

**ANNEXURES VII-3
PARTICULAR SPECIFICATION
INTERFACE MATRIX**

Annexure - 3**INTERFACE MATRIX**

INTERFACE MANAGEMENT DOCUMENTS FOR CIVIL and E&M: DEPOT, SOLAR, POWER SUPPLY, OHE, S&T, TELECOM, AFC, AND TRACK CONTRACTS OF DEPOT OF BANGALORE SUB-URBAN RAIL PROJECT.

This document describes the interface responsibilities and obligations of Civil and E&M Contractor (Depot with other system contractors like , Solar, Power Supply, OHE, S&T, Telecom,, and Track and vice versa. All the above “Contractors” have been addressed as “SYSTEM CONTRACTOR” for all interface purposes wherein any specific mention has not been done except Track Contract.

A. Interface between Depot Contractor and Traction & Power Supply Contractor

Item No	Item Description	Traction & Power Supply Contractor	Depot Contractor
1.	Installation of 132 KV, 33 KV, ETS, traction return cables and control cables (Ref item no. 6 of interface item of depot)	<p>a) Shall give the details to depot contractors for cable trenches and brackets etc. from RSS complex to ASS and various return rails in the depot area .</p> <p>b) Shall co-ordinate and provide details to Depot contractor for provision of opening and HDPE pipes of adequate size to carry the cables inside RSS, ASS/TSS, Below the tracks wherever cables are crossing the track at appropriate locations.</p>	<p>a) Shall construct cable trenches for laying the cables from RSS complex to ASS and various return rails in the depot area as per the requirement of PST contractor. Shall provide and install cable support infrastructure (metallic brackets, trays etc.) inside the trench/cable duct as per requirement.</p> <p>b) Shall provide suitable opening and HDPE pipe for carrying cables inside ASS at appropriate locations as per requirement. Shall take into consideration the bending radius of cable and concealing cables in public places (relevant places).</p>
2	Temporary Power for Installation, testing & commissioning	<p>a) Shall co-ordinate with depot contractor for provision of temporary power.</p> <p>b) Shall pay to the depot contractor for the power consumption as applicable.</p>	a) Shall provide temporary power as per requirement

Item No	Item Description	Traction & Power Supply Contractor	Depot Contractor
3.	Lighting and ventilation in Depot ASS, TSS and RS	<p>a) Shall interface with Depot Contractors for any special requirements or preferred locations of lights, fans, exhaust fans openings and other services. Shall provide heat load for HT electrical equipment inside ASS.</p> <p>b) Lighting and Ventilation requirements for Depot RSS, Depot TSS will be given by PST contractor to Depot Contractor for providing the same</p>	<p>a) Shall provide for special requirements or preferred locations of lights, fans, exhaust fans and other services. Shall design, supply and install adequate ventilation and lighting system in the ASS rooms.</p> <p>b) Lighting and ventilation in Depot ASS only will be done by Depot contractor scope.</p>
4.	Installation Of HT Cable Trays in Depot ASS.	<p>Shall interface with Depot contractor for cable trays required for HT cables inside TSS & RSS.</p> <p>Shall provide schematic layouts for the equipment inside TSS/RSS.</p> <p>Shall provide the detailed HT cable tray layout drawings.</p> <p>Shall close the opening with fire proof sealant after installation of the cables.</p> <p>All works related to RSS and depot TSS will be done by PST contractor including providing fire safety barriers for cable openings in control room buildings.</p>	<p>Shall provide and install cable trenches, cable trays, supports inside Depot ASS as per requirement. The earthing / bonding of cable trays shall be done as per drawings provided by PST contractor.</p> <p>Shall provide opening through roof/floor/walls for cables.</p>
5.	Installation of Equipments in Depot ASS, RSS and TSS (Ref item no. 8 of interface item of depot)	<p>a) Shall supply, transport and install RSS & TSS Equipments including Transformers, rectifiers, 220/33 kV Switchgear, HSCB etc as per Specifications.</p> <p>b) Shall provide equipment layout drawing for HT. Shall provide necessary details of</p>	<p>a) Shall construct ASS rooms keeping in view the specific requirements of Traction and Power Supply contractor regarding passages, door size, knock out panels, floor openings etc.</p> <p>b) Shall provide ASS room complete in all respects, including flooring, access doors, rolling shutters,</p>

Item No	Item Description	Traction & Power Supply Contractor	Depot Contractor
		<p>foundations for transformers, panels other equipment etc.</p> <p>c) Shall coordinate with Depot contractor to ensure smooth passage for carrying the equipments inside RSS & TSS.</p> <p>d) Shall coordinate with Depot contractor for suitable openings/trench in floor/roof/walls for cable.</p> <p>e) Shall coordinate for suitable approach road to RSS & TSS.</p> <p>f) Shall provide details of the rolling shutters which is adequate for pushing in the tallest equipment.</p>	<p>windows, louvers, interior finish and foundations for transformer and panels.</p> <p>c) Shall provide lifting hooks in ASS rooms as per requirements of Traction and Power Supply Contractor.</p> <p>d) Shall provide cutouts/trench in floor/roof/walls for cable entry.</p> <p>e) Shall provide suitable approach road to ASS.</p> <p>f) Shall provide the rolling shutter as per the requirement.</p>
6.	Connection (cable / bus duct) from Transformer to MDB (Ref item no.4 of interface item of depot)	a) Shall design and provide suitable terminals on the secondary side of the transformer for facilitating connection.	<p>a) Shall provide suitable openings/ducts for cable/bus duct entry.</p> <p>b) Shall design, supply, terminate and install cables/bus duct from Auxiliary transformer to MDB.</p>
7.	Protection system	<p>a) Shall design and provide all protective devices for Auxiliary Transformer protection.</p> <p>b) Shall coordinate and provide details of CTs to be installed in MDB for various protection to depot contractor.</p> <p>c) Display of Status of LV / ACB in MDB on OCC/BCC SCADA.</p> <p>d) Shall design a comprehensive protection</p>	<p>a) Shall provide and install CTs in MDB panel as per the requirement given by Power Supply contractor.</p> <p>b) Shall coordinate and provide details of protection design used for low voltage system.</p> <p>c) Shall provide potential free contacts for power SCADA connection by Traction and Power supply Contractor for display of LV ACB in MDB to OCC / BCC SCADA.</p>

Item No	Item Description	Traction & Power Supply Contractor	Depot Contractor
		system in coordination with Depot contractor.	
8.	Inter-tripping between main LV Circuit Breakers and 33 kV Feeder Circuit Breakers of the Auxiliary Transformer	a) Shall provide and connect wire for inter-tripping circuits as per requirements shown in specifications.	a) Shall provide necessary terminal details to facilitate inter-tripping.
9.	Earthing, bonding and stray current protection measures in ASS and TSS and in Depot (Ref item no. 05 of interface item of depot)	<p>a) Shall provide the earthing requirements to Depot contractor.</p> <p>b) Shall provide and connect various equipments to Earth Bus/METs inside ASS/TSS with G.I./Copper strips.</p> <p>c) Shall associate during the installation of earth mat. Shall jointly check the resistance of the earth mat after installation.</p> <p>d) All earthing, Bonding and Stray current protection measures in depot TSS.</p>	<p>a) Shall prepare the layout for earth-mat as per calculations provided and site conditions.</p> <p>b) Shall install the MET according to approved design.</p> <p>c) Shall install Earth Bus/METs (main earth terminals connected to earth mats) inside ASS to facilitate the connection of equipments.</p> <p>d) Earthing-Depot contractor need to provide METs in depot TSS for PST contractor equipment earthing.</p>
10	SCADA system	<p>a) Shall coordinate for suitable space in OCC/BCC</p> <p>b) SCADA: PST will take care of only MDB position in SCADA and not all E & M panels</p>	<p>a) Shall provide space for SCADA server room, SCADA supervisor and maintenance room</p> <p>b) Shall provide necessary potential free contacts for SCADA connection.</p>
11	Installation of OHE Mast system, in inspection bay, Repair Bay, stabling shed, interior cleaning plant and emergency equipment building	<p>a) Shall provide detailed interface drawings including the requirement of mounting plates on columns, drop arms fixed to the trusses, support for termination arrangement on beams / slabs etc.</p> <p>b) Shall supply and install bracket assemblies with fastening arrangement on</p>	<p>a) Shall realize supporting structure preparation for bracket assembly on the brackets and drop arms fixed on trusses as per drawings.</p> <p>b) Shall interface and allow installation of cable support infrastructure.</p>

Item No	Item Description	Traction & Power Supply Contractor	Depot Contractor
		columns and drop arms.	
12	Emergency Trip System (ETS) Installation	<p>a) Shall coordinate for locations of ETS in depot</p> <p>b) Shall provide ETS equipment along with foundation & support structure at appropriate locations</p> <p>c) Shall install PLC cable from nearest SCADA RTU to ETS equipment</p> <p>d) ETS : PST Contractor will indicate ETS location and install ETS.</p>	<p>a) Shall provide niche in walls or support structure to accommodate ETS equipment and emergency telephone</p> <p>b) Shall provide emergency 230V LT supply at ETS equipment location indication lamp.</p> <p>c) Shall provide cable route and install support (metallic tray, conduit etc.) for PLC cable from SCADA RTU to ETS.</p> <p>d) But 230V LT supply shall be extended by E&M contractor / Depot contractor.</p>
13	ASS, TSS and RSS building construction and coordination	<p>Shall interface for boundaries co-ordinates and fencing details.</p> <p>Shall share TSS and RSS design details like trenches, drains, cable routes etc.</p>	<p>Shall construct the ASS in depot (excluding switchyard) including lights, fans, air conditioning, Ventilation cable trays and cable trenches.</p> <p>Shall furnish boundaries co-ordinates and fencing details.</p> <p>Shall incorporate the details provided by Traction & Power Supply Contract for better connectivity of rain water drains, trenches etc.,</p>
14	Finished Ground Level	Shall request Depot contractor to provide finished ground level for cable laying purpose.	Shall provide finished ground level to Traction & Power supply contractor.
15	Track Crossing of system cables at-grade level	System contractors shall provide the requirements	<p>Shall provide sufficient no. of embedded HDPE/Hume pipes under the track formation to lay system cables.</p> <p>These pipes shall be connected to pull-pits on both side.</p>

Item No	Item Description	Traction & Power Supply Contractor	Depot Contractor
			Pull-pits shall be connected to system rooms through buried pipes/trenches.
16	Providing OCS Mast / Portal, anchors etc.	As per site condition, if there are any changes the contractor will interface with OCS contractor to further modification.	<p>Will arrange to strengthen concerned segments and provide holding down bolts (as per designs / drawings provided by OCS Contractor).</p> <p>OHE holding down bolts shall be greased and properly covered to protect the damages to bolt threads. OCS Contractor/DDC will prepare list of segments requiring strengthening, to receive OCS masts, anchors etc.</p> <p>OCS contractor/DDC will provide OHE loads to be considered for design.</p> <p>OCS Contractor shall verify OHE the location.</p>
17	Earthing and bonding arrangements.	<p>OCS Contractor/DDC shall provide designs / drawings showing arrangement of Earth terminals required to be provided on piers, pedestals, segments, parapet etc. and the extent of welding required to be done on Reinforcement bars.</p> <p>Shall design, supply and install BEC and earthing plate at ITL locations.</p> <p>Shall provide the necessary earthing connections between BEC /ITL earthing plates etc. and the earth terminals. This will include supply of cable to connect BEC and other connecting plates.</p> <p>Shall coordinate with Viaduct Contractors for verification of</p>	<p>Shall supply and provide dedicated earth bars and earth terminals according to drawings ensuring continuity of reinforcement bars. Shall provide earth terminals for connection.</p> <p>Shall coordinate with OCS Contractor for verification of earthing and bonding measures adopted in the structure, as per the recommendations in approved design.</p> <p>Pier Earthing Terminal shall be provided in between two tracks at deck level for laying of earthing connection cables from pier earth terminal to BEC.</p>

Item No	Item Description	Traction & Power Supply Contractor	Depot Contractor
		earthing and bonding measures adopted in the structure, as per the recommendations in approved design.	

B. Interface between Depot Contractor and Trackwork Contractor

Item No.	Item Description	Depot Contractor	Trackwork Contractor(s)
1	Depot Layout Drawing	Depot civil contractor shall supply detailed interface drawing of utility & depot construction. Depot contractor shall modify the depot layout based on any discrepancy notice by Track contractor.	Track Contractor shall install track based on depot layout drawing, maintaining the clearance based on interface drawing supplied by Depot civil contractor.
2	Installation of track in Workshop, Inspection Bay, Stabling Lines, Washing Plant, Blow down plant Pit lathe, Emergency team buildings and other areas of depot.	<p>Ballasted track – Prepare ground with grading and drainage, take care that all pipes and culvert crossing are laid.</p> <p>Track on Column – Shall construct the column as per requirement. of track work contractor.</p> <p>Track embedded in concrete & track on plinth I washing line.</p> <p>Prepare and provide 1st pour, 2nd pour & 3rd pour concrete in the bed.</p>	<p>Shall supply and install the track.</p> <p>Shall supply and install the track on columns including welding of special base plate to column.</p> <p>Shall supply and install track.</p> <p>Shall provide & install suitable dowel for installation of bolts/connectors by track.</p>
3		The Depot Contractor shall co-ordinate and submit drawings / showing details of cable trenches of power / control cables / Hume pipes which are to cross / laid under the track in entire depot to Track contractor.	The Track contractor shall co-ordinate review the design and drawings / showing details of cable trenches of power / control cables, / hum pipes which are to cross / laid under the track in entire depot for confirm of necessary clearances required.
4		The Depot Contractor shall submit drawings showing details of locations of High mast-lighting, Street poles, power supply distribution boards, feeder pillar boxes, fire hydrant boxes	The Track contractor review cross check drawings showing details of locations of High mast- lighting, Street light poles, power supply distribution boards, feeder pillar boxes, fire hydrant boxes which are likely to be erected near to track and confirm for

		which are likely to be erected near to track.	necessary clearances required for the track with other items of E&M works.
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C. Interfacing with Depot Civil Contractor & Rolling Stock Contractor

Item No.	Item Description	Rolling Stock Contractor	Depot Contractor
1	Design of Installation required for Rolling Stock Maintenance.	Provide rolling stock details viz wheel, bogie, brake disc, etc & the design required for design of M&P and Provisions in depot for Rolling Stock Maintenance.	To Provide civil & Electrical works as per requirement of Rolling Stock contractor.
2	Civil Works	Provide details of cast in items. The cast in items shall include any base plates fixing bolts & other for installation of equipment. Any special material required for grouting/foundation or interconnection for Installation of equipment. Make use of the finished/completed foundations as available including carrying out modifications required if any.	Construction of the pits, foundations pit drainage and other civil work required for installation of equipment/machine. Positioning and casting of cast in items supplied by Rolling Stock Contractor. Temporary/Permanent Road approach for M&P contractor.
3	Electrical works	All electrical work from connection point for electrical power supply provided by depot contractor.	Provision of electric connections as per Rolling Stock contractor requirement.
4	Temporary Power for Installation, testing & commissioning (AC single phase / 3 phase)	Shall co-ordinate with depot contractor for provision of suitable power sockets for temporary power. Shall pay to the depot contractor for the power consumption as applicable.	Shall provide temporary power as per requirement.
5		The Rolling stock contractor shall submit the details of nature, capacity, and size of rolling stock testing equipment to DEPOT Contractor for provision of adequate power supply.	The DEPOT Contractor shall coordinate with Rolling stock contractor for getting details of nature, capacity, and size of rolling stock testing equipment for provision of adequate power supply.
6		The Rolling stock contractor shall review drawings for provision of power supply distribution boxes for adequate power supply for Rolling stock testing equipment in all sheds,	The DEPOT Contractor shall Provide drawings for provision of power supply distribution boxes for adequate power supply for Rolling stock testing

		other locations of depot and advise for necessary changes for power supply requirement , if any to DEPOT Contractor.	equipment in all sheds, other locations of depot.
7		The Rolling stock contractor shall provide necessary details of requirement of Industrial type power sockets, power supply outlets for general usage other than rolling stock items in all sheds / other locations of depot to DEPOT Contractor.	The DEPOT Contractor shall coordinate with rolling stock contractor and provide necessary Industrial type power sockets, power supply outlets for general usage other than rolling stock items in all sheds / other locations of depot.
8		The Rolling stock contractor shall provide the details of earthing arrangements and earth terminals required for rolling stock testing equipment's / systems for all sheds / other locations of depot to DEPOT Contractor	The DEPOT Contractor shall coordinate with rolling stock contractor and provide the details of earthing arrangements and earth terminals required for rolling stock testing equipment / systems for all sheds / other locations of depot.
9		The Rolling stock Contractor shall provide requirement and review the design in co-ordination with DEPOTcontractor.	The DEPOT contractor shall co-ordinate with rolling stock contractor to design and provide cranes to Repair Bay, Inspection Bay and other sheds of depot as per requirement.
10		The Rolling stock Contractor shall provide requirement and review the design in co-ordination with DEPOTcontractor.	The DEPOT Contractor shall co-ordinate with rolling stock contractor to design and provide Air compressors to Repair Bay, Inspection Bay and other sheds of depot as per requirement.
11		The Rolling stock Contractor shall coordinate with DEPOTcontractor and provide the details, suitable correct capacity of overhead cranes for lifting vehicle body frames, bogies, repair bay, inspection bay, pit wheel shop, engineering training unit / shed etc and other locations of depot, Also shall provide the details of vehicle dimensions, weight including for body frame, bogie, wheels etc.	The DEPOT Contractor shall coordinate with rolling stock contractor and get the correct details, suitable correct capacity of overhead cranes lifting for vehicle body frames, bogies. Also shall incorporate all details of overhead cranes capacity wise in drawings during design stage for repair bay, inspection bay, pit wheel shop, engineering training unit / shed etc. and other locations of depot.
12		The Rolling stock contractor Shall provide necessary details of requirement of adequate air pressure / air flow to	The DEPOT Contractor Shall provide the drawings showing correct capacity of main compressor, mobile compressors as per requirement of air pressure / flow

		DEPOTcontractor for provision of correct capacity of main compressor, mobile compressors at repair bay ,inspection bay and at other locations of depot ,as required	etc at repair bay, inspection bay and at other locations of depot, as required.
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D. Interfacing with Depot contractor & M&P contractor

Item No.	Item Description	M & P contractor	Depot Contractor
1	Design of installation of Machine & plant	Supply of detailed interface GA drawings including detail foundations, drain point and other civil works, electrical power requirement, etc.	To Provide civil & electrical work as per requirement of machine supplier for execution of work by M&P contractor.
2	Civil work	Supply of cast in items. The cast in item shall include any base plate fixing bolt & other for installation of equipment.	Construction of the pit's foundations pit drainage and other civil work required for equipment / machine. Positioning and casting of cast in items supplied by the machinery supplier. Temporary Permanent Road approach for M&P contractor.
3	Electrical Works	All electrical work from power supply point to equipment/machinery for electric power supply provided by depot contractor. Provide Work completion certificate conforming to statutory requirements to certify that the installation of the electrical system as installed under contracts meets the requirement of the local authority.	Provision of electric power supply point as per machinery supplier requirements.
4	Temporary Power for installation, testing & commissioning (AC single phase / 3 phase)	a) Shall pay to the depot contractor for the power consumption as applicable.	a) Shall provide temporary power as per requirements

5	Water supply & drainage	Requirement of water supply and effluent discharge.	To provide water supply and drainage point connection as per requirement furnished by equipment supplier.
6	Construction of simulator room	<p>a) provide detailed interface drawing and G.A. drawing of simulator room.</p> <p>b) Any other requirements for modelling of driving cab simulator, to improve driving technique/facility.</p>	<p>a) Provision of power supply point/spare for driving cab simulator as per simulator contractor.</p> <p>b) Any other power requirement. Space required by the driving cab simulator contractor in connection accommodating simulator equipment shall be provided.</p>
7		The M&P contractor shall provide the drawing of M&P equipment layout of all sheds & other locations of depot showing locations of M&P equipment for installation of cable trays, cable ducts for arrangement of power supply to all M&P items by DEPOT Contractor.	The DEPOT Contractor shall provide detailed drawings of all sheds & other locations of depot showing Cable routing, cable trays, cable ducts for arrangement of power supply to all M&P items.
8		The M&P contractor shall coordinate with DEPOT Contractor and shall provide drawings / equipment layouts indicating the details of nature, size / capacity of M&P equipment with electrical load details for arrangement of Incoming power supply to all M&P equipment of all sheds, other location of depot by DEPOT Contractor.	The DEPOT Contractor shall provide the Incoming power supply to M&P equipment's as per electrical load details, size, capacity of M&P equipment of all sheds / other locations of depot in coordination with M&P contractor.
9		The M&P contractor shall provide the required drawings, Equipment layouts of M&P items to DEPOT Contractor for proper earthing to M&P equipment of all sheds /other locations of depot.	The DEPOT Contractor shall coordinate with M&P contractor and provide the details of earthing arrangements and earth terminals required for M&P equipment's / Systems for all sheds / other locations of depot.

10		The M&P contractor shall coordinate with DEPOT Contractor for provision necessary Industrial type power pockets, power supply outlets for general usage other than M&P items in all sheds / other locations of depot.	The DEPOT Contractor shall coordinate with M&P contractor and provide necessary Industrial type power sockets, power supply outlets for general usage other than M&P items in all sheds / other locations of depot.
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E. Interface with Depot Civil Contractor and Lift Contractor

Item No.	Item Description	Depot Civil Contractor	Lift Contractor
1	Electrical and control requirements	<p>Design: Electrical power and Control Interfaces matching all the requirements of Lifts contractor.</p> <p>Produce depot Buildings CSD with inputs from Lifts contractor.</p> <p>Construction: Provide three phase power with dual earth near Lifts as specified by Lifts contractor. termination and MCCB and ELCB are to be provided by the Lifts Contractor.</p> <p>Provide cable tray conduit / trunking from Lifts controller However, to DCC/OCC/BAS for data cable.</p> <p>Provide cable tray conduit / trunking for Lift inter-communication between the Lift Car, main control cubicle and DCC/OCC.</p> <p>Provide earthing in lift shaft as per the requirements given by Lifts contractor.</p> <p>Provide EPS power to lift as per requirements of lift contractor and connect to</p>	<p>Provide E&M Contractor with all details of electrical loads (normal and EPS) and earthing requirements.</p> <p>Provide data cable for control to DCC/OCC.</p> <p>Provide all lift operations cabling within Lift shaft.</p> <p>Contractor shall provide a Lift inter-communication between the Lift Car, main control cubicle and DCC/OCC.</p> <p>To provide MCCB and ELCB as per requirement of Lifts.</p> <p>Provide Shaft lighting, power sockets inside the Lift shaft</p>

		MCCB (installed by Lift contractor)	
2	Fire protection requirements	Provide Lift Shaft with Fire protection measures	Co-ordinate fire safety requirement with firefighting systems
3	Remote monitoring of lift operating status and faults by Station BAS in SCR	To collect from Lifts contractor the operating status of lift, faults and equipment condition signals and provide the visual indications and audible alarms accordingly at the BAS monitoring panel.	To provide to BAS lift operating status and faults
4	Cable Containment and Cabling	Provide the conduits from the Lift shaft to the DCC/OCC from lift control panel.	<p>The Lift Contractor shall provide cabling from Lift to Interface Terminal Block in DCC/OCC.</p> <p>The Lift Contractor shall connect the contacts with wires and terminate the data cable at the terminals in the DCC/OCC.</p>
5	Parking / Non parking for Normal activation and deactivation and in case of Fire/Smoke	<p>Depot Civil Contractor shall coordinate and provide necessary fire alarm signals to lift panel.</p> <p>Depot Civil Contractor shall provide smoke/multi-sensor detector in Lift lobby and provide its inputs to lift control panel</p>	<p>Upon receipt of general fire alarm signal the system should activate the parking on for lift.</p> <p>Send the lift to the alternative floor (a nominated floor) when a smoke/multi-sensor detector is activated at the lift lobby (at the primary designated floor) The primary designated floor will be lower floor in depot building</p>
6	Installation of seals in openings	<p>Depot Civil Contractor shall install fire barrier seal and/or waterproof sealing (when penetration is through a fire rated wall/barrier) between cable and sleeve and between sleeve and opening after each opening is confirmed ready for sealing by Lifts contractor.</p> <p>Any opening larger than the SEM provision shall be filled by Depot Civil Contractor.</p>	<p>Lift Contractor shall install a cable sleeve on every entry/penetration in openings in walls/floors/ceilings.</p> <p>The Lift Contractor shall certify the cabling is completed and cables tested before requesting Depot Civil Contractor to seal opening</p>

7	CCTV and PA provisions	Depot Civil Contractor to coordinate with (S&T contractor) and with Lift contractor for requirements for installation of CCTV camera and PA speaker.	Coordinate with Depot Civil Contractor (and S&T) contractors for requirements.
8	Provision of Lift Shaft	Construct Lift Shaft as per the design with pedestal at the bottom of lift shaft for installing Lift buffers. Provide Lifting hooks (unless LIFTS contractor does not require)	Shall provide requirements and Coordinate
9	Finishes and aesthetics	Making good and complete floor finishes up to edge of landing sill. Making good and complete wall finishes around lift landing architraves. Sealing of gaps around lift landing architraves. Making good and complete	Install lift landing sill and sill supports Install lift landing architraves Install lift landing fixtures Including call panel, landing indication panel etc. Install lift landing control post c/w cable conduit into lift shaft
10	To enable the Lift contractor to set out their level	To establish datum level and grid reference, which shall be marked at the landing of each floor level or elsewhere as agreed	To collect datum level & grid reference marking near the landing of each floor
11	Installation of lift maintenance access panel, finishes and aesthetics	Install lift maintenance access panel, making good and complete wall finishes around maintenance access panel	Install back box and lift control panel behind the maintenance access panel
12	Access path & temporary storage during construction phase	Depot Civil contractor shall ensure and provide information for clear access path as per Lifts requirements. Depot Civil contractor shall provide temporary storage at depot as per Lifts requirements	Lifts contractor to provide delivery route drawings Lifts contractor to co-ordinate with Depot Civil contractor
13	Lift pit drain sump	Drainage sump in the lift pits shall be provided by depot civil contractor on the ground	The requirement of water sump in the Lift pits for such Lifts shall

		level or below the ground level. Civil contractor shall co-ordinate with the lift contractor	be co-ordinated with the depot civil contractor
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F: Interface with Depot Contractor and S&T Contractor

Item No.	Subject	Depot Detail Design Contractor	Depot Contractor	S&T Contractor responsibilities
1	Layout of rooms at the depot – Signalling Equipment Room, UPS Room, Central Equipment Room, Signal Maintenance Room and rooms for OCC/BCC, TER etc.	Prepare and furnish drawings incorporating room requirements and routing of cable ducts/cable tray.	<p>Rooms complete with structures, false flooring, false ceiling if necessary, finishes, fire protection, doors, lighting fixtures, air conditioning & ventilation, and power sockets. Provide cable ducts/cable trays/raceway containment/trench for carrying the cables between the OCC/BCC, DCC, CER, SER, TER and other S & T rooms in Depot.</p> <p>Provide suitable structural opening, cut-out and HDPE pipe for carrying cables at appropriate locations as per requirement.</p> <p>Construction : Construct the cable duct in the UPS Room as per the drawings finalised during the Interface.</p>	<p>Design: Furnish size of the equipment of S&T equipment room to the DDC / Depot Contractor. within the coordination with one another.</p> <p>Mark cable trays on the drawings in close coordination with the Detailed Design Contractor / Depot Contractor. Review design with the design contractor. Co-ordinate closely with construction contractor to ensure the requirement at the area are met.</p> <p>Construction : Construct all cable trays, risers etc required for S&T Systems.</p> <p>Provide equipment foundations/Pedestals.</p> <p>Install all S&T equipment, cables etc. Seal the gaps after cable installation work with fire resistant material.</p>
2	Track side equipment & Cabling	Design the concrete duct / duct banks and man holes. Building & Civil works for main signalling cables throughout the depot.	Cable ducts / duct bank for main signalling cables throughout the	<p>Design Review:</p> <p>Mark the requirement of the cable ducts / duct bank</p>

	infrastructure for S&T at Depot	<p>Fibre optic cables shall have route diversity.</p> <p>Design details to be worked out in interface with S&T design requirements.</p> <p>Provision of space for line side equipment.</p>	depot with separation from the Power / E&M cables. Cross track and cable ducts for main cables.	<p>for all cables including track/road crossings for Signalling, OFC cables throughout the Depot area.</p> <p>Furnish and confirm sizes and bending radius of trays, hangers, main cable duct and cross track cable ducts for main cables in close coordination with the civil design and/or construction contractor.</p> <p>Furnish and review requirements of EMC separation for cabling.</p> <p>Review the design from detailed design consultant.</p> <p>Construction: Provide all other secondary ducts/crossings, etc. for S&T .</p> <p>Install cables for all S&T systems including provision of all cable supports.</p>
3	Test track	Design / demarcation of Cable duct by the side of the Test Track for installation of S&T gears.	Construction of Cable duct by the side of the Test Track for installation of S&T gears.	The S&T Contractor shall coordinate with the Depot Contractor / DDC for Construction of Cable duct by the side of the Test Track for installation of S&T gears.
4	Provision of Earthing equipment in rooms of Depot Control Centre, OCC/BCC, Signalling Equipment Room, UPS/Battery Room. Central Equipment Room, Signal	Design earth bus at all units in S&T Room.	<p>Earth bus bar < 1 ohm inside S&T Rooms.</p> <p>Shall install the earth pits and earthing system, with separate mat for clean earth and main earth according to approved drawings.</p>	Furnish requirement for clean earth and Main Earth Terminals. Review design with the design contractor and co-ordinate with construction contractor.

	Maintenance Room, TER & other S & T rooms in Depot		Shall install Earth Bus MET's (main earth terminals connected to earth) as required and earth mat connection to facilitate the connection of equipment by S&T Contractor.	
5	Provision of earthing for S&T equipment in outdoor depot area	Provide space as requested by S&T contractor.		Construction: Design earthing topology, set up earth mat and cables to meet earthing requirement. (Rails will not be used)
6	Marking of track circuited and non-track circuited area	N/A	N/A	N/A
7	Power supply source (AC single phase / 3 phase)	Design: Furnish details of normal and standby power supply for the S&T installations. Provision shall be made for redundant feeder cable of requisite capacity between the main electrical room and S&T-UPS room with change over arrangement. Design details to be worked out in interface with S&T Contractor.	Construction: 3 phase AC power supply from alternative sources.	Design: Furnish details of complete load for S&T Systems. Review design with the design contractor and co-ordinate with construction contractor.
8	Temporary Power for installation & commissioning (AC single phase / 3 phase)		Shall provide temporary power as per requirement.	Shall pay to the depot contractor for the power consumption as applicable
9	Communication Tower	Mark the Location for the Communication Tower (TETRA / LTE / 5G)	Construct the foundation for the Communication Tower as per the Design.	Coordinate with the Civil Construction Contractor for the provision of foundation of Communication Tower and erect the same.

BETWEEN CIVIL AND OHE/OCS CONTRACTOR			
S. No.	Item Description	Role of DDC / Civil Contractor	Role of OHE Contractor
1.	Support for OHE from platform shed roof trusses	The Contractor will provide the necessary steelwork and bolt-holes etc. at designed height to enable the suspension members to be supported from the platform shed roof trusses.	OCS Contractor will provide general arrangement showing suspension members from ceiling of Depot buildings, from which OCS can be supported. OCS Contractor will also indicate typical bending moment and direct load arising from OCS at suspension points. OCS Contractor will prepare detailed drawings for support of OCS from suspension members.
2.	Warning and indicator boards	Shall provide suitable fixings arrangements for indicator boards in station areas as per requirements of OCS.	Shall coordinate and inform locations of OCS warning and indicator boards. Shall furnish the relevant drawings. Shall review the fixing arrangement. Shall supply and install all warning and indicator boards.
3.	Providing OCS Mast / Portal, anchors etc.	Will arrange to strengthen concerned segments and provide holding down bolts (as per designs / drawings provided by OCS Contractor). OHE holding down bolts shall be greased and properly covered to protect the damages to bolt threads. As per site condition, if there are any changes in Depot, Depot contractor will interface with OCS contractor to further modification.	OCS Contractor/DDC will prepare list of details requiring strengthening, to receive OCS masts, anchors etc. OCS contractor/DDC will provide OHE loads to be considered for design. OCS Contractor shall verify OHE the location.
4.	Earthing and bonding arrangements	Shall supply and provide dedicated earth bars and earth terminals according to drawings ensuring continuity of reinforcement bars of any steel structures. Shall provide earth terminals for connection. Shall coordinate with OCS Contractor for verification of earthing and bonding measures adopted in the structure, as per the recommendations in approved design. Pier Earthing Terminal for Viaduct piers Shall be provided in between two tracks for laying of earthing connection cables from pier earth terminal to BEC.	OCS Contractor/DDC shall provide designs / drawings showing arrangement of Earth terminals required to be provided on Steel structures etc. and the extent of welding required to be done on Reinforcement bars. Shall design, supply and install BEC and earthing plate at ITL locations. Shall provide the necessary earthing connections between BEC /ITL earthing plates etc. and the earth terminals. This will include supply of cable to connect BEC and other connecting plates. Shall coordinate with Depot Contractors for verification of earthing and bonding measures adopted in the structure, as per the recommendations in approved design.