

**Addendum-01**  
**CMRL / PHASE – II / SYS / ASA05 / 2022**  
**10-08-2022**

| SN | Part   | Section   | Clause  | Original Bid condition  |                                       |  | Revised bid condition  |
|----|--------|---|---|---|---------------------------------------|--|--|
| 1. | Part-1 | Section IV Bidding forms                                | 4.1.11 (g), (i) PDF pg. No 83   | The ‘Manufacturing and Delivery for Telecommunication systems’ for all the stages of Corridor 4 involves substantially the obligations and ongoing activities including but not limited to the following:<br>g) Delivery of CDRS equipment including softwares and associated accessories at Contractor’s premises in Chennai.<br>i) Delivery of Telecom SCADA equipment including software and associated accessories at Contractor’s premises in Chennai.   |                                       |  | Deleted  |
| 2. | Part-3 | Section-VIII Particular conditions of contract          | Table 5: Access Date for Communication Network backbone from Signaling Contractor | <b>Access Date Reference</b>  | <b>Description</b>                    | <b>Calendar Days from Commencement</b> | Deleted  |
|    |        |   |   | AD-S1-010   | Access Date for Corridor 4 – C4-ECV02 | 581                                    |  |
|    |        |   |   | AD-S1-011   | Access Date for Corridor 4 – C4-ECV01 | 531                                    |  |
|    |        |   |   | AD-S4-012   | Access Date for Corridor 4 – C4-UG02  | 864                                    |  |
|    |        |   |   | AD-S7-013   | Access Date for Corridor 4 – C4-UG01  | 1134                                   |  |
| 3. | Part-2 | Section VIA ISS & CYBER SECURITY TECHNICAL REQUIREMENTS | 4.Software Management and Control   | 4.2 Software Obligations<br>4.2.1 Within 14 days of the installation of any software by the Contractor, the Contractor shall submit to the Engineer for retention by the Employer and the Engineer, two backup copies of the software, which shall include, without limitation:<br>a) all licenses in favour of the Employer for their use.<br>b) all source and executable codes.<br>c) all design documentation relating to the software; and<br>d) any specified development tools required for maintenance of the software, including, but not limited to, editors, compilers and linkers.  |                                       |  | 4.2 Software Obligations<br>4.2.1 Within 14 days of the installation of any software by the Contractor, the Contractor shall submit to the Engineer for retention by the Employer and the Engineer, two backup copies of the software, which shall include, without limitation:<br>a) all licenses in favor of the Employer for their use.<br>b) all design documentation relating to the software; and<br>c) any specified development tools required for maintenance of the software, including, but not limited to, editors, compilers and linkers. |
| 4. | Part-2 | Section VIB   | 1.6.3.2(b)  | Design, Supply, and Installation of Base Frame, under False Floor Cable Trays with required risers for wall mounted units in TER of Stations / Depot and under false floor cable trays in SCR.  |                                       |  | Design, Supply, and Installation of Base Frame for cabinets, under False Floor Cable Trays with required risers for wall mounted units in TER of Stations / Depot and under false floor cable trays in SCR.  |
| 5. | Part-2 | Section VIB   | 1.6.3.4   | In The Priority Section, Telecom Contractor shall interface with OCC/BCC designated contractor to establish temporary OCC (with full functionality) and associated central control sub systems / servers, workstation, client terminals, consoles, MS, dispatchers, control panels and interfaces along with stations' Telecom Sub systems as mentioned in relevant GS & PS Telecom contractor to install, commission and configure all functionalities as per specifications and offer acceptance tests for validation as per approved test procedures.<br>Once Permanent OCC is made available for installation and commissioning of systems, Telecom Contractor shall interface with designated OCC/BCC Contractor for remobilizing all equipment from temporary OCC to permanent OCC without any disruption to services in priority section and without any extra cost to CMRL. |                                       |  | Deleted  |
| 6. | Part-2 | Section VIB   | 1.7.4.12  | Train-borne System (except train born radio subsystem and accessories) shall not be supplied as part of this contract   |                                       |  | Deleted  |

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| 7.  | Part-2 | Section VIB | APPENDIX – A<br>1. Centralized Passenger Information System<br>1.1.8                   | The output of the PAS Amplifier should be tapped and recorded automatically either locally or remotely at OCC / BCC, so that record of the actual announcement made can be analyzed at a later date. The record to be kept for 2 weeks.   | Deleted   |
| 8.  | Part-2 | Section VIB | Appendix B ISMS<br>1.5   | Provision shall be made for displaying a minimum of four live streams from a train at OCC/BCC. In case where more than four cameras from a train is required for live streaming, throughput generated by each camera will be proportionately reduced (increasing image compression). The display system at OCC/BCC should be capable of displaying as many live streams from different trains on the line as the operator wants to see by selecting multiple windows on one or more HMI provided by S&TC contractor.  | Deleted   |
| 9.  | Part-2 | Section VIB | APPENDIX–B<br>Integrated Security Management System (ISMS)<br>1.11 ACIDS               | 4. In addition to Access Control System there shall be a provision of attendance system using bio-metric (thumb or facial) access point reader at station, depot, OCC & BCC and RSS. There should be provision for the generation and integration of attendance report to HR Systems through the network.   | Deleted   |
| 10. | Part-2 | Section VIB | APPENDIX–B<br>Integrated Security Management System (ISMS)<br>2.Network Video Recorder | 2. Network Video Recording Server<br>The CCTV information of rolling stock shall also be recorded in the same server provided by Telecom Contractor.  | Deleted   |
| 11. | Part-2 | Section VIB | 1.16(g)  | 1.16 Fault and Alarm Monitoring<br>(g)Telecom contractor shall interface access control system with Access point controllers and card/biometric readers of other OEM's for other upcoming corridors of CMRL Phase 2.  | 1.16 (g) Access control system shall be integrated with ISMS either on Hardware level for open architecture controller or at software level by sharing API's and SDK's with other OEM's for upcoming corridors of CMRL Phase-2. |
| 12. | Part-2 | Section VIB | 1.5 System Integrator<br>1.5.1   | To achieve a completely integrated system, there is a need for the integration of Telecom subsystems and the IBMS in each of the stations and at the OCC & BCC level. To achieve this, it would be important that each of the NMS of Telecom subsystems should possess a framework, to be able to integrate with a third party centralized IBMS/SCADA system and its applications for enabling the relaying of its status and alarm information. The status and alarm information should be re-laid through any of the following methods: <ul style="list-style-type: none"> <li>• Snmp-v2</li> <li>• Snmp-v3</li> <li>• web service</li> <li>• Through API (application programming interface)</li> <li>• Through cli (command line interface)</li> <li>• At database level (Database integration SQL, My SQL)</li> </ul> The system integrator (SI) shall be responsible for co-ordination & lesioning with all communication sub-system contractors for engineering, review of system design, interface design, Testing & Commissioning of all | Deleted   |

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|     |        |             |                         | communication sub-systems etc. in co-ordination with individual sub-system contractors. The SI shall be responsible for fulfilling all functionalities, interfaces, as also final testing & commissioning of all communication sub-systems in co-ordination with all sub-system contractors  |   |
| 13. | Part-2 | Section VIB | 1.5.3<br>Pg no.39of 336 | The Contractor / SI shall provide DB (Distribution Board) in rooms like SCR, DCC and any other major equipment room for further distribution of UPS power to HTMLs & other equipment pertaining to communication System shall be extended from TER by the contractor/SI. The DB shall be fed from the main UPS MCCB provided by designated contractor in UPS Room.   | The Contractor / SI shall provide DB (Distribution Board) in rooms like SCR, DCC and any other major equipment room for further distribution of UPS power to HMI's & other equipment pertaining to Communication System shall be extended from TER by the Contractor/SI. The DB shall be fed from the main UPS MCCB provided by designated contractor in UPS Room.  |
| 14. | Part-2 | Section VIB | 1.14.12.1               | Phase 415V AC from the UPS, to meet the requirement of Telecom, AFC and Signalling Contract shall be provided by MEP Contractor in UPS (MEP) Room. Telecom Contractor shall extend the AC Power supply from UPS Rooms to TER/CER. The AC distribution system provided by Telecom Contractor shall meet with the requirements of all Telecom and IT sub-systems. Distribution circuits shall be suitably protected with MCBs, Earth Leakage Detectors and SPDs etc. Adequate no. of spare circuits of each type for each sub-system shall also be provided in the distribution system by Telecom Contractor. The further cabling from AC Distribution cubicle to Equipment Racks and other required locations for powering equipments to be supplied and commissioned by the Telecom Contractor for all the equipments. | <p>(a.) Phase 415V AC from the UPS, to meet the requirement of Telecom, AFC and Signalling Contract shall be provided by MEP Contractor in UPS (MEP) Room. Telecom Contractor shall extend the AC Power supply from UPS Rooms to TER/CER. The AC distribution system provided by Telecom Contractor shall meet with the requirements of all Telecom and IT sub-systems. Distribution circuits shall be suitably protected with MCBs, Earth Leakage Detectors and SPDs etc. Adequate no. of spare circuits of each type for each sub-system shall also be provided in the distribution system by Telecom Contractor. The further cabling from AC Distribution cubicle to Equipment Racks and other required locations for powering equipment's to be supplied and commissioned by the Telecom Contractor for all the equipment's.</p> <p>(b)</p> <p>1. There will be common UPS for Signalling and Train Control, Telecommunication, Automatic Fare Collection Systems &amp; PSD. The UPS supply will be made available to Telecom contractor at a shared location in the UPS room or Switch Gear Room. Two separate feeders will be made available for the Telecom contractor to connect the main power cable. Further distribution, protection arrangements, DC supply etc. shall be the responsibility of Telecom contractor.</p> <p>2 The Telecom contractor shall provide two independent power cables from the UPS feeders to the equipment room for redundancy. The cables shall be connected to two independent active feeders of the UPS. Each cable shall be capable of taking the complete load of the Telecom equipment connected downstream.</p> <p>3 The Telecom contractor shall provide an auto changeover switch inside the Telecom equipment room which automatically switches over if one cable goes faulty or power not available in one cable. The provision for manual change over shall also be provided. The auto switchover shall be fast and effective that the Power distribution shall not have any effect because of a cable failure.</p> <p>4 The failure of the auto changeover switch shall not cause any disruption in the power supply, if both the cables are healthy and connected. The details of the auto change over switch shall be submitted to the Engineer for NONO in the detail design phase.</p> |

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| 15. | Part-2 | Section VIB | 1.14.7.6<br>Page 59<br>of 336        | The Contractor shall make any wall and slab openings, including the temporary removal of architectural finishes that shall be required for his cabling. After cabling is completed, the Contractor shall seal these openings with fire resistant materials and restore the architectural finishes and fire resistance to their original state.   | The Contractor shall interface with civil contractor for any wall and slab openings, including the temporary removal of architectural finishes that shall be required for his cabling. After cabling is completed, the Contractor shall seal these openings with fire resistant materials and restore the fire resistance to their original state.                                  |
| 16. | Part-2 | Section VIB | 1.6.4.2                              | Train-borne System (except train born radio subsystem and accessories) shall not be supplied as part of this contract  | Deleted   |
| 17. | Part-2 | Section VIB | 1.14.4.3<br>(a)<br>Page 58<br>of 336 | Specifications, sample of all the mounting brackets, Base frame, False floor and accessories   | Clause 1.14.4.3 (a)<br>Specifications, sample of all the mounting brackets, Base frame and accessories  |
| 18. | Part-2 | Section VIB | 1.18.3.3                             | The training shall be organized both on shore & offshore at Contractors / sub Contractor's / OEM Works<br>(a) Training of Employer's personnel (300 man-days) overseas in OEM premises<br>(b) 100 days for training of Employer's Operating personnel in India<br>(c) 100 days for training of Employer's Maintenance personnel in India.<br>Above mentioned training days will be further break down into stages/batches and training plan along with schedule will be submitted by Telecom Contractor for Engineer's review and approval | Deleted   |
| 19. | Part-2 | Section VIB | 1.17.5.4                             | The Installation Test shall not be started unless the test procedures have been reviewed with NOC/NOSC by the Engineer.  | Installation Test shall not be started unless the test procedures have been reviewed with NONO/ NOWC by the Engineer.   |
| 20. | Part-2 | Section VIB | 2.2.1                                | Corridor Server shall be capable to provide redundancy for minimum three stations in case of station HMI fails.  | Corridor Server shall be capable to provide redundancy for minimum three stations in case of station HMI fails. However, Servers and redundancy provided by OCC/BCC Contractor  |
| 21. | Part-2 | Section VIB | 2.5.2.1<br>Page 87 of<br>336         | All Intelligibility elements of the PAS shall comply with the requirements of BS 5839- 8 to achieve a final system that is certified BSEN 60849 compliant.   | All Intelligibility elements of the PAS shall comply with the requirements of BS 5839-8 to achieve a final system that is certified BSEN 50849 compliant.   |
| 22. | Part-2 | Section VIB | 2.5.8.1                              | All equipment must comply with and be installed in accordance with ISO/IEC 17065:2012, IEC 364 and to current safety standards applicable in India.  | All equipment must comply with and be installed in accordance with EN54 Part 24 or Part 16, IEC 364 and to current safety standards applicable in India.  |
| 23. | Part-2 | Section VIB | 2.6.12.8                             | The PAS/PIDS hardware MMI at Stations shall be provided with minimum 32" monitor & PAS Back up Console shall have touchscreen suitable for public announcements in metro rail environments. Back up PAS Control shall have zone selection capabilities and shall allow operator to select and make announcement to any particular or all PAS zones of the designated location.   | The PAS/PIDS hardware MMI at Stations shall be provided with minimum 32" monitor & PAS Back up Console with zone selection buttons suitable for public announcements in metro rail environments. Back up PAS Control shall have zone selection capabilities and shall allow operator to select and make announcement to any particular or all PAS zones of the designated location. |
| 24. | Part-2 | Section VIB | 3.4.2.2                              | Each management Workstation shall be equipped with a 22" inches color TFT display with at least "1920 x 1024" pixels resolution or latest specifications to provide graphical presentation and display of the PIDS.  | 3.4.2.2 Each management Workstation shall be equipped with a 32" inches color TFT display with at least "1920 x 1024" pixels resolution or latest specifications to provide graphical presentation and display of the PIDS.   |
| 25. | Part-2 | Section VIB | 2.7.2.6.2<br>Page 102<br>of 336      | The microphone shall have the following minimum performance:<br>(b) Sensitivity : > 73 dB (0.22 mV)  | The microphone shall have the following minimum performance:<br>(b) Sensitivity: 0.22mV = -73dB   |
| 26. | Part-2 | Section VIB | 2.7.2.12.15                          | Contractor shall submit the specified UL certifications whenever asked for by Engineer or Employer   | Contractor shall submit the specified EN/UL certifications whenever asked for by Engineer or Employer   |

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| 27. | Part-2 | Section VIB                           | 2.5.6.5             | 2.5.6.5 Loudspeakers shall be of same make/OEM as that of Control & Amplifier make/OEM. Loudspeakers with different brand & Electronics i.e., Amplifiers & Matrix of different brand will not be accepted.   | 2.5.6.5 Loudspeakers shall be of same make/OEM as that of Control & Amplifier make/OEM. Other loudspeaker manufacturers who shall comply with all applicable loudspeaker EN standards and have credential in supplying for metro and Railway projects may also be supplied  |
| 28. | Part-2 | Section VIB Particular Specifications | 2.7.2.13.1          | 2.7.2.13.1 The management system shall be equipped with a proven operating system to support the specified management functions. The NMS at OCC & BCC shall have jurisdiction over entire station – depot station line. <b>NMS should be available for access in other than CSS / CER.</b> The PAS and PIDS NMS shall be on the same server / workstation.   | The management system shall be equipped with a proven operating system to support the specified management functions. The NMS at OCC & BCC shall have jurisdiction over entire Station – depot station line. NMS should be available for access in CSS / CER. The PAS and PIDS NMS shall be on the same server / workstation.   |
| 29. | Part-2 | Section VIB                           | 3.2 Page 107 of 336 | 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.<br>OCC & BCC PAS/PIDS and its application software shall not be in scope of this RFP and shall be provided by other Contractor<br>PAS/PIDS system at stations shall be interfaced for integration with Centralized Management Software and station client application, which shall be provided by Other Designated contractor. | 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.<br>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 Another Designated contractor.<br>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.<br>PAS/PIDS system at stations shall be interfaced for integration with Centralized Management Software and station client application, which shall be provided by Another Designated contractor |
| 30. | Part-2 | Section VIB                           | 3.3.1.1             | OCC & BCC PAS/PIDS and its application software shall not be in scope of this RFP and shall be provided by other Contractor  | OCC & BCC PAS/PIDS and its application software shall not be in scope of this RFP and shall be provided by another Contractor. Contractor shall be required to integrate with OCC/BCC software application only. Any additional PAS/PIDS Central application software shall not be accepted.  |
| 31. | Part-2 | Section VIB                           | 3.3.4.2             | PIDS displays shall be of robust construction and manufactured from either high-quality mild steel or aluminum overlaid with a durable paint finish, the RAL color of which shall be agreed with the Employer.   | PIDS displays shall be of robust construction and manufactured from either Stainless Steel/Galvanized steel or aluminum overlaid with a durable paint finish, the RAL color of which shall be agreed with the Employer  |
| 32. | Part-2 | Section VIB                           | 3.3.8.3             | The following alarm conditions shall be provided to the PIDS management system as a minimum (all alarms shall be stamped with time and date):<br>Loss of communication link.<br>Loss of the entire PIDS facilities at a location<br>Failure of a display board<br>Failure of PIDS Control Equipment and/or PAS/PIDS Workstation<br>Failure of changeover of PIDS Control Equipment<br>Loss of master clock time-of-day<br>Loss of interface link with PAS.<br>Loss of interface link with PIDS- NMS.<br>Loss of interface with ATS (S&TC)<br>Power supply unit failure<br>Loss of one side of a display board        | The following alarm conditions shall be provided to the PIDS management system as a minimum (all alarms shall be stamped with time and date):<br>(a) Loss of communication link.<br>(b) Loss of the entire PIDS facilities at a location<br>(c) Failure of a display board<br>(d) Failure of PIDS Control Equipment and/or PAS/PIDS Workstation<br>(e) Failure of changeover of PIDS Control Equipment<br>(f) Loss of master clock time-of-day<br>(g) Loss of interface link with PAS.<br>(h) Loss of interface link with PIDS- NMS.<br>(i) Loss of interface with ATS (S&TC)<br>(j) Power supply unit failure<br>(k) Loss of one side of a display board   |

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|     |        |             |                               | Loss of both sides of a display board and Message priority conflict, Loss of interface link with Fire Management System.   | (l) Loss of both sides of a display board and<br>(m) Enclosure Internal Temperature<br>(n) Enclosure Internal Humidity<br>(o) Fan Function  |
| 33. | Part-2 | Section VIB | 3.3.11                        | Event Logging<br>The PIDS management system shall be provided with the necessary facilities to retrieve centrally all message logs that are captured with time and date tags by the local control equipment. This shall be independent of the logging of equipment faults. The logs shall be stored at the local control equipment for a minimum duration of 4 weeks without carrying out any housekeeping function. The PIDS management system shall capture all log-on activities with time and date tags. | The PIDS management system shall be provided with the necessary facilities to retrieve centrally all message logs that are captured with time and date tags by the local control equipment. This shall be independent of the logging of equipment faults. The logs shall be stored at the local control equipment for a minimum duration of 3 months without carrying out any housekeeping function. The PIDS management system shall capture all log-on activities with time and date tags |
| 34. | Part-2 | Section VIB | 3.4.1                         | Display Boards shall have following features.<br>(a) Brightness in Nits: Minimum 500Nits for indoor and minimum 1000 Nits for elevated platforms<br>(b) Shall have windows based media controller with required processing capacity duly consulting the other telecom contractor executing OCC.  | Display Board<br>Display Boards shall have following features.<br>(a) Brightness in Nits: Minimum 700Nits for indoor and minimum 1500 Nits for elevated platforms<br>(b) Shall have windows-based media controller with required processing capacity duly consulting the other telecom contractor executing OCC   |
| 35. | Part-2 | Section VIB | 3.5.5                         | The PIDS shall support multimedia functions to display video information in MPEG2/4 format, while supporting both SD and HD resolutions, H.264, AVCHD, full-duplex and stereo effects for audio signal, as a minimum.  | The PIDS shall support multimedia functions to display video, while supporting both SD and HD resolutions, as a minimum.  |
| 36. | Part-2 | Section VIB | 3.5.6                         | The PIDS displays shall produce images with a minimum contrast ratio of 20: 1 when operating in all ambient lighting conditions including artificial lighting and natural lighting, up to full sunlight conditions.  | The PIDS displays shall produce images with a minimum contrast ratio of 4000:1 when operating in all ambient lighting conditions including artificial lighting and natural lighting, up to full sunlight conditions.  |
| 37. | Part-2 | Section VIB | 3.5.11<br>Page 124<br>of 336  | Built-in test routines shall be initiated by the following means as a minimum:<br>a) Local maintenance commands via a notebook computer connected to the local maintenance port;<br>b) remote maintenance commands via the central PIDS Network Management Workstation;<br>c) automatically as a result of the on-line error detection; and<br>d) Automatically as a part of the power-up initialisation processes.  | Built-in test routines shall be initiated by the following means as a minimum:<br>a) Local maintenance commands via a notebook computer connected to the local maintenance port;<br>b) remote maintenance commands via the central PIDS Network Management Workstation;<br>c) Automatically as a part of the power-up initialization processes.   |
| 38. | Part-2 | Section VIB | 3.3.2.6<br>Page 108<br>of 336 | Each single sided display shall be fully visible to a normal sighted individual, from a minimum distance of 35 meters or better from the display.  | Each Double-sided display shall be fully visible to a normal sighted individual, from a minimum distance of 35 meters or better from both sides of display  |
| 39. | Part-2 | Section VIB | 3.5.12<br>Page 124<br>of 336  | The PC-based control equipment shall be industrial grade PC model. The PC- based control equipment shall function normally from -5°C to +55°C (ambient) and with relative humidity ranging up to 99%.  | The PC-based control equipment shall be industrial grade PC model. The PC-based control equipment shall function normally from -5°C to +55°C (ambient) and with relative humidity ranging up to 95%.  |
| 40. | Part-2 | Section VIB | 3.5.13                        | Additional Item.   | The LCD/TFT or equivalent display shall have a lifespan of 80,000 hours as minimum when operated at maximum specified nit level.  |
| 41. | Part-2 | Section VIB | 3.4.2.1<br>Page 123<br>of 336 | 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  | 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 required OS will be as per the system functional OS/firmware/software versions requirements, as per scope of work.   |

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| 42. | Part-2 | Section VIB                           | 4.1.2.7                                    | Video recording system shall provide primary recording at the OCC and mirror recording at BCC for all, CMRL corridor 4 stations. The local recording shall be provided in the depots itself and mirror recording at the OCC or any other suitable location. The primary recording of OCC shall be done at OCC and the mirror recording shall be at BCC  | Video recording system shall provide primary recording at each respective stations/Depot and Mirror (Secondary recording) for stations/Depot of any particular FOTS ring shall be combinedly done at any one location of respective FOTS Network ring. Compatible hardware for recording shall be supplied by the ASA-05 contractor duly complying the Interface requirements from OCC/BCC Contractor. Primary recording shall be done for 15 days at full resolution of the Camera with 20 FPS and secondary recording for 90 days at a resolution of 1920 x 1080 with 20 FPS. Secondary recording infrastructure may use modern Virtualization technologies to optimize the Hardware. In addition, Contractor shall provide additional storage space required to store 100 Camera footages for 90 days in the secondary recording device to keep the Archive/back up of Important events.   |
| 43. | Part-2 | Section VIB                           | 4.1.2.16                                   | All offered camera models should be UL/NDAA Compliant Products as per cybersecurity prospective.  | All offered camera models should be NDAA Compliant Products as per cybersecurity prospective.   |
| 44. | Part-2 | Section VIB Particular Specifications | CCTV Standards                             | <p><b>4.2.4 Housing Arrangement for Fixed IP Box type camera:</b><br/> Approvals (Safety)- UL / EN and FCC standards for Safety, EMC &amp; Immunity</p> <p>4.2.6 High-Definition IP Fixed Box Camera (Day / Night):<br/> Table 4.4<br/> W. Approval (Safety &amp; EMC Immunity, Emission)-CE, FCC, and UL/BIS Certified</p> <p>4.2.6.1 High-Definition IP Fixed Dome Camera (Day/Night): UL / EN and FCC.<br/> Table 4.5<br/> 24. Approval (Safety &amp; EMC Immunity, Emission)- UL/EN and FCC</p> <p>4.2.6.2 High Definition IP Fixed Bullet Camera (Day / Night):<br/> Table 4.6<br/> Approval (Safety &amp; EMC Immunity, Emission)-CE, FCC, and UL/BIS Certified</p> <p>4.2.6.3 High Speed, High Definition IP PTZ Dome Camera (Day / Night)<br/> Table 4.7<br/> DD. Approval (Safety &amp; EMC Immunity, Emission) UL / EN and FCC</p> <p>Apart from the data sheets, copy of Certificates to be submitted as part of the bid</p> | <p>4.2.4 Housing Arrangement Fixed IP Box type camera-Table 4.3</p> <p>7.Approvals (Safety)-CE, FCC and UL/BIS Certified standards for Safety, EMC &amp; Immunity</p> <p>4.2.6 High-Definition IP Fixed Box Camera (Day / Night):<br/> Table 4.4<br/> W. Approval (Safety &amp; EMC Immunity, Emission)-CE, FCC, and UL/BIS Certified</p> <p>4.2.6.1 High Definition IP Fixed Dome Camera (Day/Night):<br/> Table 4.5<br/> 24. Approval (Safety &amp; EMC Immunity, Emission)-CE, FCC, and UL/BIS Certified</p> <p>4.2.6.2 High Definition IP Fixed Bullet Camera (Day / Night):<br/> Table 4.6<br/> Approval (Safety &amp; EMC Immunity, Emission)-CE, FCC, and UL/BIS Certified</p> <p>4.2.6.3 High Speed, High Definition IP PTZ Dome Camera (Day / Night)<br/> Table 4.7<br/> DD. Approval (Safety &amp; EMC Immunity, Emission) CE, FCC, UL/BIS Certified</p> <p>Apart from the data sheets, copy of Certificates to be submitted as part of the bid</p> |
| 45. | Part-2 | Section VIB Particular Specifications | 4.1.2.14                                   | Camera OEM must be full time member of ONVIF and should not be blacklisted by ONVIF   | 4.1.2.14 Camera OEM must be full time member of ONVIF and should not be banned, suspended or blacklisted by ONVIF   |
| 46. | Part-2 | Section VIB                           | 4.2.5.4                                    | Additional item   | 4.2.5.4 All Cameras must have Alarm In/Out  |
| 47. | Part-2 | Section VIB                           | 4.2.5.5                                    | Additional item   | 4.2.5.5 All Cameras support 256 GB SD card Slot   |
| 48. | Part-2 | Section VIB                           | 4.1.4.5                                    | The availability requirement of CCTV equipment shall better than 99.95%   | The CCTV system shall have a system availability of better than 99.977%.  |
| 49. | Part-2 | Section VIB                           | 4.2.6.3 High Speed, High-Definition IP PTZ | <p>High Speed, High Definition IP PTZ Dome Camera (Day / Night)</p> <p>X. Preset Speed</p> <p>Pan 200° per second, Tilt 100° per second</p>   | <p>X. Preset Speed</p> <p>Pan 180° per second, Tilt 90° per second</p>  |

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|     |        |             | Dome Camera (Day / Night)  |   |  |
| 50. | Part-2 | Section VIB | 5.1.2.2 Management of Authentication                               | The Security Access Control System shall provide the authentication function with IC card and biometrics such as finger vein authentication.  | The Security Access Control System shall provide the authentication function with IC card and biometrics such as fingerprint authentication.   |
| 51. | Part-2 | Section VIB | 5.2.4 Sensor Controller<br>5.2.4.1                                 | It shall be able to display all the operational status and send the alarm signals to the ACS server and HMI. It shall also be able to detect sensor failure and the damage of connection wire.  | 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  |
| 52. | Part-2 | Section VIB | 5.5.2.1  | 5.5.2.1 Access Point Controllers shall be IP based and installed at entry side of access point (door, barrier) either individually for each door/barrier or for a group of doors/barriers (as per detailed design of the Contractor, in such a way so as to meet all prescribed functional & performance requirements   | 5.5.2.1 Access Point Controllers shall be IP based and installed in secured area. Access Point Controllers shall either individually control for each door/barrier or for a group of doors/barriers (as per detailed design of the Contractor, in such a way so as to meet all prescribed functional & performance requirements  |
| 53. | Part-2 | Section VIB | 5.5.3.1(e)   | The Access card reader/Biometric reader shall communicate with controller on Wiegand/ OSDP protocol.  | The Access card reader/Biometric reader shall communicate with controller on OSDP protocol.  |
| 54. | Part-2 | Section VIB | 5.5.2.2(f)   | Temperature range shall be 0 to 50°C for indoor installation, and same shall be 0 to 70°C outdoor installation.   | Temperature range shall be 0 to 50°C for indoor installation, and same shall be 0 to 60°C outdoor installation.  |
| 55. | Part-2 | Section VIB | 5.5.3.2 Electrical Locks   | 5.5.3.2 Electrical Locks<br>(d) The electrical locks may be configured as either ‘fail open’ or ‘fail close’, as appropriate to the access point location, on lock failure, power failure, fire alarm or emergency site evacuation  | (d) The electrical locks may be configured as ‘fail open’ as appropriate to the access point location, on lock failure, power failure, fire alarm or emergency site evacuation.  |
| 56. | Part-2 | Section VIB | Façade Clock at CMRL HQ/Metro Bhawan.                              | Please share BoQ / specification for façade clock.<br>We understand that the façade clock design shall be as per station architecture and aesthetics, as such we request below technical specification for facade clock:<br><br>1. Synchronized Motor Movement<br>2. Illumination tube or LED in background<br>3. Hands driven by power supply 240V AC, consumption less than 25VA.<br>4. Temperature Range: -30 to +55 deg. C<br>5. Internal battery to keep internal time.<br>6. Skeleton dials.<br>8. 1-2 mtr Dia of Dial.<br>9. Should be from same OEM Make as Master Clock System.<br><br>Please confirm our understanding as well as provide the actually required quantity for station locations / HQ / Metro Bhawan. | Deleted  |
| 57. | Part-2 | Section VIB | CHAPTER 6 -<br>CLOCK SYSTEM<br>(CLKS)<br>6.2<br>Page 152<br>of 336 | <b>Overview of Clock System</b><br>The Master Clock System shall be compliant with NTP protocol. It will serve as Primary Reference Clock (PRC) for all clock functions of the Metro. The Master Clock shall provide synchronized time signals received by radio communication from orbiting GPS satellites. The Master Clock shall derive Coordinated Universal Time (UTC) from received GPS satellite signals and shall convert this to local Indian  | Overview of Clock System<br><br>The Master Clock System shall be compliant with NTP protocol. It will serve as Primary Reference Clock (PRC) for all clock functions of the Metro. The Master Clock shall provide synchronized time signals received by radio communication from orbiting GPS satellites. The Master Clock shall derive Coordinated Universal Time (UTC) from received GPS satellite signals and |



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|     |        |              |                                 | <p>Standard Time. The Telecom Contractor shall provide the Master Clock for Date &amp; Time signal also so that it can act as NTP server for the Master Clock System of CMRL Phase 2.</p> <p>At OCC &amp; BCC, Master Clock system to be provided under Telecom Contract shall consist of following major components:</p> <p>(a) A GPS Master Clock Unit. (In redundancy)<br/> (b) Interface to GPS. (In main and redundant Unit)<br/> (c) Digital Slave clocks, at all stations / depot / OCC / BCC / Selected locations of CMRL HQ<br/> (d) Façade Clock at CMRL HQ/Metro Bhawan.<br/> (e) All power and signal cables, external surge protection devices etc.<br/> Both primary and secondary fixtures for installation.</p> | <p>shall convert this to local Indian Standard Time. The Telecom Contractor shall provide the Master Clock for Date &amp; Time signal also so that it can act as NTP server for the Master Clock System of CMRL Phase 2.</p> <p>At OCC &amp; BCC, Master Clock system supplied by the OCC Contractor shall consist of following major components:<br/> (a) A GPS Master Clock Unit. (In redundancy)<br/> (b) Interface to GPS. (In main and redundant Unit)<br/> (c) Digital Slave clocks, at all stations, depot &amp; RSSs<br/> (d) All power and signal cables, external surge protection devices etc.</p> <p>The ASA-05 contractor shall supply<br/> (a) Digital NTP Slave clocks, at all C-4 stations / depot.<br/> (b) Both primary and secondary fixtures for installation.</p> |
| 58. | Part-2 | Section VIB  | 6.2 (d)                         | Façade Clock at CMRL HQ/Metro Bhawan.   | Deleted  |
| 59. | Part-2 | Section VI-B | 6.7.2.3 (b)                     | Minimum two No's of Large Display clocks - digital clock at concourse to the passenger areas to be visible in all lighting conditions.  | Deleted  |
| 60. | Part-2 | Section VI-B | 7.1.1.5                         | The FOTS backbone infrastructure shall have dedicated dark fibers which shall be provided by Signalling Contractor of CMRL Phase II as required for telecom subsystems and non- telecom subsystems of the rail project.   | The FOTS backbone infrastructure shall have dedicated dark fibers which shall be provided by Telecom Contractor of CMRL Phase II as required for telecom subsystems and non- telecom subsystems of the rail project.   |
| 61. | Part-2 | Section VI-B | 7.1.3 (f)<br>Page 165<br>of 336 | Multi-Mode Optical Fiber Cables, connectors and ODF for LANs  | Scope of Supply<br>(f) Single Mode/Multi-Mode Optical Fiber Cables, connectors and ODF for LANs  |
| 62. | Part-2 | Section VIB  | 7.2.5.6<br>Page 168<br>of 336   | (a) QinQ configuration of VLANs.<br>(b) Multicast protocols<br>(c) PIM Protocols<br>(d) MVR Protocols<br>(e) MLAG<br>(f) IPv4 MCast<br>(g) ERIPv2 or other equivalent protocol<br>(h) LACP<br>(i) VRRP<br>(j) SNMP<br>(k) Delay and Loss measurements.<br>(l) CFM Measurements<br>(m) CLI Configuration<br>(n) ACL protocols<br>(o) Protection against single point of failure.<br>(p) Protection against catastrophic failure.   | (a) QinQ configuration of VLANs.<br>(b) Multicast protocols<br>(c) PIM Protocols<br>(d) MVR Protocols<br>(e) MLAG/LAG/IEEE802.1AX<br>(f) IPv4 MCast<br>(g) ERIPv2 or other equivalent open protocol<br>(h) LACP<br>(i) VRRP<br>(j) SNMP<br>(k) Delay and Loss measurements.<br>(l) CFM Measurements or equivalent,<br>(m) CLI Configuration<br>(n) ACL protocols<br>(o) Protection against single point of failure.<br>(p) Protection against catastrophic failure.  |
| 63. | Part-2 | Section VIB  | 7.2.6.2                         | <p>Ethernet Switches</p> <p>(d) The switches to be deployed in the outdoor environment must be gigabit Industrial Grade switches with seamless capability to integrate the FOTS WAN backbone on open standards and the Centralized SDN</p>  | (d) The switches to be deployed in the outdoor environment must be gigabit Industrial Grade switches with seamless capability to integrate the FOTS WAN backbone on open standards.  |

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|     |        |             |                                       | provisioning controller of the Core OCC & BCC FOTS WAN.   |  |
| 64. | Part-2 | Section VIB | 7.2.7.2 (d)<br>Page 1726.16<br>of 336 | The FOTS equipment shall support Ethernet synchronization preferably SyncE to IEEE 1588v2 standard/NTP. The synchronization shall have frequency as well as phase synchronization/NTP Server and Client functionality.  | The FOTS equipment shall support Ethernet synchronization preferably IEEE 1588v2 standard/NTP. The synchronization shall have frequency as well as phase synchronization/NTP Server and Client functionality.  |
| 65. | Part-2 | Section VIB | 7.2.8.1<br>Page 172<br>of 336         | In the event of an optical fiber cable break, the optical transmitter laser output shall shut down to a safe level as defined by IEC-825, ITUT-G 958. The shutdown mechanism shall not be software dependent.   | In the event of an optical fiber cable break, the optical transmitter laser output shall shut down to a safe level as defined by IEC-825, ITUT-G 958 or equivalent. The shutdown mechanism shall not be software dependent.  |
| 66. | Part-2 | Section VIB | 7.2.4.3                               | Telecom Contractor shall extend OFC connection up to Telecom rooms and equipments from single mode OFC termination point by signalling contractor at each station, and depot, OCC & BCC   | Deleted  |
| 67. | Part-2 | Section VIB | 7.2.6.1(a)                            | The WAN shall connect all sites in ring topologies via WAN Nodes which shall be provided at all main sites including stations, OCC & BCC /HQ and depots.  | The WAN shall connect all sites in ring topologies via WAN Nodes which shall be provided at all main sites including stations, RSS and depots.   |
| 68. | Part-2 | Section VIB | 7.4.1.2<br>Page 174<br>of 336         | In-service performance monitoring for all network elements shall include, but not be limited to, on the following performance parameters:<br>(a) Bandwidth Utilization in Byte, Packet & Percentage<br>(b) Port Frame Error Rate<br>(c) Port In Drop Rate<br>(d) Port Out Drop Rate<br>(e) RxUtilization per VLAN per Port<br>(f) Rx Throughput<br>(g) TxUtilization per VLAN per Port<br>(h) Tx Throughput<br>(i) Total Throughput | 7.4.1.2 In-service performance monitoring for all network elements shall include, but not be limited to, on the following performance parameters:<br>(a) Bandwidth Utilization in Byte, Packet & Percentage<br>(b) Rx Utilization per VLAN per Port<br>(c) Rx Throughput<br>(d) Tx Utilization per VLAN per Port<br>(e) Tx Throughput<br>(f) Total Throughput<br>(g) threshold set |
| 69. | Part-2 | Section VIB | 7.5.1.1                               | The Contractor shall provide a main and standby database for storing the system hardware and software configurations. Both the working and backup configuration database shall be automatically updated for any changes in the database.  | The Contractor shall provide database for storing the system hardware and software configurations. Working configuration database shall be automatically updated for any changes in the database.  |
| 70. | Part-2 | Section VIB | 7.5.1.2                               | The FOTS Network Management System shall allow the user to configure all existing and new circuits with the following functions:<br>(a) interface port allocation.<br>(b) logging of circuit routing data logged into configuration Database; and<br>(c) Operator's configurations check function prior to main and backup database update  | Deleted  |
| 71. | Part-2 | Section VIB | 7.9.2.1 (d)<br>Page 177<br>of 336     | Giga Ethernet Equipment<br>IPv6 is required.  | 7.9.2 Giga Ethernet Equipment<br>(d) IPv6/IPv4 is required.  |
| 72. | Part-2 | Section VIB | 7.7.1.2                               | In addition to the design requirements given in this Technical Specification, the Contractor shall submit the following information to the Engineer for review / approval:<br>(a) Optical link budget calculations for all the transmission links;<br>(b) the calculations for the GE backbone end-to-end jitter and latency;   | In addition to the design requirements given in this Technical Specification, the Contractor shall submit the following information to the Engineer for review / approval:<br>(a) Optical link budget calculations for all the transmission links.<br>(b) the calculations for the GE backbone end-to-end jitter and latency.  |

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|     |        |             |            | (c) details on the hardware modularity of each type of data and voice interface including the incremental number of interfaces that can be added to a partially equipped equipment shelf and limitations on the addition of the interfaces to the equipment already equipped with mixed types of interfaces shall be defined;<br>(d) details on the electrical and physical specifications of the local maintenance port which support remote and local operation, administration, maintenance and provisioning (OAM&P) functions of the equipment.<br>(e) a list of alarms for which the faults shall be detected.<br>(f) format in which alarms shall be displayed and remotely accessed for printing and display;<br>(g) the details of the synchronization network design and a synchronization plan which describes the fall back arrangement, failure and restore criteria used to determine the switchover of synchronization sources.<br>(h) the details of the Management Network design, flow of management traffic and protection against GE node failures or cable failures;<br>(i) types and maximum number of transmission equipment supported by the FOTS Network Management System; and<br>(j) self-healing mechanism, normal traffic flow diagrams, protected traffic flow details for various single and multiple cable(s) and/or node(s) failures,<br>(k) Normal and protected bandwidth allocation, maximum traffic capacity and method of calculation for the GE IP Network<br>(l) Details on the interface design of FOTS, with the Designated Project Contractors. | (c) details on the hardware modularity of each type of data and voice interface including the incremental number of interfaces that can be added to a partially equipped equipment shelf and limitations on the addition of the interfaces to the equipment already equipped with mixed types of interfaces shall be defined.<br>(d) details on the electrical and physical specifications of the local maintenance port which support remote and local operation, administration, maintenance and provisioning (OAM&P) functions of the equipment.<br>(e) a list of alarms for which the faults shall be detected.<br>(f) format in which alarms shall be displayed and remotely accessed for printing and display.<br>(g) the details of the Management Network design, flow of management traffic and protection against GE node failures or cable failures;<br>(h) types and maximum number of transmission equipment supported by the FOTS Network Management System; and<br>(i) self-healing mechanism, normal traffic flow diagrams, protected traffic flow details for various single and multiple cable(s) and/or node(s) failures,<br>(j) Normal and protected bandwidth allocation, maximum traffic capacity and method of calculation for the GE IP Network<br>(k) Details on the interface design of FOTS, with the Designated Project Contractors. |
| 73. | Part-2 | Section VIB | 7.9.2.11   | The proposed FOTS system must support a centralized SDN management provisioning technology for centralized device provisioning, zero touch recovery of the failed field units to minimize the MTTR and increase the service up time, centralized OS management and roll out to minimize the business down time. The SDN provisioning must not be restrictive only to the FOTS WAN switches but also must be capable to extend to the local LAN switches within Stations, Depots, RSS and other locations  | Deleted  |
| 74. | Part-2 | Section VIB | 7.2.9.1.11 | The Layer 3 switch in OCC & BCC, stations, depots and Head Quarters shall be modular chassis-based switch. Bidders shall provide FCAPS certified NMS Solution which can support & manage multiple vendor devices.   | 7.2.9.1.11 The Layer 3 switch in OCC & BCC, stations, depots and Head Quarters shall be modular chassis-based switch swappable cards /power supply/Fan etc while WAN switch shall be modular based with hot swappable minimum PSU & SFP's. Bidders shall provide FCAPS certified NMS Solution which can support & manage multiple vendor devices.  |
| 75. | Part-2 | Section VIB | 7.9.4.3    | Redundant Management Modules with stateful failover. Failure of one CPU shall not cause any disruption of Traffic.  | Redundant Management Modules with stateful failover. Failure of one Switch shall not cause any disruption of Traffic.  |

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| 76. | Part-2 | Section VIB | 7.9.5<br>Page 175<br>of 336 | <p>Layer 2 Features :</p> <p>(a) VLANs created on the core switch shall be propagated to all the edge switches automatically. Thus, helping reduce the mis-configuration/management overhead in turn reducing troubleshooting.</p> <p>(b) No of VLANs: - <math>\geq 4000</math></p> <p>(c) Spanning Tree Enhancements: BPDU Guard, Root Guard etc... to avoid Denial of Service attacks</p> <p>(d) 802.1 p/q - VLAN Tagging</p> <p>(e) 802.3x - Flow Control, Layer 2 Ping, Layer 2 Traceroute and Connectivity Fault Management</p> <p>(f) Support for features like Unit-Directional Link Detection (UDLD)/DLDP or equivalent. In case of one of the cores Fiber cut, the switch shall detect unit-directional transmission and shut down the port to avoid loops and help bring up the backup links.</p> <p>(g) Ethernet IEEE 802.3, 10 Base T</p> <p>(h) Fast Ethernet (IEEE802.3u, 10/100 Base-TX, 100 Base FX, 1000 Base FX)</p> <p>(i) Gigabit Ethernet-(IEEE 803z, 802.3ab)</p> <p>(j) 10 Gigabit Ethernet (IEEE 802.3ae)</p> <p>(k) WAN Interface Support - LAN//WAN integration</p> | <p>(a) VLANs created on the core switch should be propagated to all the edge switches automatically. Thus, helping reduce the misconfiguration / management overhead in turn reducing troubleshooting.</p> <p>(b) No of VLANs: - <math>\geq 1000</math></p> <p>(c) Spanning Tree Enhancements: BPDU Guard, Root Guard etc. to avoid Denial of Service attacks</p> <p>(d) 802.1 p/q - VLAN Tagging</p> <p>(e) 802.3x - Flow Control, Layer 2 Ping, Layer 2 Traceroute and Connectivity Fault Management</p> <p>(f) Support for features like Unit-Directional Link Detection. In case of one of the core's Fiber cut, the switch should detect unit-directional transmission and shut down the port to avoid loops and help bring up the backup links.</p> <p>(g) The Distribution switch must have the in-built capability to handle "Split brain" situation to avoid a total network downtime during such catastrophic failure situations</p> <p>(h) Ethernet IEEE 802.3, 10 Base T</p> <p>(i) Fast Ethernet (IEEE802.3u, 10/100 Base-TX, 100 Base FX, 1000 Base FX)</p> <p>(j) Gigabit Ethernet-(IEEE 803z, 802.3ab)</p> <p>(k) 10 Gigabit Ethernet (IEEE 802.3ae)</p> |
| 77. | Part-2 | Section VIB | 7.9.6<br>Page 175<br>of 336 | <p><b>Layer 3 Features</b></p> <p>(a) Layer 3 or 4 switching and routing</p> <p>(b) Port Mirroring</p> <p>(c) L2, L3 and L4 access control filters.</p> <p>(d) L3/L4 frame classification</p> <p>(e) VRRP or equivalent for High Availability</p> <p>(f) Rapid Spanning Tree Protocol (RSTP)(802.1w)</p> <p>(g) Multiple Spanning Tree Protocol (MSTP)</p> <p>(h) Rapid convergence Layer 3 protocols</p> <p>(i) 802.1s - Per-VLAN Group Spanning Tree Protocol</p> <p>(j) BGPv4</p> <p>(k) BGP/Open Shortest Path First (OSPF) interactions</p> <p>(l) UDP</p> <p>(m) BOOTP, BOOTP extensions</p> <p>(n) OSPFv2</p> <p>(o) OSPFv2 Management Information Base (MIB), traps</p> <p>(p) MPLS VPN</p> <p>(q) RIPv1</p> <p>(r) RIPv2</p> <p>(s) Efficient Intranet Multimedia and multicast support</p>  | <p><b>Layer 3 Features Support</b></p> <p>(a) Layer 3 or 4 switching and routing</p> <p>(b) Port Mirroring</p> <p>(c) L2, L3 and L4 access control filters.</p> <p>(d) L3/L4 frame classification</p> <p>(e) VRRP or equivalent for High Availability</p> <p>(f) Rapid Spanning Tree Protocol (RSTP)(802.1w)</p> <p>(g) Multiple Spanning Tree Protocol (MSTP)</p> <p>(h) Rapid convergence Layer 3 protocols</p> <p>(i) 802.1s - Per-VLAN Group Spanning Tree Protocol</p> <p>(j) BGPv4 for Core Switch only</p> <p>(k) BGP/Open Shortest Path First (OSPF) interactions for distribution and Core switch only</p> <p>(l) UDP</p> <p>(m) BOOTP, BOOTP extensions</p> <p>(n) OSPFv2 for Core and distribution Switch only</p> <p>(o) OSPFv2 Management Information Base (MIB), traps</p> <p>(p) RIPv1 for core and distribution Switch only</p> <p>(q) RIPv2 for core and distribution switch only</p> <p>(r) Efficient multicast support</p> <p>(s) IGMP (Internet Group management protocol) v1, v2, v3</p>  |

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|     |        |             |                             | (t) IGMP (Internet Group management protocol) v1, v2, v3<br>(u) IGMP v1, v2, v3 Snooping<br>(v) Protocol-Independent Multicast (PIM)-SM<br>(w) Multicast Source Discovery Protocol (MSDP)<br>(x) PIM (Protocol Independent Multicast)<br>(y) Multicast Registration Protocol<br>(z) IP Version 6 (IPv6) support in hardware.<br><br>(aa) Layer 3 Forwarding Performance for both IPv4 and IPv6 $\geq 700$ Mpps  | (t) IGMP v1, v2, v3 Snooping<br>(u) Protocol-Independent Multicast (PIM)-SM for Core and distribution switch only<br>(v) Multicast Source Discovery Protocol (MSDP)<br>(w) PIM (Protocol Independent Multicast) for Core and distribution Switch Only<br>(x) Multicast Registration Protocol<br>(y) IP Version 6 (IPv6)  |
| 78. | Part-2 | Section VIB | 8.3.2.4.1 (C)<br>191 of 336 | Hands free operation with a call button, a microphone and a speaker. Considering outdoor public environment and associated background noise, Voice from speaker shall be audible to normal human ears up to 1 meter or better distance.   | Hands free operation with a call button, a Noise cancelling microphone, a speaker and an audio frequency Induction loop. Considering outdoor public environment and associated background noise, Voice from speaker shall be audible to normal human ears up to 50cm or better distance.   |
| 79. | Part-2 | Section VIB | 8.3.2.4.1 (e)<br>191 of 336 | Help Points shall be housed in rust proof stainless steel Box with IP 65 rating with description 'To Operate instruction' to be flush/ surface mounted at designated location as per aesthetics and architectural requirement. Telecom Contractor to interface with Civil Contractor to ensure location of Help Points shall be reserved to suit system functionalities and usage   | (e) Help Points shall be housed in rust proof stainless steel Box with IP 65 rating with description "to Operate instruction" and clear visible Signage of Induction loop to be flush/Surface mounted at designated location as per aesthetics and architectural requirement. Telecom Contractor to interface with Civil Contractor to ensure location of Help Points shall be reserved to suit system functionalities and usage   |
| 80. | Part-2 | Section VIB | 8.3.2.5.2                   | Emergency Phone shall be provided inside the tunnel with following features, but not limited to:<br>m. Emergency phone with industrial grade components along with keypad, buzzer, circuit board.<br>n. Integrated Blue light/ Flashlight<br>o. cabinet are designed to be multi – layer waterproof and dust – proof. Weather resistant to IP65 standard.<br>p. Robust aluminium alloy body (Cabinet), Vandal resistant and tamper resistant hardware, simple installation.<br>q. Speed Dial.<br>r. Telephone shall be powered by 230V AC power supply.<br>s. Hearing Aid compatible receiver, Noise cancelling microphone. | Emergency Phone shall be provided inside the tunnel with following features, but not limited to:<br>m. Emergency phone with industrial grade components along with keypad, buzzer, circuit board.<br>n. Integrated Blue light/ Flashlight<br>o. cabinets are designed to be multi – layer waterproof and dust – proof. Weather resistant to IP65 standard.<br>p. Robust aluminium alloy body (Cabinet), Vandal resistant and tamper resistant hardware, simple installation.<br>q. Speed Dial.<br>r. Telephone shall be powered by 230V AC power supply. |
| 81. | Part-2 | Section VIB | 8.3.2.5.3                   | Telecom Contractor to interface with Lift Contractor make necessary provisions in Telecom Sub System to integrate Stations / OCC / Depot / HQ Lift Help Point Phones with Telecom IP EPABX network such that call can made from Lift Help Point can be routed to SCR / OCC / BCC / Security Offices as per operational requirements   | Telecom Contractor to interface with Lift Contractor make necessary provisions in Telecom Sub System to integrate Stations / OCC / Depot Lift Help Point Phones with Telecom IP EPABX network such that call can made from Lift Help Point can be routed to SCR / OCC / BCC / Security Offices as per operational requirements   |
| 82. | Part-2 | Section VIB | 8.3.2.6.2                   | The IP PBX Call Management Server shall be provided by other designated Telecom Contractor, in hot redundant configuration, will be placed at OCC with the redundant part at the BCC and should be configurable in two different subnets. It shall be configured in hot standby configuration such that no single failure should affect the availability of the system. Or Bidder may propose Virtualized solution by having all services applications, Database, Management servers including other system applications in Virtualized manner to optimize  | Deleted  |

**Addendum-01**  
**CMRL / PHASE – II / SYS / ASA05 / 2022**  
**10-08-2022**

| SN  | Part             | Section                         | Clause    | Original Bid condition   | Revised bid condition  |                       |   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|-----|------------------|---------------------------------|-----------|--|--|-----------------------|---|---|------------|--|---|-------------------|--|---|---------|----------------------|---|----------------|---|---|-----------------------|---|---|------------------|---|---|-------------|---|---|------------|--------------------------------|---|-----------|---------------|----|-------|--------------------------------|--|----|--------|----------------|---|------------|---|---|-------------------|--|---|---------|----------------------------|---|--------------|---|---|-----------------------|--|---|------------------|---|---|------------|--------------------------------|---|----------|--------------|---|-------|--------------------------------|----|--------|----------------|---|------------|---|---|-------------------|--|---|---------|----------------------------|---|--------------|--|---|------------------|---------------------------------|---|------------|--------------------------------|---|----------|--------------|---|-------|--------------------------------|
|     |                  |                                 |           | the solution hardware etc. as per bidder design. In such case Subsystem/system redundant software shall be residing in separate server other than primary application server which should work in Hot standby mode.  |  |                       |   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
| 83. | Part-2           | Section VIB                     | Chapter 8 | Additional Item  | 8.4.2.1.3 Network protocol- LDAP (Lightweight Directory Access Protocol)   |                       |   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
| 84. | Part-2           | Section VIB                     | 9.2       | GE IP backbone ring shall be of minimum 1 Gbps capacity. Also, maximum number of stations per ring shall not exceed 10 stations.   | GE IP backbone ring shall be of minimum 2.5 Gbps capacity. Also, maximum number of stations per ring shall not exceed 10 stations. |                       |   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
| 85. | Part-2           | Section VIB                     | 10.3.8    | Access Control and Intrusion Detection Management Software   | Deleted  |                       |   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
| 86. | Part-2           | Section VIB                     | 10.3.10   | PIDS management software   | Deleted  |                       |   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
| 87. | Part-2           | Section VIB                     | 10.7.3    | <div>10.7.3. Workstation for PAS/PIDS HMI, CCTV, Workstation for Viewing, Monitoring</div> <div>The PC Workstation Hardware shall be Rack Mountable for viewing, Monitoring and management of CCTV images at the stations and shall meet the following specification as a minimum:</div> <table><thead><tr><th>SN</th><th>Device</th><th>Specifications</th></tr></thead><tbody><tr><td>1</td><td>Processors</td><td>Intel Xeon Processor E5- V6 OR Intel i7 Processor 7th Gen (8 MB Cache, 3.5 GHz or better</td></tr><tr><td>2</td><td>Operating Systems</td><td>Genuine Windows / Linux latest Version</td></tr><tr><td>3</td><td>Chipset</td><td>Intel C600 or better</td></tr><tr><td>4</td><td>Memory ( RAM )</td><td>DDR 3 1600 MHz memory 8GB expandable to 64 GB</td></tr><tr><td>5</td><td>Graphics Display card</td><td>Dual NVIDIA Quadro 600/Fire Pro V4900 or better</td></tr><tr><td>6</td><td>Drive Controller</td><td>6 Gb/s controller, RAID 0,1,5 and 10 capable.</td></tr><tr><td>7</td><td>Hard Drives</td><td>1 TB (2 x 500GB 2.5inch Serial SATA (7,200 Rpm) Hard Drive) or better</td></tr><tr><td>8</td><td>Networking</td><td>Dual Integrated GbE Controller</td></tr><tr><td>9</td><td>Key board</td><td>USB key board</td></tr><tr><td>10</td><td>Mouse</td><td>USB two - button optical mouse</td></tr></tbody></table> | SN   | Device                | Specifications  | 1 | Processors | Intel Xeon Processor E5- V6 OR Intel i7 Processor 7th Gen (8 MB Cache, 3.5 GHz or better | 2 | Operating Systems | Genuine Windows / Linux latest Version | 3 | Chipset | Intel C600 or better | 4 | Memory ( RAM ) | DDR 3 1600 MHz memory 8GB expandable to 64 GB | 5 | Graphics Display card | Dual NVIDIA Quadro 600/Fire Pro V4900 or better | 6 | Drive Controller | 6 Gb/s controller, RAID 0,1,5 and 10 capable. | 7 | Hard Drives | 1 TB (2 x 500GB 2.5inch Serial SATA (7,200 Rpm) Hard Drive) or better | 8 | Networking | Dual Integrated GbE Controller | 9 | Key board | USB key board | 10 | Mouse | USB two - button optical mouse | <div>10.7.3. 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|     |                  |                                 |           |  | SN   | Device                | Specifications  |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 1  | Processors            | Intel Xeon Processor E5- V6 OR Intel i7 Processor 7th Gen (8 MB Cache, 3.5 GHz or better      |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 2  | Operating Systems     | Genuine Windows / Linux latest Version  |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 3  | Chipset               | Intel C600 or better  |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 4  | Memory ( RAM )        | DDR 3 1600 MHz memory 8GB expandable to 64 GB   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 5  | Graphics Display card | Dual NVIDIA Quadro 600/Fire Pro V4900 or better   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 6  | Drive Controller      | 6 Gb/s controller, RAID 0,1,5 and 10 capable.   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 7  | Hard Drives           | 1 TB (2 x 500GB 2.5inch Serial SATA (7,200 Rpm) Hard Drive) or better                         |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 8  | Networking            | Dual Integrated GbE Controller  |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 9  | Key board             | USB key board   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 10   | Mouse                 | USB two - button optical mouse  |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 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, 1TB memory minimum)                                   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 5  | Graphics Display card | NVIDIA RTX 3080 or better With Two 4K UHD display outputs as minimum                          |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 6  | Drive Controller      | SATA or PCIe, 6 Gb/s controller, RAID 0/1/10/5 capable.                                       |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 7  | Networking            | Dual Integrated GbE Controller  |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 8  | Keyboard              | USB keyboard  |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 9  | Mouse                 | USB two - button optical mouse  |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |
|     |                  |                                 |           |  | 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  |           |  |  |                       |   |   |            |  |   |                   |  |   |         |                      |   |                |   |   |                       |   |   |                  |   |   |             |   |   |            |                                |   |           |               |    |       |                                |  |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |   |   |                       |  |   |                  |   |   |            |                                |   |          |              |   |       |                                |    |        |                |   |            |   |   |                   |  |   |         |                            |   |              |  |   |                  |                                 |   |            |                                |   |          |              |   |       |                                |

**Addendum-01**  
**CMRL / PHASE – II / SYS / ASA05 / 2022**  
**10-08-2022**

| SN               | Part   | Section     | Clause                      | Original Bid condition  | Revised bid condition   |            |      |                  |       |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
|------------------|--------|-------------|-----------------------------|---|---|------------|------|------------------|-------|----------|------------|------|------------------|-------|----------|------|--|---|---|---|---|---|---|---|---|---|-------|---|--|--|--|--|--|---|--|--|--|-----|---|--|---|--|---|---|---|--|---|---|------|---|---|--|---|--|--|---|--|--|---|------|---|--|---|--|--|--|---|---|--|---|-------|---|---|--|--|--|---|---|--|---|---|-----------|---|---|--|--|---|--|---|--|---|---|-----|---|---|---|---|---|---|---|---|---|---|----------------|---|--|--|---|--|--|---|--|--|---|------|---|---|--|--|---|---|---|--|--|---|----------|---|---|---|---|---|---|---|---|---|--|---|------------------|-------|------|-------|-------|--------|------------|------|------------------|-------|----------|------|--|---|---|---|---|---|---|---|---|---|-------|---|--|--|--|--|--|---|--|--|--|-----|---|--|---|--|---|---|---|--|---|---|------|---|---|--|--|--|--|---|--|--|---|------|---|--|--|--|--|--|---|---|--|---|-------|---|---|--|--|--|---|---|--|---|---|-----------|---|---|--|--|---|--|---|--|---|---|-----|---|---|---|---|---|---|---|---|---|---|----------------|---|--|--|---|--|--|---|--|--|---|------|---|---|--|--|---|---|---|--|--|---|----------|---|---|---|---|---|---|---|---|---|--|
| 88.              | Part-2 | Section VIB | 11.2.1.4                    | Optical Requirements–Multi Mode Fiber   | Fiber Type Multimode<br>Connector Type LC<br>Launch Power min(avg) -7.3dBm<br>Receiver Power Range -1~ -9.9dBm<br>Optical Link Budget *Depends on fiber type.<br>Center Wavelength Range 840 to 860nm<br>Distance range 2m to 300m<br>Mean Time Between Failure 886   |            |      |                  |       |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| 89.              | Part-2 | Section VIB | 11.7.2                      | <b>Technical Specifications of Digital Multimeter (High Precision)</b><br><br>Product Supply<br><br>Digital Multimeter,9V Battery, Test lead, socket adapter, RS232 connectivity cable& software, Point contact temperature probe, user manual & soft carry case.   | <b>Technical Specifications of Digital Multimeter (High Precision)</b><br><br>Product Supply<br><br>Digital Multimeter,9V Battery, Test lead, socket adapter, RS232/USB connectivity cable& software, Point contact temperature probe, user manual & soft carry case. |            |      |                  |       |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| 90.              | Part-2 | Section VIB | 11.7.3                      | <b>Ethernet Cable Tester</b><br>Cable length Via TDR 0-2000ft   | Cable Length via TDR 0-1500 ft.   |            |      |                  |       |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| 91.              | Part-2 | Section VIB | 11.7.3                      | <b>Ethernet Cable Tester</b><br>Viewing Area 60.0 x 58.4  | Viewing Area: Minimum 50mm X50mm  |            |      |                  |       |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| 92.              | Part-2 | Section VIB | 12.1                        | <b>Subsystem Interfaces</b><br>Contractor shall submit Interface Management Plan for Employer review. Tentative Interfaces between the Communication System and sub-systems, which are anticipated, are listed in the following table:<br><table><tr><th>System - Telecom</th><th>FOT S</th><th>PA S</th><th>PID S</th><th>CCT V</th><th>Radi o</th><th>Telepho ne</th><th>MC S</th><th>Acce ss Contr ol</th><th>CDR S</th><th>T- SCADA</th></tr><tr><td>FOTS</td><td></td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>OA&amp;IT</td><td>√</td><td></td><td></td><td></td><td></td><td></td><td>√</td><td></td><td></td><td></td></tr><tr><td>PAS</td><td>√</td><td></td><td>√</td><td></td><td>√</td><td>√</td><td>√</td><td></td><td>√</td><td>√</td></tr><tr><td>PIDS</td><td>√</td><td>√</td><td></td><td>√</td><td></td><td></td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>CCTV</td><td>√</td><td></td><td>√</td><td></td><td></td><td></td><td>√</td><td>√</td><td></td><td>√</td></tr><tr><td>Radio</td><td>√</td><td>√</td><td></td><td></td><td></td><td>√</td><td>√</td><td></td><td>√</td><td>√</td></tr><tr><td>Telephone</td><td>√</td><td>√</td><td></td><td></td><td>√</td><td></td><td>√</td><td></td><td>√</td><td>√</td></tr><tr><td>MCS</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>Access Control</td><td>√</td><td></td><td></td><td>√</td><td></td><td></td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>CDRS</td><td>√</td><td>√</td><td></td><td></td><td>√</td><td>√</td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>T- SCADA</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr></table> | System - Telecom  | FOT S      | PA S | PID S            | CCT V | Radi o   | Telepho ne | MC S | Acce ss Contr ol | CDR S | T- SCADA | FOTS |  | √ | √ | √ | √ | √ | √ | √ | √ | √ | OA&IT | √ |  |  |  |  |  | √ |  |  |  | PAS | √ |  | √ |  | √ | √ | √ |  | √ | √ | PIDS | √ | √ |  | √ |  |  | √ |  |  | √ | CCTV | √ |  | √ |  |  |  | √ | √ |  | √ | Radio | √ | √ |  |  |  | √ | √ |  | √ | √ | Telephone | √ | √ |  |  | √ |  | √ |  | √ | √ | MCS | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | Access Control | √ |  |  | √ |  |  | √ |  |  | √ | CDRS | √ | √ |  |  | √ | √ | √ |  |  | √ | T- SCADA | √ | √ | √ | √ | √ | √ | √ | √ | √ |  | <b>Subsystem Interfaces</b><br>Contractor shall submit Interface Management Plan for Employer review. Tentative Interfaces between the Communication System and sub-systems, which are anticipated, are listed in the following table:<br><table><tr><th>System - Telecom</th><th>FOT S</th><th>PA S</th><th>PID S</th><th>CCT V</th><th>Radi o</th><th>Telepho ne</th><th>MC S</th><th>Acce ss Contr ol</th><th>CDR S</th><th>T- SCADA</th></tr><tr><td>FOTS</td><td></td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>OA&amp;IT</td><td>√</td><td></td><td></td><td></td><td></td><td></td><td>√</td><td></td><td></td><td></td></tr><tr><td>PAS</td><td>√</td><td></td><td>√</td><td></td><td>√</td><td>√</td><td>√</td><td></td><td>√</td><td>√</td></tr><tr><td>PIDS</td><td>√</td><td>√</td><td></td><td></td><td></td><td></td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>CCTV</td><td>√</td><td></td><td></td><td></td><td></td><td></td><td>√</td><td>√</td><td></td><td>√</td></tr><tr><td>Radio</td><td>√</td><td>√</td><td></td><td></td><td></td><td>√</td><td>√</td><td></td><td>√</td><td>√</td></tr><tr><td>Telephone</td><td>√</td><td>√</td><td></td><td></td><td>√</td><td></td><td>√</td><td></td><td>√</td><td>√</td></tr><tr><td>MCS</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td></tr><tr><td>Access Control</td><td>√</td><td></td><td></td><td>√</td><td></td><td></td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>CDRS</td><td>√</td><td>√</td><td></td><td></td><td>√</td><td>√</td><td>√</td><td></td><td></td><td>√</td></tr><tr><td>T- SCADA</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td>√</td><td></td></tr></table> | System - Telecom | FOT S | PA S | PID S | CCT V | Radi o | Telepho ne | MC S | Acce ss Contr ol | CDR S | T- SCADA | FOTS |  | √ | √ | √ | √ | √ | √ | √ | √ | √ | OA&IT | √ |  |  |  |  |  | √ |  |  |  | PAS | √ |  | √ |  | √ | √ | √ |  | √ | √ | PIDS | √ | √ |  |  |  |  | √ |  |  | √ | CCTV | √ |  |  |  |  |  | √ | √ |  | √ | Radio | √ | √ |  |  |  | √ | √ |  | √ | √ | Telephone | √ | √ |  |  | √ |  | √ |  | √ | √ | MCS | √ | √ | √ | √ | √ | √ | √ | √ | √ | √ | Access Control | √ |  |  | √ |  |  | √ |  |  | √ | CDRS | √ | √ |  |  | √ | √ | √ |  |  | √ | T- SCADA | √ | √ | √ | √ | √ | √ | √ | √ | √ |  |
| System - Telecom | FOT S  | PA S        | PID S                       | CCT V   | Radi o  | Telepho ne | MC S | Acce ss Contr ol | CDR S | T- SCADA |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| FOTS             |        | √           | √                           | √   | √   | √          | √    | √                | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| OA&IT            | √      |             |                             |   |   |            | √    |                  |       |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| PAS              | √      |             | √                           |   | √   | √          | √    |                  | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| PIDS             | √      | √           |                             | √   |   |            | √    |                  |       | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| CCTV             | √      |             | √                           |   |   |            | √    | √                |       | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| Radio            | √      | √           |                             |   |   | √          | √    |                  | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| Telephone        | √      | √           |                             |   | √   |            | √    |                  | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| MCS              | √      | √           | √                           | √   | √   | √          | √    | √                | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| Access Control   | √      |             |                             | √   |   |            | √    |                  |       | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| CDRS             | √      | √           |                             |   | √   | √          | √    |                  |       | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| T- SCADA         | √      | √           | √                           | √   | √   | √          | √    | √                | √     |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| System - Telecom | FOT S  | PA S        | PID S                       | CCT V   | Radi o  | Telepho ne | MC S | Acce ss Contr ol | CDR S | T- SCADA |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| FOTS             |        | √           | √                           | √   | √   | √          | √    | √                | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| OA&IT            | √      |             |                             |   |   |            | √    |                  |       |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| PAS              | √      |             | √                           |   | √   | √          | √    |                  | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| PIDS             | √      | √           |                             |   |   |            | √    |                  |       | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| CCTV             | √      |             |                             |   |   |            | √    | √                |       | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| Radio            | √      | √           |                             |   |   | √          | √    |                  | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| Telephone        | √      | √           |                             |   | √   |            | √    |                  | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| MCS              | √      | √           | √                           | √   | √   | √          | √    | √                | √     | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| Access Control   | √      |             |                             | √   |   |            | √    |                  |       | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| CDRS             | √      | √           |                             |   | √   | √          | √    |                  |       | √        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| T- SCADA         | √      | √           | √                           | √   | √   | √          | √    | √                | √     |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |
| 93.              | Part-2 | Section VIB | 12.8.5.1<br>Page 240 of 336 | The CCTV System has interfaces to the following telecommunications systems:<br>(a) Access Control and Intrusion Detection System (ACIDS).<br>(b) Telephone System (Help Point).<br>(c) Fault Reporting system (FRS).<br>(d) Master Clock System.<br>(e) Passenger Information Display System (PIDS).  | The CCTV System has interfaces to the following telecommunications systems:<br>(a) Access Control and Intrusion Detection System (ACIDS).<br>(b) Telephone System (Help Point).<br>(c) Fault Reporting system (FRS).<br>(d) Master Clock System.                      |            |      |                  |       |          |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |   |  |  |   |  |  |   |      |   |  |   |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |   |                  |       |      |       |       |        |            |      |                  |       |          |      |  |   |   |   |   |   |   |   |   |   |       |   |  |  |  |  |  |   |  |  |  |     |   |  |   |  |   |   |   |  |   |   |      |   |   |  |  |  |  |   |  |  |   |      |   |  |  |  |  |  |   |   |  |   |       |   |   |  |  |  |   |   |  |   |   |           |   |   |  |  |   |  |   |  |   |   |     |   |   |   |   |   |   |   |   |   |   |                |   |  |  |   |  |  |   |  |  |   |      |   |   |  |  |   |   |   |  |  |   |          |   |   |   |   |   |   |   |   |   |  |

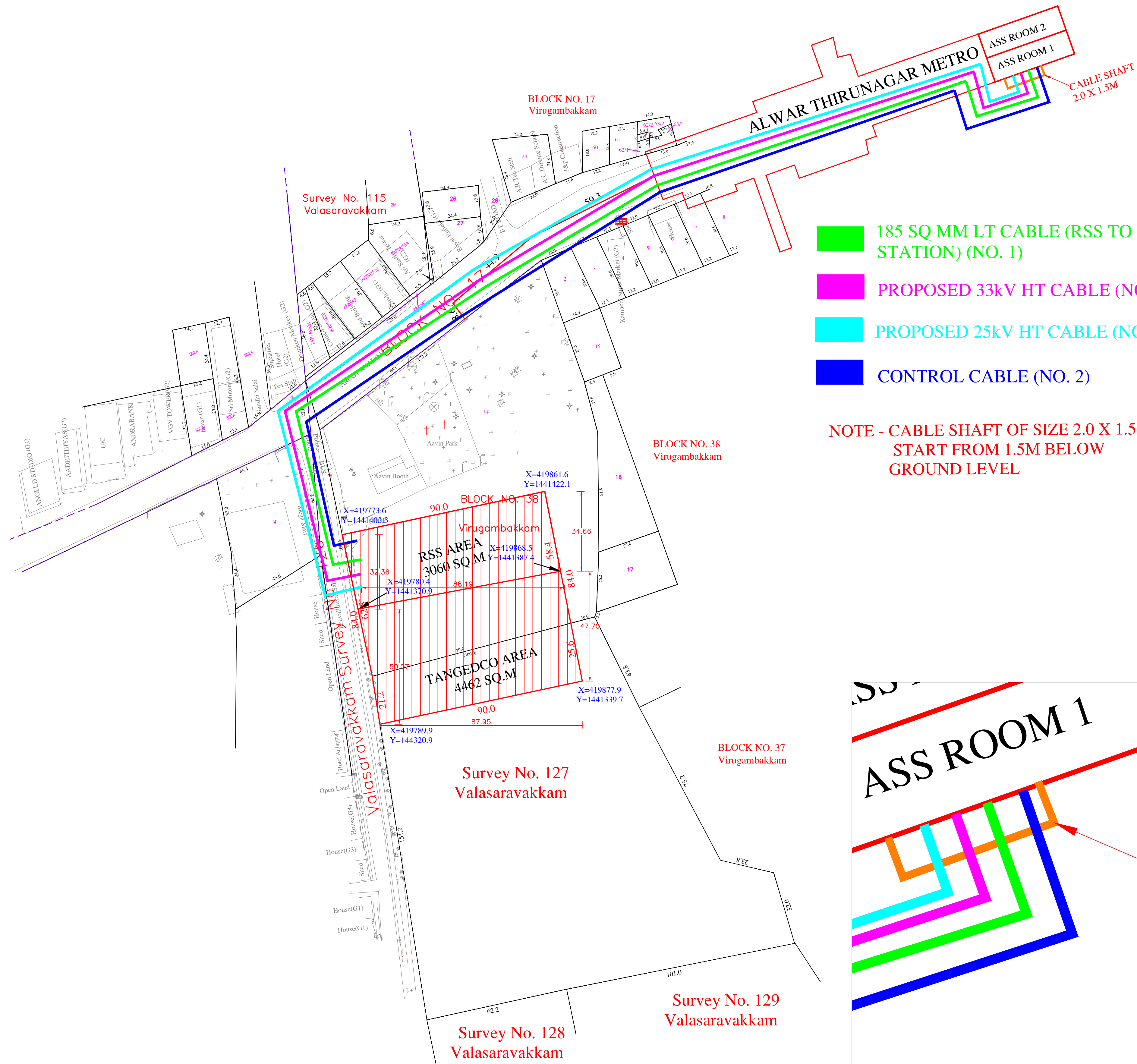
**Addendum-01**  
**CMRL / PHASE – II / SYS / ASA05 / 2022**  
**10-08-2022**

| SN  | Part   | Section     | Clause                  | Original Bid condition   | Revised bid condition |
|-----|--------|-------------|-------------------------|--|-----------------------|
| 94. | Part-2 | Section VIB | Appendix 19<br>10.4 (M) | A virtualization technology solution shall be implemented per specific core networks only. | Deleted               |

**Enclosure:**

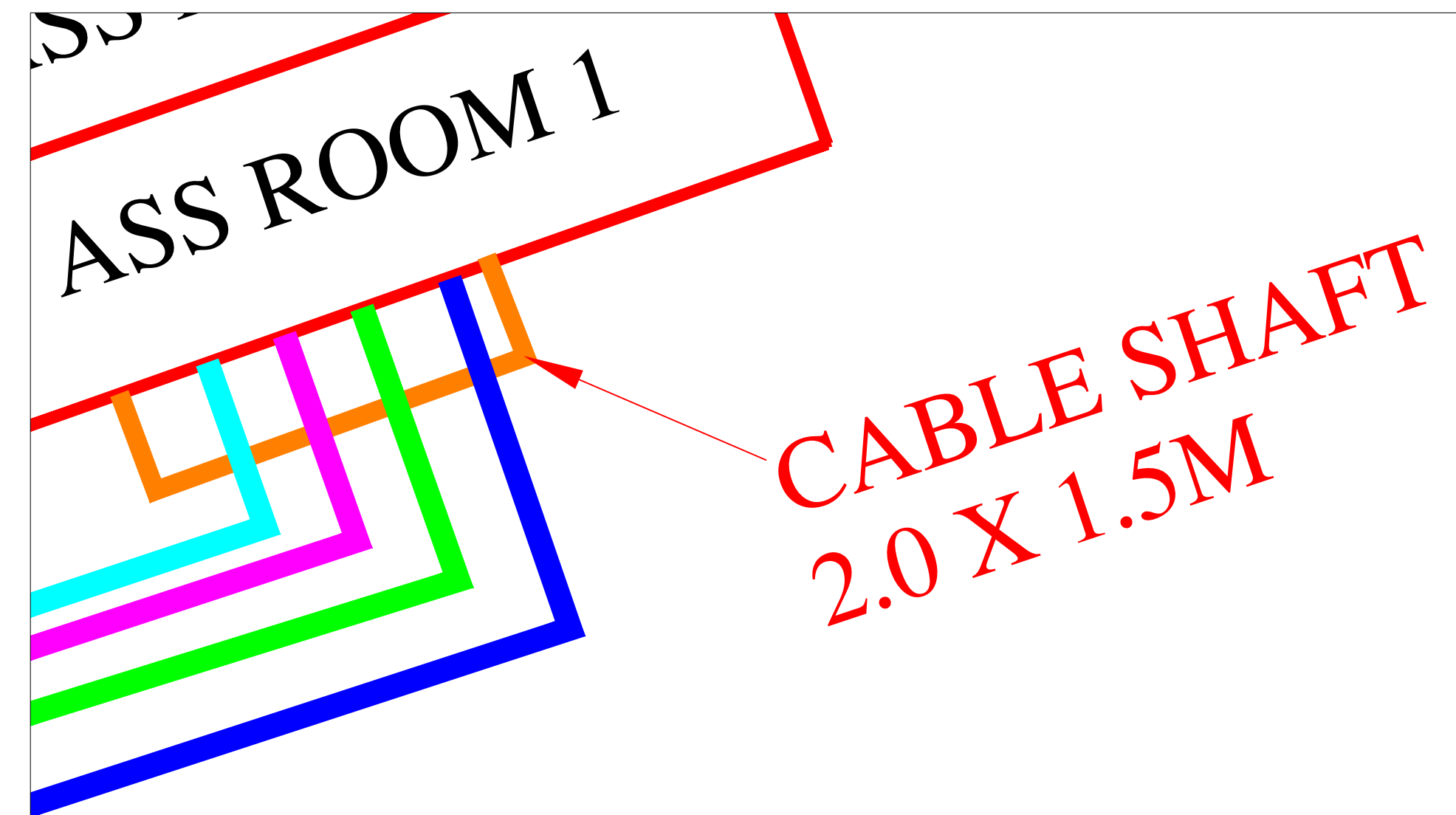
Annexure-A -RSS Layout



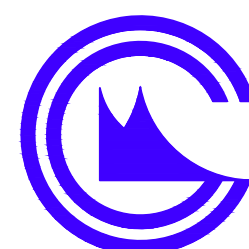


- 185 SQ MM LT CABLE (RSS TO STATION) (NO. 1)
- PROPOSED 33kV HT CABLE (NO. 6)
- PROPOSED 25kV HT CABLE (NO. 8)
- CONTROL CABLE (NO. 2)

NOTE - CABLE SHAFT OF SIZE 2.0 X 1.5 M  
START FROM 1.5M BELOW  
GROUND LEVEL



CLIENT :  
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**NKAB** **NIPPON KOEI** **BARRELL**  
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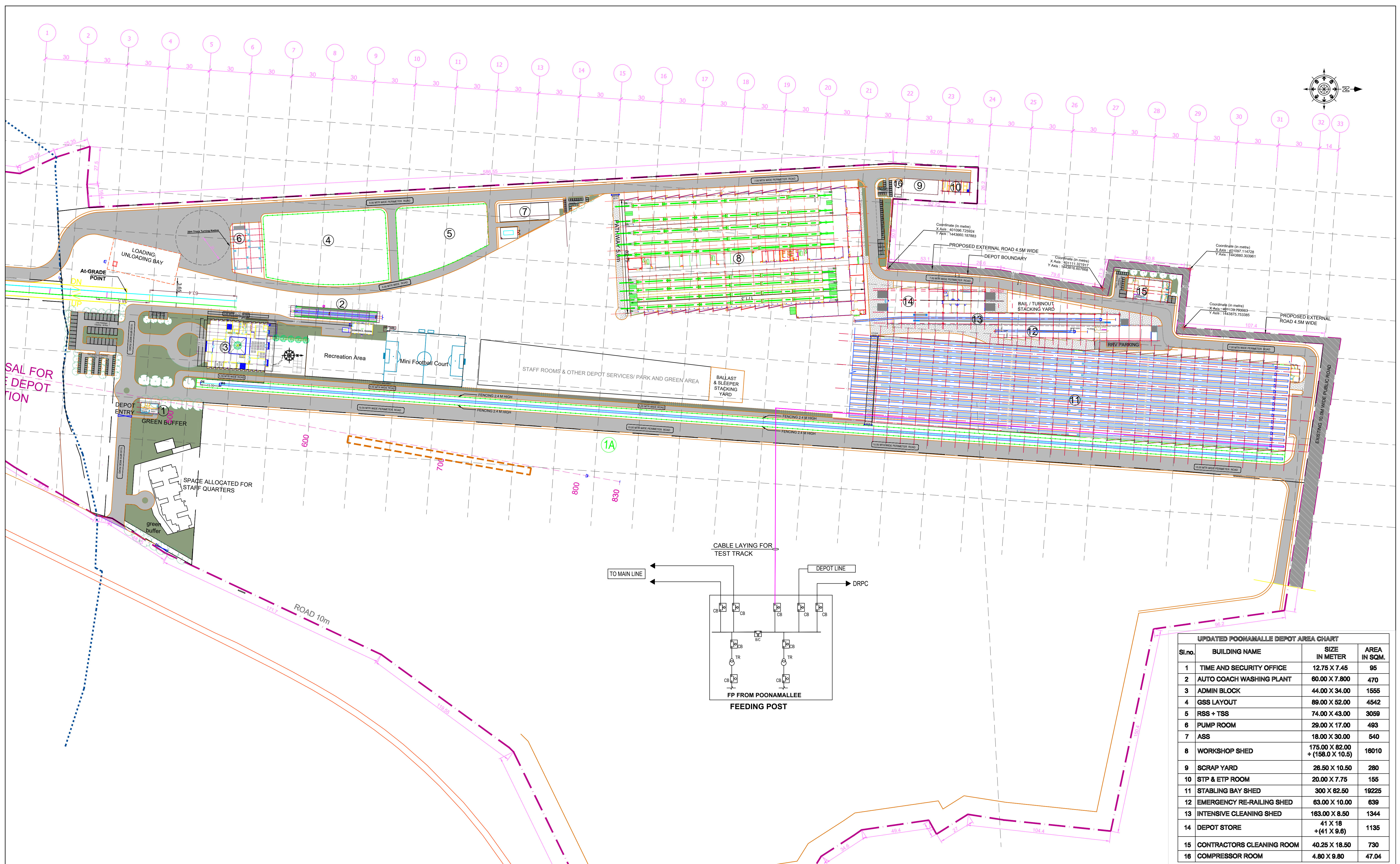
| REV. | DATE     | DESCRIPTION    |
|------|----------|----------------|
| B    | 03.01.22 | TENDER PURPOSE |
| A    | 27.09.21 | TENDER PURPOSE |

DRAWN BY :  
S.S  
DESIGNED BY :  
S.S  
CHECKED BY :  
AW  
APPROVED BY :  
P.M

## CHENNAI METRO RAIL PROJECT PHASE - II

|  |                            |            |
|--|----------------------------|------------|
| TITLE :<br><br>LOCATION LAYOUT                 | SHEET NO                   | SHEET SIZE |
|  | 1 OF 1                     | A1         |
| DRAWING NAME: ALWARTHIRU NAGAR RSS<br>LOCATION | SCALE : NTS                |            |
| DRAWING NUMBER: CMRL-GC1-PS&OHE-C4-0053        | DRAWN DATE: 13 - 05 - 2021 |            |

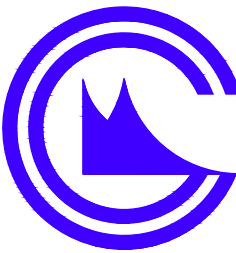







| UPDATED POONAMALLEE DEPOT AREA CHART |                           |                                    |              |
|--------------------------------------|---------------------------|------------------------------------|--------------|
| Sl.no.                               | BUILDING NAME             | SIZE IN METER                      | AREA IN SQM. |
| 1                                    | TIME AND SECURITY OFFICE  | 12.75 X 7.45                       | 95           |
| 2                                    | AUTO COACH WASHING PLANT  | 60.00 X 7.800                      | 470          |
| 3                                    | ADMIN BLOCK               | 44.00 X 34.00                      | 1555         |
| 4                                    | GSS LAYOUT                | 89.00 X 52.00                      | 4542         |
| 5                                    | RSS + TSS                 | 74.00 X 43.00                      | 3059         |
| 6                                    | PUMP ROOM                 | 29.00 X 17.00                      | 493          |
| 7                                    | ASS                       | 18.00 X 30.00                      | 540          |
| 8                                    | WORKSHOP SHED             | 175.00 X 82.00<br>+ (156.0 X 10.5) | 16010        |
| 9                                    | SCRAP YARD                | 28.50 X 10.50                      | 280          |
| 10                                   | STP & ETP ROOM            | 20.00 X 7.75                       | 155          |
| 11                                   | STABLING BAY SHED         | 300 X 62.50                        | 18225        |
| 12                                   | EMERGENCY RE-RAILING SHED | 63.00 X 10.00                      | 639          |
| 13                                   | INTENSIVE CLEANING SHED   | 163.00 X 8.50                      | 1344         |
| 14                                   | DEPOT STORE               | 41 X 18<br>+ (41 X 9.6)            | 1135         |
| 15                                   | CONTRACTORS CLEANING ROOM | 40.25 X 16.50                      | 730          |
| 16                                   | COMPRESSOR ROOM           | 4.80 X 9.80                        | 47.04        |

CLIENT :

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| REV. | DATE     | DESCRIPTION    |
|------|----------|----------------|
| C    | 07.01.22 | TENDER PURPOSE |
| B    | 02.09.21 | TENDER PURPOSE |
| A    | 03.05.21 | TENDER PURPOSE |

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S.S

DESIGNED BY :  
S.S

CHECKED BY :  
AW

APPROVED BY :  
P.M

CHENNAI METRO RAIL PROJECT PHASE - II

TITLE :  
CORRIDOR-04  
POONAMALLEE DEPOT MASTER PLAN

DRAWING NAME:  
FEEDING POST

DRAWING NUMBER: CMRL-GC1-PS&OHE-C4-0008

SHEET NO  
1 OF 1

SHEET SIZE  
A1

SCALE : NTS

DRAWN DATE: 03- 05 - 2021