
3. The projector should feature network capability to be fully controllable by the multimedia control system via LAN (Ethernet interface).
4. The projector should feature automatic cooling down after being switched-Off to avoid damaging the lamps.
5. The operating noise should not exceed 30 db.
6. The projector should be mounted on the ceiling of the conference room with an electromechanical lifting device.
7. The project should be controlled by remote control.
8. The lifting device should be controlled via switches located at the conference room 19-inch rack.
9. The lifting device should allow lowering the projector down (approx.,1.5 meter above ground) so that lamp replacement or service can be done without ladders or scaffoldings (maintenance position).
10. The lifting device should feature high mechanical accuracy to avoid adjustment of the projector after movement.
11. Dual lamp system should provide fail safe operation.
12. Remote controlled zoom and shift lenses and a vertical keystone feature should be included.
13. Casting facility shall also be available for LCD projector to avoid cable connections for presentations using laptops and mobile phones.
14. LAN with Wi Fi provision (40 concurrent users) shall be provisioned inside Conference room for networking the entire system (TV & LCD projector).
15. Suitable Conference telephone and general land line telephone shall be supplied and installed in conference room.

Other expected Features:

(i) Light output >/= 4000 lumens.
(ii) Resolution: Video 750 TV lines, RGB 1400x 1050 pixels
(iii) Colour system; NTSC, PAL system
(iv) Computer signals up to UXGA (60 Hz)
(v) Video signals: 15k RGB 50/60 Hz, Progressive component 50/60 Hz, DTV (480/60i,1080/50p), Composite Video, Super-video.

5. LED TV

1. One Smart LED TV of reputed brand of minimum 65 inches shall be installed on opposite side wall of Projector screen.
   Display type : LCD
   Display Resolution: 3,840 x 2,160
   Power Consumption (In standby) : </= 0.5 W
   Operating System: Android
   Audio Power output: 10W + 10 W
   Sound Modes: Standard, Dialog, Cinema, Music, Sports, Dolby Audio
   Acoustic and Calibration: Room and User Position Compensation
   Video Signal support: HDMI™ signal: 4096 x 2160p (24, 50, 60 Hz), 3840 x 2160p (24, 25, 30, 50, 60, 100, 120 Hz) 4, 1080p (30, 50, 60, 100, 120 Hz), 1080/24p, 1080i (50, 60 Hz), 720p (30, 50, 60 Hz), 720/24p, 576p, 480p
   Blue tooth profile support: version 4.2; HID (mouse/keyboard connectivity)/HOGP (Low Energy device connectivity)/SPP (Serial Port Profile)/A2DP (stereo audio) 2/AVRCP (AV remote control)
   Ethernet inputs: yes
   Wi-Fi Standard: Wi-Fi Certified 802.11a/b/g/n/ac
   Wireless Casting facility shall also be available for LED

6. Motor driven screen for Meeting room

(i) Meeting room should be equipped with 1 motor driven screen.
(ii) The motor driven screen should be concealed in the ceiling with closure doors.
(iii) Ceiling mounts shall be provided, and the screens shall be installed seamlessly into the Ceiling elements.
(iv) The viewing surface should be best suitable for LCD data-and video projection (e.g., matte white) and should feature a very wide viewing angle (>/= 120 degree) and a gain factor of 1.0.
(v) The screen must have a plain surface and must be cleanable, flame retardant and mildew resistant.
(vi) Operation of the motor driven screens shall be provided via 3 buttons (up/stop/down) at appropriate location.
(vii) The screen sizes for Meeting room shall be need based.
(viii) The screen shall be able to be stopped in any position.

7. Speaker System for Conference Room

(i) The wireless speaker array of appropriate output capacity shall be installed for high intelligible and rich sound as per the room acoustic requirements. Simulation tools shall be used for speakers' placements for best possible performance.
(ii) Bluetooth interface A2DP with aptX®
(iii) WLAN interface IEEE 802.11b/g Encyption WPA2