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SN	Part	Section	Clause	Original Bidcondition	Revised bidcondition
1.	Part-1	Section-II	10.Price Bid	The Price bid for item of works will be in Excel format and shall be downloaded by the bidder and shall quote his prices against each Price Centre item which shall be inclusive of all taxes, duties etc. In the 'format the bidder should quote for all the tendered items. Where, any row or column is not applicable, the bidder has to indicate '0' against this. The system will generate a comparative statement. Therefore, all costs are to be indicated in the format. Order will be finalized on technically cleared, L-1 offer. The bidder may modify and resubmit the bid on line, if he wishes before the bid submission date and time. The system will accept only the last submitted bid. Bidder can find out the status of his tender on line, any time after opening the bids. The tenderer should not rename the file or modify the format while uploading in the system. The file name should be the same as the file name given in the tender. The filled price bid shall be uploaded and submitted ONLY in the e-procurement portal.	The Price bid for item of works will be in Excel format and shall be downloaded by the bidder and shall quote his prices against each Price Centre item which shall be inclusive of all taxes and duties excluding GST, Customs Duty. In the 'format the bidder should quote for all the tendered items. Where, any row or column is not applicable, the bidder has to indicate '0' against this. The system will generate a comparative statement. Therefore, all costs are to be indicated in the format. Order will be finalized on technically cleared, L-1 offer. The bidder may modify and resubmit the bid on-line, if he wishes before the bid submission date and time. The system will accept only the last submitted bid. Bidder can find out the status of his tender on line, any time after opening the bids. The tenderer should not rename the file or modify the format while uploading in the system. The file name should be the same as the file name given in the tender. The filled price bid shall be uploaded and submitted ONLY in the e-procurement portal.
2.	Part-1	Section-II	ITB 35.1	The currency that shall be used for Bid evaluation and comparison purposes to convert all Bid Prices expressed in various currencies into a single currency is: Indian Rupees (INR) The source of selling exchange rate shall be: Financial Benchmarks India Pvt Ltd (FBIL) as delegated by the Reserve Bank of India vide their order no. RBI/2018-19/34 DBR.Ret.BC No. 01/12.01.001/2018-19 dated August 02, 2018. The date for the selling exchange rate shall be: 28 days prior to the stipulated date of submission of the Bid.	The currency that shall be used for Bid evaluation and comparison purposes to convert all Bid Prices expressed in various currencies into a single currency is: Indian Rupees (INR) The source of selling exchange rate shall be: Financial Benchmarks India Pvt Ltd (FBIL) as delegated by the Reserve Bank of India vide their order no. RBI/2018-19/34 DBR.Ret.BC No. 01/12.01.001/2018-19 dated August 02, 2018. The date for the selling exchange rate shall be: 28 days prior to the last date of submission of the Bid, read in conjunction with latest addendum/corrigendum.
3.	Part-1	Section-III	1.10	Additional Clause	1.10 Other factors: The following factors and methods will apply under ITB 37.2 (g): (a) Operating and Maintenance Costs – Not considered for Bid evaluation.
4.	Part-1	Section-III	1.1.1	The following credentials are required for Cyber Security Expert: CISO, CISSP, CISM, CISA, CSSA certificates or equivalent.	"The following credentials are required for Cyber Security Expert: CCISO/CISSP are preferred."
5.	Part-1	Section-III	EQC 2.3.2	Minimum average annual construction turnover of INR 99 Crores, calculated as total certified payments received for contracts in progress and/or completed, within the last 5 (five) years, prior to the 'last date for bid submission', divided by 5 (five) years.	Minimum average annual construction turnover of INR 77.57 Crores, calculated as total certified payments received for contracts in progress and/or completed, within the last 5 (five) years, prior to the 'last date for bid submission', divided by 5 (five) years.
6.	Part-1	Section-III	EQC 2.3.3	The Bidder must demonstrate that its financial resources defined in FIN-3, less its financial obligations for its current contract commitments defined in FIN-4, meet or exceed the total requirements for the subject contract of INR 25 Crores	The Bidder must demonstrate that its financial resources defined in FIN-3, less its financial obligations for its current contract commitments defined in FIN-4, meet or exceed the total requirements for the subject contract of INR 19.39 Crores
7.	Part-1	Section-III	EQC 2.4.1	1. Experience in the capacity of Telecom System Integrator (without Specialist subcontractor) either as Single entity or JV member(iv)) OR 2. Experience in the capacity of Telecom System Integrator as Specialist Subcontractor(i) must have been substantially(iii) completed in the last 10 (ten) years, prior to	1. Experience in the capacity of Telecom System Integrator (without Specialist subcontractor) either as Single entity or JV member(iv)) OR 2. Experience in the capacity of Telecom System Integrator as Specialist Subcontractor(i) must have been substantially(iii) completed in the last 10 (ten) years, prior to the 'last date for bid submission', A minimum number of

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				the 'last date for bid submission', A minimum number of (a) One Telecommunication work involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Airports/ Smart City; of value INR 145 Cr.(ii,v) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock, in the scope of the work. OR (b) Two Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Airports/ Smart City; each of value INR 90 Cr.(ii,v) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work. OR (c) Three Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail /Monorail/ Mainline Railway projects/ Large Airports/ Smart City; each of value INR 72 Cr.(ii,v) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the contracts. Compliance Requirements Single Entity - Must meet requirement Joint Venture All Partners Combined - Must meet requirement (v) Each Partner - N/A Lead Partner - Must have completed in the last 10 years, prior to the 'last date for bid submission', minimum One Telecommunication works involving Design,Supply,Installation, Testing and commissioning in Metro Rail / Monorail/Mainline Railway projects/Large Airports/ Smart City; of value INR 72 Cr.(ii) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the contracts.	(a) One Telecommunication work involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects ; of value INR 145 Cr.(ii,v,vi) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock, in the scope of the work. OR (b) Two Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Mono Rail/ Mainline Railway projects/ Large Infra Projects each of value INR 90 Cr.(ii,v,vi) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the work. OR (c) Three Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail /Monorail/ Mainline Railway projects/ Large Infra Projects ; each of value INR 72 Cr.(ii,v,vi) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the contracts. Compliance Requirements Single Entity - Must meet requirement Joint Venture All Partners Combined - Must meet requirement (v) Each Partner - N/A Lead Partner - Must have been substantially (iii) completed in the last 10 years, prior to the 'last date for bid submission', minimum One Telecommunication works involving Design, Supply, Installation, Testing and commissioning in Metro Rail / Monorail/Mainline Railway projects/Large Infra Projects; of value INR 72 Cr.(ii,v,vi) or above; with at least 4 (four) subsystems out of FOTS/MAN, Tetra, PABX, CCTV, PAS, PIDS, ACIDS, Master Clock in the scope of the contracts.
8.	Part-1	Section-III	EQC 2.4 Notes for the Bidder	Additional Clause	vi) In the case of a turnkey project/Large Infra Projects, the value of the telecommunication portion/work alone shall be considered to meet this requirement. The value of the work shall be converted into Indian Rupees (INR) if other currencies are used as per the respective exchange rate on the date of award of the Contract. Upon converting into INR, 5% inflation per year (annual compounding) shall be applied on the INR equivalent value of the work for updating to the price level as on 31-05-2023.
9.	Part-2	Section–VI A	12.14.2	The Contractor shall ensure the timely preparation of the Testing & Commissioning Plans in a format and to a level of detail as agreed with the Engineer. The Contractor shall submit the first draft of the Testing and Commissioning Plans to the Engineer for his initial comments within 90 days of the Effective Date of LOA/date of commencement.	The Contractor shall ensure the timely preparation of the Testing & Commissioning Plans in a format and to a level of detail as agreed with the Engineer. The Contractor shall submit the first draft of the Testing and Commissioning Plans to the Engineer for his initial comments within 180 days from the Date of commencement.
10.	Part-2	Section–VI A	12.7	12.7.1 Occupational Health and Safety Plan (OH&S)	Deleted

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11.	Part-2	Section–VI B	1.4.1.1	All Centralized Telecom Facilities for the following locations shall be under the scope of this contractor. 1. Temporary OCC (@ Poonamallee Depot) a. All Workstations and Consoles in Temporary OCC Room b. CER-01 (Equipment Room for Temporary OCC) c. Telecom Maintenance Management Room d. Integrated Testing and Commissioning Lab 2. Permanent OCC (@ Madhavaram Depot) a. OCC Room b. Incident Management Room c. Telecom Maintenance Management Room d. Security Control Room Actual Quantity of Workstations/Consoles in Temporary OCC & BCC to be determined during design stage	All Centralized Telecom Facilities for the following locations shall be under the scope of this contractor. 1. Temporary OCC/BCC (@ Poonamallee Depot) a. All Workstations and Consoles in Temporary OCC/BCC Room b. CER-01 (Equipment Room for Temporary OCC/BCC) c. Telecom Maintenance Management Room d. Integrated Testing and Commissioning Lab and Security Control Room 2. Permanent OCC/BCC (@ Madhavaram Depot and Nandanam) a. All Workstations and Consoles in OCC/BCC and Incident Management Room. b. CER-01 (Equipment Room for OCC/BCC) c. Telecom Maintenance Management Room d. Security Control Room Actual Quantity of Workstations/Consoles in Temporary OCC & BCC to be determined during design stage.
12.	Part-2	Section–VI B	1.4.1.2	Additional Clause	1.4.1.2 Contractor shall consider all telecom facilities in MHQ Nandanam for the following rooms: 1. BCC 2. CER 3. SER 4. Security Control Room 5. Traction Equipment Room 6. AFC Equipment Room 7. SCADA Equipment Room 8. Three more Equipment Room reserved for future."
13.	Part-2	Section-VI B	1.4.4	Relevant Codes and Standards S.no 91 Characteristics of a single-mode optical fibre and cable-ITU T G.652	Relevant Codes and Standards S.no 91 Characteristics of a single-mode optical fibre and cable-ITU T G.652.D
14.	Part-2	Section–VI B	1.6.3	Availability Requirements: Table 1.3 Detailed availability requirements are given 2. CCTV System (99.95%)	Availability Requirements: Table 1.3 Detailed availability requirements are given 2. CCTV System (99.977%)
15.	Part-2	Section–VI B	10.1.1.2	In addition to IP Phones, DLT, help points at platforms shall also be provided for passengers for assistance when they are within the Station platforms.	In addition to normal IP Phones, Direct Line Telephones, Direct Line Consoles, Help points at platforms shall also be provided.
16.	Part-2	Section–VI B	10.1.1.3	The provision of Media gateways inside depot shall be provided as part of this tender by Telecom Contractor	The provision of Media gateways for depots (Madhavaram ASA-08 ,and Poonamallee ASA_05), with long line cards for Emergency Telephones for tunnels section (minimum 4 for ASA-05 and minimum 12 for ASA-08) shall be provided as part of this tender by Telecom Contractor .
17.	Part-2	Section–VI B	10.1.3	Telephone System user shall have voice mail facility for all users.	Telephone System user shall have voice mail facility for users. Bidder may assume minimum 50 concurrent request for voice mail facility.
18.	Part-2	Section–VI B	10.1.3.1	Direct Line Telephone Communication The Direct Line Telephone Communication System shall provide control	Direct Line Telephone Communication The Direct Line Telephone Communication System shall provide IP telephone lines with a

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				telephone lines for train operation, traction power supply control and telephone lines for all maintenance rooms. The system shall ensure instant, uninterruptible, communication between key points, which shall include, but not be limited to: (1) Between OCC & BCC and different key locations like all Station Control Rooms (SCR), BCC, Depot Control Centre (DCC), Traction Substation (TSS), Receiving Sub Stations (RSSs), Auxiliary Sub Station (ASS), each signalling equipment room, telecom equipment room at stations and depot. (2) Between adjacent / interfacing station control rooms; (3) Between adjacent interlocked station control room and DCC; (4) Passenger Help Line at middle of the Platform: Help Points mainly for passengers to ask for assistance in platform/ public areas. Help Point call made shall be configured as per time bound escalation and can be made to transfer automatically from SCR to OCC & BCC Chief Controller in case the call is not answered by Station Controller (5) Between RSSs and State Electricity Board Control room, OCC & BCC control room through leased PSTN (BSNL/MTNL/Private Operator) telephone lines; The leased line shall be arranged by Telecom contractor but paid for the initial cost & recurring cost by CMRL. Necessary permissions for external leased line entry to be taken with respective authority in CMRL (6) Between OCC & BCC / Head Quarter and security control rooms at stations, depot.	high priority in Exchange configuration for train operation, traction power supply control and telephone lines for all maintenance rooms. The system shall ensure instant, uninterruptible, communication between key points, which shall include, but not be limited to: (1)Between each key (Telecom Network Management Room, AFC Central Rooms, etc.)/Controller position in OCC & BCC and different key locations like all Station Control Rooms (SCR), Depot Control Centre (DCC), Traction Substation (TSS), Receiving Sub Stations (RSSs), Auxiliary Sub Station (ASS) at stations and depot. (2)Between adjacent / interfacing station control rooms; (3)Between adjacent interlocked station control room and DCC; (4)Passenger Help Line at middle of the Platform: Help Points mainly for passengers to ask for assistance in platform/ public areas. Help Point call made shall be configured as per time bound escalation and can be made to transfer automatically from SCR to OCC & BCC Chief Controller in case the call is not answered by Station Controller (5)Between OCC & BCC / Head Quarter and security control rooms at stations, depot. (6)Automatic hot-line routing of calls from Security Control Room (at OCC and BCC) Direct Line Telephones to Police Control Room shall be provided.
19.	Part-2	Section–VI B	10.1.3.2.5	The IP PBX network shall integrate with PSTN, IP PBX and Direct Line Telephone network allowing calls to be made between these networks. IP PBX network too shall support facsimile and other data communication services throughout Corridor 3,4&5 of CMRL Phase II System.	The IP PBX network shall integrate with PSTN, Direct Line Telephone network and Direct Telephone Console allowing calls to be made between these networks. IP PBX network too shall support facsimile and other data communication services throughout Corridor 3,4&5 of CMRL Phase II System.
20.	Part-2	Section–VI B	10.1.3.4.1	The Telephone System shall be interfaced with a Centralized Digital Recording System for recording of designated telephone lines including emergency telephone lines.	The Telephone System shall be interfaced with a Centralized Digital Recording System for recording of designated telephone lines, all direct line telephones including emergency telephone lines.
21.	Part-2	Section–VI B	10.1.3.4.2	It shall be possible to select any one additional PABX phone conversation for recording purposes from the HMI. CDRS shall be provided as part of the Telecom Contract and it shall be the responsibility of Telecom Contractor to coordinate, finalize the number and type of channels, interface, test and commission the recording of Telephone Communication in the CDRS. All Direct Line Telephone communication from and to all the Direct Line Consoles in the OCC & BCC, Stations shall be recorded in the CDRS. The interface between Telephone system and CDRS should be on IP. The number of channels has to be accordingly finalized by Telecom Contractor.	It shall be possible to select any one additional PABX phone conversation for recording purposes from the HMI. CDRS shall be provided as part of the Telecom Contract and it shall be the responsibility of Telecom Contractor to coordinate, finalize the number and type of channels, interface, test and commission the recording of Telephone Communication in the CDRS. All the communications from and to SCR, DCC, OCC (all controller positions), BCC (all controller positions) and Security control Room (all Controller positions) shall be recorded in the CDRS. The interface between Telephone system and CDRS should be on IP. The number of channels has to be accordingly finalized by Telecom Contractor.

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22.	Part-2	Section–VI B	10.1.3.4.3	Centralized Digital Recording System for recording of free space voice conversations of all Controllers in DCC Room, OCC,BCC and Security Room at OCC/BCC.The micro phones of free space voice recorder shall be so placed in DCC to enable clear recording of all controller positions without any mixing / disturbance.	Centralized Digital Recording System for recording of free space voice conversations of all Controllers in DCC Room at Madhavaram and Poonamallee, OCC,BCC and Security Room at OCC/BCC. The micro phones of free space voice recorder shall be placed in appropriate locations to enable clear recording of all controller positions without any mixing / disturbance.
23.	Part-2	Section–VI B	10.1.3.5.1	The Telephone Common Network Management System (NMS) main at OCC and redundant at BCC with Maintenance Supervisory Console, Keyboard with common Log Printer Server and associated printers, shall be provided by Telecom Contractor.Corridor 3,4&5 Telephone system and network shall be interfaced preferably with Common NMS by using open standards and all features and functionality shall be ensured. If contractor fails to interface with common NMS, separate NMS may be provided	The Telephone Common Network Management System (NMS) main at OCC and redundant at BCC with Maintenance Supervisory Console, Keyboard with common Log Printer Server and associated printers, shall be provided by Telecom Contractor. Corridor 3,4&5 Telephone system and network shall be interfaced preferably with Common NMS by using open standards and all features and functionality shall be ensured. If contractor fails to interface with common NMS, separate NMS may be provided. Virtualised environment shall be provided by ASA-06 for hosting all NMS softwares.
24.	Part-2	Section–VI B	10.2.2.1	IP PBX Network (1) Network switches; (2) Line and trunk interfaces; (3) IP Telephone sets (4) Passenger Help point phone (5) Distribution Frames (6) Testing and commissioning facilities. (7) Power supply equipment, cables, accessories, distribution frames, cabinets, enclosures, mounting brackets, equipment housing, racks and earthing etc. (8) Minimum 50% cables shall be available as spares	IP PBX Network (1)Central Switching Unit/Processor Unit; (2)Line and trunk interfaces; (3)IP Telephone sets (4)Passenger Help point phone (5)Distribution Frames (6)Testing and commissioning facilities. (7)Power supply equipment, cables, accessories, distribution frames, cabinets, enclosures, mounting brackets, equipment housing, racks and earthing etc. (8)Minimum 50% cables shall be available as spares
25.	Part-2	Section–VI B	10.2.2.2.3	The Contractor shall integrate with existing exchanges available at Nandanam Metros (Metro Head Quarter), Phase 1 and Phase 1 ext Telephone System for seamless communication via standard protocols	The Contractor shall integrate with existing exchanges available at Nandanam Metros (Metro Head Quarter), Phase 1 and Phase 1 ext Telephone System for seamless communication via standard protocols. The contractor can consider each exchange as one SIP Trunk
26.	Part-2	Section–VI B	10.3.1.1.5	Additional Clause	Each IP PBX shall be modular and scalable in architecture. IP PBX shall support IP ITSP trunks/ Digital ISDN / Analog PSTN.
27.	Part-2	Section–VI B	10.3.1.1.6	Additional Clause	Redundancy for the important interfaces/ modules such as power supply, processor etc. shall be provided
28.	Part-2	Section–VI B	10.3.1.4.1	All the voice circuits from the IP PBX switch shall be terminated at the main distribution frame inside the TER for distribution of the internal and external lines and interface with relevant Subsystems and Project Contractors. The circuit termination shall be of IDC (insulation displacement contact) type.	All the voice circuits from the IP PBX switch/Media gateway shall be terminated at the main distribution frame inside the TER for distribution of the internal and external lines and interface with relevant Subsystems and Project Contractors. The circuit termination shall be of IDC (insulation displacement contact) type.
29.	Part-2	Section–VI B	10.3.1.4.2	All the data circuits from the IP PBX switch shall be terminated at the digital distribution frame inside the TER or CER for distribution of the internal and external lines and interfaces with relevant Subsystems.	All the data circuits from the IP PBX switch/Media gateway shall be terminated at the digital distribution frame inside the TER or CER for distribution of the internal and external lines and interfaces with relevant Subsystems.

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30.	Part-2	Section–VI B	10.3.1.7	Feature Telephone (IP) The feature telephone shall be equipped with, but not be limited to, the following facilities: 1. Handset with; 2. 12 push-button keypad; 3. Adjustable volume control for speaker and ringer; 4. A minimum of 10 programmable function keys for assignment of features or additional extension circuits; 5. A minimum of 20 memories for speed dialing; 6. Hands-free operation through built-in speaker and microphone; 7. Powered by the IP PBX/PoE switch; 8. Visual display of details for incoming and outgoing calls; 9. Display of call duration Visual display of details for incoming and outgoing calls; 10. Dial by name, directory 11. Intercom facility; 12. System clock display; 13. On-hook dialing; 14. Programmable for multi-lines operations with more than one extension number assigned; and 15. Support “boss-secretary” combination with intercommunication between the two parties via the depression of a single button 16. Lamp for message waiting; 17. Supporting DHCP Client or static IP address allocation plan 18. Inbuilt Lost-packet compensation mechanism, Self-adaptive jitter cache and echo suppression for smooth voice function Voice compression standards G711, G722, G723.1, G729a 19. (Support for H.323/SIP 20. QoS support, TOS diffserv, 802.1p/q	Feature Telephone (IP) (for Direct Line Telephones) The feature telephone shall be equipped with, but not be limited to, the following facilities: 1. Handset with; 2. 12 push-button keypad; 3. Adjustable volume control for speaker and ringer; 4. A minimum of 10 programmable function keys for assignment of features or additional extension circuits; 5. A minimum of 20 (for SCR), 10 (for Power Equipment Room) and 40 (for OCC and BCC Controller Positions) Physical Programmable keys for speed dialing; 6. Hands-free operation through built-in speaker and microphone; 7. Powered by the PoE switch; 8. Visual display of details for incoming and outgoing calls; 9. Display of call duration Visual display of details for incoming and outgoing calls; 10. Dial by name, directory 11. Intercom facility; 12. System clock display; 13. On-hook dialling; 14. Programmable for multi-lines operations with more than one extension number assigned; and 15. Support “boss-secretary” combination with intercommunication between the two parties via the depression of a single button 16. Lamp for message waiting; 17. Supporting DHCP Client or static IP address allocation plan 18. Inbuilt Lost-packet compensation mechanism, Self-adaptive jitter cache and echo suppression for smooth voice function Voice compression standards G711, G722, G723.1, G729a 19. (Support for H.323/SIP) 20. QoS support, TOS diffserv, 802.1p/q
31.	Part-2	Section–VI B	10.3.1.8	Additional Clause	Each Phone should support minimum 02 SIP User Accounts.
32.	Part-2	Section–VI B	10.3.2.1.1	(1) OCC & BCC and different key locations like all station control rooms (SCR),Security room, depot control center (DCC), traction substation (TSS), receiving substation(RSS), auxiliary substation (ASS), and emergency telephones, each signalling equipment room and telecommunication equipment room in stations and depot;	(1) OCC & BCC and different key locations like all station control rooms (SCR),Security room, depot control center (DCC), traction substation (TSS), receiving substation(RSS), auxiliary substation (ASS), and emergency telephones, in stations and depot
33.	Part-2	Section–VI B	10.3.2.2.1	Direct Line Consoles shall be provided by other designated Contractor at OCC & BCC for each of the controllers.	Direct Line Consoles shall be provided by Contractor at OCC & BCC for each of the controllers.
34.	Part-2	Section–VI B	10.3.2.2.2	Contractor shall interface for ensuring Console functionality if different OEM by using open interface standards and subscriber equipment shall be fully compatible to achieve all features of Direct Line Console. Detailed interface plan shall be prepared jointly with other Telecom Contractor.	Contractor shall interface all the subscriber equipment both DLT and Normal IP Phones (if different OEM) for ensuring Console functionality by using open interface standards and shall be fully compatible and achieve all features of Direct Line Console. Detailed interface plan shall be prepared jointly with other Telecom Contractor.

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35.	Part-2	Section–VI B	10.3.2.2.3	The Direct Line Console shall provide selection facilities, in the form of push button and/or soft keys with visual display unit for user to perform 1. Originate outgoing calls to the selected user. 2. Select and answer any incoming calls destined for the direct line console. 3. Originate outgoing calls to a pre-defined group of users; 4. Originate outgoing calls to a group or all users defined by the Direct Line Console at the time before the call is placed; 5. Make conference calls to add additional users to an established call connection. 6. Patch calls or put through two individual users for call connection. 7. Transfer call to IP PBX extension. 8. Make and receive emergency call (override facility).	The Direct Line Console shall provide selection facilities, in the form of soft keys/PC based/touchscreen based with visual display unit for user to perform 1. Originate outgoing calls to the selected user. 2. Select and answer any incoming calls destined for the direct line console. 3. Originate outgoing calls to a pre-defined group of users; 4. Originate outgoing calls to a group or all users defined by the Direct Line Console at the time before the call is placed; 5. Make conference calls to add additional users to an established call connection. 6. Patch calls or put through two individual users for call connection. 7. Transfer call to IP PBX extension. 8. Make and receive emergency call (override facility).
36.	Part-2	Section–VI B	10.3.2.2.5	The selection facilities of the direct line console, in the form of physical push button and/or soft key, shall be labeled with identity of the called party or functions of the selection facilities.	The selection facilities of the direct line console, in the form of soft keys/PC based/touchscreen based, shall be labelled with identity of the called party or functions of the selection facilities.
37.	Part-2	Section–VI B	10.3.2.2.6	The selection facilities shall provide selection status indication in the form of LCD or LED displays.	The selection facilities shall provide selection status indication.
38.	Part-2	Section–VI B	10.3.2.2.7	Dedicated push button and/or soft keys shall be assigned to each telephone line which can be connected to the direct line console.	Deleted
39.	Part-2	Section–VI B	10.3.2.2.8	At least 10 spare push buttons and/or soft keys shall be provided for assignment of additional functions or telephone lines.	Deleted
40.	Part-2	Section–VI B	10.3.2.2.9	The push buttons and/or soft keys of similar functions or nature shall be grouped together to facilitate the user to locate the required selection.	Deleted
41.	Part-2	Section–VI B	10.3.2.3	Direct Line Telephones Direct Line Telephones shall be standard IP Telephones connected to OCC & BCC Direct Line Console through single push button selection. In each station 1 No. of such telephones, 20 lines for SCR/DCC, and 10 lines for each of the other locations in the Stations/Depot/RSS shall be provided. It shall be possible for the SCR to make normal and emergency direct line calls to the designated controllers in OCC & BCC. Different audio/visual indications shall be provided for incoming direct line calls on the Direct Line Telephones for normal and emergency calls.	Direct Line Telephones Direct Line Telephones shall be standard IP Telephones connected to OCC & BCC Direct Line Console through single push button selection. In each station, such telephones shall be provided in Station Control Room and Power Equipment Rooms with, It shall be possible to make normal and emergency direct line calls to the designated controllers in OCC & BCC. Different audio/visual indications shall be provided for incoming direct line calls on the Direct Line Telephones for normal and emergency calls. Direct Line Telephone to be provided at each Controller position in OCC and BCC integrated with DLC.
42.	Part-2	Section–VI B	10.3.2.3.1	Additional Clause	Dedicated push button and/or soft keys shall be assigned to each telephone line which can be connected to the direct line console.
43.	Part-2	Section–VI B	10.3.2.3.2	Additional Clause	At least 10 spare push buttons and/or soft keys shall be provided for assignment of additional functions or telephone lines.
44.	Part-2	Section–VI B	10.3.2.3.3	Additional Clause	The push buttons and/or soft keys of similar functions or nature shall be grouped together to facilitate the user to locate the required selection.
45.	Part-2	Section–VI B	10.3.2.4.2	Emergency Phone with Blue Light (as per NFPA 130-2007) a) Another type of DLT connected to SCR and OCC	Emergency Phone with Blue Light (as per NFPA 130-2007) a) Analog phone connected to SCR and OCC

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				Emergency Telephones at cross passages in Tunnels and shall be provided by other designated contractors having underground sections in their scope. ASA-06 Contractor shall provide media gateways with long line cards to interface with Emergency phones in tunnels. Call originated from Emergency Telephones from tunnel area shall be landed in nearest station's SCR phone, in case phone in SCR gets unattended in defined and configurable time duration then same call will be re-routed to controller's phone in OCC /BCC.	Emergency Telephones at in Tunnels shall be provided by other designated contractors having underground sections in their scope. ASA- 06 Contractor shall provide media gateways in 1+1 redundancy with a minimum of 24 long line cards in each to interface with Emergency phones in tunnels. Call originated from Emergency Telephones from tunnel area shall be landed in nearest station'sSCR phone, in case phone in SCR gets unattended in defined and confi gurable time duration then same call will be re-routed to controller's phone in OCC /BCC. These phones shall be able to auto-attend incoming call in speaker mode without any manual intervention. The distance between two Emergency phones should not exceed 250 meters.
46.	Part-2	Section–VI B	10.3.2.7	IP Network Topology	Deleted
47.	Part-2	Section–VI B	10.4.2.3.3	As part of threat isolation and tracking provision for IP Network, MAC/IP tracing associations for troubleshooting and intrusion control is required. Isolation of networks based on such assessments should be possible from IP Network NMS to contain potential threats	Deleted
48.	Part-2	Section–VI B	10.4.5	Telephone Matrix Table 10.1	Telephone Matrix Table 10.1 Please refer Annexure H for revised Table 10.1.
49.	Part-2	Section-VI B	15.2.1.1	15.2.1.1 In addition to the requirements specified in FOTS chapter of this PS, following specifications shall be complied with by Optical Fiber Cables for Underground Section used inside the tunnel, if any. For the Elevated/At-Grade Section and for any Optical Fiber Cable being laid outside the station limits and which is either buried under the earth or is laid on the via-duct, the Specifications shall be in accordance with the armoured OFC TEC/RDSO specifications no. IRS TC/55:2006 with latest amendments. The Contractor shall get these cables inspected from RDSO /TEC and all cost of inspection shall be borne by the Contractor.	15.2.1.1 In addition to the requirements specified in FOTS chapter of this PS, following specifications shall be complied with by Optical Fiber Cables for Underground Section used inside the tunnel, if any. The Contractor shall get these cables inspected from Employer representative and all cost of inspection shall be borne by the Contractor.
50.	Part-2	Section–VI B	15.2.10.1	All patch cords(or jumpers) and pigtails shall be fitted with one type of high quality optical connector such as FC/PC connectors for the single mode patch cord/pigtail at the factory. The manufacturer shall indicate the type of connector offered for the Engineer to choose a suitable type. The optical type specified on the transmission equipment shall be compatible with the optical Fiber termination. The coupling loss of the connector shall be less than 0.3dB repeatedly.	All patch cords(or jumpers) and pigtails shall be fitted with one type of high quality optical connector such as LC connectors for the single mode patch cord/pigtail at the factory. The manufacturer shall indicate the type of connector offered for the Engineer to choose a suitable type. The optical type specified on the transmission equipment shall be compatible with the optical Fiber termination. The coupling loss of the connector shall be less than 0.3dB repeatedly.
51.	Part-2	Section–VI B	15.2.10.2	All single mode optical patch cords and pigtails shall comply with ITU-T Recommendation G.652.	All single mode optical patch cords and pigtails shall comply with ITU-T Recommendation G.652.D
52.	Part-2	Section–VI B	15.2.9.1	Test method of the cable shall conform to the ITU-T Recommendations G.652 for the single mode Fiber cable and relevant IEC specifications.	Test method of the cable shall conform to the ITU-T Recommendations G.652.D for the single mode Fiber cable and relevant IEC specifications.
53.	Part-2	Section–VI B	15.6.1	The mounting brackets, Secondary Fixtures for CCTV, PIDS, PAS, Clocks and other Telecom equipment and mounting accessories should be manufactured from AISI316L stainless steel, these accessories shall be designed to meet every mounting requirements in the most severe and corrosive environments along	The mounting brackets, Secondary Fixtures for CCTV, PIDS, PAS, Clocks and other Telecom equipment and mounting accessories should be manufactured from Galvanized steel or GI with Powder Coating, these accessories shall be designed to meet every mounting requirements in the most severe and corrosive environments along with

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				with aesthetics requirement of station / building architecture	aesthetics requirement of station / building architecture
54.	Part-2	Section–VI B	16.14.2	16.14.2 Information Security requirements for design outputs The requirements listed below shall be complied throughout the Chennai Metro Project. a) All sensitive digital information (any information that is protected against unwarranted disclosure, such as IP schema, low level designs) shall be encrypted. b) Sensitive information shall be stored in encrypted and compartmentalized folders, accessed only by users with access authorizations. c) Remote access shall be allowed via VPN secured communication only. d) Anti-malware, EDR, anti-spam, anti-spyware, etc. software shall be installed on all computers,Servers and Laptops. e) Personal firewalls shall be installed on personal computers. f) Laptop disks shall be encrypted. g) The level of Information Security shall be monitored in accordance with the requirements defined by CMRL.	Information Security requirements for design outputs The requirements listed below shall be complied throughout the Chennai Metro Project. a) All sensitive digital information (any information that is protected against unwarranted disclosure, such as IP schema, low level designs) shall be encrypted. b) deleted c) Remote access shall be allowed via VPN secured communication only. d) Anti-malware, EDR, anti-spam, anti-spyware, etc. software shall be installed on all computers, Servers and Laptops. e) deleted f) deleted g) The level of Information Security shall be monitored in accordance with the requirements defined by CMRL.
55.	Part-2	Section–VI B	16.20.1	16.20.1 Periodic Cyber Risk Assessment B.The Bidder shall periodically (every 24 months as a minimum) conduct a cyber risk assessment in order to assess the capability of an external or an internal hacker to compromise the project systems, network and applications.	16.20.1 Periodic Cyber Risk Assessment B.The Bidder shall periodically (every 12 months as a minimum) conduct a cyber risk assessment in order to assess the capability of an external or an internal hacker to compromise the project systems, network and applications
56.	Part-2	Section–VI B	16.20.2	16.20.2 Penetration Testing (PT) a. PT for critical components of the Chennai Metro – every 12 months. b. PT for non-critical components – every 18 months.	16.20.2 Penetration Testing (PT) a. PT for critical components of the Chennai Metro – every 12 months. b. PT for non-critical components – every 12 months.
57.	Part-2	Section–VI B	16.21.6	All designs and infrastructure shall be verified by an Independent Cybersecurity agent engaged by the Bidder, preferably empaneled by CERT India. The Telecom systems shall comply the requirements of the periodic cyber security audits from independent agency engaged by the Employer.	Cyber Security Risk Assessment of all designs and infrastructure shall be verified by an Independent Cybersecurity expert empaneled by CERT India. The Telecom systems shall comply with the requirements of the periodic cyber security audits and Penetration testing (PT Clause 16.20.1) from independent agency engaged by the Employer. It should be carried out every 12 months
58.	Part-2	Section–VI B	16.3.7	Passwords should be changed frequently. Password history shall be used.	Password change policy can be done every 90days. Password history shall be used.
59.	Part-2	Section–VI B	16.5.19	Firewall Services shall follow industry best practices	Clause deleted
60.	Part-2	Section–VI B	16.5.20	Network Address Translation (NAT) shall follow industry best practices.	Clause deleted
61.	Part-2	Section–VI B	16.9.2	ISS shall incorporate EDR technology (Endpoint Detection and Response) and EPP capabilities, including host Firewall, device control configuration management, disk encryption and Host based IPS, to meet the need for continuous monitoring of and response to advanced threats.	ISS shall incorporate EDR technology (Endpoint Detection and Response) and EPP capabilities, including host Firewall, device control configuration management and Host based IPS, to meet the need for continuous monitoring of and response to advanced threats.
62.	Part-2	Section–VI B	16.9.34	Endpoint solution should have capability of AV, Vulnerability protection, HIPS, Firewall, Device control, virtual Patching and integrated DLP and pre and post machine learning execution	Endpoint solution should have capability of AV, Vulnerability protection, HIPS, Firewall, Device control, virtual Patching/exploit prevention and machine learning execution.
63.	Part-2	Section–VI B	16.9.53	Solution should provide the full disk, file and folder encryption	Clause deleted

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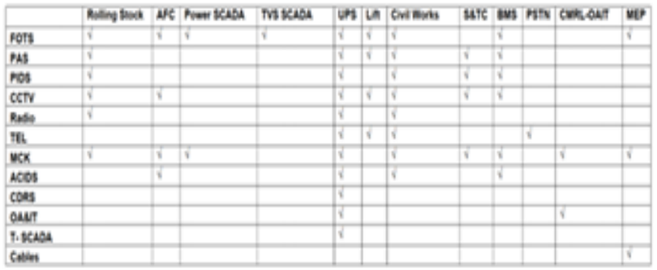
64.	Part-2	Section–VI B	17.14	Interfaces between Telecom Contractor and Designated Contractors Tentative Interfaces between the Communication System and other Systems, which are anticipated, are listed in the following table: 	17.14 Interfaces between Telecom Contractor and Designated Contractors For further details, refer to 'System wise Interface Chapter 18 of this Document'.
65.	Part-2	Section–VI B	18.10.12	INTERFACES WITH VAC TVS & SCADA CONTRACTORS	Please refer revised interface between VAC & TVS SCADA Annexure-E
66.	Part-2	Section–VI B	18.10.14.3(Scope of allocation matrix) 2.ISMS/ACIDS	In case ASA- 05/ASA08 architecture supports seamless integration with ASA-06, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05 & 06 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 shall supply individual NMS.Virtualised environment shall be provided by ASA-06 for hosting all NMS software	In case ASA-05/ASA08 architecture supports seamless NMS integration, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05, ASA-06 and ASA-08 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 and ASA-08 shall supply individual NMS. Virtualised environment shall be provided by ASA-06 for hosting all NMS softwares
67.	Part-2	Section–VI B	18.10.14.3(Scope of allocation matrix) 4.Telephone	Additional Clause	The Telephone Common Network Management System (NMS) main at OCC and redundant at BCC with Maintenance Supervisory Console, Keyboard with common Log Printer Server and associated printers, shall be provided by Telecom Contractor. Corridor 3,4&5 Telephone system and network shall be interfaced preferably with Common NMS by using open standards and all features and functionality shall be ensured. If contractor fails to interface with common NMS, separate NMS may be provided. Virtualized environment shall be provided by ASA-06 for hosting all NMS software
68.	Part-2	Section–VI B	18.10.14.3(Scope of allocation matrix) 5.FOTS/OAIT	In case ASA-05/ASA08 architecture supports seamless NMS integration, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05 & 06 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 shall supply individual NMS. Virtualised environment shall be provided by ASA-06 for hosting all NMS softwares	In case ASA-05/ASA08 architecture supports seamless NMS integration, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05, ASA-06 and ASA-08 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 and ASA-08 shall supply individual NMS. Virtualised environment shall be provided by ASA-06 for hosting all NMS softwares
69.	Part-2	Section–VI B	18.10.14.3(Scope of allocation matrix) 6. PAS	In case ASA-05/ASA08 architecture supports seamless NMS integration, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05 & 06 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 shall supply individual NMS. Virtualised environment shall be provided by ASA-06 for hosting all NMS softwares	In case ASA-05/ASA08 architecture supports seamless NMS integration, ASA-06 shall permit the integration. ASA-06 shall acquire the common NMS for ASA-05, ASA-06 and ASA-08 and back charge the proportionate cost to each contractor. If seamless integration is not possible, ASA-05 and ASA-08 shall supply individual NMS. Virtualised environment shall be provided by ASA-06 for hosting all NMS softwares
70.	Part-2	Section–VI B	2.4.3	Appropriate software shall be pre-loaded onto the notebook computers to access full management facilities through the local maintenance port.	Appropriate software shall be pre-loaded onto the notebook computers to access for maintenance purpose only

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71.	Part-2	Section–VI B	2.5.10.6	The centralized database shall have a storage capacity for at least 3 months of alarm data, system configuration data, alarm history, and system event logging data without the need to perform any housekeeping function. Housekeeping shall be conducted automatically at a pre-defined time configurable by PIDS Network Management System.	The centralized database shall have a storage capacity for at least 4 weeks of alarm data, system configuration data, alarm history, and system event logging data without the need to perform any housekeeping function. Housekeeping shall be conducted automatically at a pre-defined time configurable by PIDS Network Management System.
72.	Part-2	Section–VI B	3.2	PAS Central Server PIDS/PAS central server for all 3 Corridors of CMRL phase 2 shall be located in the OCC & BCC TER, which shall be connected to the PIDS/PAS Corridor server (for each corridor) and PAS/PIDS workstation at station via the data transmission system. Details of Centralised Passenger Information System is given in chapter 2 of this TS.	PAS Central Server PIDS/PAS central server for all 3 Corridors of CMRL phase 2 shall be located in the OCC & BCC TER, which shall be connected to the PIDS/PAS Corridor server (one corridor server at any suitable location within the Corridor) and PAS/PIDS workstation at station via the data transmission system. The actual location will be considered during detail design in the FOTS ring of the corridor. Details of Centralised Passenger Information System is given in chapter 2 of this TS.
73.	Part-2	Section–VI B	3.3.1.1	Stations Platforms, Concourses (both Paid & Unpaid), Commercial Areas, Ticket Gates, Gate Lines, Elevators, Escalator Landings, Staircases, Entrances, Exits, Sky walks (wherever applicable), Security Checking Machines, Cash Transfer Routes, Evacuation Routes, Parking areas, Front of the house areas, Back of House Rooms, washrooms, Equipment, Operational & Administrative rooms, Station Control Room, Station boundaries, Entry to viaduct and viaduct, vicinity of station area (entry / exit structures, road side, nearby areas etc.) Technical Rooms, SCR, Security Room, ASS, Walk Ways, Station Manager Room,Cross passage in tunnel area, TOM etc	Platforms, Concourses (both Paid & Unpaid), Commercial Areas, Ticket Gates, Gate Lines, Elevators, Escalator Landings, Staircases, Entrances, Exits, Sky walks (wherever applicable), Security Checking Machines, Cash Transfer Routes, Evacuation Routes, Parking areas, Front of the house areas, Back of House Rooms, washrooms, Equipment, Operational & Administrative rooms, Station Control Room, Station boundaries, Entry to viaduct and viaduct, vicinity of station area (entry / exit structures, road side, nearby areas etc.) Technical Rooms, SCR, Security Room, ASS, Walk Ways, Station Manager Room, TOM etc.
74.	Part-2	Section–VI B	3.4.2.3	The Telecom Contractor has to provide the detailed strategy to the Employer for installation of equipment at stations. The control equipments shall be provided as under: (C)One hard wired PA Control panel, complete with microphone and zone selections shall be provided in OCC, BCC SCR (Station Control Room) and SSR (Security Control Room) of each station for announcement in the station area so that, in case of emergency, announcement can be done in each zone / all zones.One Microphone shall be provided at every platform, Microphone shall be located at nominated location of platform. The PAS System shall provide uniform broadcast coverage throughout all areas of each site within which staff or members of the public may gain access to. The design shall be such that the speakers are so located as to ensure that there are no dead zones between adjacent speakers due to interference or any other reason	(c) One hard wired PA Control panel, complete with microphone and zone selections shall be provided in OCC, BCC SCR (Station Control Room) and SSR (Security Control Room) of each station for announcement in the station area so that, in case of emergency, announcement can be done in each zone / all zones. One PSB shall be provided at nominated location of each platform platform location. The PAS System shall provide uniform broadcast coverage throughout all areas of each site within which staff or members of the public may gain access to. The design shall be such that the speakers are so located as to ensure that there are no dead zones between adjacent speakers due to interference or any other reason
75.	Part-2	Section–VI B	3.5.2.8	Through acoustic modeling the relevant system performance shall be validated to comply with the following requirements: Table 2.1: Performance Parameter 3. Frequency Response All areas 315 Hz to 16 kHz at +/- 3 dB and In case of horn speaker 500hz - 4.5 kHz at - 10dB.	Through acoustic modelling the relevant system performance shall be validated to comply with the following requirements: Table 2.1: S.NO.3 .Frequency Response All areas 315 Hz to 16 kHz at +/- 3 dB and In case of horn speaker 550hz - 4.5 kHz at - 10dB
76.	Part-2	Section–VI B	3.5.5	System Response Times The processing and switching delay contributed by the PAS equipment shall not exceed 150 ms for any type of commands. The response time of PAS equipment shall include switching time and handover time of FOTS network.	System Response Times The processing and switching delay contributed by the PAS equipment shall not exceed 500 ms for any type of commands. The response time of PAS equipment shall include switching time and handover time of FOTS network

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77.	Part-2	Section–VI B	3.5.6.5	Loudspeakers shall be of same make/OEM as that of Control & Amplifier make/OEM.Other Loudspeakers manufacturers who shall comply with all applicable loudspeaker EN Standards and have credential in supplying for metro and Railway projects may also be supplied.	Loudspeakers shall be of same make/OEM as that of Control & Amplifier make/OEM. Speakers complying EN/UL or any other 3rd Party approved credential in supplying for metro or any other passenger carrying transportation projects.
78.	Part-2	Section–VI B	3.5.7.4	The PAS shall have minimum two audio matrix switches/controller (as Matrix Switch A & Matrix Switch B) in at each node with each controller controlling separate PAS circuits or matrix switches/controller shall be configured in redundant manner such that switch over between controllers shall not exceed 5 s for all required functionalities	The PAS shall have minimum two audio matrix switches/controller configured in redundant manner with active controller controlling PAS circuits A&B. The switch over between controllers shall not exceed 5 s for all required functionalities
79.	Part-2	Section–VI B	3.5.7.5	As normal mode of operation, in response to PA service the Matrix switch/ controller-A will feed to amplifiers driving Even numbered speakers of respective PA Zones & matrix switch/controller-B will feed to amplifiers driving Odd numbered speakers of the respective PA Zones. In normal mode, all even numbered & odd numbered speakers of any zone, combination of zones or all zones shall broadcast message simultaneously without causing any distortion or throughput synchronisation issue.	As normal mode of operation, in response to PA service the active Matrix switch/ controller will feed to amplifiers driving circuit A and circuit B speakers of the respective PA Zones. In normal mode, all speakers of any zone, combination of zones or all zones shall broadcast message simultaneously without causing any distortion or throughput synchronization issue.
80.	Part-2	Section–VI B	3.6.5.1.4	Each Platform Announcement Device shall be provided with a microphone. The PAS control panel shall have the facilities to make live broadcast to Pre-Defined Platform Zone.	Each Platform shall be provided with one Platform Announcement Device and a microphone. The PAS control panel shall have the facilities to make live broadcast to Pre-Defined Platform Zone.
81.	Part-2	Section–VI B	3.7.1.8	The system shall comply with the following standards: (a) All PAS equipment in equipment rooms shall be rack mounted (b) All speakers should be EN54-24 or UL Approved (c) All speakers shall be compliant to following Room Speaker - IP 34, Indoor Speaker(Areas with Coverings like platforms,sheds etc.) - IP 54 and Outdoor Speaker -IP65 rating and installation to be done to protect inside circuitry and cable termination from water and dust ingress. (d) Speaker to be used in Toilets should be repellent to moister (e) PA Matrix/Voice Announcers should be EN54-16 or UL Approved/Listed (f) All equipment's should be CE Approved	The system shall comply with the following standards: (a) All PAS equipment in equipment rooms shall be rack mounted (b) All speakers should be EN54-24 or UL Approved (c) All speakers shall be compliant to following Room Speaker - IP 34 or better, Indoor Speaker(Areas with Coverings like platforms, sheds etc.) - IP 54 and Outdoor Speaker -IP65 rating and installation to be done to protect inside circuitry and cable termination from water and dust ingress. (d) Speaker to be used in Toilets should be repellent to moister (e) PA Matrix/Voice Announcers should be EN54-16 or UL Approved/Listed (f) All equipment's should be CE Approved
82.	Part-2	Section–VI B	3.7.2.1.1	The hardware and software of the PAS shall use modular design to allow for easy expansion of the system. Addition of input and output ports for the switching equipment shall be achieved by simple addition of plug in cards or inputs or input output modules including amplifiers which should be of a hot swappable card type.	The hardware and software of the PAS shall use modular design to allow for easy expansion of the system. Addition of input and output ports for the switching equipment shall be achieved by simple addition of plug in cards or inputs or input output modules including amplifiers which should be of a hot swappable card type or IP devices .
83.	Part-2	Section–VI B	3.7.2.1.2	The PAS control equipment shall be provided with suitable redundant modules / cards to prevent single point of failure that affects overall system operation at a particular location including critical components so as to achieve the RAMS requirement laid down.The PAS control equipment shall have hot redundancy of the controller in both OCC & BCC to prevent failure that affects overall system operations.	The PAS control equipment shall be provided with suitable redundant modules /cards to prevent single point of failure that affects overall system operation at a particular location including critical components so as to achieve the RAMS requirement laid down. The central PIDS/PAS application shall have redundancy in both OCC & BCC to prevent failure that affects overall system operations.
84.	Part-2	Section–VI B	3.7.2.12.17	All speakers should be from same OEM as that of PAS System Supplier	Clause deleted

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85.	Part-2	Section–VI B	4.1.3	The following major types of messages shall be provided by the PIDS as a minimum: (1) Fixed; (2) Pre-formatted with data to be added; and (3) Instantly constructed. (4) Advertisements & other information (5) Clocks, etc (6) Trains information received from S&TC etc	The following major types of messages shall be provided by the PIDS as a minimum: (1) Fixed; (2) Pre-formatted with data to be added; and (3) Instantly constructed. (4) Advertisements & other information (5) User Configurable Clocks, etc (6) Trains information received from S&TC etc
86.	Part-2	Section–VI B	4.2.4.4	Each display shall be fully visible to a normal sighted individual, when standing or sitting in a wheelchair, at a minimum distance of 25 meters or better from the display	Each display shall be fully visible to a normal sighted individual, when standing or sitting in a wheelchair, at a minimum distance of 15m for concourse and 35m for platform from the display.
87.	Part-2	Section–VI B	5.1.5	The ISMS Software shall have intuitive Dashboard with live monitoring and dynamic reports. The software shall provide single consistent experience to operators for different sub systems. The software shall be commercially available off the shelf (COTS) with provision for customization by XML or any other method.	The ISMS architecture must have failover options for both Hardware and Application level fail over. The primary and Secondary would be hosted in OCC / BCC in Active – Active mode for high reliability.
88.	Part-2	Section–VI B	5.2.12	The VMS shall support end to end encrypted streams with cameras supporting Secure RTP (SRTP) / open encrypted standards both in unicast and multicast from the camera.	The VMS shall support end to end encrypted streams with cameras supporting Secure RTP (SRTP) or any equivalent open encrypted standards both in unicast and multicast from the camera
89.	Part-2	Section–VI B	5.2.13	The VMS platform must have Indian certification from agency like STQC or International agency like UL with valid Cyber Security certification under the Physical Security and emergency communication category	The VMS platform must have Indian certification from agency like STQC or International agency like UL or compliance of standards like FIPS, GDPR .
90.	Part-2	Section–VI B	5.2.22	The video management system shall support high availability of recording servers. A failover option shall provide standby support for recording servers with automatic synchronization to ensure maximum uptime and minimum risk of losing data such that once Primary server goes offline then videos which are recorded at secondary server shall be automatic sync to primary server without user intervention.	The video management system shall support recording at Primary and Secondary locations. A failover option shall provide standby support for recording servers with automatic synchronization to ensure maximum uptime and minimum risk of losing data such that once Primary server goes offline then videos which are recorded at secondary server shall be automatic sync to primary server without user intervention.
91.	Part-2	Section–VI B	5.2.28	The video management system shall support a solution that makes it possible to integrate multiple third-party video content applications seamlessly into viewing client environments.	Deleted
92.	Part-2	Section–VI B	5.2.4	The VMS Solution Shall support native Fail over with in application with no dependency on any external application for both hardware and application redundancy. The native fail-over architecture must be for both management and recording servers. The fail over time should be near real time and there should not be any loss in the Live video and recorded video	The VMS Solution shall support Fail over to ensure hardware and application redundancy. The fail over time should be near real time and there should not be any loss in the Live video and recorded video.
93.	Part-2	Section–VI B	5.2.5	The VMS shall support Direct Multicast from Camera with no dependency of stream being sent to OCC Or BCC, recording servers for live viewing and optimize the overall bandwidth consumption on the FOTS back bone. The actual bandwidth requirements will be dealt in the design stage	The VMS shall support optimization of bandwidth using suitable technologies like multi casting or multi streaming or Compression . The actual bandwidth requirements will be dealt in the design stage.
94.	Part-2	Section–VI B	5.2.6	The VMS Application shall be capable to handle both IP v4 and IP v6 Unicast and Multicast traffic with both PIM - SM and PIM - DM support.	The VMS Application shall be capable to handle Unicast and Multicast traffic with both PIM - SM and PIM - DM support.

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95.	Part-2	Section–VI B	5.4(2)(J)	Network Video Recorder: j.System should ensure that once recorded, the video cannot be altered, ensuring the audit trail is intact for evidential purposes. This has to be achieved using Authentication with SHA-1 hashing function, secured with encryption to ensure authentication. Water marking alone for ensuring tamper proof recording is not sufficient. The VMS must support digital signature to prove authentication and integrity. Temper proof recording mechanism which meets security of minimum 128 bits encryption shall be implemented.	System should ensure that once recorded, the video cannot be altered, ensuring the audit trail is intact for evidential purposes. This has to be achieved using Authentication with SHA-1/MD5 technique hashing function, secured with encryption to ensure authentication. Water marking alone for ensuring tamper proof recording is not sufficient. The VMS must support digital signature to prove authentication and integrity. Tamper proof recording mechanism which meets security of minimum 128 bits encryption or better shall be implemented.
96.	Part-2	Section–VI B	6.1.2.3(d)	Long range PTZ/Fixed CCTV cameras with night vision facility shall be provided at the edge of the platforms with SOD Compliance which would be pointing towards the viaduct covering min. 150 mtrs. on train entering side of viaduct station	Long range PTZ/Fixed CCTV cameras with night vision facility shall be provided at the edge of the platforms with SOD Compliance which would be pointing towards the viaduct covering min. 150 mtrs on train entering side of viaduct station and out door range of 40mtr.
97.	Part-2	Section–VI B	6.1.4.1	General The specific system performance requirements for the CCTV system shall be as specified herein: The OEM for CCTV system shall be registered in India with self-owned service centre without joint venture. The OEM shall have implemented end to end CCTV solution in metro environment	The OEM for CCTV system shall be registered in India with self-owned service center for minimum of 3 years without joint venture . The documental evidence to be attached as part of the bid. The OEM shall have implemented end to end CCTV solution in metro environment
98.	Part-2	Section–VI B	6.2.1.1	Proposed CCTV system shall be based on Non-Proprietary open standard based integrated system with network centric functional and management architecture aimed at providing high speed manual / automatic operation for best performance	Proposed CCTV system shall be based on Non-Proprietary open standard based integrated system with network centric functional and management architecture aimed at providing best performance.
99.	Part-2	Section–VI B	6.2.2.1.7	Focal Length should be of following as minimum. Lens 2.8-12mm, Lens 3-50mm & Lens 8-80mm. Vendor to indicate the focal length range for both wide & Telephoto dynamic range, Particular lens and allocation as per coverage area shall be finalized in detailed design stage PAN Tilt Adjustment as minimum: (a) For Fixed Camera - Manual Pan / Tilt adjustment up to 340 / 180 Deg. (b) For PTZ Cameras - 360 Deg continuous Pan and 180 Deg tilt with auto flip. Pan and tilt units, fitted with the camera and associated equipment, shall meet the following minimum performance: (a) Pan Rotation: 0° to 360° (b) Tilt Rotation: -90° to + 90° (c) Pan Speed: 90°/Sec. (d) Tilt Speed: 90°/Sec Bandwidth :64 Kbps – 8 Mbps; Camera Inputs minimum - 2 potential free dry inputs, Outputs - 1 NO/NC changeover contact.	Vendor to indicate the focal length range for both wide & Telephoto dynamic range, Particular lens and allocation as per coverage area shall be finalized in detailed design stage PAN Tilt Adjustment as minimum: (a) For Fixed Camera - Manual Pan / Tilt adjustment up to 340 / 180 Deg. (b) For PTZ Cameras - 360 Deg continuous Pan and 180 Deg tilt with auto flip. Pan and tilt units, fitted with the camera and associated equipment, shall meet the following minimum performance: (a) Pan Rotation: 0° to 360° (b) Tilt Rotation: -90° to + 90° (c) Pan Speed: 90°/Sec. (d) Tilt Speed: 90°/Sec Bandwidth :64 Kbps – 8 Mbps; Camera Inputs minimum - 2 potential free dry inputs, Outputs - 1 NO/NC changeover contact.
100.	Part-2	Section–VI B	6.2.2.1.8	Additional clause	IR Viewable length shall be minimum 20mtr for indoor cameras and minimum 40mtr for outdoor cameras.

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101.	Part-2	Section–VI B	6.2.3 Varifocal Lenses	Table 6.2 8. Table 6.2 focus Control-Manual Zoom Control - Manual	Table 6.2 8. Table 6.2 focus Control-Auto focus Zoom Control - Motorized
102.	Part-2	Section–VI B	6.2.6.1	High Definition IP Fixed Dome Camera (IR Camera) 10) Supported Protocols:- Telnet, FTP, TCP/IP, UDP/IP (Unicast, Multicast IGMP), IPv4/v6, SNMP, SNTP, RSTP, ONVIF etc. or as required to fulfil the functional requirement of project	High Definition IP Fixed Dome Camera (IR Camera):- 10) Supported Protocols:- FTP, TCP/IP, UDP/IP (Unicast, Multicast IGMP), IPv4/v6, SNMP, SNTP, RTSP, ONVIF etc. or as required to fulfil the functional requirement of project
103.	Part-2	Section–VI B	6.2.6.2(E)	High Definition IP Fixed Bullet Camera (IR Camera): IR Viewable Length-50m	High Definition IP Fixed Bullet Camera (IR Camera): IR Viewable Length-40 m to 50m
104.	Part-2	Section–VI B	6.2.6.2(L)	Supported Protocols - Telnet,FTP,TCP/IP, UDP/IP (Unicast, Multicast IGMP), IPv4/IPv6, SNMP, SNT, RSTP, ONVIF etc. or as required to fulfill the functional requirement of project.	Supported Protocols:- FTP, TCP/IP, UDP/IP (Unicast, Multicast IGMP), IPv4/v6, SNMP, SNTP, RTSP, ONVIF etc. or as required to fulfil the functional requirement of project
105.	Part-2	Section–VI B	6.2.6.2(R)	(R)Wide Dynamic Range- 100 dB or better	(R) Wide Dynamic Range- 120 dB or better
106.	Part-2	Section–VI B	7.2.1.5	The contractor shall provide BIC Card and/or a biometric authentication such as fingerprint authentication at Station/Depot Control room ,TER/CER,SER ,TSS ASS and UPS room and remaining access rooms shall be provided with card.	The contractor shall provide smart Card (ISO 14443 Type A) and biometric based authentication (fingerprint authentication) at Station/Depot Control room ,TER/CER,SER ,TSS ASS and UPS room .The contractor shall provide smart Card based authentication for remaining access-controlled rooms.
107.	Part-2	Section–VI B	7.4.4(i)	(i)Access control reader unit shall have four states monitoring capability.	Access control unit shall have four states monitoring capability. Four states monitoring capability shall be 4 states alarm monitoring including detection of Cable short circuit and open circuit etc.
108.	Part-2	Section–VI B	7.4.8	AFC Contractor shall provide ISO 14443 cards, Access control system shall be compatible with these types of Cards	AFC Contractor shall provide ISO 14443 Type A cards, Access control system shall be compatible with these types of Cards.
109.	Part-2	Section–VI B	7.5.1.1	As a part of ISMS , central access control server (with hardware redundancy and disk mirroring) shall be installed in CER, within the OCC & BCC, which shall control and monitor all of the Access Control and Intrusion Detection facilities installed within all phase 2 (Corridor 3,4&5)corridors, sites, stations, OCC & BCC, Depots and Operational administrative offices both for OCC, BCC & Depots. Additionally, one stand by server for each corridor shall be installed as a stand by which shall ensure seamless functionality in case of communication link failure between OCC/BCC & stations.	As a part of ISMS , central access control server (with hardware redundancy and disk mirroring) shall be installed in CER, within the OCC & BCC, which shall control and monitor all of the Access Control and Intrusion Detection facilities installed within all phase 2 (Corridor 3,4&5)corridors, sites, stations, OCC & BCC, Depots and Operational administrative offices both for OCC, BCC & Depots.
110.	Part-2	Section–VI B	7.5.2.2(h)	Additional Clause	Access control unit shall have four states monitoring capability. Four states monitoring capability shall be 4 states alarm monitoring including detection of Cable short circuit and open circuit etc.
111.	Part-2	Section–VI B	7.5.13	Additional Clause	7.5.13 Access Control Printer 7.5.13.1 Color printing facilities shall be provided adjacent to the VAC (HMI) of the OCC/BCC operator/security control, to enable any operator selected or scheduled data to be printed out. 7.5.13.2 Such data shall include the issue of cards with photographic images of cardholders. 7.5.13.3 The printing facilities within each Control Room and CER location shall be

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					rationalized such that the local maintenance staff and operators at the VAC (HMI) are able to print out the required data from the Access Control and Intruder Detection System and any of the telecommunications sub-systems in the size, color, quality, format and quantity required.
112.	Part-2	Section–VI B	7.7	7.7 Reliability and Availability 3.Relevant Codes and Standards This Specification covers the design, manufacturing, delivery, installation, testing, commissioning and support for Access Control System to be supplied under this Tender, as described as detailed. It is to be noted that guidelines of Ministry of Home Affairs pertaining to Access Control System shall be adhered to. The Access Control System and its constituent parts shall comply with the relevant latest version of all the standards like UL Standards (Underwriters Laboratory) and British Standards, International Electromechanical Commission (IEC) standards, International Organization for Specification (ISO) Standards, European Standard (EN) etc. as per table listed below. Access to or the use of a devices by electrical, electronic or mechanical control unit- • UL294 Edition-6 Standard for Access Control System Units. • UL294B Edition-1 Standard for Power over Ethernet (PoE) Power Sources for Access Control Systems and Equipment	7.7 Reliability and Availability 3.Relevant Codes and Standards This Specification covers the design, manufacturing, delivery, installation, testing, commissioning and support for Access Control System to be supplied under this Tender, as described as detailed. It is to be noted that guidelines of Ministry of Home Affairs pertaining to Access Control System shall be adhered to. The Access Control System and its constituent parts shall comply with the relevant latest version of all the standards like UL Standards (Underwriters Laboratory) and British Standards, International Electromechanical Commission (IEC) standards, International Organization for Specification (ISO) Standards, European Standard (EN) etc. as per table listed below. Access to or the use of a devices by electrical, electronic or mechanical control unit- • UL294 Edition-6 Standard for Access Control System Units. • UL294B Edition-1 Standard for Power over Ethernet (PoE) Power Sources for Access Control Systems and Equipment • UL1076-Intrusion systems
113.	Part-2	Section–VI B	8.3	Façade Clock 8.3.3.1 Contractor shall propose design, manufacturing, testing and commissioning of 1.5 meter to 3 meters dia.of dial, self-illuminated analogue façade clock with hour and minutes hands. 8.3.3.2 This clock will be installed only at Metro Bhawan HQ	Clause deleted
114.	Part-2	Section–VI B	8.7.3.4	The master clock system shall work from 230V AC UPS with an internal battery backup of at least 4 hours.	The master clock system shall work from 230V AC UPS.
115.	Part-2	Section–VI B	8.7.3.5	The design of the slave clocks shall be of high quality and blend into the architecture of the area in which they are located. Digital slave clocks shall be programmable both for 12 hours and 24 hours. Clocks shall be provided as follows: a) One wall mounted synchronized digital clock in each Station Control Rooms, OCC & BCC, SSR, TOM, RSS, small offices. The character height of the display shall not be less than 75 mm for indoor clocks and the character height of the display shall not be less than 100mm for outdoor clocks. b) Display digital clock at various locations shall display 4 characters viz.time in HH:MM format c) The numbers of clocks are to be worked as per the above requirement.	The design of the slave clocks shall be of high quality and blend into the architecture of the area in which they are located. Digital slave clocks shall be programmable both for 12 hours and 24 hours. Clocks shall be provided as follows: a) One wall mounted synchronized digital clock in each Station Control Rooms, OCC & BCC, SSR, TOM, RSS, small offices. The character height of the display shall not be less than 70 mm for indoor clocks and the character height of the display shall not be less than 100mm for outdoor clocks. b) Display digital clock at various locations shall display 4 characters viz.time in HH:MM format c) The numbers of clocks are to be worked as per the above requirement
116.	Part-2	Section–VI B	9.2.2.4	FOTS system should be transparent to the network requirements PCI-DSS compliance of the AFC System	FOTS Network shall allow the AFC Traffic for Any third party certification testing such as PCI-DSS

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117.	Part-2	Section–VI B	9.2.4.11	The Contractor shall ensure that the optical budget, of the end-to-end longest connections, is minimum adequately satisfied for the optical specifications of high capacity transmission equipment such as GE. Cable attenuation values and other parameters shall not exceed the values advocated in the standard G.652. The Contractor shall submit the same for Engineer's approval.	The Contractor shall ensure that the optical budget, of the end-to-end longest connections, is minimum adequately satisfied for the optical specifications of high capacity transmission equipment such as GE. Cable attenuation values and other parameters shall not exceed the values advocated in the standard G.652.D. The Contractor shall submit the same for Engineer's approval
118.	Part-2	Section–VI B	9.2.5.11	The Active – Active clustering technology should have the ability to handle a "Split brain" situation especially at the station level distribution switches and clear explanation must be provided on the mechanism available in the proposed system to avoid such catastrophic failures across the network back bone.	The Active – Active clustering technology should have the ability to handle a "Split brain or equivalent" situation especially at the station level distribution switches and clear explanation must be provided on the mechanism available in the proposed system to avoid such catastrophic failures across the network back bone.
119.	Part-2	Section–VI B	9.2.5.6	Additional Clause	In addition to design, the FOTS network shall be extended to all locations / rooms in stations,RSS.Contractor shall provide 2 separate ports at middle of each platform,2 ports at each entrance,2 ports in concourse area
120.	Part-2	Section–VI B	9.2.6.2	Additional Clause	(e) Switches shall have redundant power supply. (f) Switches shall support link redundancy
121.	Part-2	Section–VI B	9.2.9.1.11	The Layer 3 switch in OCC & BCC, stations, and Head Quarters shall be modular chassis based switch.with swappable cards/powersupply /Fan etcwhile WAN switch shall be modular based with hot swapable minimum PSU&SFP's. Bidder s shall provide FCAPS certified NMS Solution which can support & manage multiple vendor devices.	The Layer 3 switch in OCC & BCC shall be modular chassis based switch with swappable cards/power supply /Fan etc while WAN switch at stations ,depots ,and Head quarters shall be modular based with hot swapable minimum PSU&SFP's. Bidders shall provide FCAPS certified NMS Solution which can support & manage multiple vendor devices.
122.	Part-2	Section–VI B	9.2.9.1.20	Shall provide flexible reporting capabilities including pre-defined and custom reports with scheduled and flexible delivery options. NMS should support Software Defined Network Management including Open Flow devices.	Shall provide flexible reporting capabilities including pre-defined and custom reports with scheduled and flexible delivery options
123.	Part-2	Section–VI B	9.2.9.1.5	The Telecom Contractor shall be responsible to interface with other designated telecom contractors of other packages/corridors by providing common NMS to monitor the entire Network by receiving control and alarms from other NMS. Integration of alarms monitoring shall be provided to T SCADA system also	The Telecom Contractor shall be responsible to interface with other designated telecom contractors of other packages/corridors by providing common NMS to monitor the entire Network by receiving control and alarms from sub-system equipment/NMS of all 3 contractors. Integration of alarms monitoring shall be provided to T SCADA system also
124.	Part-2	Section–VI B	9.9.10	Layer 2 Features: (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. (b) No of VLANS: - ≥1000 (c) Spanning Tree Enhancements: BPDU Guard, Root Guard etc. to avoid Denial of Service attacks (d) 802.1 p/q - VLAN Tagging (e) 802.3x - Flow Control, Layer 2/3 Ping, Layer 2/3 Traceroute and Connectivity Fault Management (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. (g) The Distribution switch must have the in-built capability to handle "Split brain	Layer 2 Features: The Layer 2 shall have minimum following facilities: (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. (b) No of VLANS: - ≥1000 (c) Spanning Tree Enhancements: BPDU Guard, Root Guard etc. to avoid Denial of Service attacks (d) 802.1 p/q - VLAN Tagging (e) 802.3x - Flow Control, Layer 2/3 Ping, Layer 2/3 Traceroute and Connectivity G96Fault Management (f) Support for features like Unit-Directional Link Detection or equivalent . 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 (g) The Distribution switch must have the in-built capability to handle "Split brain or equivalent "situation to avoid a total network downtime during such catastrophic failure

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				"situation to avoid a total network downtime during such catastrophic failure situations (h) Ethernet IEEE 802.3, 10 Base T (i) Layer3 switching and routing support (j) Fast Ethernet (IEEE802.3u, 10/100 Base-TX, 100 Base FX, 1000 Base FX) (k) Gigabit Ethernet-(IEEE 803z, 802.3ab) (l) 10 Gigabit Ethernet (IEEE 802.3ae)	situations (h) Ethernet IEEE 802.3, 10 Base T (i) Layer3 switching and routing support (j) Fast Ethernet (IEEE802.3u, 10/100 Base-TX, 100 Base FX, 1000 Base FX) (k) Gigabit Ethernet-(IEEE 803z, 802.3ab) (l)10 Gigabit Ethernet (IEEE 802.3ae) (j)Efficient Intranet Multimedia and multicast support; (k)IGMP (Internet Group management protocol); (l)IGMPv1, v2, v3 Snooping; G96
125.	Part-2	Section–VI B	9.9.10.1	Additional Clause	Layer 2 Features:(Industrial Grade switch) 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. (b) No of VLANS: - ≥1000 (c) Spanning Tree Enhancements: BPDU Guard, Root Guard etc. to avoid Denial of Service attacks (d) 802.1 p/q - VLAN Tagging (e) 802.3x - Flow Control, Layer 2/3 Ping, Layer 2/3 Traceroute and Connectivity Fault Management (f) Support for features like Unit-Directional Link Detection or equivalent . 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 (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 (h) Ethernet IEEE 802.3, 10 Base T (i) Layer3 switching and routing support (j) Fast Ethernet (IEEE802.3u, 10/100 Base-TX, 100 Base FX, 1000 Base FX) (k) Gigabit Ethernet-(IEEE 803z, 802.3ab) (l) 10 Gigabit Ethernet (IEEE 802.3ae) (j)Efficient Intranet Multimedia and multicast support; (k)IGMP (Internet Group management protocol); (l)IGMPv1, v2, v3 Snooping; (m)Layer-2 Field Switch (Industrial grade) for all stations/Depots/Ramp etc. Operating temperature 0°C to + 60°C, Humidity up to 90% (noncondensing). Switch shall be without any moving parts (no fans)
126.	Part-2	Section–VI B	9.9.13(e)	Dynamic (time of day)	Deleted
127.	Part-2	Section–VI B	9.9.2.7	It is the Contractor's duty to estimate the total number of Ethernet ports requested in each TER for subsystems connection and redundant backbone uplinks. In addition, spare ports shall be included for future expansion	It is the Contractor's duty to estimate the total number of Ethernet ports requested in each TER for subsystems connection and redundant backbone uplinks. In addition, the FOTS network shall be extended to all locations / rooms in stations,RSS. Contractor shall provide 2 separate ports at middle of each platform,2 ports at each entrance,2 ports in concourse area. FOTS Network shall have separate Distribution/ and access layer as required. The contractor to ensure that there should not be any single point of failure.

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128.	Part-2	Section–VI B	9.9.6(j)	9.9.6 Security Features (j) Dynamic (time of day)	9.9.6 Security Features (j) Deleted
129.	Part-2	Section–VI B	Appendix-D Telecom Lab(1)	1. Telecom Model room cum R&D Lab shall be developed for training, testing and R&D purposes	1. A separate integrated test facility including all equipment's shall be installed at Admin building of Poonamallee Depot (Offline Integration test platform/Telecom Lab and Offline Integrated Testing Lab of Signalling) for testing and training facilities
130.	Part-2	Section–VI B	Appendix-E	NETWORK MANAGEMENT ROOM REQUIREMENTS	Please refer revised Annexure-D for details
131.	Part-2	Section–VI B	GEN	Additional Item	Please refer Annexure- A for Chainage Details
132.	Part-2	Section–VI B	GEN	Additional Item	Please refer Annexure -B for Corridor 3&5 Parking Details.
133.	Part-2	Section–VI B	GEN	Additional Item	Please refer revised map and station list in Annexure - F
134.	Part-2	Section–VI B	GEN	Additional Item	Please refer Annexure- G 1.7.1 Redundancy Configuration
135.	Part-2	Section-VI C	GEN	Additional Item	Please refer Annexure - C for 1. St. Thomas Mount Station Drawings 2. Stabling Lines drawings near end of Siruseri Sipcot II Metro.
136.	Part-2	Section–VI D	25.13.13	A properly constructed and equipped first aid room shall be provided as per BOCW Central Rules 1998 to be used for treatment and rest. It should be in the charge of a person trained in first aid and should be available during all working hours.	A properly constructed and equipped first aid room shall be provided as per BOCW Central Rules 1998 to be used for treatment and rest. It should be in the charge of a person trained in first aid and should be available during all working hours. The requirement will be met by entering into an MOU with nearest hospital and provisioning of First Aid Boxes in sufficient numbers.
137.	Part-2	Section–VI D	25.13.16	Ambulance services BOCW Central Rules 1998 should be notified of the location of the site and the nature of the work to be carried out. All employees shall be made aware of the procedure for calling an ambulance during the site specific induction.	Ambulance services BOCW Central Rules 1998 should be notified of the location of the site and the nature of the work to be carried out. All employees shall be made aware of the procedure for calling an ambulance during the site specific induction. The Bidder shall be allowed to have an arrangement with Nearest Hospital through MOU for providing ambulance services on priority
138.	Part-2	Section–VI D	33.3	The contractor shall ensure the provision of a site occupational health center. This may be mobile or static however, both must be maintained in good order and complete with facilities as per the Schedule IX, Schedule-X of TBOCWR 2006	The contractor shall ensure the provision of a site occupational health center. This may be mobile or static however, both must be maintained in good order and complete with facilities as per the Schedule IX, Schedule-X of TBOCWR 2006.The requirement will be met by entering into an MOU with nearest hospital and arranging regular doctor visits.
139.	Part-2	Section–VI D	33.4	The Contractor shall establish a First Aid Base, in accordance with the Employer Requirements, at each of his principal work areas. If during the life of the contract the Contractor's principal work area moves from one location to another, the Contractor shall be required to move his First Aid Base	The Contractor shall establish a First Aid Base, in accordance with the Employer Requirements, at each of his principal work areas. If during the life of the contract the Contractor's principal work area moves from one location to another, the Contractor shall be required to move his First Aid Base. The requirement will be met by entering into an MOU with nearest hospital and provisioning of First Aid Boxes in sufficient numbers.
140.	Part-2	Section–VI D	33.5	A qualified Doctor, Nurse and assistant Nurse shall be in attendance at the first aid base during all times when work is being undertaken on the site.	A qualified Doctor, Nurse and assistant Nurse shall be in attendance at the first aid base during all times when work is being undertaken on the site. The requirement will be met by entering into an MOU with nearest hospital and arranging regular doctor visits.
141.	Part-2	Section–VI D	33.6	A fully equipped ambulance and driver shall be provided at the first aid base during all working hours. The ambulance shall be equipped with the articles specified in Schedule-IV of TBOCWR 2006.	A fully equipped ambulance and driver shall be provided at the first aid base during all working hours. The ambulance shall be equipped with the articles specified in Schedule-IV of TBOCWR 2006.The Bidder shall be allowed to have an arrangement with Nearest Hospital through MOU for providing ambulance services on priority

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142.	Part-2	Section–VI D	4.4	Note 2: Qualified Junior OHS&E Manager as per table 2 OHS&E Personnel Qualifications & Experience to be deployed at each worksite at each shift.	Clause deleted
143.	Part-2	Section–VI D	4.4.1	The Chief OHS&E Manager (Safety Manager)-Key Staff shall be a professional and experienced manager with at least fifteen (12) years' experience in the construction of underground metro rail Projects with at least 10 year's direct relevant experience in administering of OHS&E. The Chief OHS&E Manager should have minimum five years' experience in similar position of similar works .	The Chief OHS&E Manager (Safety Manager)-Key Staff shall be a professional and experienced manager with at least 8 years' experience in the construction of underground metro rail Projects with at least 4 year's direct relevant experience in administering of OHS&E. The Chief OHS&E Manager should have minimum 4 years' experience in similar position of similar works .
144.	Part-2	Section–VI D	8.3	The Contractor shall conduct weekly OSHE co-ordination meetings with his sub-contractors and Interfacing Contractors to ensure that works are carried out on Site with minimum risk to workers and to the public	The Contractor shall be responsible for weekly OSHE co-ordination meetings with his sub-contractors and Interfacing Contractors to ensure that works are carried out on Site with minimum risk to workers and to the public
145.	Part-3	Section-VIII	2.1	Cost compensation for the delay period- Hardware warranty extension cost for deferment of DNP obligations, at actuals	Cost compensation for the delay period-Hardware and Software warranty extension cost for deferment of DNP obligations, at actuals
146.	Part-3	Section-VIII	Part-A Contract Data S.No. 20	20. Repayment amortization rate of advance payment 14.2(b) 25% of each IPC amount as per GC 14.2 (b)	20. Repayment amortization rate of advance payment 14.2(b) 17% of each IPC amount as per GC 14.2 (b)
147.	Part-3	Section-VIII	Part-A contract data(S.no 5) 1.1.3.3.	Time for Completion- 1330 days from the Commencement date	Time for Completion- 1691 days from the Commencement date
148.	Part-3	Section-VIII	Part-A contract data	Table-1: Summary of Key Dates	Please refer Annexure-I for revised Summary of Key Dates
149.	Part-3	Section-VIII	Part-B Specific Provisions, PCC-69, GCC-12.4	Add the following at the end of Sub-clause 11.1: If the works or sections not available for usage by the Employer for more than 1 hour due to the Contractor's default, then the penalty of INR 25,000 shall be paid by the contractor for each hour till the works or sections made ready by him. The cumulative amount shall be deducted by the Employer from the subsequent bills submitted by contractor.	Add the following at the end of Sub-clause 11.1: If the works or sections not available for usage by the Employer for more than 1 hour due to the Contractor's default, then the penalty of INR 25,000 shall be paid by the contractor for each hour till the works or sections made ready by him. The cumulative amount shall be deducted by the Employer from the subsequent bills submitted by contractor. Maximum value of this non-performance damages shall be limited up to the value of Performance Security + Retention amount.

Enclosed:
1. Annexure A – Chainage Details
2. Annexure B – Parking details for C5-ECV-02, ECV-03
3. Annexure C – Drawings
4. Annexure D – Telecom Network Management Room
5. Annexure E – Interfaces with VAC TVS & SCADA Contractors
6. Annexure F – Revised Phase-2 Map and Updated List of Stations
7. Annexure G – Redundancy Configuration
8. Annexure H – Telephone Matrix
9. Annexure I – Summary of Key Dates

Annexure-A
Chainage details

Corridor -3					Corridor -4					Corridor -5				
			DN Line	UP Line				DN Line	UP Line				DN Line	UP Line
1	Madhavaram Milk Colony	MMC	0.000	0.000	1	Light House Metro	LIH	-79	-54	1	Madhavaram Depot Metro	MVD	765.818	783.524
2	Madhavaram High Road Metro	MHR	1685.422	1677.305	2	Kutchery Road Metro		1564	1565	2	Assissi Nagar Metro	ASI	1678.362	1696.507
3	Moolakadai Metro	MKD	2660.053	2646.036	3	Thirumayilai Metro	TML	2269	2276	3	Manjambakkam Metro	MJB	2668.118	2694.708
4	Sembiyam Metro	SMB	**3470.445**	**3462.058**	4	Alwarpet Metro	AWP	3089	3094	4	Velumurugan Nagar Metro	VMN	3469.784	3496.391
5	Perambur Market Metro	PRM	4083.543	4080.938	5	Bharathidasan Road Metro	BOS	3832	3837	5	Madhavaram Bus Terminal Metro	MBT	4295.424	4321.970
6	Perambur Metro	PRB	5053.178	5046.782	6	Boat Club Metro	BCL	5005	4993	6	Shastri Nagar Metro	SNG	5146.581	5173.118
7	Ayanavaram Metro	AYN	6058.999	6057.650	7	Nandanam Metro	SCR	6024	6001	7	Rettri Junction Metro	RJN	5934.787	5961.324
8	Otteri Metro	OTR	7260.177	7235.858	8	Panagal Park Metro	PPK	7077	7053	8	Kolathur Junction Metro	KJN	7325.406	7348.563
9	Pattalam Metro	PTL	7993.748	7988.330	9	Kodambakkam Metro	KOD	8522	8489	9	Srinivasa Nagar Metro	SVN	8512.861	8568.269
10	Perambur Barracks Road Metro	PBR	8828.026	8829.135	10	Kodambakkam Power House Metro	KPH	10314	10316	10	Villivakkam Metro	VVK	9522.800	9553.439
11	Purasaiwakkam Metro	PWK	**10257.721**	**10274.573**	11	Vadapalani Metro	SVA	11064	11064	11	Villivakkam Bus Terminus Metro	VBT	10266.655	10304.664
12	Kelleys Metro	KLY	10962.387	10967.411	12	Saligramam Metro	SAG	11740	11741	12	Villivakkam MTH Road Metro	VMR	11247.053	11265.770
13	Kilpauk Metro	SKM	11574.528	11569.545	13	Saligramam Ware House Metro	AVI	12667	12665	13	Anna Nagar	ANW	12453.074	12484.620
14	Chetpet Metro	CHP	12409.939	12396.313	14	Alwarthiru Nagar Metro	ALT	13601	13604	14	Thirumangalam Junction Metro	TMJ	13457.914	13489.675
15	Sterling Road Metro	SRD	**13264.222**	**13254.473**	15	Valasaravakkam Metro	VLV	14545	14547	15	Anna Nagar KV Metro	ANK	14256.603	14289.049
16	Nungambakkam Metro	NGM	14025.265	14009.555	16	Karambakkam Metro	KAR	15713	15718	16	Koyembedu Metro	KBD	**15427.329**	**15456.502**
17	Anna Flyover Metro	ANF	14644.674	14629.034	17	Alapakkam Metro	ALP	16443	16444	17	Koyembedu Market Metro	GRM	**17056**	**17056**
18	Thousand Lights Metro	STL	15745.143	15714.530	18	Porur Jn Metro	PRJ	17240	17246	18	Natesan Nagar Metro	SNB	17895	17895
19	Royapettah Metor	RPT	16797.331	16789.249	19	Porur Bypass Metro	PBP	18048	18051	19	Virugambakkam Metro	ELN	18712	18712
20	Dr Radhakrishnan Salai Metro	RKS	17862.926	17849.209	20	Thelliyaragaram Metro	THL	18978	18981	20	Mugalivakkam Metro	MUG	23855	23855
21	Mandaiveli Metro	MDV	20054.810	20049.125	21	Iyyapanthangal Metro	IYP	19740	19740	21	Ramapuram Metro	DLF	25121	25121
22	Greenways Road Metro	GWR	20986.766	20987.958	22	Kattupakkam Metro	KPM	20857	20857	22	Manapakkam Metro	SNA	26155	26155
23	Adyar Junction Metro	ADJ	22359.200	22350.049	23	Kumananchavadi Metro	KUC	21644	21645	23	Chennai Trade Centre Metro	CTC	27357	27357
24	Adyar Depot Metro	ADD	23408.775	23400.618	24	Karayanchavadi Metro	KAC	22525	22527	24	Butt Road Metro	BUT	28680	28680
25	Indira Nagar Metro	ING	24065.263	24071.330	25	Mullaithottam Metro	MUL	23512	23517	25	Aringar Anna Alandur Metro	SAL	29783	29783
26	Thiruvanmiyur Metro	TMY	24804.002	24788.208	26	Poonamallee Metro	POO	24356	24360	26	St. Thomas Mount Metro	STM	31057	31057
27	Tharamani Metro	TMN	25735.018	25722.073	27	Poonamallee Bypass Metro	POB	25779	25785	27	Adambakkam Metro	ADM	31788	31788
28	Nehru Nagar Metro	NNG	27015.072	27006.314	28	Poonamallee Depot	DPT-1			28	Vanuvampet Metro	VPT	32744	32744
29	Kandanchavadi Metro	KCH	27787.177	27778.712						29	Ullagaram Metro	PVM	33595	33595
30	Perungudi Metro	PGD	29008.490	29000.074						30	Madipakkam Metro	MPM	34536	34536
31	Thoraipakkam Metro	TPK	29735.220	29726.827						31	Kilkattalai Metro	KKT	35605	35605
32	Mettukuppam Metro	MTK	30619.738	30610.616						32	Echangadu Metro	ECG	36358	36358
33	PTC Colony Metro	PTC	31610.863	31602.420						33	Kovilambakkam Metro	KVM	37372	37372
34	Okkiyampet Metro	OKP	32450.609	32440.880						34	Vellakkal Metro	VKL	38443	38443
35	Karapakkam Metro	KRP	33305.659	33296.005						35	Medavakkam I Metro	MKR	40100	40100
36	Okkiyam Thoraipakkam Metro	OTP	34272.333	34263.067						36	Medavakkam II Metro	KGS	41168	41168
37	Sholinganallur Metro	SHN	35370.448	35369.503						37	Perumbakkam Metro	PBM	42246	42246
38	Sholinganallur Lake I Metro	SHL	36372.353	36371.108						38	Classical Tamil Institute Metro	GLH	43245	43245
39	Sholinganallur Lake II Metro	PON	37162.605	37161.318						39	Elcot Park Metro	ELT	44424	44424
40	Semmancheri I Metro	SBU	38431.114	38430.000						40	Mahavaram Depot	DPT-2		
41	Semmancheri II Metro	SEM	39817.026	39816.477										
42	Gandhi Nagar Metro	GAN	40711.856	40710.817										
43	Navallur Metro	NAV	41539.061	41537.307										
44	Siruseri Metro	SIR	42501.739	42499.755										
45	Siruseri Sipcot I Metro	SIP	43681.548	43688.225										
46	Siruseri Sipcot II Metro	SPT	44606.721	44601.086										

Note:

1.Station names to be confirmed with final List

2.In corridor-5, the inter distance between CMBT and Koyambedu Market is 711 mtrs

3.The chainages are as on date received from all DDCs, may vary after final design.

Annexure-B

CMRL Phase-2, Corridor 5, Contract Package : ECV-02 & ECV-03
Parking Nos. Available in Station entrances.

Description	Area Available		Circulation area		Parking area		Number of Parking lots			
	Entry-1	Entry-2	Entry-1	Entry-2	Entry-1	Entry-2	Entry-1		Entry-2	
ECV-02							**2W**	**4W**	**2W**	**4W**
GRAIN MARKET	176	350	44	88	115	341	37	NIL	94	NIL
SAI NAGAR BUS STOP	538	280	135	70	404	210	117	NIL	68	NIL
ELANGO NAGAR BUS STOP	200	30	50	8	150	23	60	NIL	30	NIL
MUGALIVAKKAM	380	350	95	88	285	263	150	NIL	134	NIL
DLF ITSEZ	170	0	43	0	128	0	51	NIL	45	NIL
SATHYA NAGAR	400	0	100	0	300	0	43	NIL	NIL	NIL
CTC	190	160	48	40	143	120	78	NIL	42	NIL
BUTT ROAD	0	52	0	13	0	39	50	NIL	105	NIL
ALANDUR	0	0	0	0	0	0	NA	NA	NA	NA
SAINT THOMAS MOUNT	0	0	0	0	0	0	DELETED			
ADAMBAKKAM	2500		625		1875		450	40	NA	NA
VANUVAMPET	240	100	60	25	180	75	50	NIL	50	NIL
PUZHUTHIVAKKAM	300	170	75	43	225	128	112	NIL	48	NIL
Description	**Area Available**		**Circulation area**		**Parking area**		**Number of Parking lots**			
	Entry-1	**Entry-2**	**Entry-1**	**Entry-2**	**Entry-1**	**Entry-2**	**Entry-1**		**Entry-2**	
ECV-03							**2W**	**4W**	**2W**	**4W**
MADIPAKKAM	0	126	0	32	0	95	NIL	NIL	48	NIL
KILKATTALAI							36	NIL	30	NIL
ECHANKADU	300	0	75	0	225	0	52	NIL	94	NIL
KOVILAMBAKKAM	0	270	0	68	0	203	NIL	NIL	58	NIL
VELLAKKAL	0	0	0	0	0	0	64	NIL	51	NIL
MEDAVAKKAM 1	300		75		225		98	NIL	NIL	NA
MEDAVAKKAM 11	0	0	0	0	0	0	88	NIL	52	NIL
MEDAVAKKAM JUNCTION	0	0	0	0	0	0	DELETED			
PERUMBAKKAM	150	0	38	0	113		63	NIL	36	NIL
GLOBAL HOSPITAL	230	150	58	38	173	113	36	NIL	18	NIL
ELCOT	0		0		0		NIL	NIL	NIL	NIL

Annexure – C

Please refer the link below.

Annexure C - Drawing.rar

ANNEXURE-D

APPENDIX E- NETWORK MANAGEMENT ROOM REQUIREMENTS:

Phase-2 Network Management Room Layout

Sl.No.	Equipment	Quantity	Scope			
			Hardware	Software		
				ASA-05	ASA-06	ASA-08
1	Common NMS and Common Clients for all stations (for all sub-systems)	3	ASA-06		✓	
2	PA MICROPHONE	1	ASA-06		✓	
3	TETRA NMS	1	ASA-07	ASA-07 Scope		
4	VRS PLAYBACK	1	ASA-06		✓	
5	22" MONITOR (DESK TYPE)	7	ASA-06			
6	75" MONITOR (WALL MOUNT)	1	ASA-06			
7	RACK	1	ASA-06			
8	24 PORT SWITCH	2	ASA-06		✓	
9	CBN I/O PORT	2	ASA-06		✓	
10	MOVING PEDESTAL TYPE STORAGE	2	ASA-06			
11	ALMIRAH	3	ASA-06			
12	CARD READER	1	ASA-06		✓	
13	EM LOCK	1	ASA-06		✓	
14	PUSH BUTTON	1	ASA-06		✓	
15	EMERGENCY BREAK GLASS	1	ASA-06		✓	
16	DOOR CONTACT	1	ASA-06		✓	
17	CHAIR	6	ASA-06			
18	WALL MOUNTED WHITE BOARD	1	ASA-06			
19	PRINTER	1	ASA-06		✓	
20	IP PHONE	4	ASA-06		✓	
21	OPERATOR COMPUTER (WITH INTERNET)	4	ASA-06		✓	
22	OPERATOR COMPUTER (With NMS and Clients for ASA-05/06/08 stations (for all sub-systems))	3	ASA-06			
22.1	at ASA-05 Package	1		✓		
22.2	at ASA-06 Package	1	ASA-06		✓	
22.3	at ASA-08 Package	1	ASA-06			✓
23	KVM Switch	4	ASA-06			

24	LONG SINGLE DESK	1	ASA-06			
25	SINGLE DESK	4	ASA-06			
26	WALL MOUNT SPEAKER	2	ASA-06		✓	
27	WALL MOUNT DIGITAL CLOCK	1	ASA-06		✓	
28	ACDB Panel	1	ASA-06		✓	

ANNEXURE-E

TVS/VAC & TELECOM interface details:

18.10.12 INTERFACES WITH VAC TVS & SCADA CONTRACTORS

18.10.12.1 Definitions and Scope

Specification describes the interface requirements between Telecom Contract and TVS/VAC Contract(s).

18.10.12.2 VAC TVS &SCADA Contractor shall be the Lead Contractor and Telecom Contractor shall be the Participating Contractor.

18.10.12.3 Contractors' Responsibilities

This specification outlines the Contractors' interface requirements, which are based on the Technical Studies carried out during the early stages of the Project.

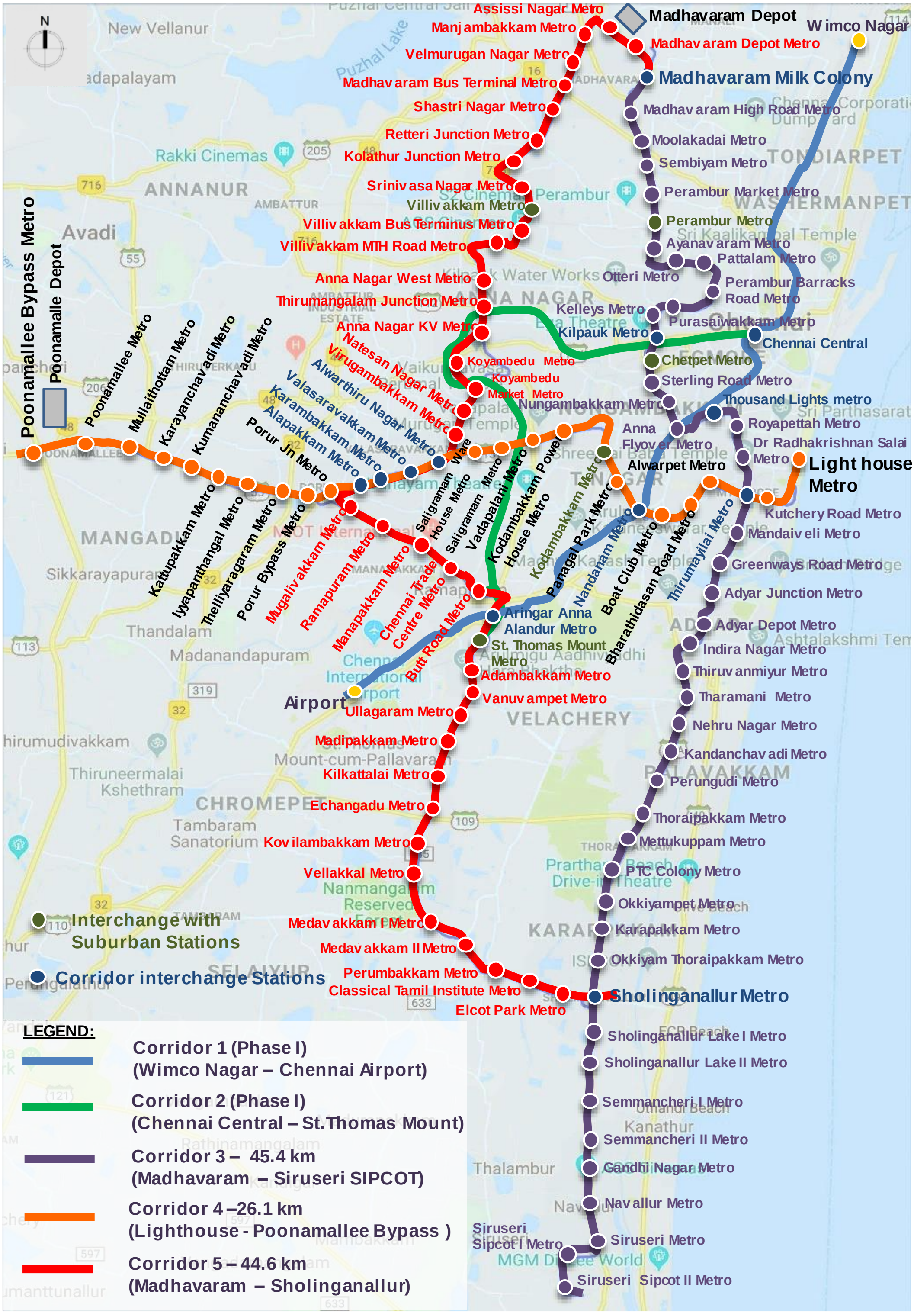
18.10.12.4 Scope of Interface & Division of Responsibilities

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

VAC TVS & SCADA (VTS) Contractor vs. TELECOM (TEL) Contractor

Item No.	Subject	Contractor A (Lead) VAC TVS & SCADA (VTS) Contractor	Contractor B (Follower) Telecom (TEL) Contractor
		Contract No. –	***Contract No. –***
Interface description brief/ Key elements (time schedule, physical, functional, ...).			
Interface related to Telecom			
Design/Construction stage			
VTS / TEL 1	VAC System Design	a) Shall collect the details of equipment heat dissipation load, number of persons and required operating temperature details of the rooms related to telecom. b) Shall check the requirement to install permanent air conditioning and/or ventilation for equipment that houses in the rooms related to telecom. c) Shall collect details related to Equipment Rack/Cabinet location layout inside the Telecom rooms to plan the ducting and FCU locations.	a) Shall provide the details as requested by the VTS contractor. b) Shall provide heat dissipation requirements and room layout to enable VTS contractor to check and install air-conditioning / ventilation for the Telecom room. c) Shall provide the Equipment Rack/Cabinet location, room layout to enable VTS Contractor to design/locate ducting, grille and FCUs.
VTS / TEL 2	ISMS System Design	a) Shall coordinate for IP detail collection for all Stations, OCC & BOCC from Contractor B. b) Shall coordinate for network synchronizing from Contractor B. c) Shall advise the details of connectivity required between Station to OCC&BOCC level and adjacent Station level for connecting the ISMS System	a) Shall provide IP detail collection for all Stations, OCC & BOCC to contractor A. b) Shall Provide network synchronizing to Contractor A. c) Shall provide the CBN (Communication Backbone Network) interface between Station to OCC&BOCC level and adjacent Station level for connecting the ISMS System.

Item No.	Subject	Contractor A (Lead) VAC TVS & SCADA (VTS) Contractor **Contract No. –**	Contractor B (Follower) Telecom (TEL) Contractor ***Contract No. –***
Interface description brief/ Key elements (time schedule, physical, functional, ...).			
		d) Station ISMS data to be shared to Telecom Contractor at station level. The same to be received at OCC&BOCC level and Adjacent Station Level through VLAN via Telecom CBN e) OCC & BOCC ISMS data to be shared to Telecom Contractor at OCC & BOCC level. The same to be received at Station Level through VLAN via Telecom CBN. f) Shall advise the characteristics of the data connection between Station PLC's for the ISMS for all underground station including OCC & BOCC for the control and monitoring arrangements g) Shall Coordinate and lay cable from Telecom switch in TER up to ISMS SCADA network switch at Station, OCC & BOCC	d) Telecom Contractor shall provide VLAN communication channel for ISMS data transfer between Station to OCC&BOCC level and adjacent Station level using CBN. And ensure the data transfer. e) Telecom Contractor shall provide VLAN communication channel for ISMS data transfer between OCC&BOCC level to Station level using CBN. And ensure the data transfer. f) Shall cater for the required band width and availability of the data connection on the Communication Back-bone Network (CBN) for meeting the inter-site connectivity requirements for the ISMS SCADA system up to the communication switches at the TER at all underground stations including OCC & BOCC, for the control and monitoring arrangements. g) Shall coordinate and monitor the same.
Testing & Commissioning Stage			
VTS / TEL 3		a) Shall conduct joint testing on VAC system in Telecom system rooms at all underground stations. b) Shall jointly test the control and monitoring arrangements of ISMS between OCC, BOCC and different stations. ISMS contractor shall show data connections in O&M Manual. c) Test report shall be jointly signed.	a) Shall attend and verify the VAC parameters such as temperature and relative humidity in Telecom system rooms at all underground stations. b) Shall attend the joint test and validate the results. Telecom contractor shall show data connections in O&M Manual. c) Test report shall be jointly signed.
Maintenance Stage			
VTS / TEL 4		Shall validate the joint maintenance procedures and test plans prepared by contractor A and periodical joint inspection between Telecom and TVS/VAC SCADA system and include the same in the TVS/VAC SCADA maintenance manual.	Finalize the joint maintenance procedures and periodical joint inspection between Telecom and TVS/VAC SCADA system and include the same in the Telecom maintenance manual.



UPDATED ROUTE MAP OF CMRL PHASE II (As on 10-05-2023)

Annexure -F

Phase -2 Stations		
	Corridor 3: Madhavaram to SIPCOT	Tender
1	Madhavaram Milk Colony	ASA-08
2	Madhavaram High Road	ASA-08
3	Moolakadai	ASA-08
4	Sembiyam	ASA-08
5	Perambur Market	ASA-08
6	Perambur Metro	ASA-08
7	Ayanavaram	ASA-08
8	Otteri	ASA-08
9	Pattalam	ASA-08
10	Perambur Barracks Road	ASA-08
11	Purasaiwakkam High Road	ASA-08
12	Kelleys	ASA-08
13	KMC	ASA-08
14	Chetpet Metro	ASA-08
15	Sterling Road Junction	ASA-08
16	Nungambakkam	ASA-08
17	Gemini Anna Flyover	ASA-08
18	Thousand Lights	ASA-08
19	Royapettah Govt. Hospital	ASA-08
20	Radhakrishnan Salai Jn	ASA-08
21	Mandaiveli	ASA-08
22	Greenways Road Metro	ASA-08
23	Adyar Junction	ASA-08
24	Adyar Depot	ASA-08
25	Indira Nagar	ASA-08
26	Thiruvanmiyur Metro	ASA-08
27	Tharamani Link Road	ASA-08
28	Nehru Nagar	ASA-08
29	Kandanchavadi	ASA-08
30	Perungudi	ASA-08
31	Thoraipakkam	ASA-08
32	Mettukuppam	ASA-08
33	PTC Colony	ASA-08
34	Okkiyampet	ASA-08
35	Karapakkam	ASA-08
36	OkkiyamThoraipakkam	ASA-08
37	Sholinganallur	ASA-08
38	Sholinganallur Lake I	ASA-06
39	Sholinganallur Lake II	ASA-06
40	Semmancheri I	ASA-06
41	Semmancheri II	ASA-06
42	Gandhi Nagar	ASA-06
43	Navallur	ASA-06
44	Siruseri	ASA-06
45	SIPCOT 1	ASA-06
46	SIPCOT 2	ASA-06

	Corridor 4: Lighthouse to Poonamallee Bypass	
1	Lighthouse	ASA-05
2	Thirumayilai Metro	ASA-05
3	Kutchery Road	ASA-05
4	Alwarpet	ASA-05
5	Bharathidasan Road	ASA-05
6	Boat Club	ASA-05
7	Nandanam	ASA-05
8	Panagal Park	ASA-05
9	Kodambakkam Metro	ASA-05
10	Kodambakkam Power House	ASA-05
11	Vadapalani	ASA-05
12	Saligramam	ASA-05
13	Avichi School	ASA-05
14	Alwarthiru Nagar	ASA-05
15	Valasaravakkam	ASA-05
16	Karabakkam	ASA-05
17	Alapakkam Junction	ASA-05
18	Porur Junction	ASA-05
19	Porur Bypass Crossing	ASA-05
20	Thelliyagaram	ASA-05
21	Iyappanthangal Bus Depot	ASA-05
22	Kattupakkam	ASA-05
23	KumananChavadi	ASA-05
24	KaryanChavadi	ASA-05
25	Mullaithottam	ASA-05
26	Poonamallee Bus Terminus	ASA-05
27	Poonamallee Bypass	ASA-05
28	Poonamallee Depot	ASA-05

	Corridor 5: Madhavaram to Sholinganallur	
1	Madhavaram Depot Metro	ASA-08
2	Assissi Nagar	ASA-08
3	Manjambakkam	ASA-08
4	Velumurugan Nagar	ASA-08
5	MMBT	ASA-08
6	Shastri Nagar	ASA-08
7	Retteri Junction	ASA-08
8	Kolathur Junction	ASA-08
9	Srinivasa Nagar	ASA-08
10	Villivakkam Metro	ASA-08
11	Villivakkam Bus Terminus	ASA-08
12	Villivakkam MTH	ASA-08
13	Anna Nagar West	ASA-08
14	Thirumangalam	ASA-08
15	Kendriya Vidyalaya	ASA-08
16	Koyambedu	ASA-08
17	Koyambedu Market Metro	ASA-06
18	Natesan Nagar	ASA-06
19	Virugambakkam	ASA-06
20	Mugalivakkam	ASA-06
21	Ramapuram	ASA-06
22	Manapakkam	ASA-06
23	CTC	ASA-06
24	Butt Road	ASA-06
25	Alandur	ASA-06
26	ST. Thomas Mount	ASA-06
27	Adambakkam	ASA-06
28	Vanuvampet	ASA-06
29	Ullagaram	ASA-06
30	Madipakkam	ASA-06
31	Kilkattalai	ASA-06
32	Echangadu	ASA-06
33	Kovilambakkam	ASA-06
34	Vellakkal	ASA-06
35	Medavakkam I	ASA-06
36	Medavakkam II	ASA-06
37	Perumbakkam	ASA-06
38	Classical Tamil Metro	ASA-06
39	ELCOT	ASA-06
40	Madavaram Depot	ASA-08

Annexure - G

1.7.1 Redundancy Architecture shall be followed as per the below requirement.

Location	Subsystem	Redundancy Configuration
OCC	CPIS (PIDS and PAS part of CPIS)	1+1
	ISMS (CCTV and ACID part of ISMS)	1+1
	MCS	1
	FOTS	1
	Telephone	1+1
	OAIT	1
	CDRS	1
	T-SCADA	1
BCC	CPIS (PIDS and PAS part of CPIS)	1+1
	ISMS (CCTV and ACID part of ISMS)	1+1
	MCS	1
	FOTS	1
	Telephone	1+1
	OAIT	1
	CDRS	1
	T-SCADA	1

Note: The requirement mentioned in this table supercedes redundant architectures mentioned in remaining all other chapters in Technical Specifications.

Annexure – H

10.4.5 Telephone Matrix

The following type of telephones shall be provided by the Contractor at the following locations:

Table 10.1

Location	Normal IP Phone	DLT	DLC	Analog (not under ASA-06 Scope) but media gateways to be provided for analog phones	Help Point Phones
Station & depot Controller	√	√			
Security Controller	√				
Office managers/Crew Controller Room	√				
All Controller positions in OCC and BCC		√	√		
Major Equipment/Plant Room	√				
Power equipment Rooms		√			
Ticket Counters/EFO	√				
All SER & TER	√				
Station platform					√
Depot and Tunnels				√	

Annexure-I

Table 1: Summary of Sections (Key Date):

Delay Damages for Non-achievement of Key Dates:

Key Date No.	Key Date Description (Sub-clause 1.1.5.6)	Time for Completion (Calendar days from Commencement date) (Sub-clause 1.1.3.3)	Associated Price Centres for the purposes of Liquidated Damages
Stage 1 –Implementation of all Telecom works at Temporary OCC & BCC including Integration (C4-ECV01&C4-ECV02)			
KD-OCC-001	Obtaining NONO for Preliminary design	60	Total of Price Centres – A1 & A2 (Proportionate cost)
KD-OCC-002	Submission of Final Design in a phased manner including temporary OCC&BCC	150	NA
KD-OCC-003	Obtaining NONO for Final Design including temporary OCC&BCC	180	Total of Price Centres – B.S1.1
KD-OCC-004	Delivery of Telecom Cables, Racks & Fixtures including temporary OCC&BCC	280	Total Price Centres B.S1.2.4, B.S1.2.11
KD-OCC-005	Delivery of Materials including temporary OCC&BCC	380	Total of Price Centres B.S1.2 excluding B.S1.2.4 & B.S1.2.11
KD-OCC-006	Completion of Installation including temporary OCC&BCC	500	70% Total of Price Centres B.S1.3 (proportionate Cost)
KD-OCC-007	Installation verification test and Partial acceptance test	560	30% of Total of Price Centres B.S1.3 (proportionate Cost)
KD-OCC-008	System Acceptance Test and Integrated Testing and commissioning of Equipment in Temporary OCC and BCC with Telecom Equipment of C4 for Stage-1 Services (Corresponding Civil Packages C4-ECV-01, C4-ECV-02, C4-DPT01) including integration and testing with Phase 1 telecom systems	650	Total of Price Centres B.S1.4.1, B.S1.4.2
KD-OCC-009	Service trials, System Readiness for CMRS Inspection and ROD Clearance	665	Sum of Price Centres B.S1.4.3, B.S1.4.5
KD-OCC-010	Issuance of Completion Certificate	672	Total of Price Centres B.S1.4.1, B.S1.4.2,B.S1.4.4
KD-OCC-011	Achieve Operational Acceptance for respective Stage's Revenue Service	1212	Price Centre BS1.4.6
Stage 2 – Completion of Telecom works for Revenue Services in Corridor-5 including integration with Temporary OCC and BCC (Corresponding Civil Packages C5-ECV02 & C5-ECV03)			
KD-S2-001	Obtaining Notice of No Objection (NONO) for Preliminary Design	60	Total of Price Centres – A1 & A2

Key Date No.	Key Date Description (Sub-clause 1.1.5.6)	Time for Completion (Calendar days from Commencement date) (Sub-clause 1.1.3.3)	Associated Price Centres for the purposes of Liquidated Damages
KD-S2-002	Obtaining Notice of No Objection (NONO) for Final Design in a phased manner	180	Total of Price Centres – C.S2.1
KD-S2-003	Delivery of all Telecom Cables, Racks & Fixtures for C5-ECV02 and C5-ECV-03 Packages according to the access dates	280	Total Price Centres CS2.2.8 & C.S2.2.15
KD-S2-004	Manufacture and Delivery of Telecommunication systems at Site for C5-ECV02 and C5-ECV03 Package - according to access dates	450	Total of Price Centres C.S2.2 excluding C.S2.2.8 & C. S2.2.15
KD-S2-005	Completion of Installation Works and testing (IVT and PAT) at Site for C5-ECV02 stations and C5-ECV03 Stations	730	Total of Price Centres CS2.3
KD-S2-006	System Acceptance Test and Integrated test and Commissioning of Equipment including interfacing & integration with temporary OCC&BCC	820	90% of Total Price Centre C.S2.4.1 & C.S2.4.2
KD-S2-007	Service trials and System Readiness for CMRS Inspection and ROD Clearance	840	Price Centre C.S2.4.3, C.S2.4.5
KD-S2-008	Issuance of Completion Certificate	847	Total of Price Centers, C.S2.4.1 ,C.S2.4.2 ,C.S2.4.4
KD-S2-009	Achieve Operational Acceptance for respective Stage's Revenue Service	1387	Price Centre C.S2.4.6
Stage 3A – Integration and Interfacing with Temporary OCC and BCC (Corresponding Civil Packages C3-EV01)			
KD-S3A-001	Obtaining Notice of No Objection (NONO) for Preliminary Design	210	Total of Price Centers – A1 & A2 (Proportionate cost)
KD-S3A-002	Submission and Obtaining Notice of No Objection (NONO) for Final Design	280	NA
KD-S3A-003	System Acceptance Test and Integrated Testing and commissioning of Equipment including interfacing & integration with temporary OCC & BCC	1020	Total of Price Centres – D1.S3A.1, D1.S3A.2
KD-S3A-004	Service trials, System readiness for CMRS Inspection, ROD Clearance and Issuance of Completion certificate	1050	Total of Price Centres – D1.S3A.3
KD-S3A-005	Achieve Operational Acceptance for respective Stage's Revenue Service	1590	Total of Price Centres – D1.S3A.4
Stage 3B – Completion of Telecom works for Revenue Services in Corridor-3 including integration with Temporary OCC and BCC. (Corresponding Civil Packages C3-ECV01)			

Key Date No.	Key Date Description (Sub-clause 1.1.5.6)	Time for Completion (Calendar days from Commencement date) (Sub-clause 1.1.3.3)	Associated Price Centres for the purposes of Liquidated Damages
KD-S3B-001	Obtaining notice of no objection for the final design of Stage 3B	350	D2.S3B.1
KD-S3B-002	Manufacture &Delivery of Telecom OFC, Data and power cables at Contractor's premises in Chennai and Manufacture & Delivery of Racks, Cabinet and fixtures and associated accessories for stations at Contractor's premises in Chennai for C3-ECV-01 stations	480	Total of Price Centres D2.S3B.2.8 & D2.S3B.2.15
KD-S3B-003	Manufacture &Delivery of all Telecom equipments at Contractor's premises in Chennai	650	Price Centre D2.S3B.2 price centres excluding D2.S3B.2.8 & D2.S3B.2.15
KD-S3B-004	Completion of Installation and testing (IVT and PAT) Works at Site for C3-ECV-01 package	950	Total of Price Centres D2.S3B.3
KD-S3B-005	System Acceptance Test and Integrated Testing and commissioning of Equipment including interfacing& integration with temporary OCC & BCC	1040	Total of Price Centres D2.S3B.4.1, D2.S3B.4.2
KD-S3B-006	Service trials, System readiness for CMRS Inspection and ROD Clearance	1060	Total of Price Centres D2.S3B.4.3, D2.S3B.4.5
KD-S3B-007	Issuance of Completion Certificate	1067	Total of Price Centre D2.S3B.4.1& D2.S3B.4.2 ,D2.S3B.4.4
KD-S3B-008	Achieve Operational Acceptance for respective Stage's Revenue Service	1607	Price Centre D2.S3B.4.6
Stage 4A –Integration & Interfacing with Temporary OCC and BCC. Shifting to permanent BCC (Corresponding Civil Packages C4 -UG02)			
KD-S4A-001	System Acceptance Test and Integrated Testing and commissioning of Equipment including interfacing & integration with temporary OCC and shifting of BCC at Nandanam Metros	800	Total of Price Centres E1.S4A.1, E1.S4A.2
KD-S4A-002	Service trials, System readiness for CMRS Inspection, ROD Clearance and Issuance of Completion certificate	830	Total of Price Centres – E1.S4A.3
KD-S4A-003	Achieve Operational Acceptance for respective Stage's Revenue Service	1370	Total of Price Centres – E1.S4A.4
Stage 4B Integration and Interfacing with OCC and BCC. Shifting to Permanent OCC (Corresponding Civil Packages C5-EV-03, C5-UG-06, C5-EV03,& C5-DPT02)			
KD-S4B-001	System Acceptance Test and Integrated Testing and commissioning of Equipment including shifting to Permanent OCC in Madhavaram and	1539	Total of Price Centres –E2.S4B.1, E2.S4B.2

Key Date No.	Key Date Description (Sub-clause 1.1.5.6)	Time for Completion (Calendar days from Commencement date) (Sub-clause 1.1.3.3)	Associated Price Centres for the purposes of Liquidated Damages
	interfacing & integration test with BCC at Nandanam Metros		
KD-S4B-002	Service trials, System readiness for CMRS Inspection, ROD Clearance and Issuance of Completion certificate	1569	Total of Price Centres – E2.S4B.3
KD-S4B-003	Achieve Operational Acceptance for respective Stage's Revenue Service	2109	Total of Price Centres – E2.S4B.4
Stage 5 Integration and Interfacing with OCC and BCC (Corresponding Civil Packages C3-UG-01, C3-UG-02)			
KD-S5-001	System Acceptance Test and Integrated Testing and Commissioning of Equipment including interfacing & integration test with OCC and BCC	1564	Total of Price Centres – F.S5.1, F.S5.2
KD-S5-002	Service trials, System readiness for CMRS Inspection, ROD Clearance and Issuance of Completion certificate	1594	Total of Price Centres – F.S5.3
KD-S5-003	Achieve Operational Acceptance for respective Stage's Revenue Service	2134	Total of Price Centres – F.S5.4
Stage 6 Integration and Interfacing with OCC and BCC (Corresponding to Civil Packages C3-UG-03)			
KD-S6-001	System Acceptance Test and Integrated Testing and commissioning of Equipment including interfacing & integration test with OCC and BCC	1549	Total of Price Centres – G.S6.1, G.S6.2
KD-S6-002	Service trials, System readiness for CMRS Inspection, ROD Clearance and Issuance of Completion certificate	1579	Total of Price Centres – G.S6.3
KD-S6-003	Achieve Operational Acceptance for respective Stage's Revenue Service	2119	Total of Price Centres – G.S6.4
Stage 7A Integration and Interfacing with OCC and BCC (Corresponding Civil Packages C3-UG-04, C3-UG-05)			
KD-S7A-001	System Acceptance Test and Integrated Testing and commissioning of Equipment including interfacing & integration test with OCC and BCC	1654	Total of Price Centres – H1.S7A.1,H1.S7A.2
KD-S7A-002	Service trials, System Readiness for CMRS Inspection and ROD Clearance	1684	Total of Price Centres – H1.S7A.3
KD-S7A-003	Issue of Completion certificate for successful OCC & BCC integration with all Stages of CMRL Phase 2	1691	Total of Price Centres – H1.S7A.1,H1.S7A.2
KD-S7A-004	Achieve Operational Acceptance for respective Stage's Revenue Service	2231	Total of Price Centres – H1.S7A.4
Stage 7B Integration and Interfacing with OCC and BCC (Corresponding Civil Packages C4 -UG-01)			
KD-S7B-001	System Acceptance Test and Integrated Testing and commissioning of Equipment including interfacing & integration with OCC and BCC	1140	Total of Price Centres – H2.S7B.1, H2.S7B.2

Key Date No.	Key Date Description (Sub-clause 1.1.5.6)	Time for Completion (Calendar days from Commencement date) (Sub-clause 1.1.3.3)	Associated Price Centres for the purposes of Liquidated Damages
KD-S7B-002	Service trials, System readiness for CMRS Inspection, ROD Clearance and Issuance of Completion certificate	1200	Total of Price Centres – H2.S7B.3
KD-S7B-003	Achieve Operational Acceptance for respective Stage's Revenue Service	1740	Total of Price Centres – H2.S7B.4

Legend: "NONO" – "Notice of No Objection" from the Engineer