MUMBAI METRO RAIL CORPORATION LTD (MMRC)

***Please also refer published Addendum no.1 dt. 14/02/2017, Addendum no.2 dt. 22/02/2017 & Addendum no.3 dt. 08/03/2017 & addendum no.4 dt. 17/03/2017**

Name of work:- Construction of the Depot cum Workshop Buildings, Metro station building, sub-way, earthwork and all associated works at Aarey colony, for the Mumbai Metro Line -3 Project "

Addendum no.5 dt. 03/04/2017

S. N.	Reference clause & description	Existing content to be deleted	To be replaced as
1	SN 11 of Addendum no.1, Vol 1 NIT Subclause 1.1.10 (II)Earnest Money	**ii. Earnest Money Deposit / Tender Security** :- Earnest money deposit for this work will be Rs. 3,40,35,000/- only.The Tenderer shall submit with his Tender a Tender Security for the sum mentioned in NIT in the following forms: a. An amount of INR 1,00,000 (Rupees one Lac) Through RTGS/NEFT/Net Banking/Credit card/Debit Card; b.For the balance Tender Security, Irrevocable bank guarantee issued by a Scheduled Commercial Bank (including Scheduled Commercial Foreign Banks) in India in the form given in Annexure 6 to these Instruction to Tenderers (ITT). In case of joint venture or consortium, the Bank Guarantee for Tender Security shall be from JV/consortium and not from individual members, or an irrevocable Letter of Credit, or a Demand Draft / Pay Order / Bank Draft in favour of Mumbai Metro Rail Corporation Ltd. payable at Mumbai from a Scheduled Commercial bank based in India or Fixed Deposit receipt of a Scheduled Commercial Bank / post office based in India duly pledged in faour of Mumbai Metro Rail Corporation Ltd. The Tender Security shall remain valid for a period of 56 days beyond the validity period for the tender. The tenderer shall upload scanned copy of the Tender Security as part of Envelope A on the online MMRDA e-tendering portal only. The bidder shall submit the original Tender Security, two days before the Date of opening of Envelope A, up to 15.00 hrs at the office of the Chief Project Manager-5, MMRC Ltd. Plot No. 13, NaMTTRI Building, E-Block,Bandra Kurla Complex Bandra –East, Mumbai-400051, India	**ii. Earnest Money Deposit / Tender Security** :- Earnest money deposit for this work will be Rs. 3,40,35,000/- only. In case of joint venture/consortia, EMD shall be from joint venture/consortia and not from individual members. EMD can be paid by using two Mode of Payment: a) Online payment gateway (i.e. Debit Card/Credit Card/Net-Banking) b) RTGS / NEFT mode using the System Generated Unique Challan (Account No for EMD transaction for this particular Tender is mentioned in the Challan) Payment procedure for NEFT/RTGS: EMD Payment as mentioned above has to be made through RTGS / NEFT mode using the System Generated Challan. Bidders should ensure that the payment of the EMD is made at-least 5 working days prior to the last date of Bid Preparation and Submission of the Tender Schedule to have seamless submission. Bidders need to upload scanned copy of EMD paid receipt during bid preparation. Bidders failing to complete the payment of EMD using the above mentioned process of RTGS /NEFT or Online payment gateway after downloading the system generated challan will not be able to submit their bids. EMD Refund: Bidders should mention the beneficiary details for EMD refund in the Earnest Money Deposit Form for fields marked as details required for Refund. MMRDA or e-Tendering Service Provider will not be liable for delays caused in EMD refund due to incorrect beneficiary details. The earnest money deposit of unsuccessful bidders will be refunded either physically by cheque/pay order or through RTGS, NEFT mode only after finalization of the tender for which the above refund details are required. Bidders should also upload scanned copy of cancelled cheque along with refund letter for refund of their EMD payment. In case of successful bidder, amount of the earnest money deposit may be transferred towards part of the security deposit to be paid after the award of the work, if he intends to do so in writing. Kindly note that transfer of funds to MMRDA's account through NEFT / RTGS mode, from the Bidders' ICICI accounts is currently not possible. In case of funds transfer through NEFT / RTGS, Bidders are requested to transfer from any other bank (excluding ICICI Bank). • EMD Refund Account should remain active until tender is awarded. • EMD Refund will happen only after Awarding or Cancellation of tenders. *Note: i) The entire EMD amount shall have to be paid in single amount as the system will not accept multiple part payments otherwise the bid shall be rejected. ii) If any bidder has already paid Rs. 1,00,000/- amount, the same will be refunded in due course.

Addendum no.5 dt. 03/04/2017			
S. N.	**Reference clause & description**	**Existing content to be deleted**	**To be replaced as**
2	Vol 1 Sec II ITT Clause no-C18.1	Earnest Money for the sum mentioned in NIT shall be submitted in any one of the following forms: (a) Demand Draft / Pay Order / Bank Draft in favour of Mumbai Metro Rail Corporation Ltd. payable at Mumbai , from a Nationalized bank based in India, (b) Fixed Deposit Receipt (FDR) of a Scheduled Commercial bank / Post office based in India duly pledged in favour of Mumbai Metro Rail Corporation Ltd. In case of joint venture/consortia, FDR for EMD shall be in the name of joint venture/consortia and not in name of individual members. The EMD shall remain valid up to 240 days from the date of tender.	Earnest Money for the sum mentioned in NIT shall be submitted through RTGS/NEFT/Debit Card/Credit Card/Net-Banking: In case of joint venture/consortia, EMD shall be from joint venture/consortia and not from individual members.
3	Vol 1 Sec II ITT Annexure -6 Form of Bank Guarantee for tender security	Annexure-6 [As per clause C18.1] FORM OF BANK GUARANTEE FOR TENDER SECURITY	Deleted
4	SN 4 of Addendum no.3, Vol 1 Sec I NIT Sub Clause 1.1.3.2 (A) Work Experience	**A. Work Experience:** The bidders will be considered to qualify only if they have completed work(s) during last 10 years ending 31.03.2016 as given below: (i) At least one work of similar nature* of value of INR 272 crores or more. If the above work of INR 272 crores has been done by the foreign partner of JV and the work was done in the country of origin of the foreign partner then in addition to this, the foreign partner must have done works equal to INR 136 crores outside the country of origin of the foreign partner. OR (ii) Two works of similar nature*each of value of INR 170 crores or more, If the above works of INR 170 crores each have been done by the foreign partner of JV and the work was done in the country of origin of the foreign partner then in addition to this, the foreign partner must have done works equal to INR 136 crores outside the country of origin of the foreign partner. OR (iii) Three works of similar nature* each of value of INR 136 crores or more If the above works of INR 136 crores each have been done by the foreign partner of JV and the work was done in the country of origin of the foreign partner then in addition to this, the foreign partner must have done works equal to INR 136 crores outside the country of origin of the foreign partner **Notes:** **.** Similar nature*of work would include, RCC frame structure building(s) or Metro Station or Metro Depot. **.** In case of JV/ Consortium, the lead partner besides satisfying clause 1.3.1.1.v.(iii).a must have experience of completing either RCC frame structure building(s) or Metro Station or Metro Depot.	**A. Work Experience:** The bidders will be considered to qualify only if they have completed work(s) during last 10 years ending last day of the previous month in which tender is submitted as given below: (i) At least one work of similar nature* of value of INR 272 crores or more. If the above work of INR 272 crores has been done by the foreign partner of JV and the work was done in the country of origin of the foreign partner then in addition to this, the foreign partner must have done works equal to INR 136 crores outside the country of origin of the foreign partner. OR (ii) Two works of similar nature*each of value of INR 170 crores or more, If the above works of INR 170 crores each have been done by the foreign partner of JV and the work was done in the country of origin of the foreign partner then in addition to this, the foreign partner must have done works equal to INR 136 crores outside the country of origin of the foreign partner. OR (iii) Three works of similar nature* each of value of INR 136 crores or more If the above works of INR 136 crores each have been done by the foreign partner of JV and the work was done in the country of origin of the foreign partner then in addition to this, the foreign partner must have done works equal to INR 136 crores outside the country of origin of the foreign partner **Notes:** Similar nature* of work would include RCC frame structure building (s) or Metro Station or Metro Depot or a combination there of.

Addendum no.5 dt. 03/04/2017			
S. N.	**Reference clause & description**	**Existing content to be deleted**	**To be replaced as**
5	SN 6 of Addendum 3, Vol 1 Clause no C2.3(i) ii(a) of ITT sec-II page 17	(i) Following information shall be furnished: information related to RCC frame structure building(s) or Metro Station or Metro Depot & Industrial steel shed and Earth work. (i) Extent of participation by each member of the consortium in terms of percentage of the value of the proposed Contract. Member % of participation A B C (ii) The tenderer should supply the following information, separately for each member of the consortium. (a) Works executed of RCC frame structure building(s) or Metro Station or Metro Depot & Industrial steel shed, and Earth work ,in each year during the last 10 years (for work experience) & last 5 years upto date of submission (for key activity experience) (in Rs. equivalent/quantity units)as stipulated. (b) Value of the commitments and on-going works, on yearly basis, to be completed during the next 30 months from the first date of the month of the tender submission. Above (a) should be updated to price level of 01.04.2017 by assuming 2% inflation on foreign currency and 5% on Indian currency. The exchange rate of foreign currency shall be applicable 28 days before the date of submission	(i) Following information shall be furnished: information related to RCC frame structure building(s) or Metro Station or Metro Depot & Industrial steel shed and Earth work. (i) Extent of participation by each member of the consortium in terms of percentage of the value of the proposed Contract. Member % of participation A B C (ii) The tenderer should supply the following information, separately for each member of the consortium. (a) Works executed of RCC frame structure building(s) or Metro Station or Metro Depot & Industrial steel shed ,and Earth work ,in each year during the last 10 years ending last day of the previous month in which tender is submitted (for work experience) & last 5 years up to date of submission(for key activity experience) in Rs equivalent/quantity units as stipulated (b) Value of the commitments and on-going works, on yearly basis, to be completed during the next 30 months from the first date of the month of the tender submission. Above (a) should be updated to price level of 01.04.2017 by assuming 2% inflation on foreign currency and 5% on Indian currency. The exchange rate of foreign currency shall be applicable 28 days before the date of submission
6	Vol 1 of NIT Sub Clause 1.1.2.1 The Project	The Project Mumbai Metro Line 3 (MML3) shall require a dedicated Depot-cum-Workshop facility for catering to operational & maintenance requirement of its fleet of 35 Rakes of 8 cars each. The proposed Depot is located over a plot of area of about 30.2 hectare at Aarey Colony, close to SEEPZ station of the alignment. However, the Depot is planned over an area of about 25 hectares, including ramp. Based on Operational and Maintenance Plan, Depot for MML3 project shall be implemented	The Project Mumbai Metro Line 3 (MML3) shall require a dedicated Depot-cum-Workshop facility for catering to operational & maintenance requirement of its fleet of 31 Rakes of 8 cars each. The proposed Depot is located over a plot of area of about 30.2 hectare at Aarey Colony, close to SEEPZ station of the alignment. However, the Depot is planned over an area of about 25 hectares, including ramp. Based on Operational and Maintenance Plan, Depot for MML3 project shall be implemented
7	Vol 1 of NIT Sub Clause 1.1.3.1 B .Finicial Standing	**B. Financial Standing:** The tenderers will be qualified only if they have minimum financial capabilities as below: (i) T1 – Liquidity: (ii) T2 - Profitability T3 -Net Worth: (iii) T4 - Annual Turnover:	B. Financial Standing: The tenderers will be qualified only if they have minimum financial capabilities as below: (i) T1 – Liquidity: (ii) T2 - Profitability (iii)T3 -Net Worth: (iv) T4 - Annual Turnover:
8	Vol 1 of NIT Sub Clause 1.1.3.1 B .Finicial Standing Notes	Notes: · Financial data for latest last five audited financial years has to be submitted by the tenderer in Appendix-18 of FOT along with audited balance sheets. The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature in original with membership number. In case audited balance sheet of the last financial year is not made available by the bidder, he has to submit an affidavit certifying that 'the balance sheet has actually not been audited so far'. In such a case the financial data of previous '4' audited financial years will be taken into consideration for evaluation. If audited balance sheet of any year other than the last year is not submitted, the tender may be considered as non-responsive. · Where a work is undertaken by a group, only that portion of the contract which is undertaken by the concerned applicant/member should be indicated and the remaining done by the other members of the group be excluded. This is to be substantiated with documentary evidence.	Notes: · Financial data for latest last five audited financial years has to be submitted by the tenderer in Appendix-18 of FOT along with audited balance sheets. The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature in original with membership number. In case audited balance sheet of the last financial year is not made available by the bidder, he has to submit an affidavit certifying that 'the balance sheet has actually not been audited so far'. In such a case the financial data of previous '4' audited financial years will be taken into consideration for evaluation. If audited balance sheet of any year other than the last year is not submitted, the tender may be considered as non-responsive. · Where a work is undertaken by a group, only that portion of the contract which is undertaken by the concerned applicant/member should be indicated and the remaining done by the other members of the group be excluded. This is to be substantiated with documentary evidence. · It is clarified that wherever latest last financial year/last financial year/audited financial year has been stipulated it means financial year ending 31-03-2016

Addendum no.5 dt. 03/04/2017			
S. N.	**Reference clause & description**	**Existing content to be deleted**	**To be replaced as**
9	Vol 1 of NIT Sub Clause 1.1.3.3 B .Bid Capacity Criteria Notes	Notes: Financial data for latest last five financial years has to be submitted by the tenderer in Appendix-15 of FOT along with audited financial statements. The financial data in the prescribed format shall be certified by the Chartered Accountant with his stamp and signature in original with membership num · Value of existing commitments for on-going construction works during period of 30 months w.e.f. first day of the month of submission of the tender, has to be submitted by the tenderer in Appendix-16 of FOT. These data shall be certified by the Chartered Accountant with his stamp and signature in original with membership number ·In case of a group, the above formula will be applied to each member to the extent of his proposed participation in the execution of the work .If the proposed % participation is not mentioned, then equal participation will be assumed	Notes: Financial data for latest last five financial years has to be submitted by the tenderer in Appendix-15 of FOT along with audited financial statements. The financial data in the prescribed format shall be certified by the Chartered Accountant with his stamp and signature in original with membership num · Value of existing commitments for on-going construction works during period of 30 months w.e.f. first day of the month of submission of the tender, has to be submitted by the tenderer in Appendix-16 of FOT. These data shall be certified by the Chartered Accountant with his stamp and signature in original with membership number ·In case of a group, the above formula will be applied to each member to the extent of his proposed participation in the execution of the work .If the proposed % participation is not mentioned, then equal participation will be assumed · It is clarified that wherever latest last financial year/last financial year/audited financial year has been stipulated it means financial year ending 31-03-2016
10	Vol 1 In FOT-APPENDIX 15 in Heading & Column 2	(As per clause E4.2) FINANCIAL DATA (WORK DONE DURING THE LATEST LAST FIVE FINANCIAL YEARS) & Total value of work done pertaining to audited financial statements	(As per NIT clause 1.1.3.2 B (iv)) FINANCIAL DATA (CONSTRUCTION WORK DONE DURING THE LAST FIVE FINANCIAL YEARS) & Total turnover of construction work done pertaining to audited financial statements
11	Vol 1 FOT Appendix 15A	FORM OF TENDER APPENDIX 15 A	ENTIRE FORM DELETED
12	Clause 1.1.3.1 B of NIT Page no 6	**(i) T4 - Annual Turnover:The average annual turnover from construction of last five financial years.** **should be > INR136crores.** **As given in Appendix 15 A**	**(i) T4 - Annual Turnover:The average annual turnover from construction work of last five financial years.** **should be > INR136crores.** **As given in Appendix 15**
13	Vol-1 FOT -APPENDIX 16 Heading of 10th i.e. last column	Value of work to be done in 2019-20(Ist April 2019 to 31st March 2020)	Value of work to be done in 2019-20(1st April 2019 to 30th Sept 2019)
14	Vol-1FOT -APPENDIX 17 In Heading of Table	(considering escalation as per Clause 1.1.3.2 of Notes Bullet no.3 of NIT)	(considering inflation as per Clause 1.1.3.2 A)
15	SN 24 of Addendum no.1 Vol 3 Appendix 19 System Interface Management	Appendix 19(Revised) SYSTEM INTERFACE MANAGEMENT	Appendix 19(Revision 2) SYSTEM INTERFACE MANAGEMENT

BIDDING DOCUMENTS

MUMBAI METRO LINE 3

EMPLOYER'S REQUIREMENTS

GENERAL SPECIFICATIONS

Part 2

Section VI-A

Appendix 19(Revision 2)

SYSTEM INTERFACE MANAGEMENT

January 2017

MUMBAI METRO RAIL CORPORATION LIMITED
MMRDA BUILDING,
Bandra Kurla Complex,Bandra (East),
Mumbai – 400 051, India.

MUMBAI METRO LINE 3

Part 2

Section VI-A

Appendix 19

SYSTEM INTERFACE MANAGEMENT

	Issuing entity	Discipline	Area	Document No.	Revision Index
	GCC	301	P00	1600033	H

DOCUMENT / DRAWING TECHNICAL VERIFICATION AND REVISION RECORD

PROJECT NAME	**Mumbai Metro Rail Line 3**		
***DOC / NO.**	**GCC-MMR-301-P00-1600033**	**DATE OF FIRST ISSUE**	**02-02-2016**
***DOC / TITLE**	**System Interface Management Requirement**		

REV No.	DATE OF ISSUE/REV.	DESCRIPTION	PREPARED/ DESIGNED	CHECKED	APPROVED
A	02-02-2016	First Diffusion	BDE	HFL	RJM
B	16-02-2016	Udated for RS RFP	BDE	HFL	RJM
C	18-02-2016	Official Diffusion	BDE	HFL	RJM
D	28/03/2016	Updated with Aarey Station Interface Sheet and Rolling Stock	BDE	HFL	RJM
E	06/05/2016	Attachement N Updated with all Interface Sheet with Rolling Stock	BDE	HFL	RJM
F	06/05/2016	Attachement N to be completed/Modifyed for others Contracts by Key Experts	BDE	HFL	RJM
G	30/08/2016	Attachment E and F updated	PNK	BDE	RJM
H	18/01/2017	Attachement E, F2 & M updated. Minor changes and corrections done.	PNK	BDE	RJM

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EMPLOYER'S REQUIREMENTS

DESIGN AND CONSTRUCTION INTERFACE MANAGEMENT

1. DEFINITIONS AND ABBREVIATIONS

1.1 Chief Interface Coordinator(CIC) means a suitably qualified person, assigned by a Contractor, who is the Team Leader responsible for administerating, monitoring, managing, supervising and resolving all interface issues between Interfacing Contractors for the Mumbai Metro Line 3 Project.

1.2 General Consultant Interface Manager (GCIM) means the responsible person, assigned by the PM who is the main coordinatorof all project interfaces with **RE** and contractors **CIC**. He shall coordinate the overall technical point of the project from the point of view of proper integration of a System and Civil Work in all technical and operational areas to ensure delivery of safe and coherant metro system. He shall attend coordination meetings with all project contractor's**CIC**, and communicate issues & concerns relating to coordination, approvals and systems & Civil interfaces.

1.3 Combined Services Drawings (CSD)means the drawings produced by the Civil Work Contractor, showing the locations, sizes and details of all of the Contractor's equipment, cable containment, pipes, etc. These drawings are to be used to enable all equipment, pipes, cables, etc. to be installed without conflict and to enable future changes or modifications to be performed without impacting the existing installation.

1.4 Interface means the region of interaction across the common boundary between two adjacent but separately managed and controlled parts of the Project. The coordination and management of the interaction regions is necessary to ensure that the overall scope and definition of the Project works is complete and seamless across all such boundaries.

1.5 Interfacing Contractors means any of the following whose activities or the works they are engaged to carry out in any way or at any time affect or are affected by the Works:

a. Project Contractors and design or specialist consultants engaged on the Project from time to time by the Employer, the Government of Republic of India, the Government of Maharashtra or the utility providers;
b. utility providers;
c. developers or franchisees appointed on the Project from time to time by the Employer;
d. subcontractors of any tier of the contractors within category (a) above, and contractors and subcontractors of any tier of utility providers, developers and franchisees within categories (b) and (c) above;
e. provided that the definition shall exclude the Contractor and his subcontractors of any tier in relation to the Works and in any other capacity which would otherwise fall within categories (a) to (d) above in relation to other works.

1.6 Interface Coordination Sheet (ICS) means a document produced by the Contractor which defines the integration and interfaces between his contract and the Interfacing Contractors employed on the Project.

1.7 Interface Management Programme (IMPG) means the programme produced by the Contractor, developed and updated on a quarterly basis, which describes the sequence and timing of each of the Interfacing Contractor's scope of work, and clearly describes dependencies between his Works and the work of the Interfacing Contractors.

1.8 Interface Management Plan (IMP) means the Report prepared by the Contractor, developed and updated on a quarterly basis that provides a clear description of his interfaces both sequentially and technically as specified in the Contract. The report will be reviewed in accordance with this procedure and is a pre-requisite to the PM's Notice of No Objection.

1.9 Interface Specification (IS)means the specification document developed by the Lead Contractor for the interfacing part of his project on the basis of, and by integrating into his design, the information provided by the Interfacing Contractors in accordance with the interface agreements as contained in the **ICS**. The Interface specification needs to be agreed upon by both the Lead Contractor and the Interfacing Contractor's before it is submitted to the**PM** for Notice of No Objection.

1.10 Master Interface Log (MIL) is an electronic Log of identified interfaces maintained by the Interface SupportingTeam (**IST**) in the format given in **Attachement D**, showing (among others) updated status and priority rating of each interface agreement, by its unique serial number, for the purpose of monitoring the progress of Interface agreements from inception to close-out.

1.11 Master Interface Matrix (MIM) means the document developed by the **PM**, which may be updated, and/or expanded to include additional Interfacing Contractors, by the PM as the Project progresses. The purpose of the Master Interface Matrix is to allocate which Interfacing Contractors are the lead party(s) for each contract.

1.12 Resident Engineer (RE)means the General Consultant Discipline Key Chief Resident Engineer, who is incharge of the monitor progress in interface agreements of his contractor with other interfacing contractors, on site in accordance with the IMP/IMPG and resolve interface issues which the interfacing contractors are unable to resolve among themselves. He shall identify interface issues that cannot be resolved at his level and alert the GCIM about them in the course of his day-to-day interactions with the GCIM for taking further action.He shall pursue the matter till the required information is exchanged in time.

1.13 Structural, Electrical and Mechanical Drawings (SEM) means those drawings produced by the Civil Work Contractor, showing the locations, sizes and details for all structural openings, plinths, embedments, sumps, floor chases, etc. required for the installation of all equipment, cable trays, pipes, etc.

1.14 Zone of Interface means where two or more components of the railway provided by two or more Interfacing Contractors combine to provide a single element.

Acronyms and abbreviation will appear immediately after the first time the words are used. Thereafter, only the acronyme or abbreviation will be used in the **Appendix 19** .

Acronym	Description
CIC	Chief Interface Coordinator (of the Contractor)
CSD	Combined Services Drawing
GC	General Consultant for MML3
GCIM	General Consultant Interface Manager
ICS	Interface Coordination Sheet – Monthly report
IS	Interface Specification
IST	Interface Support Team

IST TL	Interface Support Team Team Leader (Project Rail Systems Manager, a Member of the Project Management Team, discharges this function.)
IMP	Interface Management Plan
IMPG	Interface Management Programme
MIM	Master Interface Matrix
MIL	Master Interface Log
MMRC	Mumbai Metro Rail Corporation
MOM	Minute Of Meeting
PM	Project Manager as Employer's Representative
RE	Resident Engineer as Project Manager's Representative
SEM	SructuralElectical and Mechanical Drawings

2. INTRODUCTION

2.1 Interface and co-ordination of the Works will include the co-ordination of all design,technical and programming matters with the various Interfacing Contractors to achieve fully co-ordinated construction and installation of the facilities.

2.2 This **Appendix 19** describes the Contractor's responsibilities with regard to interface management and coordination with those Interfacing Contractors and who are responsible for undertaking work, which interfaces with the Contract. The Contractor's responsibility for interface coordination shall include currently defined Interfacing Contractors and those whoshall be identified in the future. This responsibility is not limited to a particular number of Interfacing Contractors.

2.3 The Contractor's responsibility for interface co-ordination shall include identification of Interfacing Contractors, subcontractors, including subcontractors within his own Contract.and those who shall be subsequently identified during the course of the Contract for whom the Contractor will need to interface and coordinate the Works. This in no way detracts from the fact that the Contractor remains solely responsible for identifying, liaising, and co-ordinating with all Interfacing Contractors in relation to the Works.

2.4 The **PM**will monitor and oversee the interface Management activities by the contractor and will specifically provide direction or information in the following circumstances.

a) When the interfacing contract has not yet been awarded

b) When common agreement cannot reached between the interfacing parties

c) When it is in the interest of the project programme, quality or safety to issue direction.

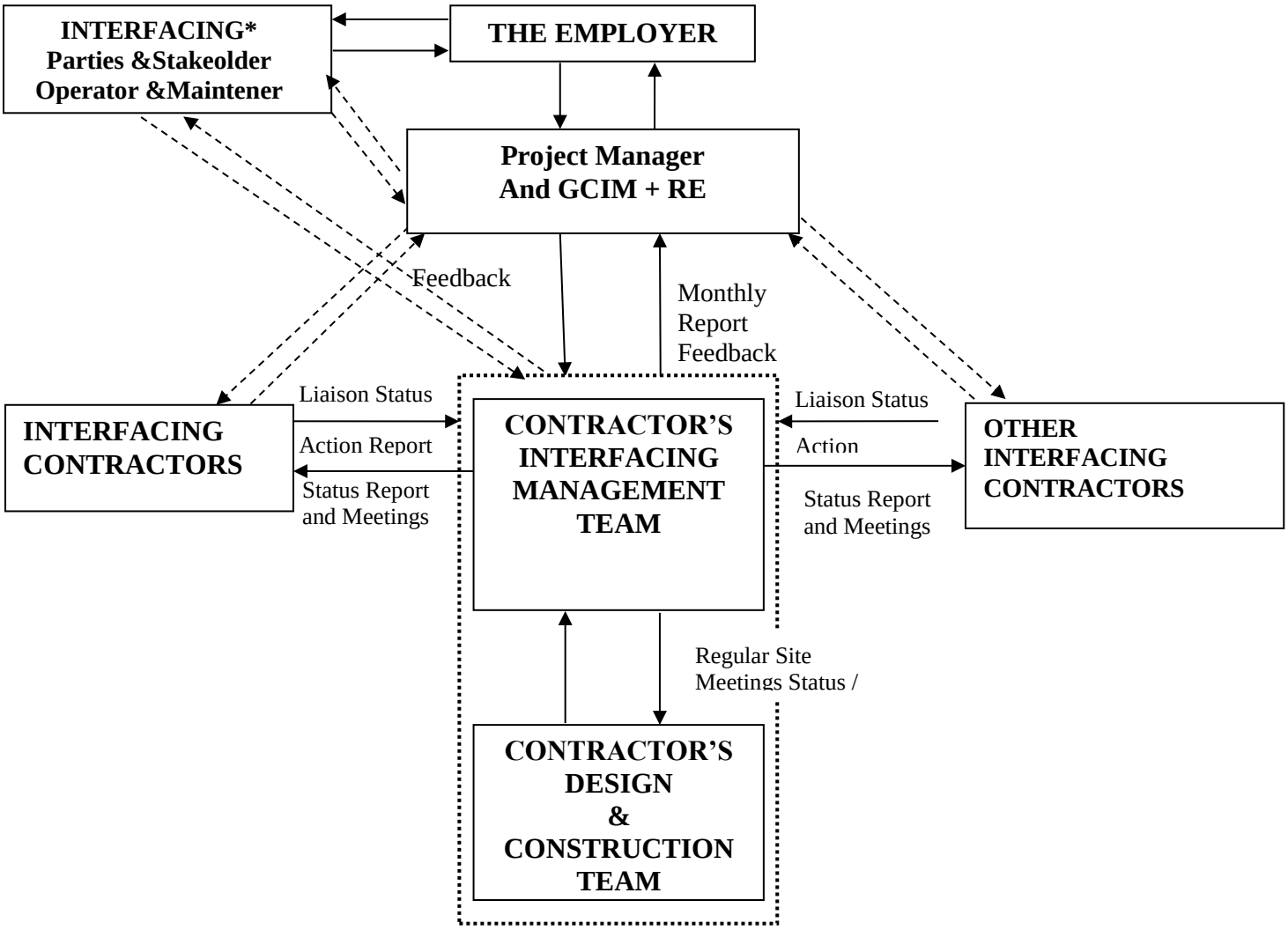
Direction or information provided by the employer representative where ever necessary, shall not in any way relieve the contractor of his full responsibility to ensure the correctness, accuracy and suitability of the interface implementation and required specification.

2.5 The Contractor shall at all times use his best endeavours to resolve all interfaces applicable to the Contract and shall be proactive in seeking out interface issues and their solutions.

2.6 The Contractor shall ensure that all of the above Interface requirements are included in his Interface Management Plan, refer to Clause 6 of this **Appendix 19**. Flow charts illustrating the process of entering into an Interface agreement/desagreement and Monitoring its progress with the help of the Interface Coordination Sheet are provided as **Attachment A**(Flowchartcreation

/elaboration of theInterface Coordination Sheet) and**Attachment B** (Flowchart for Progress Monitoring of Interface Agreement)of this **Appendix 19**. And Figure 1 gives a schematic presentation of the Interface Communication and Coordination processes between the various role-players in the Project.

2.7 The Contractor's internal sub-contractors' and suppliers' interfaces are the sole responsibility of the Contractor and are not covered in this **Appendix 19**. However, the Contractor shall co-ordinate and manage these interfaces in such a way as to identify and cater for the requirements of the Interfacing Contractors and domestic interfaces, including but not limited to, the avoidance of clashes and sequencing of Works. The Contractor shall compile an internal **IMP** for his own use, a copy of which shall be furnished to the **PM**on request at any time.



Contractor's Organisation

Figure 1 – Interface Communication and Coordination Model

INTERFACING *
Interfacing Parties could be: Utility,Telephone Operator, Water, Electricity….
Interfacing Stakeholder could be: Safety Autority, ISA, RDSO,CMRS, Fire, Police, EIG.

3. CO-ORDINATION

3.1 Contractor's Co-Ordination Responsibilities

The Contractor shall co-ordinate with the **PM** (**GCIM** and/or **RE**) and shall be required to attend meetings on issues appertaining to Government authorities and utility agencies regarding the services/facilities to be provided by them for the project.

The Contractor shall ensure that the work of all Interfacing Contractors can be carried out in accordance with the Interface Management Plan prepared by the Contractor.

3.2 Site Co-Ordination & Attendance

This Chapter 3.2 describes what the Civil Work Contractor shall do.

3.2.1. The Civil Work Contractor shall, at his own cost, provide all attendance on and co-ordination with Interfacing Contractor. The following items are not a comprehensive or exhaustive list of the co-ordination or interface attendance items to be provided for the Interfacing Contractor's use, but are intended to provide an outline of the content of amenities, services and facilities for which the Civil Work Contractor is responsible:

a) Single point of contact for meetings, actions, planning, scheduling and co-ordinating.

b) Site access

The Civil Work Contractor shall co-ordinate with the Interfacing Contractor and provide access and use of temporary access roads to and from and within the Site. The Civil Work Contractor shall co-ordinate all vehicle movements, deliveries and other activities with the Interfacing Contractor so as to ensure conflicts of use will be controlled on and around the Site.

c) Storage and Accommodation area

The Interfacing Contractor will require limited temporary site accommodation and storage areas. The Civil Work Contractor shall agree with the Interfacing Contractor access and areas for storage and temporary site accommodation prior to their commencing work on Site.

d) Work space requirement and sequence of Works

e) Shared use of Civil Work Contractor's scaffold

The Civil Work Contractor shall co-ordinate with the Interfacing Contractor and provide free use and shared access of his erected scaffolding, ladders and hoists should they be available at the time the Interfacing Contractor requires to use them. Not withstanding this requirement, the Civil Work Contractor shall at all times remain responsible for the management of safety and the maintenance of such scaffolding, ladders and landings. The Civil Work Contractor will not be required to adapt or erect access scaffolds specifically for the use of Interfacing Contractor.

If the Interfacing Contractor erects and uses his own scaffold he will be required to adhere to the Civil Work Contractor's safety rules and access routing for equipment and materials. The Civil Work Contractor shall ensure that all scaffolds of Interfacing Contractor are erected in a safe manner and are subject to permits for use issued by the Contractor.

f) Setting out control points

g) Access Openings

The Civil Work Contractor will form all penetrations and delivery openings and subsequently close them(either temporary or permanent) for access to rooms or areas for the delivery of equipment and materials.

h) The Civil Work Contractor will be required to install all temporary and permanent lifting hooks and beams shown Temporary lighting requirements 100 lux minimum.
i) Temporary power and water supplies have to be provided at agreed locations around the Site for the Interfacing Contractor's use.
j) Water tightness. All rooms and areas handed over to Interfacing Contractor shall be in a watertight condition and maintained as such.
k) Ensure all electrical supplies both temporary and permanent have the correct testing and commissioning certification.
l) Waste management and disposal
m) Appropriate protection to finishes, walls, floors, ceilings and equipment using polythene, hardboard, steel plates etc.
n) Programme agreement for mobilizing and demobilizing
o) Fire fighting and supply and maintenance of fire extinguishing equipment and devices pursuant to the Civil Work Contractor's obligations .
p) Construction interface co-ordination management of penetrations in structures, embedded and cast-in items, etc.
q) Temporary Drainage
   The Civil Work Contractor shall provide, operate and maintain all necessary temporary drainage, sumps, silt traps and sump pumps to collect and dispose of wastewater from Interfacing Contractor construction processes including installation, testing and commissioning activities.
r) Sanitation facilities
   The Civil Work Contractor shall provide all sanitation facilities and the disposal of waste. No unauthorised sanitation facility will be allowed on the Site.
s) Making good and fire stopping of penetrations
t) Lifting apparatus and hoists
   The Civil Work Contractor will be required to install all temporary and permanent lifting hooks and beams shown on the drawings and the Specification required for installation and/or maintenance purposes. The Civil Work Contractor will be responsible for the testing and labeling of all apparatus. The Civil Work Contractor will be required to make available any lifting or hoist apparatus on Site as required by the Interfacing Civil Work Contractor at agreed times and duration for their use. The Civil Work Contractor shall be responsible for the maintenance testing and operational management of hoists. The Civil Work Contractor shall make available his cranes for lifting equipment or materials for Interfacing Contractor.
u) Health and Welfare Facilities
   The Civil Work Contractor shall allow Interfacing Contractor use of his health, welfare and mess facilities, and temporary background lighting. He shall liaise with the Interfacing Contractor to determine their planned and actual manning levels and ensure that sufficient facilities are provided prior to them commencing work on Site. The facilities shall be maintained on Site until the Interfacing Contractor has completed its Works and demobilised or such earlier time as the **PM** may direct.

3.2.2. The Civil Work Contractor is deemed to have ascertained for himself the full scope of his responsibilities and obligations under the Contract in terms of attendance on and co-ordination with Interfacing Contractor and shall not be entitled to any additional payment, Cost or extension of time for completion should he have failed to do so.

3.2.3. The Civil Work Contractor shall make due allowance for providing Attendance, including power and other utilities supplies, throughout all phases of the Interfacing Contractor work including testing and commissioning and where supplies to various Interfacing Contractors need special consideration during testing and performance trials under peak load conditions.

4 INTERFACE

4.1 Co-Ordination of Contractor's Scope of Work

In accordance with the requirements of the Conditions of Contract and other specified requirements**,** the Contractor shall co-ordinate his own work with that of all Interfacing Contractors and ensure that the design, construction, installation and testing requirements of the Interfacing Contractors are incorporated into the Civil Work Contractor's co-ordinated plans, programmes and Works. The Contractor shall proactively seek out interface issues and solutions.

In addition to the Civil Work Contractor's obligations to the Interfacing Contractors contained elsewhere in the Contract, the Civil Work Contractor shall provide / handover occupation or access as required, to the Interfacing Contractors to those parts of the Works which are subject to Key Dates by the required Key Dates.

The Civil Work Contractor shall complete those parts of the Works, which are subject to Key Dates, by the required Key Dates thatare specified in the Appendix to Tender and/or **Appendix 3**of Part 2 – Employer's Requirements of this Contract. Those parts of the Works subject to Key Dates shall be completed to a state whereby any Interfacing Contractor can immediately commence his works without the need to make any change, addition or modification to the Contractor's Works.

4.2 Interfacing Contractors

4.2.1 The Interfacing Contractors will require interface and co-ordination for information, programming, drawings acceptance, handover etc. as shown on the Interface Coordination Sheet enclosed in **Attachment F** of this **Appendix 19**.

However, the Contractor should note the Interface Coordination Sheet shown herein has been compiled by the **PM**(and **GCIM**/**RE**), and is therefore given as example only.

The Contractor's responsibilities in this respect are in no means restricted by the details listed in such sheets and no warranty is given by the Employer or the **PM**that all interfaces and Interfacing Contractors have been included in such. The Contractor is to confirm and verify all of the details included in the Interface Coordination Sheets, and his review should ensure that all interfaces have been included.

The Contractor shall take overall responsibility for the Interface Coordination Sheets, which must be submitted to the **PM**(and **GCIM**/**RE**) for a notice of no objection.

4.2.2 The Master Interface Matrix (**MIM**), enclosed in **Attachment E**, assigns the Contractor which has been designated as the Lead party(s) for each interfacing contractor. The **MIM**has been developed by the **PM**(and **GCIM**), which he may update and/or expand at

any time to include additional Interfacing Contractors, and the Contractors lump sum price for Interface Management shall be deemed to include any such additional works related to interfacing.

4.2.3 The Contractor shall expand the **MIM** and the **ICS** for additional subcontractor system interfaces. Those additional subcontractors system Interfaces should include interaction areas between different systems in the same project contractor scope. In that case the Contractor shall take overall responsibility for its own **MIM** and **ICS** and shall submit the expandable **MIM** and **ICS** to the **PM** (and **GCIM**/**RE**) for approval.

4.2.4 The leading Interfacing Contractor shall be responsible for administrating, monitoring, managing, supervising and resolving all interface issues between all Interfacing Contractors. Any expansion during the course of the works should be done by the Lead Interfacing Party

4.2.5 In a situation when the Lead Contract has not yet been awarded and the Interfacing contractor has commenced work, the **PM**(and **GCIM**) will perform the coordination activities including preparation of tentative **ICS**/**IS**, with the express understanding that they may undergo changes as and when the Lead Contractor commences his work on being awarded the Contract etc.

4.2.6 Where an interfacing contract has yet to be awarded, the Lead Contractor shall proceed with the coordination activities (including preparation of **ICS** and Interface specification) as instructed by the **PM** until such time when the Interfacing Contractor is available.

4.3 Interfacing Contractors - Communications and Information Exchange

4.3.1 GENERAL

a) The Contractor shall communicate, co-ordinate and exchange information directly with the Interfacing Contractors and the Contractor shall keep the **PM**(and **GCIM**/**RE**) advised at all times. Information necessary to fulfil the Contractor's interface obligations shall be directly requested and obtained from the Interfacing Parties, and receipt acknowledged. Conversely, the Contractor shall provide directly to the Interfacing Contractors information within the Contractor's scope that is required by them.

b) All requests for information, acknowledgement of receipt of information, and any official communication between the Contractor and the Interfacing Contractors shall be made in writing, with a copy to the **PM**for his information. The **PM**(and **GCIM**/**RE**) shall be invited to attend all interface meetings between the Contractor and the Interfacing Contractors. Irrespective of whether these meetings were attended by the**PM**or not, the contractor's monthly progress report to**PM**shall invariably include the details of all interface meetings held and decisions arrived.

c) The Contractor's programme shall allow time for the availability of necessary interface information from the Interfacing Contractors and in this regard the Contractor shall, where required, proceed on a late start basis to allow adequate time for others to provide required information and thereby achieve design process compatibility.

d) The Contractor shall allow for the fact that many of the design and construction activities for the different contracts will be proceeding concurrently. In the event that certain interface information is not forthcoming at the time targeted, the Contractor shall be responsible to resolve the matter with the relevant Interfacing Contractor

without recourse to the **PM**, and where necessary develop alternative interim arrangements such that the interface informationis accommodated at a later date.

e) Definitive dates for transfer of information and particular interface actions shall be confirmed between the Contractor and the Interfacing Contractors.

4.3.2 INTERFACING FUNCTIONS

The Interfacing Contractors are responsible for, but not limited to, the following;

a) the management of Contract to Contract Interfaces as required;
b) preparing the Interface Management Plan and subsequent procedures;
c) preparing their Interface Management Programmes in accordance with this procedure and submitting these to the Interfacing Contractors for concurrence;
d) preparing the Interface Management Programmes and submitting these to the **PM**for a Notice of No Objection;
e) preparing their Interface Coordination Sheets and Interface Specifications and issuing same to the relevant Interface Contractors and **PM**;
f) Co-ordinating with the relevant Interface Contractors to establish coordinated **CSD**&**SEM** Drawings;
g) Maintaining their **ICS** updated continuously and attaching it to their Monthly Progress Report submitted to the **PM**in accordance with the requirements of the Contract and this **Appendix 19**

4.3.3 DOCUMENTATION REVIEW

The Contractor shall, as a minimum:

a) review those portions of the Specification and Drawings relevant to the interface and transmit such information to the Interfacing Contractors;
b) co-ordinate and co-operate with Interfacing Contractors on all Site related matters including, but not limited to, Site access and occupation, attendance, safety, verification of work compatibility, survey control, etc...;
c) review the interface information received and agree in writing with the Interfacing Contractors that the interface information is adequate for that stage of that activity.

4.3.4 DESIGN STAGE

The design interface is an iterative process, thus throughout the design process, the Contractor shall be responsible for coordinating his own design with Interfacing Contractors to develop interface designs in conjunction and co-operation with the designers of Interfacing Contractors. These interface designs will be monitored and have to be given Notice of no objection by the **PM**, but the Contractor shall work directly with the Interfacing Contractors to develop designs which are mutually acceptable to all parties.

The Contractor shall, immediately upon Contract Award, gather all necessary information and develop his design to a level where meaningful interaction can take place as soon as the Interfacing Contractors are available.

4.3.5 INTERFACE DESIGN CHANGE PROCESS

The Contractor shall establish an interface design change process to ensure that:

a) All proposed changes for a specific interface are reported, recorded and resolved;
b) Proposed changes are fully evaluated;
c) Internal/External communications and distribution paths are properly defined

4.3.6 CONSTRUCTION / INSTALLATION SATGE

During construction the Contractor shall, when a construction item is ready for field inspection, advise the Interfacing Contractor in advance to verify compatibility with the Interfacing Contractor's needs.

The Contractor shall:

a) advise the Interfacing Contractors in writing when the as-constructed interface-related work can be inspected, and provide the necessary Site access and occupation;
b) request in writing and obtain from the Interfacing Contractors, interface information required for that stage of the Contract;
c) agree in writing with the Interfacing Contractors on the adoption of any applicable comments on the constructed work;
d) agree that any testing and commissioning for works can be carried out in accordance with the Interface Management Plan;
e) conduct on-Site inspections of the work elements, and give comments in writing to the Interfacing Contractors;
f) agree in writing with the Interfacing Contractors that the as-constructed work meets the interface requirements.
g) Where the execution of work by Interfacing Contractors depends upon the Contractor's site management or upon information to be given by the Contractor, the Contractor shall provide the Interfacing Contractors with the required services or the correct and accurate information required to enable the Interfacing Contractors to meet thier programme for the construction or installation of their works.

4.3.7 TEST &COMMISSIONING STAGE

The Contractor shall co-ordinate all of his testing and commissioning activities with the Interfacing Contractors. Interface commissioning shall demonstrate that the delivered interface, part A of the interface, is ready and meets the interface requirements of the interface part B, and vice versa.

Successful completion of all interface commissioning shall prove its readiness for commissioning of the overall contract scope and completion of the overall Metro-rail Project, prior to handover to the Employer for their commercial operation.

4.3.8MAINTENANCE STAGE

The Contractor shall co-ordinate all of his maintenance activities with the interfacing contractors. Important interface issues, daily maintenance should be jointly identified with interfacing contractor.

4.4 Resolution of Co-Ordination Difficulties

When the Contractor identifies interface co-ordination difficulties, the Contractor shall review the pertinent points of each Interfacing Contractor to determine possible compatible solutions in terms of sequence, timing and technical details. The Contractor shall then meet with the relevant Interfacing Contractor(s) to determine solutions, which are mutually acceptable to each Interfacing Contractor and advise the **PM**.

Where an acceptable solution has not been identified, the Contractor shall advise the **PM** in writing of the problems encountered. If, in the opinion of the PM, an interface is not proceeding satisfactorily, then the **PM**will review the matter, and establish a co-ordinated plan directing the Contractor and the Interfacing Contractor(s) on the required action. In the event that no agreement can be made between the Contractor and the Interfacing Contractor(s), the **PM**shall determine the requirements to the best of his knowledge, and his determination shall be final and binding on the Contractor and the Interfacing Contractor(s).

4.5 Interface Performance

The Contractor's performance in relation to his compliance with the interface requirements under the Contract shall be assessed by the **PM**three months after the Commencement Date and thereafter at three monthly intervals. The assessment will be in the form of an audit of the Contractor's interface management system. This audit will assess the Contractor's compliance with the responsibilities delineated in this **Appendix 19**and elsewhere as related to interface management and the preparation of the Interface Management Plan (**IMP**) and Programme and other documentation and procedures associated with Interface Management and Coordination.

The Contractor will be notified of non-conformances from the audit, which will require rectification. Where, in the opinion of the **PM**, the Contractor has failed to rectify a non-conformance within a reasonable period from the date of notification, this may lead to non-payment of any lump sums, until such time as the non-conformance has been rectified to the satisfaction of the **PM**, refer sub-clause below.

The Contract allows for continuous audits of the Contractor's compliance with his Interface Management Plan and the requirements of this **Appendix 19** of Part 2 Employer's Requirements, and any extreme or continuing failures shall result in a negative audit report, which may lead to non-payment of the relevant payment item in the Preliminaries section of the Pricing Document. The decision of the **PM**in this regard shall be final.

5. CONTRACTOR'S INTERFACE MANAGEMENT SYSTEM

5.1 Interface Management System

The Contractor shall establish and maintain an Interface Management System to identify, control and monitor the interfaces of the Contract, which shall include, but not be restricted to, the following:

a) Establishment and maintenance of an Interface Management Team suitably qualified and experienced in co-ordination and interface management in relationship with the **GCIM**.
b) Provision, as one of his Key Personnel, of a Chief Interface Co-ordinator, to head the Interface Management Team, suitably qualified and experienced as noted in **Section A** of this Part 2 Employer's Requirements, with the responsibility, experience and authority to resolve interface matters in accordance with the Contract. The Chief Interface Co-ordinator (**CIC**) will develop a monitoring and reporting procedure to be implemented by his team for the duration of the Contract.
c) Implement and maintain a strict monitored control of information transfer to the Interfacing Contractors, the Employer and the **PM**utilising the official channels of communication.
d) Provide a comprehensive interface schedule of Interfacing Contractors, including specialist domestic interfaces (i.e. specialist testing and commissioning engineers) identifying all interfacing activities and timetables of events.
e) Arrange all internal and external interface meetings. The **PM**may arrange regular meetings to monitor the status of interfaces, and may require special meetings asthat are necessary to resolve specific issues. The Contractor's Interface Management Team will be required to attend such meetings. The Contractor may request assistance from the **PM**(and **GCIM**/**RE**) to arrange meetings on particular subjects.
f) Providing the **PM**(and **GCIM**/**RE**) with all information and/or details of interfaces, including copies of all correspondence and material.
g) Providing the **PM**(and **GCIM**/**RE**) with access to information for the purpose of conducting audits on the interface system and for confirming that interface co-ordination is proceeding consistently with the Project requirements.
h) Establish interface dates for information, documentation, access or works completion requirements.

5.2 Interface Management Team

The Contractor's Interface Management Team will undertake and fulfil the following tasks:

a) Provide timely interface information when requested, anticipating the information needs of the Interfacing Contractors and transmitting such information as soon as it is available.
b) Pro-actively keep the Interfacing Contractors informed of any development of the Works related to the interfaces. Communicating and co-operating with the Interfacing Contractors to identify and resolve potential interface problems.
c) Advise the Interfacing Contractors on potential problems related to the interfaces, together with proposed solutions likely to be acceptable to Interfacing Contractors and which meet the needs of the Project.
d) Arrange and/or attend meetings with the Interfacing Contractors as necessary to resolve interface issues.
e) During each stage of the Contract, the Contractor shall directly communicate and co-ordinate with Interfacing Contractors as necessary to achieve a fully co-ordinated construction/installation.

f) Contractor shall issue true records of all interface meetings, with appropriate actions and attendance lists, to all Interfacing Contractors, whether in attendance or not, and to the **PM**(and **GCIM/RE**), within 3 days of the meeting. Minutes of meetings shall be signed by all parties in attendance, signifying their agreement to the contents thereof, before being formally issued by the Contractor.

The authority and responsibilities of all personnel involved in the Interface Management Team must be clearly defined in the **IMP**.

6 .INTERFACE MANAGEMENT PLAN & INTERFACEMANAGEMENT PROGRAMME

6.1 General

The Contractor shall prepare the proposed Interface Management Plan and proposed Interface Management Programme, in accordance with **Part 2 Section VI-A clause 3.4**, this clause 6 and based on the formats noted in **Attachments H ~~and I~~**, to which the PMissues a notice of no objection. The Interface Management Plan (**IMP**) and Interface Management Programme shall completely define the Contractor's programme and methodology for interface co-ordination and management, whilst complying with all Key Dates stated in the Appendix to Tender and/or **Appendix 3**of this Part 2 Employer's Requirements.

Subsequently they shall be kept up to date and submitted on a quarterly basis to the PMfor scrutiny and notice of no objection, and a summary of the principal issues shall be included in each Monthly Progress Report. The Contractor shall note that each submission of these documents is subject to regular audits and the issue of a notice of no objection by the PM.

6.2 Interface Management Programme (IMPG)

The Interface Management Programme describes the sequencing and timing of each of the Interfacing Contractor's scope of work, clearly describing the interdependencies for all stages of the work between the Contractor's works and that of the Interfacing Contractors and complementing the Interface Management Plan, whilst complying with all Key Dates stated in the Appendix to Tender and/or **Appendix 3**of this Part 2 Employer's Requirements.

The programme shall be structured to detail each of the primary zones of interface and the principal elements of the design and of the works requiring interfacing contribution from others. This Interface Management Programme shall also be related to the Contractor's Works Programme and shall show the sequences and timing agreed with the Interfacing Contractors to the necessary degree of detail to clearly illustrate each of the interfaces to be undertaken.

Targets to receive or supply information shall also be shown, with due allowance being given for the design process of others. Information relating to Contractual Key Dates and information exchange dates shall be shown for both the Contractor and the Interfacing Contractors to demonstrate a matching of design processes.

A record of these interfaces, with current status and agreed dates for information transfer, site inspections, access, occupation, handover, etc..shall be maintained and also identified on the**ICS**, refer Clause 7 below.

Refer to **Attachment K** - Guidance Notes for the Preparation of **IMPG**

6.3 Interface Management Plan (IMP)

The Interface Management Plan is that document which describes the Contractor's interface management in terms of providing a clear description of each of the interfaces, both technically and sequentially, and represents an account of how the Contractor proposes to achieve co-ordination of the Works. The description shall completely detail the Contractor's work scope and interface with each of the Interfacing Contractors in terms of technical description, sequence and timing for each of the elements required to achieve a coordinated design. The Contractor shall demonstrate how potential interface conflicts can be eliminated by design simplification. This document is also required to demonstrate that the co-ordinated design and construction details described therein fully comply with the needs of others, and agreement in writing of these details by the Interfacing Contractors will be a pre-requisite to the **PM**issuing a notice of no objection. In this step, the **IMP** shall be submitted to the **PM** for approval with this Notice of No Objection.

Refer to **Attachment L** – Guidance Notes for the Preparation of **IMP**.

6.4 Requirements For The Interface Management Programme &Interface Management Plan

The Interface Management Programme (**IMPG**) shall be a process-driven programme in a format to be agreed with the **PM**. The **IMPG** shall incorporate the key activities from both the Interfacing Contractors' and Contractor's Works programmes that will enable the Contractor to demonstrate that any Interface is being correctly managed and will result in fully co-ordinated construction / installation of works.

The Interface Management Plan and Interface Management Programme shall:

a) Follow the outline structure, numbering system, and related procedures in a format to be agreed with the **PM**(and **GCIM/RE**).
b) Be co-ordinated with the Interfacing Contractors to ensure compatibility of interface identification and definition.
c) Comply with the Key Dates stated in the Appendix to Tender and/**or Appendix 3**of this Part 2 Section VI-A Employer's Requirements.
d) Be transmitted to the Interfacing Contractors concurrently with submittals to the PM.
e) Support the Works Programme to which the PM has given a notice of no-objection.
f) Address each zone of interface i.e. ancillary buildings, train stabling, trackwork external, trackwork internal, substations, signalling and telecommunications facilities, operation and control rooms, staff accommodation, external works etc. related to each design submission and stage of design or construction / installation.
g) List all relevant interfaces in detail, their status, and the corresponding source(s) of information.
h) Include interface information transfer dates which have been agreed by the Interfacing Contractors.
i) Accommodate comments and input required by the PM.
j) Include an account of how the interfaces are being managed.
k) Identify the latest information regarding agreements with the Interfacing Contractors and transfers of information.
l) Review and address the design, supply, installation, testing & commissioning programme of the Interfacing Contractors to ensure that the Key Dates of each contract can be achieved, and highlight any programme risks requiring management attention.
m) Identify any problems related to co-ordination with Interfacing Contractors.

6.5 Interface Specification.

6.5.1 The Interface Specification form enclosed in **Attachment C**, and associated drawings shall specify the proposed method and schedule for verifying the interface integrity, the individual equipment/system performance and the combined system performance.

The Interface Specification shall include a programme of tests to demonstrate the performance and integrity of the integrated system. The interface sheets developed by the **PM**(**GCIM**) are attached in**Appendix-19** – **Attachment N**.Theattached interface sheetsare not final.They are indicative in natureanddo not relieve the Contractor's obligation to identify any new interface to meet contract requirements. The interface sheets, which the Contractor develops, shall be used as a basis to establish the Interface Specification. Any revision to the Interface Specification shall be mutually agreed between the Contractor and Interfacing Contractors, with submission to the **PM**, and shall specifically -

a) Understand the design requirements of each party and associated constraints;
b) Determine the detailed interface works to be performed during the various stages and
c) Agree on the interface works in reference to respective scope, with any agreements reached to be formally documented in InterfaceMinutes of Meetings , including an actions item list.

6.5.2 The Interface Contractors shall mutually identify and agree the Interfaces that will exist between them using theInterface Coordination Sheets, the format of which is contained in **AttachmentF part 1**. These interfacesshall be expanded, if required, to include all, and any other, interfaces that develop during the execution of the Project.

6.5.3 The Interfacing Contractors shall mutually agree upon the information to be exchanged and shall develop a unique Interface Specification for each interface identified. A sample Interface Specificationproforma is provided in **Attachment C**.

The **ICS**s will be tracked and monitored using an **ICS** Register to be compiled by the Contractor. This register will track the progress of the **ICS** from inception through to closure and final processing by the Contractor, prior to transmittal to the PMas a complete Integrated Design.

Each interface shall have a unique reference number to enable the Interface to be readily identified and tracked and monitored.

6.6 Contractor's Submissions

6.6.1 On commencement of the contract, Master Interface Matrix (MIM) and the Interface sheets in the Contract Documents shall be used as the reference documents from which the Contractor develop its Interface Management Plans (**IMP**) and its Interface Management Programmes (**IMPG**). The Contractor has to provide to the **PM** the following, as per the due date(s) mentioned below.

a) **CV** of **CIC** subject to Notice of No Objection (BDE1) by **PM**(30 days)
b) Interface Management Plan (**IMP**) (45 days)
c) Interface Management Programme (**IMPG**) 3 month rolling program updated monthly (45 days)
d) Interface Coordination Sheets (**ICS**) – monthly progress report pertaining to interface matters (45 days)
e) Confirmation of Coordination form (45 days)
f) Interface specification (45 days)

6.6.2 The **PM** shall review the Contractor's interface submissions and issue Notice of No Objection for those sections that comply with the contractual requirements of Interface Management and recommend changes to any sections that do not meet Employer's Requirements. The Master Interface Log (**MIL**) is updated by **PM**/**GCIM** (**IST)** with the sections of the Contractor's **IMPG** that receive a Notice of No Objection. A sample Master Interface Log example is provided in **Attachment D**.

6.6.3 To receive a Notice of No Objection, the Contractor's Interface Management Programme (**IMPG**) and Interface Management Plan (**IMP**) shall meet the Employer's requirements on Interface Management - **Appendix 19** of Part 2 Section VI A.

6.6.4 The **PM**/**GCIM**is responsible for the overall implementation and maintenance of the interface management process throughout the project life cycle by developing and implementing interface management work processes, capturing the necessary interface agreements, monitoring progress, ensuring that schedule requirements are maintained and pointing out any change requests that may arise out of interface requirements.

6.7 Monitoring the Progress of Interface Agreements

6.7.1 The Chief Interface Coordinator (**CIC**) of the Lead Contractor convenes regular Interface Meeting with the Interfacing Contractor to progress the Interface issues by keeping track of activities required to be performed towards facilitating the needed exchange of information. The Lead Contractor writes the Minutes of Meeting, actions oriented and systematically review the last Minutes of Meeting to confirm agreement, check progress, prior to examining new items.

6.7.2 The **PM**/**GCIM** (**IST TL**) and his delegates monitor the status of the interface agreements on a regular basis by having periodical (weekly or monthly) meetings with the concerned persons. The Interface Agreements with a `Critical' rating are prioritized and rigorously monitored.

6.7.3 When the Interfacing Contractor receives the requested information by the required date and considers it acceptable, to close a particular interface item/location Lead Contractor will record in the confirmation of coordination form for the interfacing element and send it to the Interfacing Contractor/s for agreement. The mutually agreed Interface Specification is then submitted to **PM** for Notice of No Objection.

6.7.4 To close a particular significant phase or portion, Lead Contractor will record in the Interface Specification document and send it to the Interfacing Contractor's for agreement. The mutually agreed Interface Specification is then submitted to **PM** for Notice of No Objection. If **PM**raises any objection, the Lead Contractor re-works the Interface Specification document, in consultation with the Interfacing Contractor, and re-submits to **PM** for Notice of No Objection. After issue of Notice of No Objection, the Interface Agreement is recorded as `closed' in the Interface Databases of both the Contractors as well as in the **MIL**. The closed interfaces are omitted from future interface agreement reporting.

6.7.5 The **PM**/**GCIM** shall prepare Status Reports from the Master Interface Log (**MIL**) on the progress of the Interface Agreements as part of the Monthly Progress Reports to the **Employer**.

6.7.6 **PM/GCIM** shall check the physical interfaces on site as necessary to make sure that they are progressing according to the agreements made by the Interfacing Contractors and report to the **PM/GCIM**.

7 .INTERFACE COORDINATION SHEET (ICS)

7.1 The Contractor's Interface Coordination sheet, the format of which is shown in **Attachment F** – Part 1, is required to be used by each of the Interfacing Contractors to record all of the Contract Interfaces. The Contractor shall ensure that each Interfacing Contractor provides input and maintains the **ICS** continually updated as required in this **Appendix 19** .

7.2 The Contractor shall ensure that the Interfacing Contractors demonstrate their co-ordination efforts as required by the Contract. To achieve this, the Contractor and the Interfacing Contractors shall identify their interface requirements which shall be input into the interface documents i.e. **IMP**, **IMPG**, **ICS** etc. by the Contractor.

7.3 The Contractor shall monitor the **ICS** to ensure that, as the Interface progresses, the records show the appropriate Status (refer status codes indicated in Part 3 of **Attachment F**) as agreed with the Interfacing Contractors. The Contractor will be responsible for confirming the "Closing Out" of each **ICS**record, whilst ensuring that throughout the interface process all Interfacing Contractors have agreed to the following:

a) The receiving Interfacing Contractor has received and accepted the Interface being recorded.
b) All InterfacingContractors have recorded the interface record as "Proposed Close Out".
c) The Confirmation of Co-ordination form in **Attachment G** has been updated and signed by the relevant Interfacing Contractors, refer clause 7.4 below.

7.4 When documents are exchanged for review/comment with Interfacing Contractors, the originator preparing these documents should ensure that they are accompanied by the Confirmation of Coordination form in **Attachment G**. When the Interfacing Contractor returns these documents with comments to the originator, they should be returned with the Confirmation of Coordination form duly completed, confirming coordination and agreement or comment as appropriate, as a record of them having coordinated the interface item. This Confirmation of Co-ordination is to be transmitted to the **PM,**upon signing by the Interfacing Contractor(s), for Notice of No Ojection with the appropriate Template **Attachment H**- Review and Comment on all Design / Interface Submittals. The Rank (B, Ma, Mi) iscatgoriesd into blocked, major & minor catagories.

7.5 The **PM** will obtain approval from **MMRC** on every Main Features of the final designs / drawings with respect of the following "Approval for Notice of No Objection".

8. COORDINATION DRAWINGS

8.1 General

For the purpose of achieving a Project which is fully co-ordinated with respect to civil, structural, architectural, building services, electrical, mechanical works and interface elements, and to ensure compatibility between different facilities and services, and adequate space requirements, all drawings are to be reviewed and co-ordinated by the Civil Work Contractor.

The Civil Work Contractor will provide and issue detailed Interface Working Drawings in terms of items such as; special arrangements, space allocation, cast in items, primary and secondary fixings, grouting of equipment/plinths, drill and fix brackets, embedded and cast-in items and the like.

The drawings shall be prepared by the Civil Work Contractor, reviewed and validated by the Contractor for its own Interface in accordance with the ICS.. The Civil Work Contractor shall also include composite cross-sections and layouts, which show the spatial requirements of all Interfacing Contractors and identify items to be finalised, defined, or resolved.

8.2 Combined Services Drawing (CSDs) And Structural E&M Drawings (SEMs)

The Civil Work Contractor's **CSD**s and **SEM**s must be clear and sufficiently detailed to unambiguously show the intent of the subject services and the corresponding structure / facility allowances. While these drawings do not have to duplicate all of the details of the Drawings, they must include plans sections and elevations as required to clearly illustrate the compatible relationship between the different disciplines. Specifically, the drawings will include wall elevation drawings at 1:50 scale (or larger where required) indicating all openings, access panels, reinforcement zones, embedded and cast-in items and the like, and shall be submitted to the **PM**for a Notice of No Objection.

The **CSD**s shall show the intended locations, routes and spatial relationships of the individual **E&M** services, Building Services systems, and installations, Depot Equipment, Core Systems installations and other installations, fully co-ordinated with each other and the civil structural and architectural work. The **CSD**s shall also clearly indicate that effective cable co-ordination has been achieved in terms of cable location or cable trays and the trunking and cable routing.

The **SEM**s shall show all civil, structural, and architectural requirements for the **E&M** services, Building Services systems and installations, Builder's works and the Core Systems and other installations.

Where Builder's works are required by the Interfacing Contractors, the drawings, details, specification notes and catalogue information and the like shall be obtained by the Civil Work Contractor from these Interfacing Contractors indicating the builder's work to be incorporated into the Works. The Civil Work Contractor shall include details of such Builder's works in the **SEM**s and Method Statements as appropriate.

Builder's work comprises, but is not limited to, the following:

a) construction of plinths, bases, builders bund walls and the like.
b) placing and fixing of holding down bolts, lifting beams and hooks and other supporting items;
c) supply, fabrication installation, protection, fixing and finishing of supporting steelwork, for equipment and associated accessories;
d) casting in of edgings, angles in recesses, ducts, conduit, pipes etc;
e) fixing equipment and associated, brackets, cable containment and fixtures;
f) forming of penetrations, sleeves, access panels, holes, chases, recesses, openings;

all in accordance with the Civil Work Contract.

The **CSD**/**SEM**s shall also be used for the purpose of co-ordinating with the Interfacing Contractors and shall be continuously updated to reflect the latest interface co-ordination. Copies of the **CSD**/**SEM** drawings shall be included in submittals to the **PM**(and **GCIM**/**RE**).

Where the **CSD**s or **SEM**s do not fully co-ordinate with the Site conditions the Civil CoontractorContractor shall co-ordinate and propose a solution to the problem. All proposed solutions shall be issued to the PMas Project Manager.

8.3 Interface Drawings

For the Interface Drawings, the Contractor shall prepare in diagrammatic format for each interface the demarcation of scope of responsibilities between the Contractor and each of the Interfacing Contractors. The Contractor shall submit all Drawings with interface requirements for a notice of no objection from the PM. Any proposed deviation to the Construction Specification or Drawings shall be identified and justified with design documentation, details and drawings. The submission shall also identify all interface requirements. The contractor should develop own interface drawings with detailed design and dimensions and submit the same to other interfacing contractor.

8.4 As Constructed Drawings

Upon completion of the Works the Civil Work Contractor shall submit all Combined Services Drawings, Structural **E&M** Drawings, and Interface Demarcation Drawings showing the final "As Constructed" status of the Works related to these drawings.

9. ATTACHMENTS

Attachment A - Flow Chart for creation / elaboration of Interface Coordination Sheet

Attachment B - Flow Chart for Progress Monitoring of Interface Agreements

Attachment C - Interface Specification Form

Attachment D - Master Interface Log (MIL) – Example

Attachment E - Master Interface Matrix (MIM)

Attachment F Part 1 - Interface Coordination sheet - Example

Attachment F Part 2 - Interface Coordination Sheet – Contract Codes

Attachment F Part 3 - Interface Coordination Sheet – Status Codes

Attachment G - Confirmation of Coordination Form

Attachment H - Review and Comment on all Design / Interface Submittals Template

Attachment K - Guidance Notes for the Preparation of Interface Management Programme.

Attachment L - Guidance Notes for the Preparation of Interface Management Plan.

Attachment M – Interface Sheet (Template)

Attachment N –Indicative Interface Sheet List for Contract MM3-CBS-CWD

N1- Indicative Interface Sheet of Track Works and Depot Civil works station.

N2- Indicative Interface Sheet of Track Works and Depot Civil works.

N3- Indicative Interface Sheet of Depot Civil works and Rolling Stock

N4- Indicative Interface Sheet of OCS and Depot Civil works

N5- Indicative Interface Sheet of Signalling, Train Control, PSD & Telecom & Detailed Design Consultant

N6- Indicative Interface Sheet of Signalling, Train Control, PSD & Telecom & Depot Civil works

N7- Indicative Interface Sheet of UG Tunnel (UGC-07) and Depot Civil Works.

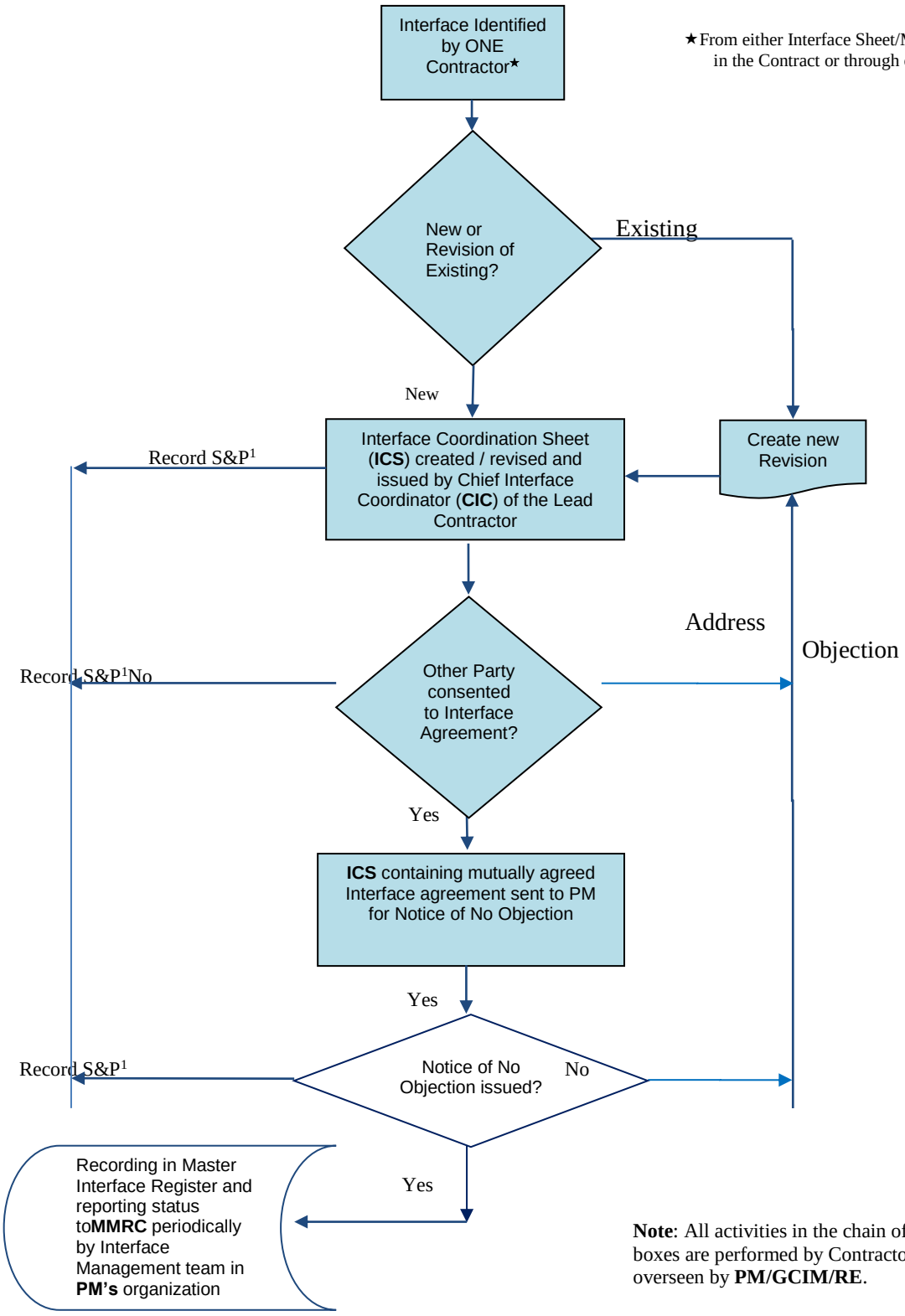
N8- Indicative Interface Sheet of Depot Civil Works and Depot E&M.

N9- Indicative Interface Sheet of Depot Civil Works and Pylon termination Contractor

N10- Indicative Interface Sheet of Depot equipment Contractor and Detailed Design Consultant

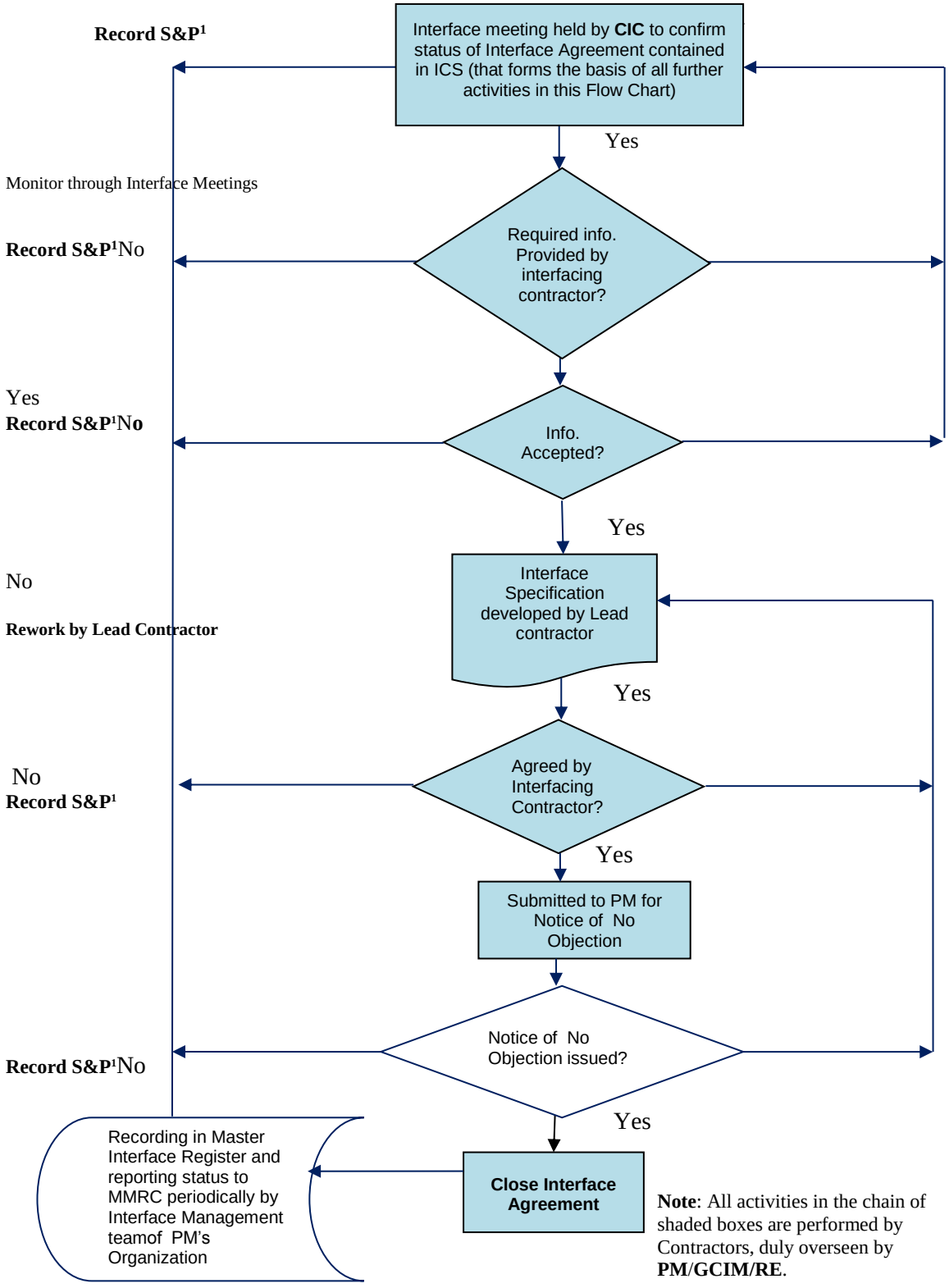
N11- Indicative Interface Sheet of Detailed Design Consultant and Depot Civil Works.

Attachment A - Flow Chart for creation / elaboration of Interface Coordination Sheet



1 = Status and Priority
Ref Attachment F Part 3

Attachment B - Flow Chart for Progress Monitoring of Interface Agreements



Note: All activities in the chain of shaded boxes are performed by Contractors, duly overseen by **PM/GCIM/RE**.

1 = Status and Priority
Ref Attachment F Part 3

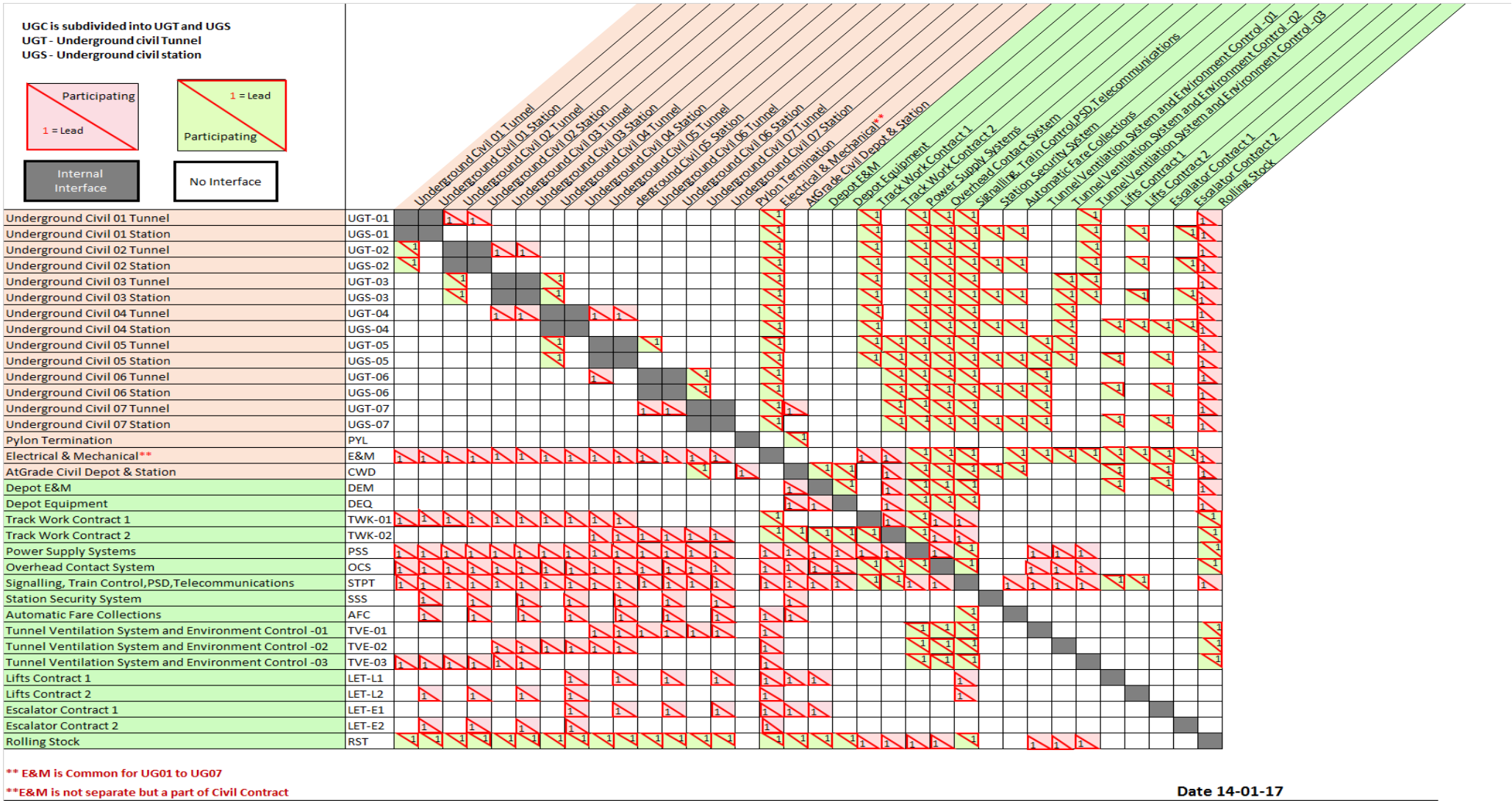
Attachment C - Interface Specification Form

<table>
<tr><td colspan="3">INTERFACE SPECIFICATION</td><td colspan="3">Ref: to creat</td></tr>
<tr><td></td><td>Contract Designation</td><td>Contractors Sequence Number</td><td>Date of Issue</td><td colspan="2"></td></tr>
<tr><td>Initiating Contractor</td><td></td><td></td><td colspan="3">Interface Manager Signature</td></tr>
<tr><td>Responding Contractor</td><td></td><td></td><td colspan="3">Interface Manager Signature</td></tr>
<tr><td>Interface Specification Required for;</td><td colspan="2"></td><td>Response Required by;</td><td colspan="2"></td></tr>
<tr><td>Reviewed by;</td><td></td><td></td><td></td><td colspan="2"></td></tr>
<tr><td>Design Sections</td><td></td><td></td><td>Station Arch. / Building Services</td><td colspan="2"></td></tr>
<tr><td colspan="6"><u>Description of the Interface</u></td></tr>
<tr><td colspan="5"><u>Specific Details of the Interface</u></td><td><u>Location</u></td></tr>
<tr><td colspan="6">Drawings / Specifications Attached</td></tr>
<tr><td colspan="2">Title</td><td colspan="3">Drawing / Specification Ref.</td><td>Drg. Issue</td></tr>
<tr><td colspan="2"></td><td colspan="3"></td><td></td></tr>
<tr><td colspan="6"></td></tr>
<tr><td>Document</td><td>Name</td><td>Date</td><td colspan="3">Document References (if any)</td></tr>
<tr><td>Prepared by:</td><td></td><td></td><td colspan="3"></td></tr>
</table>

Attachment D - Master Interface Log (MIL) - Example

PM Ref. No.	Revision No.	Interface Item No.	Stage	Location	Contract A	Name	Contract B	Name	Status	Remarks
10	A0	UT/US-05	Construction / Installation	Mahalaxmi	Contract UAA-02 shall install cable containment for HV, LV, Signal & telecom and emergency lighting cable routing	UAA-02	Contract UAA-0 shall lay power cable for emergency light and control cable for telephone system from station (controllers will be from Mumbai Central station up to May Day Park shaft)	UAA-01	Pending	
10	A0	UT/US-06	Construction / Installation	Mahalaxmi	Contract UAA-02 shall construct temporary and permanent drainage system and interlink with contract UAA-01 drainage system	UAA-02	Contract UAA-01 shall construct temporary and permanent drainage system and interlink with contract UAA-02 drainage system	UAA-01		
10	A0	UT/US-07	Construction / Installation	BKC	Completion of contract UAA2-02 handover shaft back to UAA-01	UAA-02	Contract UAA-01 shall Jointly inspect and accept the shaft handed over by UAA-02	UAA-01	Completed	
10	A0	UT/US-08	Test & Commissioning	SEEPZ	Alignment of the tunnels, 1st stage concrete in the tunnels to match with the shaft base slab	UAA-02	Agree and accept	UAA-01	Completed	
10	A0	UT/US-09	Maintenance	Santacruz	Stop water leakage between the Shaft wall & tunnels	UAA-02	Joint inspection and accept	UAA-01	Pending	

Attachment E - Master Interface Matrix (MIM)



Underground Civil 01 Tunnel	UGT-01
Underground Civil 01 Station	UGS-01
Underground Civil 02 Tunnel	UGT-02
Underground Civil 02 Station	UGS-02
Underground Civil 03 Tunnel	UGT-03
Underground Civil 03 Station	UGS-03
Underground Civil 04 Tunnel	UGT-04
Underground Civil 04 Station	UGS-04
Underground Civil 05 Tunnel	UGT-05
Underground Civil 05 Station	UGS-05
Underground Civil 06 Tunnel	UGT-06
Underground Civil 06 Station	UGS-06
Underground Civil 07 Tunnel	UGT-07
Underground Civil 07 Station	UGS-07
Pylon Termination	PYL
Electrical & Mechanical**	E&M
AtGrade Civil Depot & Station	CWD
Depot E&M	DEM
Depot Equipment	DEQ
Track Work Contract 1	TWK-01
Track Work Contract 2	TWK-02
Power Supply Systems	PSS
Overhead Contact System	OCS
Signalling, Train Control,PSD,Telecommunications	STPT
Station Security System	SSS
Automatic Fare Collections	AFC
Tunnel Ventilation System and Environment Control -01	TVE-01
Tunnel Ventilation System and Environment Control -02	TVE-02
Tunnel Ventilation System and Environment Control -03	TVE-03
Lifts Contract 1	LET-L1
Lifts Contract 2	LET-L2
Escalator Contract 1	LET-E1
Escalator Contract 2	LET-E2
Rolling Stock	RST

** E&M is Common for UG01 to UG07

**E&M is not separate but a part of Civil Contract

Date 14-01-17

Attachment F Part 1 - Interface Coordination sheet- Example

Interface Co-ordination Sheet:EAS-05 / AC 01

Elevated stations contractor A
Viaduct Corridor - 1 Contractor B

PROVISIONS AS PER THE INTERFACE SHEET				**INTERFACE IMPLEMENTATION**	
NO	**Project Stage**	**Interface point-Lead**	**Interface Point- Participating**	**Status**	**Action/Progress records &Folllow-ups**
Sheet 2 – MMRC Station					
2	Design Stage	Contractor A (Lead Contract) shall furnish the details of Viaduct Lighting mast locations and loading details to Contractor-B (Lead Contract)	Contract B(Participating Contract) shall collect the loading particulars of Viaduct lighting mast of various locations. Shall design and provide the details of foundations	Pending	**Past Activity** **Activity during the Month** 1 meeting during the Month **Major Decisions** A. Contract A shall fix cable trays by anchor fasteners B. Contract A to submit mutually agreeable method statement by 15th Dec 2010 **Open Issue**
3	Design Stage	Contractor-A(Lead Contract)shall request fitting/mounting arrangements to install cable containment for signal, telecom and LV & Lighting cables	Contractor-B(Participating Contract) shall include in viaduct design	Pending	**Past Activity** 3 Minutes of Meeting **Activity during the Month** 1 meeting 10th December **Major Decisions** A. Contract A shall fix cable trays by anchor fasteners B. Contract A to submit mutually agreeable method Statementby 15th Dec 2010 **Open Issue**

Attachment F Part 2 - Interface Coordination Sheet-Contract Codes

The following table provides the Interfacing Party Contract codes to be used whenpreparing / updating the Contractors Interface Coordination Sheet, which should be prepared on thebasis of a separate Excel spreadsheet for each Interfacing Party.

Interface Party Codes	
AFC	Automatic Fare Collection
CWD	AtGrade Civil Depot& Station
DEM	Depot E&M
DEQ	Depot Equipment
LET-E	Escalator
LET-L	Lift
OCS	Overhead Contact System
PSS	Power Supply System
PYL	Pylon Termination
RST	Rolling Stock
SSS	Station Security System
STPT	Signalling ,Train control, PSD and Telecom
TVE	Tunnel Ventilation System / Environment Control System
TWK	Track work
UGC	Underground Civil (UGC-01 to UGC-07)

Notes :

1 Depot Equipment may be subdivided into individual items of equipment in which case Contractorswill be notified of designated interfacing codes.
2 Other document coding should be in accordance with the requirements of the Contract and as agreed with **PM**.

Attachment F Part 3 - Interface Coordination Sheet- Status Codes

The following table describes the Interface Status with codes to be used in preparing / updating the Interface Coordination sheet.

Interface Status Codes & Meanings		
Interface Status	**Code for Log**	**Description of Status**
To be coordinated	TBC	Both Contractor's have not agreed the conditions for this interface
Coordinated	COR	Both Contractor's have agreed that the interface is valid
Not coordinated	NCOR	One Contractor does not agree the conditions for this interface
Received	REC	The Contractor responsible for the design/construction element has received the information/documents required
Provided	PRO	The Contractor responsible for providing the information/documents to progress the design/construction element has provided the documents to the Interfacing Party
Accepted	ACP	The Contractor has accepted the proposed Interface Design or Construction element
Not Accepted	NACP	Either of the Contractors have not accepted the proposed Design/Construction element
Propose closeout	PCO	Both Contractor's have accepted the proposed Interface Design or Construction element and no other requirements are outstanding. Both Parties can agreed to sign the Confirmation of Coordination Form
Closed out	CO	The final Interface Documentation together with Confirmation of Coordination Form has been sent to the Interface Coordination Manager for closing the interface
Superseded	SUP	The Interface design or construction element has been superseded

Attachment G – Confirmation of Coordination Form

Mumbai Metro Rail Project		
Ref No.		
CONFIRMATION OF COORDINATION		
CONTRACT:		**TRANSMITTAL No.:**
TITLE:		
ACTIVITY NO.:		
GENERAL DESCRIPTION:		
SIGNATURE OF INTERFACING CONTRACTORS:		

	Interfacing Contractor	**Authorized Name**	**Signature**	**Date Reviewed**	**Comment**
1					
2					

Signatures above confirm that this design document has been reviewed as part of the coordination process.

NOTE: Where Contractors are not in agreement with the details on this submission, they are to comment above and advise the interfacing party in question requesting accommodation of the requirement and advise the PMunder separate cover and report progress in Monthly Report / Coordination Meetings.

Attachment H-Review and Comment on all Design / Interface Submittals Template

SUBMISSION REVIEW REQUEST No.

SRR of Ref Document

CONTRACT- MM3-CBS-CWD

Column**"Commentstatus"**contains **(Open/closed with date) + Rank(B, Ma ,mi)** and is filled in by PM

Interface Reference No.			**Date of submission**	
Type of Reference			**Revision:**	
Subject / Title			**Date of Review**	
	GC Review Status			
Review without objection ☐		**Review without objection, subject to** ☐	**Rejected** ☐	
Reviewer: Date: Signature:			Checker: Date: Signature:	

Column**"Commentstatus"**contains **(Open/closed with date) + Rank(B, Ma ,mi)** and is filled in by GC

Page No. / Paragraph No.	**GC comments**	**Contractor Reply**	**Comment status**

Ranks :

1 B – Blocked
2 Ma – Major
3 Mi – Minor

Attachment K - Guidance Notes for the Preparation of Interface Management Programme.

1. The programme shall be prepared and submitted in bar chart format.
2. The bar chart shall be formed by activities grouped by major Zones of Interface.
3. The detail of each bar chart activity shall demonstrate the Contractor's understanding of the scope of work of any Interfacing Contractor who is to supply input to the Contractor, in order for him to achieve an integrated coordinated design.
4. The bars shown on the bar chart shall be annotated with details of the information expected from the Interfacing Contractors, and highlight any target dates to receive or produce information.
5. Information relating to contractual milestone dates shall be shown on both the Contractor's and Interfacing Contractors schedules.
6. The prime purpose of the document is to assist with ensuring that a coordinated design, construction, testing and commissioning is achieved. This document shall be forwarded to Interfacing Contractors for comment and agreement on a regular basis.
7. A complementary table of activities and dates should be prepared for ease of reference.

Attachment L - Guidance Notes for the Preparation of Interface Management Plan.

The purpose of this Plan is to demonstrate how the Contractor proposes to achieve a fully coordinated design, which is compatible with that design carried out by Interfacing Contractors.

This document shall describe each of the component parts, within Zones of Interface, of the design, which require input from Interfacing Contractors. The descriptions should include details relating to the inputs required from both the Contractor and Interfacing Contractor, to achieve a fully coordinated design. The document should also be complementary to the IMPG, which details the proposed schedule and timings of each of the interfacing activities.

This document shall also detail the proposed interfacing requirements to be met by all Interfacing Contractors. The Contractor shall ensure that this document is acceptable to the Interfacing Contractors and that they are able to comply with all of its requirements. This is to be achieved by document exchanges and discussions to achieve agreement of documents.

The Plan shall therefore:

i) Detail each of the component parts of the Project, which require the input of Interfacing Contractors to achieve a coordinated design. It shall describe the various disciplines and detail the technical input from others that will be required to achieve a coordinated design.
ii) Cover the whole duration of the Works and be complementary to the **IMPG**, which details the proposed/agreed schedule and timings.
iii) Be given by the Contractor to other Interfacing Contractors for their information and agreement.
iv) Be developed in association with the process of increasing knowledge of the design and shall reflect the agreements reached by the Contractor and the Interfacing Contractors as the Project progresses. The Plan shall be updated on a quarterly basis to reflect this developing status.

The Status of any interface at any point in time shall be identified by one of the following conditions;

(i) to be coordinated
(ii) coordinated
(iii) not coordinated
(iv) received
(v) provided
(vi) accepted
(vii) not accepted
(viii) propose close-out
(ix) superseded
(x) closed out

Attachment M–Interface Sheet (Template)

Mumbai Metro Interface Sheet	**Contract A (Lead Contract)**	**Name of Contract**	**Contract B(Participating Contract)**	**Name of Contract**	***Sheet # : Number/max***	***Rev : A1*** ***Date :***
Approved by : ((name(s) and signature(s))	*Discipline A*		*Discipline B*		*Last changes :*	
PM issued by :	*Name of writer, position, signature for discipline A*		*Name of writer, position, signature for discipline B*			
PM Checked by :	*Name of checker, DCL, signature for discipline A*		*Name of checker, DCL, signature for discipline B*			
Interface description brief / Key elements (time schedule, physical, functional,…):						
Contract A(Lead Contract)		**DESIGN STAGE**		Contract B(Participating Contract)		
Title ***Interface A Name/Interface B-Number***: detail ***Interface A Name/Interface B-Number=Number+1***: detail			**Title** ***Interface A Name/Interface B-Number***: detail ***Interface A Name/Interface B-Number=Number+1***: detail			
Reference documents:			*Reference documents:*			
Contract A(Lead Contract)		**CONSTRUCTION / INSTALLATION STAGE**		Contract B(Participating Contract)		
Interface A Name/Interface B-Number=Number+1: detail			***Interface A Name/Interface B-Number=Number+1***: detai			
Reference documents:			*Reference documents:*			
Contract A(Lead Contract)		**TEST & COMMISIONNING STAGE**		Contract B(Participating Contract)		
Interface A Name/Interface B-Number=Number+1: detail			***Interface A Name/Interface B-Number=Number+1***: detail			
Reference documents:			*Reference documents :*			
Contract A(Lead Contract)		**MAINTENANCE STAGE**		Contract B(Participating Contract)		
Interface A Name/Interface B-Number=Number+1: detail			***Interface A Name/Interface B-Number=Number+1***: detail			
Reference documents:			*Reference documents :*			

Attachment N –Indicative Interface Sheet List for Contract MML3-CBS-CWD

Sr. No.	DESCRIPTION
N1	Indicative Interface Sheet of Track Works and Depot Civil works station.
N2	Indicative Interface Sheet of Track Works and Depot Civil works.
N3	Indicative Interface Sheet of Depot Civil works and Rolling Stock
N4	Indicative Interface Sheet of OCS and Depot Civil works
N5	Indicative Interface Sheet of Signalling, Train Control, PSD & Telecom & Detailed Design Consultant
N6	Indicative Interface Sheet of Signalling, Train Control, PSD & Telecom & Depot Civil works
N7	Indicative Interface Sheet of UG Tunnel (UGC-07) and Depot Civil Works.
N8	Indicative Interface Sheet of Depot Civil Works and Depot E&M.
N9	Indicative Interface Sheet of Depot Civil Works and Pylon termination Contractor
N10	Indicative Interface Sheet of Depot equipment Contractor and Detailed Design Consultant
N11	Indicative Interface Sheet of Detailed Design Consultant and Depot Civil Works.

Note- The "Design stage " Interface mentioned in Interface Sheets no. N1 to N8 are only for information of the depot civil contractor.The design part mention in interface sheets will be performed by the DDC civil employed by the employer. The DDC civil contractor will be responsible to confirm site check.

N1. INDICATIVE INTERFACE SHEET OF TRACK WORKS(TWK) and DEPOT CIVIL WORKS STATION (CWD)

Mumbai Metro Interface Sheet	**Contract A**	**TWK**	**Contract B**	**CWD**	***Rev # :***	***A1***
					Date:	***09/01/17***
Approved by *:*	**TWK (Track Works)** Lead Contract		**CWD (Depot Civil Works station)** Participating Contract		First issue:	
GC issued by :						
Checked by :						

Interface description brief / Key elements (time schedule, physical, functional, ...) :

1.General Interface details between the TWK (Track Works)vs CWD (Civil work depot station)

Contract A(TWK)	**DESIGN STAGE**	Contract B(CWD-DDC)
TWK/CWD-01: Shall fix chainages of the turnouts / crossover based on the chainage of station centre line furnished by the station building contract.		**TWK/CWD-01**: Shall furnish correct chainage of station centre line.
TWK/CWD-02: Shall provide the rail level		**TWK/CWD-02**: Shall Check the rail level.
TWK/CWD-03: Shall check the same.		**TWK/CWD-03:** Shall ensure that pillars / columns supporting in station structure are located clear of the minimum infringement clearance from centre of track stipulated in the S.O.D.

Mumbai Metro Interface Sheet	Contract A	TWK	Contract B	CWD	*Rev # :*	*A1*
					Date:	*09/01/17*
			wherever such pillars / column are beyond the platform length.			
TWK/CWD-04: Shall provide track drainage consistent with the general drainage arrangement in station area.			**TWK/CWD-04:** Shall design the general drainage system in the station area taking into account track drainage catchment area.			
TWK/CWD-05: Contract B shall verify with contract A.			**TWK/CWD-05:** Contract A shall ensure that all components of the structure at intersection with ramp/ At Grade are clear of the structure gauge of the S.O.D. with respect to the project rail level.			
Contract A(TWK)		**CONSTRUCTION / INSTALLATION STAGE**		Contract B(CWD)		
TWK/CWD-06: Shall jointly check before taking over.			**TWK/CWD-06:** Shall hand over the track installation area in the vicinity of pillars / columns and such obstructions clear of the infringement distances stipulated in the S.O.D.			
TWK/CWD-07: Shall ensure proper drainage compatible to Civil Contract design of drainage.			**TWK/CWD-07:** Shall furnish levels and location of the general drainage system in the station area and ensure track drainage is compatible with general drainage system.			
TWK/CWD-08: Track work contract shall jointly decide the storage space and access for track work as per key Dates of access.			**TWK/CWD-08:** Shall provide storage space for track materials in consultation with track contract and shall permit access to track contract for construction of track as per agreed schedule of access periods.			
TWK/CWD -09: Track contract shall furnish requirement of temporary water supply. But for track construction work the water supply and electricity will be arranged by track contract.			**TWK/CWD-09:** Shall provide temporary water for construction of track on term of mutual agreement to design & construct the water supply scheme in consultation with track contract.			

Mumbai Metro Interface Sheet	Contract A	TWK	Contract B	CWD	*Rev # :*	*A1*
					Date:	*09/01/17*
TWK/CWD 10: Shall provide survey Data of Track for completion (level and horizontal) of platform			**TWK/CWD 10:** level completes the platform (level and horizontal) according to track.			
Reference documents:			Reference documents:			
Contract A(TWK)		**TEST & COMMISSIONING STAGE**		Contract B(CWD)		
NIL			**NIL**			
Reference documents :			Reference documents*:*			
Contract A(TWK)		**MAINTENANCE STAGE**		Contract B(CWD)		
NIL			**NIL**			
Reference documents:			Reference documents:			

N2. INDICATIVE INTERFACE SHEET OF TRACK WORKS(TWK) and DEPOT CIVIL WORKS (CWD)

Mumbai Metro Interface Sheet	**Contract A**	**TWK**	**Contract B**	**CWD**	***Rev # :***	***A1***
					Date:	***09/01/17***
Approved by *:*	**TWK (Track Works)** Lead Contract		**CWD (Depot Civil Works)** Participating Contract		First issue:	
GC issued by :						
Checked by :						

Main interfaces between Civil Work Depot contract and Track Works contract are the following:

- X, Y, Z track co-ordinates
- Floor finishing
- In pit track supporting posts + embedded track + washing track
- Track drainage
- Temporary water supply during construction
- Time schedule

Contract A(TWK)	**DESIGN STAGE**	Contract B(CWD-DDC)
TWK/CWD-01: Shall take into account the depot drawings and pieces of information from contract B and shall design accordingly the track layout within the whole depot.		**TWK/CWD-01**: Shall provide to Contract A the general depot layout, relevant detailed drawings and any pieces of information allowing contract B carrying out the track design within the depot.

Mumbai Metro Interface Sheet	Contract A	TWK	Contract B	CWD	*Rev # :*	*A1*
					Date:	*09/01/17*
TWK/CWD-02: Shall provide to contract B the track depot layout, the drawings of the different types of track laying (outdoor, indoor, on pit, in the washing shed etc.), and principles for track drainage, compacted soil requirements etc., and any track requirements.			**TWK/CWD-02**: Shall take into account track drawings, track requirements, track drainage principles, compacted soil requirements ,pit drawings, including washable apron etc. from contract A for designing the depot.The design of the general drainage system for the depot, including the final formation levels, gradients, cross slopes, longitudinal cross drainage pipes culverts crossings. Etc. shall be decided by contract B in consultation with contract A.			
TWK/CWD-03: Shall co-ordinate with contract B, shall furnish any track updates, shall take into account observations from Contactor B and shall update the changes, if needed.			**TWK/CWD-03:** Shall co-ordinate with contract A, shall furnish any depot updates, shall take into account observations from Contactor A and shall update the changes, if needed.			
Contract A(TWK)		**CONSTRUCTION / INSTALLATION STAGE**		Contract B(CWD)		
TWK/CWD-04: Shall plan and co-ordinate the track works in the depot with the progress of depot works based on mutually accepted programme of works.			**TWK/CWD-04:** Shall plan and co-ordinate the depot works with the progress of track works in the depot based on mutually accepted programmed of works and ensure key dates for access.			
TWK/CWD-04(A) Shall ensure with contract B for gaining access to various location of in depot for executing track work and also for storing the required track material.			**TWK/CWD-04(A)** Shall provide suitable roads for gaining access to various location of in depot for executing track work and also for storing the required track materials.			

Mumbai Metro Interface Sheet	Contract A	TWK	Contract B	CWD	*Rev # :*	*A1*
					Date:	*09/01/17*
TWK/CWD-05: Contract A shall ensure in respect of track in locations like washing lines, inspection bay, working lines, etc. contract A shall check and ensure the concrete base to the required levels providing suitably dowels for track base plates, shear connectors, etc. as required before taking over from contract B for installing the track work. **TWK/CWD-05(A):** Before commencing the ballasted/slab track work in an area, contactor A shall verify with contract B that the longitudinal and cross drains are completed in that area. Before laying the track, contract B shall provide designed cross slopes on the track formation.			**TWK/CWD-05:** In respect of track in locations like washing lines, inspection bay, working lines, etc. contract B shall complete the concrete base to the required levels providing suitably dowels for track base plates, shear connectors, etc. as required. **TWK/CWD-05(A):** Before handing over the finished formation of depot to contract A for installing slab/ballasted track, contract B shall construct and complete the longitudinal and cross drains forming the drainage network designed by him including up to out flow and any sump etc Contactor B shall excavate the finished formation to the required dimensions and install the drains to proper design levels and with appropriate perforated drain cover on top for entire drainage.			
TWK/CWD-06: Contract A shall request temporary water supply from contract B, However contract A shall make own arrangement of water supply for concreting.			**TWK/CWD-06:** Shall provide temporary water supply during the track works			
TWK/CWD -07: *Shall conduct tests and commissioning of track works..*			**TWK/CWD-07:** Shall provide necessary support to contract A to ensure testing and commissioning of track works..			
Reference documents:			Reference documents:			

Mumbai Metro Interface Sheet	**Contract A**	**TWK**	**Contract B**	**CWD**	***Rev # :***	***A1***
					Date:	***09/01/17***
Contract A(TWK)		**TEST & COMMISSIONING STAGE**		Contract B(CWD)		
TWK/CWD-08: Shall conduct tests and commissioning of track works.			**TWK/CWD-08:** Shall provide necessary support to Contractor a to ensure testing and commissioning of track works.			
Reference documents :			Reference documents*:*			
Contract A(TWK)		**MAINTENANCE STAGE**		Contract B(CWD)		
NIL			**NIL**			
Reference documents:			Reference documents:			

N3. INDICATIVE INTERFACE SHEET OF CIVIL DEPOT WORKS (CWD) And ROLLING STOCK (RST)

Mumbai Metro Interface Sheet	**Contract A**	**CWD**	**Contract B**	**RST**	***Sheet # : 1/2***	***Rev # : A1***
Approved by *:*	**Depot Civil Works** (Interface Lead)		**Rolling stock** (Interface Follower)		Last changes : Special machines foundations included	
GC issued by :						
Checked by :						

General Interface details between the Rolling stock & Civil Depot.

Contract A(Civil Depot-DDC*)*	**DESIGN STAGE**	Contract B(Rolling stock*)*
CW/RS-01: Shall prepare the Civil works accordingly to parameters of Rolling Stock		**CW/RS-01:** Shall provide parameters of Rolling Stock to Depot Civil Contractor
CW/RS-02: Shall require details from Contractor B about Rolling Stock technical characteristics, and depot facilities requirements and recommendations. Shall follow requirements through regular review meetings and associated actions items managed by means of a data base.		**CW/RS-02:** Shall provide at time to Contractor A any relevant Rolling Stock technical characteristics (static/dynamic gauges, subassemblies detailed drawings, weights,) and depot facilities requirements and recommendations.
CW/RS-03: Shall design the Depot maintenance facilities for accommodating special tools, testing and diagnostic equipment, special jigs, fixtures and gauges, spare parts to be delivered by Contractor B.		**CW/RS-03:** Shall provide lists of special tools, testing and diagnostic equipment, special jigs, fixtures and gauges, spare parts to be delivered in the depot.
CW/RS-04: Shall take into account Rolling Stock Manufacturer requirements and recommendations.		**CW/RS-04:** Shall furnish to Contractor A, all along the design stage, any updates, accurate details and pieces of information allowing Contractor A to Finalize the Depot maintenance facilities design.

CW/RS-05: Shall design the Depot maintenance facilities to suit Rolling Stock Manufacturer requirements and recommendations. **CW/RS-05A:** Shall design and provide Base foundation and pedestal, Electrical power required for special machines installation	**CW/RS-05**: Shall help to contract-A to ensure that Depot maintenance facilities design fit Rolling Stock requirements and recommendations. **CW/RS-05A**: Shall provide details of Base foundation and pedestal, Electrical power required for special purpose machines installation for those machines supplied by contractor-B
CW/RS-06:Structure Gauge and Dynamic Envelope (KE) - To ensure Civil Constructions are as per the SOD.	**CW/RS-06:** Rolling Stock shall ensure compliance as per stipulations of Contract and SOD in respect of Static gauge, KE, Structure gauge and other clearances.
CW/RS-07:Building and Foundation work for Driving Simulator and its components -Shall prepare the civil works accordingly. Shall do the foundation work as per the design & drawing.	**CW/RS-07:** Supply General Arrangement drawing of the Simulator room, other facilities required. Supply of detailed interface drawings including detail foundations, showing load points and other Civil works, etc. Supply of any special grouting material that goes into foundation.
CW/RS-08: Finishing requirements for Simulator room. - Shall provide finishing as per the requirements	**CW/RS-08:**Shall provide details of roof, floor and room finishes; Furnish equipments layouts within the rooms
Reference documents*:*	Reference documents:
Contract A(Civil Depot***)***	**CONSTRUCTION / INSTALLATION STAGE** Contract B(Rolling stock***)***
CW/RS-05: Shall ensure conformance to design parameters during Depot Maintenance facilities construction.	**CW/RS-05:** Shall co-ordinate with contract-A
CW/RS-06: Shall inform Contractor B with any Depot maintenance facilities Evolution and updating. Shall find an agreement with Contractor B for the resolution of any Design change. **CW/RS-06A:**Shall provide base foundation and electrical power cable and compressed air line required for special purpose machine installation	**CW/RS-06**: Shall inform Contractor A with any Rolling Stock requirements and Recommendations updating. Shall find an agreement with Contractor A for the resolution of any design change **CW/RS-06A**:Shall install special purpose machines

Reference documents*:*	Reference documents:
Contract A(Civil Depot***)***	**TEST & COMMISIONNING STAGE** Contract B(Rolling stock***)***
CW/RS-07: Shall conduct tests demonstrating that Depot maintenance facilities suit Rolling Stock needs.	**CW/RS-07:** Shall provide necessary support to Contractor A during Depot maintenance facilities tests and commissioning.
Reference documents :	Reference documents:
Contract A(Civil Depot***)***	**MAINTENANCE STAGE** Contract B(Rolling stock***)***
NIL	**NIL**
Reference documents:	Reference documents*:*

N4. INDICATIVE INTERFACE SHEET OF OVERHEAD CONTACT SYSTEM (OCS) and DEPOT CIVIL WORKS (CWD)

Mumbai Metro Interface Sheet	**Contract A**	**OCS**	**Contract B**	**CWD**	***Rev # :***	***A1***
					Date:	***10/01/17***
Approved by *:*	**OCS (Overhead Contact System)** Lead Contract		**Depot Civil Works** Participating Contract		First issue:	
GC issued by :						
Checked by :						

Interface description brief / Key elements (time schedule, physical, functional, ...) :

1.General Interface details between the Overhead Contact System (OCS) vs Depot Civil

Contract A(OCS)	**DESIGN STAGE**	Contract B(Depot Civil-DDC)
OCS/Depot-01: Shall provide the locations and load details of Drop Arms with fixing arrangement for OCS support in Sheds.		**OCS/Depot-01**: Shall design the Shed structures in depot considering the requirements of Contract A.
OCS/Depot-02: Shall provide location and load for anchoring of OCS tension lengths in wheel lathe and workshop sheds.		**OCS/Depot-02**: Shall design the shed structures and keep provision for holes for fixing arrangement as per the requirements of Contract A.
OCS/Depot-03: Shall provide the requirements of Duct banks for 33 kV Cables, 25 KV Cables, Traction Return Cables, Control Cables, and BEC in at grade section to Contract B.		**OCS/Depot-03**: Shall design the combined services drawings for at grade section considering the requirements of Contract A.

Mumbai Metro Interface Sheet	Contract A	OCS	Contract B	CWD	*Rev # :*	*A1*
					Date:	*10/01/17*
OCS/Depot-04: Shall provide the requirements of Duct banks for 25 KV Cables, Traction Return Cables, Control Cables and BEC in Depot to Contract B.			**OCS/Depot-04**: Shall design the combined services drawings for Depot considering the requirements of Contract A.			
OCS/Depot-05: Shall design safety interlocking system between Retractable Rigid OCS and Inspection Bay platform access doors.			**OCS/Depot-05**: Shall provide details of Access Door of Inspection Bay Platform.			
OCS/Depot-06: Shall design safety interlocking system between flexible OCS and heavy washing shed platform access door.			**OCS/Depot-06**: Shall provide details of Access Door of washing shed platform			
Reference documents*:*			Reference documents*:*			
Contract A(OCS)		**CONSTRUCTION / INSTALLATION STAGE**		Contract B(Depot Civil)		
OCS/Depot-07: Shall install fixing arrangements for Retractable OCS in inspection bay structural columns.			**OCS/Depot-07**: Shall drill holes for fixing Retractable OCS in inspection bay structural columns as per the requirements of Contract-A.			
OCS/Depot-08: Shall Install OCS drop arms in heavy washing shed.			**OCS/Depot-08:** Shall provide vertical steel supports with suitable fastenrs for fixing OCS drop arms in heavy washing shed.			
OCS/Depot-09: Shall supply and install 33 kV cables, 25 KV cables, traction return			**OCS/Depot-09:** Shall provide ductbanks / conduits for 33 kV cables, 25 KV cables, traction return cables, control cables, and BEC cables in at grade			

Mumbai Metro Interface Sheet	Contract A	OCS	Contract B	CWD	*Rev # :*	*A1*
					Date:	*10/01/17*
cables, control cables, and BEC cables in at grade section.			section.			
OCS/Depot-10: Shall supply and install 25 KV cables, traction return cables, control cables, and BEC cables in Depot.			**OCS/Depot-10:** Shall provide ductbanks / conduits for 25 KV cables, traction return cables, control cables, and BEC cables in Depot.			
OCS/Depot-11: Shall provide a safety interlocking arrangement between the OCS and inspection bay and heavy washing shed platform access doors.			**OCS/Depot-11:** Shall install the interlocking arrangement in inspection bay and heavy washing shed platform access doors.			
OCS/Depot-12: Shall Install anchoring plates in wheel lathe and workshop sheds.			**OCS/Depot-12:** Shall provide fixing points for anchoring plates.			
Reference documents:			Reference documents:			
Contract A(OCS)		**TEST & COMMISSIONING STAGE**		Contract B(Depot Civil)		
OCS/Depot-13: Shall test the interlocking arrangement of inspection bay and heavy washing shed platform access door with Contract B.			**OCS/Depot-13**: Shall witness the testing of interlocking arrangement for inspection bay and heavy washing shed platform access door.			
Reference documents :			Reference documents*:*			

Mumbai Metro Interface Sheet	**Contract A**	**OCS**	**Contract B**	**CWD**	***Rev # :***	***A1***
					Date:	***10/01/17***
Contract A(OCS)		**MAINTENANCE STAGE**		Contract B(Depot Civil)		
NIL			**NIL**			
Reference documents:			Reference documents:			

N5 . INDICATIVE INTERFACE SHEET OF SIGNALLING, TRAIN CONTROL, PSD & TELECOMMUNICATION (STPT) & DETAILED DESIGN CONSULTANT(DDC)

Mumbai Metro Interface Sheet	**Contract A**	**STPT**	**Contract B**	**DDC**	***Rev # :***	***A1***
					Date:	***06/02/2017***
Approved by *:*	**ST (Signalling Train Control, PSD &Telecommunication**) Lead Contract		**DDC (Detailed Design Consultant)** Participating Contract		First issue:	
GC issued by :						
Checked by :						

Interface description brief / Key elements (time schedule, physical, functional, ...) :

1.General Interface details between the Signalling Train control, PSD & Telecommunication vs. Detailed Design Consultant (DDC)

Contract A(Signalling Train Control, PSD & Telecommunication)	**DESIGN STAGE**	**Contract B (DDC)**
ST/DDC-01: a) Shall furnish detailed requirements (space, doors, mechanical load, lighting, false flooring, cable raceways (routing), Embedded conduits, vertical risers, cutouts, slab openings, air conditioning & ventilation arrangements, for etc.) for concerned rooms. a) Shall furnish the design details of radio masts on buildings, area and arrangement of fixtures, routing requirements for antenna cable, aviation warning lights and Earthing arrangements of the mast. Shall also check the adequacy of maintenance access for the radio mast, antenna etc b) shall furnish detailed drawings and load requirements of PSD at Aarey station Platform		**ST/DDC-01:** a) Shall integrate S&T detailed requirements and shall provide detailed design drawings of concerned rooms. b) Shall check the mast design details from the angle of structural safety including its fixtures in the structural design and also integrate cable routing arrangements for antenna cables, aviation warning lights and Earthing arrangements in the structural design. Plan for adequate maintenance access for radio mast, antenna etc. c) Shall incorporate in civil design

ST/DDC-02: a) Shall integrate the requirements of contractor B in the design of access control and intrusion detection system. **b)** Shall provide the details of fixture for ACID to DDC	**ST/DDC-02: a)** Shall advise the access control and intrusion detection requirement, as well as monitoring requirements, for various locations in the OCC, Aarey station, DCC, Depot perimeter fence and gate sensors and for access control vehicle barrier. Shall design the doors so as to be suitable for access control system. **b)** Shall incorporate in design the fixture details in the drawings.
ST/DDC-03 Shall furnish the detailed drawings and requirements (dimensions, cable weight, cable minimum bending radius, cable supporting and mounting details) of cable routing arrangements and containments.	**ST/DDC-03:** Shall incorporate all cable routings in combined services drawings and shall design the cable routing and containments within the yard, buildings and sheds.
ST/DDC-04: Shall provide detailed drawings and requirements with the locations, loads, type of fixing / mounting arrangements, etc. of all heavy S & T equipment like CCTV cameras, TDS clocks, PA speakers, CCTV monitors, etc. to be installed in concerned rooms and areas.	**ST/DDC-04:** Shall validate the locations and fixing arrangements in structural and detailed design.
ST/DDC-05: Shall furnish the requirements of lightning protection for different S&T systems to be installed	**ST/DDC-05:** Shall validate the location and installing procedure of lightning protection system.
ST/DDC-06: a) Shall Design the power cable requirement from OCC S&T UPS room to CER, OCC, DCC and all depot area. **b)** Shall design the S&T power cable requirement from Aarey station S&T UPS rooms to SER, TER SCR, and station area.	**ST/DDC-06: a)** Shall co-ordinate with contractor A to finalise the route for the power cable from UPS room to CER, OCC, DCC and all Depot area. **b)** The same as above for S&T power cable route from Aarey station (S&T UPS room) to SER, TER SCR, station area at same station
ST/DDC-07: Shall furnish the locations and sizes of foundations of all track side Signalling equipments like Signals,Masts, cable termination boxes, Point machines etc., in the depot.	**ST/DDC-07:** Shall design concrete including the expansion joints for all track side signalling equipments accordingly.

ST/DDC-08: Shall furnish the detailed layout drawings of line side equipments to be installed like signals, Masts, point machines, cable termination boxes, telephones, ATP / ATO equipments, Train stoppage beacons and location boxes etc. along the ramp.	**ST/DDC-08:** Shall suitably incorporate the detailed drawing prepared by contractor A.
Contract A(Signalling Train Control, PSD & Telecommunication)	**CONSTRUCTION / INSTALLATION STAGE** **Contract B (DDC)**
NIL.	**NIL**.
Contract A(Signalling Train Control, PSD & Telecommunication)	**TEST & COMMISSIONING STAGE** **Contract B (DDC)**
NIL	**NIL**
Contract A(Signalling Train Control, PSD & Telecommunication)	**MAINTENANCE STAGE** **Contract B (DDC)**
NIL	**NIL**

N6 -INDICATIVE INTERFACE SHEET OF SIGNALLING, TRAIN CONTROL, PSD & TELECOMMUNICATION (STPT) & DEPOT CIVIL WORKS (CWD)

Mumbai Metro Interface Sheet	**Contract A**	**STPT**	**Contract B**	**AFC**	***Rev # :***	***A2***
					Date:	***06/01/17***
Approved by *:*	**ST (Signalling Train Control, PSD &Telecommunication)** Lead Contract		**CWD (Civil Work Depot)** Participating Contract		First issue:	
GC issued by :						
Checked by :						

Interface description brief / Key elements (time schedule, physical, functional, ...) :

1.General Interface details between the Signalling Train control, PSD & Telecommunication vs. Civil Work Depot (CWD)

Contract A(Signalling Train Control, PSD & Telecommunication)	**CONSTRUCTION / INSTALLATION STAGE**	**Contract B(CWD)**
ST/CWD-01: a) Shall specifiy technical room sizes and details like false floor, false ceiling etc. b) Arrange and install masts antenna, antenna connections, aviation warning and Mast earthing.		**ST/CWD-01:** Shall provide the: a) Concerned rooms and other facilities mentioned here. b) Cable routing arrangements to enable contractor A and the E&M contractor to fix containments and lay cables. c) Fixing arrangements as needed for heavy equipment, cutouts, embedded conduits etc. for all S & T equipments for provide and assist in fixture for the mast and arrangements for maintenance access to the radio masts.
ST/CWD-02: Shall provide, install and fix all Telecommunication equipment, including cables with connections to individual devices.		**ST/CWD-02:** Shall provide the required heavy foundations and raceway. Shall provide the necessary support to contractor A during the installation of S & T equipment.

ST/CWD-03: Shall plan and coordinate the installation of S & T equipment with the progress of depot works, in accordance with the global depot coordination.	**ST/CWD-03:** Shall plan and coordinate the progress of depot works with the progress of S & T equipment installation in the depot.
ST/CWD-04: Shall install S&T UPS power cables from the distribution panel to all concerned rooms. Shall also arrange for distribution of power supply to all field S&T Equipments.	**ST/CWD-04:** Shall provide necessary cutouts and embedded conduits for routing and mounting of cables.
ST/CWD-05: Shall install the Access control & intrusion detection system for the OCC / DCC areas as well as the depot area and Aarey station.	**ST/CWD-05:** Shall ensure that the requirements are fully met. Co-ordinate with S&T contractor particularly for Access control and intrusion detection. For other systems general assistance as needed by S&T contractor shall be extended.
ST/CWD-06: Shall prepare foundations and install all track side signalling equipments like Signals, cable termination boxes, Point machines, axle counters, etc., in the depot	**ST/CWD-06: Shall provide concrete works with expansion joints before track slab is laid as per interface drawing**
ST/CWD-07: Shall install the line side S & T equipments like signals, Masts, ATP/ATO equipments, train stoppage beacons, location boxes, point machines, cable termination boxes, telephones, axle counters, along the ramp.	**ST/CWD-07: Shall provide the necessary arrangements to install line side S & T equipments like signals, Masts, ATP / ATO equipments, train stoppage beacons, location boxes, point machines, cable termination boxes, telephones,axle counters, etc along the ramp.**
ST/CWD-08: a) Shall install the MML3 LAN in the Depot all buildings in Depot, Aarey station to cover all the locations indicated by contractor A. b) Shall extend the FOTS-FO, FOTS-IP to all buildings in the depot area and terminate at a central distribution point in each building.	**ST/CWD-08:** a) Shall provide necessary cutouts and embedded conduits for routing and mounting of LAN cables. b) shall facilitate
ST/CWD-09: Shall install the PA, telephone, CCTV depot and Aarey station.	**ST/CWD-09:** Shall provide necessary assistance to install the PA, telephone, CCTV system.
ST/CWD-10: Shall supply mountings and fixtures to Depot contractor	**ST/CWD-10:** Shall install and assist in mounting and fixing arrangements for heavy equipments like CCTV monitors, display boards, clocks etc during the construction as per ST requirements. Keeping the structure strength in mind

ST/CWD-11: Shall install the equipments at OCC Depot and station like staff protection keys locks, emergency stop plungers, PIDS, PA System, Clocks, CCTV cameras and TV equipment etc	**ST/CWD-11:** Shall facilitate
ST/CWD-12: Shall lay all necessary cables in Depot, station and other areas	**ST/CWD-12:** Shall arrange Ducts and track crossings as per requirements. The material likes pipes etc. will be supplied by the S&T department.
ST/CWD-13: Shall furnish cable routing plan to Contractor B for PSD	**ST/CWD-13:** Shall construct cable ducts/containment for PSD cable
ST/CWD-14: Shall install PSD at platforms of station	**ST/CWD-14:** Shall co-ordinate and assist installation
ST/CWD-15: ST shall conduct Ergonomic study for OCC. The Floor levels, acoustic treatment, acoustic parameters of OCC should be provided by STPT to Civil Depot Contractor.	**ST/CWD-15:** Depot Civil shall be doing the False Floors and False Ceilings in consultation with Contractor A.
Contract A(Signalling Train Control, PSD & Telecommunication)	**TEST & COMMISSIONING STAGE** **Contract B (CWD)**
ST/CWD-16: Shall conduct testing jointly with depot, OHE and Rolling Stock Contractors.	**ST/CWD-16:** Shall attend the joint testing with S & T, OHE and Rolling Stock Contractors.
Contract A(Signalling Train Control, PSD & Telecommunication)	**MAINTENANCE STAGE** **Contract B(CWD)**
NIL	**NIL**

N7 . INDICATIVE INTERFACE SHEET OF UG TUNNEL (UGC-07) & DEPOT CIVIL WORKS (CWD)

Mumbai Metro Interface Sheet	**Contract A**	**UGC-07**	**Contract B**	**CWD**	***Rev # :***	***A1***
					Date:	***09/01/17***
Approved by *:*	**UG Tunnel (UGC-07)** Lead Contract		**Depot Civil Works(CWD)** Participating Contract		First issue:	
GC issued by :						
Checked by :						

General Interface details between Underground Tunnels and Depot Civil Works.

Contract A(UGC-07)	**DESIGN STAGE**	Contract B(CWD-DDC)
UG/CWD-01: Contractor-A shall design the cut &cover portion including the ramp leading to the Depot connection . The Contractor-A shall interface and coordinate with the Contractor-B on the following issues/requirements : **a)** Longitudinal profile at the Contract boundary and its approaches ; **b)** Formation /Rail level on depot connection (to be compatible with the base of ramp structure). **c)** Design parameters and the provisions required in the ramp structure for accommodating the approach slab(to be designed and provided by the Contractor-B) to be provided at the junction of RCC ramp structure with the at-grade formation(for the smooth transition from ballastless track on the ramp to the ballasted track on the formation).		**UG/CWD-01:** Contractor-B Shall exchange the required details with the Contractor-A to ensure the compatability of works to be done by the two contractors at the contract boundary and its approaches.
UG/CWD-02: Contractor-A shall Agree and incorporate Survey and Alignment details given by Contract-B		**UG/CWD-02:** Contractor-B Shall give particulars of Survey and Alignment details like Vertical and horizontal profile, rail level,gradient,radius and transition of curve at the junction point(contract boundary).

Mumbai Metro Interface Sheet	Contract A	UGC-07	Contract B	CWD	*Rev # :*	*A1*
					Date:	*09/01/17*
UG/CWD-03: Contractor-A shall Agree with the drainage scheme duly ensuring the compatibility and incorporate the drainage system/measures in the beginning of ramp given by Contractor-B.			**UG/CWD-03:** Contractor-B Shall design the drainage arrangements in depot at the junction of RCC ramp structure with the at-grade formation and its approaches to prevent (to the maximum extent possible) water entering from depot to the ramp/tunnels etc. and furnish the details of drainage System/measures required to be incorporated in the ramp structure.			
Reference documents:			Reference documents:			
Contract A(UGC-07)		**CONSTRUCTION / INSTALLATION STAGE**		Contract B(CWD)		
UG/CWD-04: Shall review the measures and agree for their adequacy			**UG/CWD-04**: Take measures and ensure that water doesn't enter from depot to the ramp/tunnels .			
UG/ CWD -05: Accept survey details of Depot connecting section			**UG/CWD-05**: Accept survey details of cut & cover portion including the ramp.			
Reference documents:			Reference documents:			
Contract A(UGC-07)		**TEST & COMMISSIONING STAGE**		Contract B(CWD)		
UG/CWD -*06*:Contractor-A shall co-ordinate with contractor-B and rolling stock contractor while conducting trial tests regarding kinematic and structural gauge checking and undertake corrective works in the profile wherever necessary.			**UG/CWD-06**: Contractor-B should attend for testing and commissioning work and do Corrective works in the profile where ever necessary			
Reference documents :			Reference documents*:*			

Mumbai Metro Interface Sheet	**Contract A**	**UGC-07**	**Contract B**	**CWD**	***Rev # :***	***A1***
					Date:	***09/01/17***
Contract A(CWD)		**MAINTENANCE STAGE**		Contract B(RST)		
NIL			**NIL**			
Reference documents:			Reference documents:			

N8. INDICATIVE INTERFACE SHEET OF DEPOT CIVILWORKS (CWD) & DEPOT E & M STATION(DEM)

Mumbai Metro Interface Sheet	**Contract A**	**CWD**	**Contract B**	**DEM**	***Rev # :***	***A1***
					Date:	***09/01/17***
Approved by *:*	**Depot Civil Works(CWD)** Lead Contract		**DEM (DEM Stations)** Participating Contract		First issue:	
GC issued by :						
Checked by :						
General Interface details between Civil work Depot(CWD) and DEM Stations(DEM)						
Contract A(CWD-DDC)	**DESIGN STAGE**			Contract B(DEM)		
CW/DEM-01:Shall provide the E&M requirement in the architectural drawings.			**CW/DEM-01**: Shall advice to Contract "A" regarding E&M requirement such as required cutout, sleeves, wall opening for all MEP services to be provided in architectural and structural design at Depot and Array Station.			
CW/DEM-02: Shall coordinate and provide requirement of Contract "B" in drawings			**CW/DEM-02**: Ensure all the required cut outs, sleeves and other provisions for E&M services as VAC, Fire Fighting, cable trays, etc. are in place as per the drawing and requirement.			
CW/DEM-03: Shall include Contract "B" requirement in the civil drawings.			**CW/DEM-03**: Shall advice the required trench layout for electrical cables with three types of trenches, one for HT cables, one for LT cables, and one combined for both LT & HT cables (required number of trenches will be designed considering minimum 750mm horizontal sufficient space for installation and maintenance works) pipe lines, etc. for various E&M services to be provided in the civil drawings.			

Mumbai Metro Interface Sheet	Contract A	CWD	Contract B	DEM	*Rev # :*	*A1*
					Date:	*09/01/17*
CW/DEM-04: Shall incorporate Contract "B" requirement in his false ceiling design. (Reflected Ceiling Plan).			***CW/DEM-04***: Shall provide required drawings to Contract "A" of lighting fixture mouting/fixing details, layout & design, fire alarm &fire fighting equipment's location, VAC equipments etc.			
CW/DEM-05: Shall incorporate Contract "B" E&M equipment loads in Structural design.			**CW/DEM-05:** Shall submit the E&M equipment's loads (weight) details and GAD to Contract "A".			
CW/DEM-06: Shall incorporate and provide the lifting hooks / chain pulley with rail arrangement for other E&M services as required.			**CW/DEM-06**: Shall submit the lifting hook, chain pulley with rail arrangement details / load requirements for all MEP services to Contract "A".			
CW/DEM-07: Shall incorporate foundation for Transformers, DG's, Compressor, VAC equipment, Firefighting pumps and other E&M equipment as required.			**CW/DEM-07**: Shall provide the Dimensional and load (in kgs / ton) details of E&M to Contract "A".			
CW/DEM-08: Shall design and construct the fire water tank, raw water tank and treated water tank.			**CW/DEM-08**: Shall coordinate and provide water requirement for fire fighting system, raw water and treated water to Contract "A".			
CW/DEM-09: Cable trench and manholes with top cover should be provided by civil. (RCC for External Trenches and Steel for Internal Trenches).			**CW/DEM-09**: Shall advice Contract "A" the E&M requirement with trench and manhole layout plan, etc. details and drawings.			
CW/DEM-10: Shall coordinate & provide Contractor "B" requirement			**CW/DEM-10**: Closing and sealing of cable trench at entry / exit point of trench / manholes to the building from external trench.			

Mumbai Metro Interface Sheet	Contract A	CWD	Contract B	DEM	*Rev # :*	*A1*
					Date:	*09/01/17*
CW/DEM-11: Shall provide the I/O points on open protocol for plumbing pumps, STP & ETP equipments, control panels, etc to Contract "B".			**CW/DEM-11**: Shall integrate with Depot E&M SCADA or BMS System.			
CW/DEM-12: Shall provide electrical power requirement for ETP, STP to Contract "B" for designing power distribution.			**CW/DEM-12**: Shall design and incorporate in the electrical distribution the requirements of Contract "A".(only power cables)			
CW/DEM-13: Shall co-ordinate & provide area required for earthing, the Soil resistivity report, etc. for Earth Mat Design.			**CW/DEM-13**: Shall advice to Contract "A" Earth mat area and shall design the Earth Mat in coordination with Civil Contractor.			
CW/DEM-14: Shall provide the Earthing and Bonding Details for Civil and Steel Structures.			**CW/DEM-14**: Shall advice to Contract "A" E&M Earthing design details requirements.			
CW/DEM-15: Shall provide to Contract "B" wall partition, glass glazing, roof sheeting, etc. specification and other details for designing of VAC works (In room wise matrix form).			**CW/DEM-15**: Shall detail VAC designs as per room detail inputs from Contract "A". (Shall detail A/c, Non A/c rooms etc).			
CW/DEM-16: Over head crane weight shall be incorporated in workshop's structural design as per requirement of contract "B".			**CW/DEM-16**: Shall advice to contact "A" the Overhead Crane details like types, Quantity, Capacity, weight, etc.for incorporation in structural design.			
CW/DEM-17: Shall design pump sizing, rating and head for the water supply pumps, sump pumps, horticulture pupms etc.			**CW/DEM-17**: Shall incorporate and design Control panel and electrical distribution system accordingly.			

Mumbai Metro Interface Sheet	Contract A	CWD	Contract B	DEM	*Rev # :*	*A1*
					Date:	*09/01/17*
Contract A(CWD)		**CONSTRUCTION / INSTALLATION STAGE**		Contract B(DEM)		
CW/DEM-18:Shall provide the Contract "B" requirements / details as mentioned under Design Stage above.			**CW/DEM-18**: Shall coordinate, verify and submit acceptance to Contract "A" works.			
CW/DEM-19:Shall share and incorporate the E&M requirements in the architectural false ceiling drawings			**CW/DEM-19**:Shall coordinate and advice with Contract "A" for requirement.			
CW/DEM-20:Shall provide the space for installation of raceways before finished flooring works.			**CW/DEM-20**:Shall install the required raceways before flooring works.			
CW/DEM-21:Shall install aligned Steel Girders for Overhead crane long travel movement.			**CW/DEM-21**:Shall verify the requiremets provided by contract "A".			
CW/DEM-22:Shall advice to Contract "B" the installation instructions for welding rails and all other peripheral accessories for Overhead Crane operations.			**CW/DEM-22**:Shall follow the advice of Contract "A" for completion of welding works for Crane operations.			
CW/DEM-23:Fixing work of Supporting arrangement for High Bay/Medium Bay Lighting to be provided.			**CW/DEM-23**:Shall arrange Lighting luminaires etc. with fixing arrangement.			
CW/DEM-24:Excavation and closing of area identified for earth mat will be done by Contract "A" in coordination with Contract "B".			**CW/DEM-24**:Shall share the design details of earth mat for excavation and cloaing of pits to Contract "A".			

Mumbai Metro Interface Sheet	**Contract A**	**CWD**	**Contract B**	**DEM**	***Rev # :***	***A1***
					Date:	***09/01/17***
CW/DEM-25:Contract "A" shall provide three types of cable trench with cover for electrical cables (first for onlyLT cables, second for only HT cables and third for both HT & LT combined), pipe lines, and Drainage lines for various MEP services in Depot to be provided in the civil drawings.			**CW/DEM-25**:Shall coordinate and advice to Contract "A"the requirements			
CW/DEM-26: Shall provide piping network for water supply system, strom water drainage system, horticulture sypply system and coordinate with contract "B" in installation of pumps.			**CW/DEM-26**:Shall provide water supply pumps, sump pumps, horticulture pupms etc. as requirement of Contract "A".			
Reference documents:			Reference documents:			
Contract A(CWD)		**TEST & COMMISSIONING STAGE**		Contract B(DEM)		
CW/DEM-27: Contract "A" shall conduct test run jointly with Contract "B" corrective works in the profile wherever necessary.			**CW/DEM-27**: Contract "A" shall conduct test run jointly with Contract "B"			
Reference documents :			Reference documents:			
Contract A(CWD)		**MAINTENANCE STAGE**		Contract B(DEM)		
NIL			**NIL**			
Reference documents:			Reference documents:			

N9. INDICATIVE INTERFACE SHEET OF DEPOT CIVIL WORKS (CWD) AND PYLON TERMINATION CONTRACTOR (PYL)

Mumbai Metro Interface Sheet	**Contract A**	**CWD**	**Contract B**	**PYL**	***Rev # :***	***A1***
					Date:	***09/01/17***
Approved by *:*	**Depot Civil Works(CWD)** Lead Contract		**Pylon Termination Contractor (PYL)** Participating Contract		First issue:	
GC issued by :						
Checked by :						
General Interface details between Depot Civil Works and Pylon Termination Contractor						
Contract A(CWD)	**CONSTRUCTION / INSTALLATION STAGE**			Contract B(PYL)		
CW/PY-01: Shall construct diversion road based on Termination yard layout			**CW/PY-01:**Shall mark termination yard layout on ground including working space required for construction of termination yard.			
CW/PY-02: Shall evolve construction methodology for underpass so that already constructed cable duct not damaged.			**CW/PY-02:**Shall complete cable duct nearer to underpass on priority and vacate the area for Contract A.			
CW/PY-03: Shall undertake construction work at existing pylons(4 nos) location only after Termination yard is commissioned and existing pylons including foundations dismantled.			**CW/PY-03:**Shall dismantle existing pylons including foundation without disturbing adjacent construction work carried out by Contract A.l			
Reference documents:			Reference documents:			
Contract A(CWD)	**TEST & COMMISSIONING STAGE**			Contract B(PYL)		

Mumbai Metro Interface Sheet	**Contract A**	**CWD**	**Contract B**	**PYL**	***Rev # :***	***A1***
					Date:	***09/01/17***
Reference documents :			Reference documents*:*			
Contract A(CWD)		**MAINTENANCE STAGE**		Contract B(PYL)		
NIL			**NIL**			
Reference documents:			Reference documents:			

N10 . INDICATIVE INTERFACE SHEET OF DEPOT EQUIPMENT(DEQ) AND DETAILED DESIGN CONSULTANT(DDC)

Mumbai Metro Interface Sheet	**Contract A**	**DEQ**	**Contract B**	**DDC**	***Rev # :***	**A0**
					Date:	**03-02-2017**
Approved by :	**Depot Equipment Contractor** (Interface Lead)		**Detailed Designed Consultant** (Interface Follower)		Last changes :	
GC issued by :						
GC Checked by :						

General Interface details between Depot Contractor and Detailed Designed Consultant

Contract A (Depot Equipment)	**DESIGN STAGE**	Contract B (Detailed Designed Consultant)
DE/DDC-01: Under-floor wheel lathe along-with Chip crusher, conveyor and Train Shunter – Shall provide details of civil requirements for building, Machine foundation, flooring, pit, drainage, etc.		**DE/DDC-01**: Shall prepare the civil construction drawings along with interfaces.
DE/DDC-02: **Railcar lifting system for 4 cars (Pit jacks)** – Shall provide requirements for foundation of equipment, Pits etc.		**DE/DDC-02**: Shall prepare the civil construction drawings along with interfaces.
DE/DDC-03: **Mobile lifting jacks for 8 cars** – Shall give requirements for Floor Surface, markings etc.		**DE/CW-03**: Shall prepare the civil construction drawings along with interfaces.
DE/DDC-04: **Bogie Turn Table** -Shall define the requirements for mounting foundation etc. for Bogie Turntables		**DE/DDC-04**: Shall prepare the civil construction drawings along with interfaces.
DE/DDC-05: **Automatic Train Wash Plant** - Shall define the floor and other foundations including the pipeline ducts, drainage, tanks etc. for the train wash plant. To lay the cables/conduit etc. to provide the Control of the Train Wash plant in DCC and shall co-ordinate the job with Depot Civil Works		**DE/DDC-05**: Shall prepare the civil construction drawings along with interfaces.

Contractor.	
DE/DDC-06: **Bogie Testing Bench** - Shall define the structure and foundation of the testing bench and to define the Civil require the testing bench	**DE/DDC-06**: Shall prepare the civil construction drawings along with interfaces.
DE/DDC-07: **Air Compressor for shop air supply with Piping Network –** Shall provide details for mounting, mounting elements, flooring, openings, trenches and other requirements. To define and lay the piping network for the compressed air from compressor room to workshop, etc.	**DE/DDC-07**: Shall prepare the civil construction drawings along with interfaces.
DE/DDC-08: **Pendant Type Travelling EOT cranes (for inspection bay & workshop) -** Shall define requirements for crane installation in inspection bay and workshop. To clear of the ceiling or roof of the building.	**DE/DDC-08**: Shall prepare the civil construction drawings along with interfaces.
DE/DDC-09: Any other Depot Equipment - Shall define the requirements for civil construction.	**DE/DDC-09**: Shall prepare the civil construction drawings along with interfaces.
Reference documents:	**Reference documents:**

N11 - INDICATIVE INTERFACE SHEET OF DETAILED DESIGN CONSULTANT(DDC) AND DEPOT CIVIL WORKS (CWD)

Mumbai Metro Interface Sheet	**Contract A**	**DDC**	**Contract B**	**CWD**	***Rev # :***	**A0**
					Date:	**03-02-2017**
Approved by :	**Detailed Design Consultant** (Interface Lead)		**Depot Civil Works Contractor** (Interface Follower)		Last changes :	
GC issued by :						
GC Checked by :						

General Interface details between Detailed Design Consultant Works and Depot Civil Works

Contract A (Detailed Design Consultant)	**CONSTRUCTION STAGE**	Contract B (Depot Civil Works)
DDC/CW-01: Under-floor wheel lathe along-with Chip crusher, conveyor and Train Shunter - Shall prepare the civil construction drawings along with interfaces.		**DDC/CW-01**: Shall construct Building, Pit, Floor, and Foundation for lathe, gantry for crane, drainage and electrical conduits for the Pit and opening in the Wall for Chip conveyor and all other civil requirements.
DDC/CW-02: **Railcar lifting system for 4 cars (Pit jacks)** - Shall prepare the civil construction drawings along with interfaces.		**DDC/CW-02**:Shall construct to build according to the requirements. The Depot Civil Works Contractor to provide the drainage for the Pit.
DDC/CW-03: **Mobile lifting jacks for 8 cars** - Shall prepare the civil construction drawings along with interfaces.		**DDC/CW-03**: Shall construct according to the requirements
DDC/CW-04: **Bogie Turn Table** - Shall prepare the civil construction drawings along with interfaces.		**DDC/CW-04**: Shall construct according to the requirements
DDC/CW-05: **Automatic Train Wash Plant** - Shall prepare the civil construction drawings along with interfaces.		**DDC/CW-05**: Shall construct according to the requirements. Provide the epoxy painting at the Train Wash Plant floor area if necessary. Depot Civil Works Contractor to conceal the Conduits etc. as defined and laid by the Depot Equipment Supplier.

DDC/CW-06: **Bogie Testing Bench** - Shall prepare the civil construction drawings along with interfaces.	**DDC/CW-06**: Shall construct according to the requirements.
DDC/CW-07: **Air Compressor for shop air supply with Piping Network** - : Shall prepare the civil construction drawings along with interfaces.	**DDC/CW-07:** Shall construct according to the requirements. To provide the passageway I trenches, etc. for the compressor piping network as defined by the Depot Equipment supplier.
DDC/CW-08: **Pendant Type Travelling EOT cranes (for inspection bay & workshop) -** Shall prepare the civil construction drawings along with interfaces.	**DDC/CW-08**: Shall construct according to the requirements. Build the columns, install girders, corbels/trusses, etc. to accommodate the mounting of the cranes.
DDC/CW-09: Any other Depot Equipment - Shall prepare the civil construction drawings along with interfaces.	**DDC/CW-09**: Shall construct according to the requirements.
Reference documents:	**Reference documents:**