



# UTTAR PRADESH METRO RAIL CORPORATION LIMITED

Administrative building, Vipin Khand, Gomtinagar, Lucknow - 226010  
E-mail id- [cecontractlmrc@gmail.com](mailto:cecontractlmrc@gmail.com)

CIN: U60300UP2013SGC060836  
Tel. : 0522-2304015 Fax : 0522-2304012

UPMRC/CE-CONTRACT/ AGCC-01/2020-21

Date: 14/09/2020

To,

**All Bidders**

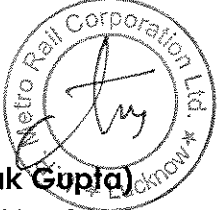
**Subject: - Reply to Pre-bid queries and Addendum-1 for tender AGCC-01.**

**Ref: - Tender AGCC-01:** Construction of elevated viaduct with 03 Nos. elevated stations (viz. Taj East Gate, Basai & Fatehabad Road Metro Station) and Metro Depot cum Workshop at 15th Battalion PAC, Agra including Civil, structural, Architectural Finishes, Water Supply, Sanitary Installation, Drainage, External Development, road works, VAC, Fire Fighting, Fire Detection, E&M works, PEB structures etc. on Priority Section of Corridor-1, Phase-I of Agra Metro at Agra, Uttar Pradesh, India.

Dear Sir,

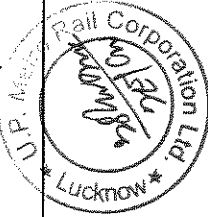
Please find enclosed herewith the reply to pre-bid queries and Addendum-01 to the tender AGCC-01. Further, the submission and opening dates are remained same i.e.

- Date & Time of submission of tender : **05.10.2020 upto 15:00 Hrs**
- Date & Time of opening of tender : **05.10.2020 @ 15:30 Hrs**

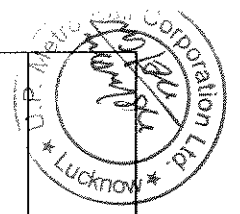
  
(Deepak Gupta)  
CE/Contract

**Reply to Pre-Bid Queries AGCC-01**

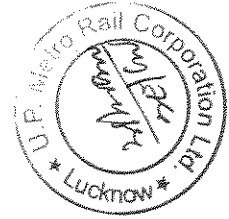
AGCC-01 : Construction of elevated viaduct and 3 Nos. elevated stations (viz. Taj East Gate, Basai & Fatehabad Road Metro Station) including Civil, Architectural Finishes, Water Supply, Sanitary Installation, Drainage, External Development, Fire Fighting, Fire Detection, E&M works and PEB structures on Priority Section of Corridor-1, Phase-1 of Agra Metro at Agra, Uttar Pradesh, India.				
S. No	Clause No.	Existing Clause	Bidder's Clarification	UPMRC's Reply
1	General	Soil Investigation Report	Please provide Soil Investigation report/ Bore logs taken along project alignment.	Geotechnical report is included in DPR for the project (which is available on UPMRCL website). Bidders should carry out any additional survey and/or site investigation works by themselves, should that be considered necessary by them. Kindly also refer clause A7 of ITT.
2	AutoCAD Drawings	Not Provided	Please provide AutoCAD drawings of GAD/Span arrangement, required only for planning purpose.	CAD drawings are being provided on e-mail as per the request of bidder. However in case of any discrepancy between the tender drawing/s and the AutoCAD drawing/s, the former shall prevail.
3		Piling Equipment Rotary Rig - 15Nos	Considering the quantum of work and duration, kindly revise minimum equipment list as below: Piling Equipment Rotary Rig- 4Nos	
4		Fully Automatic and Computerized Batching Plant -2 Nos. (each of 60 Cum/h) minimum or equivalent capacity in different configuration at casting yard with an RO of suitable capacity for proper quality of water.	Fully Automatic and Computerized Batching Plant -2 Nos. (each of 30 Cum/h) minimum or equivalent capacity in different configuration at casting yard with an RO of suitable capacity for proper quality of water.	
5	Vol 1, FORM OF TENDER	Concrete Pumps - 3Nos	Concrete Pumps - 2Nos	
6	APPENDIX 14 B, Minimum Equipments	Boom Placers - 4 Nos	Boom Placers - 1 Nos	Kindly refer to Annexure -2 of Addendum 1
7		Cranes in casting yard/site of suitable capacity - 4 Nos	Cranes in casting yard/site of suitable capacity - 2 Nos	
8		Cranes of suitable capacity for launching /Erection (400MT/ 350 MT) - 4 Nos	Cranes of suitable capacity for launching /Erection (400MT/ 350 MT) - 2 Nos	
9		Gantry of suitable capacity in casting yard - 4 Nos	Gantry of suitable capacity in casting yard - As required	
10		Minimum no. of Pre-casting beds (typical) - 21 Nos	Minimum no. of Pre-casting beds (typical) - As required	
11		Transit Mixtures - 10 Nos	Transit Mixtures - 6nos	
12		Trailers for carrying U Girder -150T capacity - 4Nos	Trailers for carrying U Girder -150T capacity - 2 nos	
13	Volume-2, GCC Cl No:4-12, Rights of way and Facilities, Pg.24	The Employer will acquire and provide land for Permanent Works and right of way (within UPMRC's land) for access thereto over routes established by the Contractor. Insurance for Works and Contractor's Equipment:-The Contractor shall insure the Plant, Rolling stock, Materials and Works in the joint names of the Employer, the Contractor and Sub-contractors (wherever applicable) against all loss or damage.	We request you provide status of land acquisition and provide schedule of land handing over.	Required land/areas shall be made available in accordance with Clause 2.2 of GCC.
14	Volume-2, GCC 15.2, Insurance for Works and Contractor's Equipment, Pg.72		As supply of rolling stock is not in the scope of present contract. Therefore we request you to remove rolling stock from Insurance requirements.	As per Tender Conditions. Kindly also read "wherever applicable" mentioned in brackets.



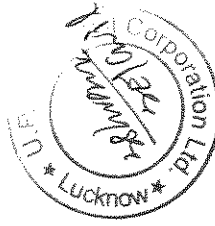
15	General	As per NIT the estimated value is Rs. 290.00 cr and in BOQ it is Rs. 281.75 cr. Request to please confirm.	Confirmed. Bidders are required to quote percentage (Above/At par/Below) over the BOQ value.
16	General	We request you to kindly provide the Auto CAD drawings for the subject project tender please.	CAD drawings are being provided on e-mail as per the request of bidder . However in case of any discrepancy between the tender drawing/s and the AutoCAD drawing/s, the former shall prevail.
17	General	We request you to kindly provide the Structural drawings (i.e. Both Reinforcement Details & Station Roof Structural drawings) please.	Detailed structural drawings for permanent works shall be provided by UPMRC to the successful bidder in execution stage after award of work (except for items where explicitly mentioned so in tender conditions/BOQ) and the contractor shall be paid for the work carried out by him under relevant BOQ items.
18	General	We request you to please provide Geotechnical report for the subject project tender.	Geotechnical report is included in DPR for the project (which is available on UPMRCL website). Bidders should carry out any additional survey and/or site investigation works by themselves, should that be considered necessary by them. Kindly also refer clause A7 of ITT.
19	General	Hindrance free site may please be handedover before commencement of work - Please confirm.	As per Tender Conditions. Kindly also refer clause 2.2 of GCC
20	General	Please confirm any working hours restriction is there for this project.	As per Tender Conditions. Kindly also refer clause A7 of ITT. The bidders should obtain the requisite information and satisfy themselves regarding the relevant site and working conditions. However, to the best of UPMRCL's knowledge, there is no such restriction in place. It must however be noted that Government / administration's rules, regulations & guidelines as applicable from time to time shall have to be complied.
21	Volume 2 - GCC & SCC - Clause 4.18	We request to kindly provide the water & power for construction works at one point within the project site at free of cost/ on chargeable basis.	As per Tender Conditions
22	Volume 3 - ER - Attachment A - Point no. 2	We request you to kindly provide the land for setting up our Site Office, Stores, Godowns, Precast Yard/Casting Yard, Fabrication Yard, Batching Plant, Labour Camp near by the proposed alignment and kindly mention the location of the same please.	As per Tender Conditions



23	General		We request to please provide the list of any approvals, clearances to be obtained by the Contractor.	As per Tender Conditions. Kindly also refer clause A7 of ITT.
24	Volume 2 - GCC & SCC - Clause 2.3		We request to please provide the List of Permits, License, etc., to be obtained by us for this tender.	As per Tender Conditions. Kindly also refer clause A7 of ITT.
25	Volume 1 - Annexure 10		We request to please confirm our scope of Design for the subject project, as the designer to be appointed by us.	As per Tender conditions. Design for permanent works shall be provided by UPMRC (except for items where explicitly mentioned so in tender conditions/SOQ). The contractor would be required to have his design team as specified in the tender document to do necessary design interface and for design of various temporary works , shop drawings and any other requirements specified in tender document.
26	Volume 2 - GCC & SCC - Clause 15.1		We request you to please confirm the % / Value of Professional Indemnity Insurance for the subject project tender.	As per Tender conditions
27	BOQ Rates		We request you to please confirm that the rates provided in the tender are including GST or excluding GST.	As per Tender conditions. Kindly also refer SCC Clause No. 11.1.1
28	Volume 2 - GCC & SCC - Clause 2.3	<p>Work Experience: The tenderers will be qualified only if they have completed work(s) during last Seven years ending 31.07.2020 as given below:</p> <p>(i) At least one "similar work" of value of Rs. 232 Crores or more OR</p> <p>(ii) Two "similar work" each of value of Rs. 145 Crores or more OR</p> <p>(iii) Three "similar work" each of value of Rs. 116 Crores or more</p> <p>The tenderer should have constructed at least one elevated metro station as a part of at least one "Similar Work" referred in para (i) / (ii) / (iii) above <u>or in any other separate contract of Metro Railways</u> - Request to please consider this our reasonable request please.</p>	<p>Work Experience: The tenderers will be qualified only if they have completed work(s) during last Seven years ending 31.07.2020 as given below:</p> <p>(i) At least one "similar work" of value of Rs. 232 Crores or more OR</p> <p>(ii) Two "similar work" each of value of Rs. 145 Crores or more OR</p> <p>(iii) Three "similar work" each of value of Rs. 116 Crores or more</p> <p>The tenderer should have constructed at least one elevated metro station as a part of at least one "Similar Work" referred in para (i) / (ii) / (iii) above <u>or in any other separate contract of Metro Railways</u> - Request to please consider this our reasonable request please.</p>	Kindly refer to Annexure -1 of Addendum 1
29	General		Also, we sincerely request you to kindly extend the due date of submission of tender by another 15 days i.e. upto 20.10.2020, to enable us to visit the site and get the competitive quotes from our various sub vendors and quote our tender competitively for the subject project.	As per Tender conditions



30	1.4.2. Minimum Eligibility Criteria: A. Work Experience	<p>“***Similar Work” for this contract shall be work of construction of Metro Viaduct having a pre-stressed concrete super structure, with or without elevated metro station (which may/may not include finishing work and E&amp;M works). The tenderer should have constructed at least one elevated metro station as a part of at least one “***Similar Work” referred in para (i) / (ii) / (iii) above.</p>	<p>The established construction companies in the highway/expressway sector, who execute bridges, flyovers, grade separators, inter-changes, toll plazas etc as part of respective projects, can able to execute the metro viaduct and elevated stations without any difficulty or inability or inadequacies. Depriving experienced and competent highway construction firms from bidding, by limiting the criterion to metro viaduct alone will not only unduly preclude wider competition but also reduce the competition. Therefore, experience in highway/expressway comprising concomitant structures may also be considered for qualification under the ‘Similar Works’</p>	Kindly refer to Annexure -1 of Addendum 1
31	1.4.1.i. Eligible Applicants:	<p>The tenders for this contract will be considered only from those tenderers who meet requisite eligibility criteria prescribed in the sub-clauses of clause 1.4 of NIT. Joint Ventures and consortiums are not allowed to participate in the tender.</p>	<p>In case the Authority has any constraint in rationalising the eligibility criteria by making it broad-based, Joint Ventures/Consortia may be allowed for the proposed project for wider participation and enhanced competition, like in several other metro projects in the country.</p>	As per Tender conditions.
32	General		<p>Your attention is invited to the Qualifying Criteria of the subject work. It is noticed that Joint Venture is not allowed in this tender whereas it is a standard practice in all depts like RVNL, Railways, NHAI, NHIDCL, MORTH, etc they allowed Joint Venture in all tenders. Infact, all Metro departments like DMRC, Kochi Metro, etc are also having the provision of JVs to facilitate healthy competition in the bid.</p>	As per Tender Conditions.



## Summary Sheet of ADDENDUM No.-1: Contract AGCC-01

Summary Sheet of Addendum-1 : Tender AGCC-01			
Tender AGCC-01: Construction of elevated viaduct with 03 Nos. elevated stations (viz. Taj East Gate, Basai & Fatehabad Road Metro Station) and Metro Depot cum Workshop at 15th Battalion PAC, Agra including Civil, structural, Architectural Finishes, Water Supply, Sanitary Installation, Drainage, External Development, road works, VAC, Fire Fighting, Fire Detection, E&M works, PEB structures etc. on Priority Section of Corridor-1, Phase-I of Agra Metro at Agra, Uttar Pradesh, India.			
S. NO.	Existing Clause / Pg. No.	Clause in Existing Tender Document	Revised Clause placed as Annexure/ Pg. No.
1	Clause 1.4.2 A, Bullet, NIT, Vol-1, Page-12	<p>• <b>***Similar Work***</b> for this contract shall be work of construction of Metro Viaduct having a pre-stressed concrete super structure, with or without elevated metro station (which may/may not include finishing work and E&amp;M works)</p> <p>• The tenderer should have constructed at least one elevated metro station as a part of at least one <b>***Similar Work***</b> referred in para (i) / (ii) / (iii) above.</p>	<p>• <b>***Similar Work***</b> for this contract shall be work of construction of Metro Viaduct/<u>Bridge/Flyover (excluding approaches &amp; embankments)</u> having a pre-stressed concrete super structure, with or without elevated metro station (which may/may not include finishing work and E&amp;M works)</p> <p>• The tenderer should have constructed at least one elevated metro station as a part of at least one <b>***Similar Work***</b> referred in para (i) / (ii) / (iii) above <u>or in any other separate contract of Metro Railway.</u></p>
2	Appendix 14B, FOT, Vol-1, Page-91	Please refer Appendix 14B of tender documents.	Please refer Revised Appendix 14B attached as Annexure 2.
3	Sr. no 3 of vendor list of E&M works, Technical Specification/E&M, Vol-5, Page-889	Ecko, KEI, Finolex, Havell, Bonton, Skytone, Polycab, Fort Gloster, NICCO, Universal, L&T	Ecko, KEI, Finolex, Havell, Bonton, Skytone, Polycab, Fort Gloster, NICCO, Universal, L&T, <b>Seiko</b>
4	Clause 4.2.1, Performance Security, GCC, Vol-2, Page-16	<p>Within 30 days from date of ..... acceptable to the Employer. The Extension of time for submission of Performance Security beyond 30 (Thirty) days up to 60 days from date of issue of LOA may be given by the Authority who is competent to sign the Contract Agreement. However, a Penal Interest of 15% per annum shall be charged for the entire period i.e. from the date of issue of LOA to the date of submission of Performance Security. In case the Contractor fails to submit the requisite Performance Security within 60 days from the date ..... provided in the "Instructions to Tenderers" shall be used for Bank Guarantee.</p>	<p>Within 30 days from date of ..... acceptable to the Employer. The Extension of time for submission of Performance Security beyond 30 (Thirty) days up to 60 days from date of issue of LOA may be given by the Authority who is competent to sign the Contract Agreement. However, a Penal Interest of 15% per annum shall be charged for the entire period i.e. from the date of issue of LOA to the date of submission of Performance Security. In case the Contractor fails to submit the requisite Performance Security within 60 30 days from the date ..... provided in the "Instructions to Tenderers" shall be used for Bank Guarantee.</p>
5	Page no 28, 73, 78, 79, 92, 93, 107 & 109 of BOQ, Vol-4	Please refer the page no 28, 73, 78, 79, 92, 93, 107 & 109 of BOQ of tender documents	Please refer the revised page no 28R, 73R, 78R, 79R, 92R, 93R, 107R & 109R of BOQ attached as Annexure 5 of Addendum-1.
6		Two nos. of additional drawing of Structure Earthing & Modelling & Bonding	Annexure 5, Page 28R, 73R, 78R, 79R, 92R, 93R, 107R & 109R Annexure 6, (additional Sheet 1 & 2)



**Contract AGCC-01:** Construction of elevated viaduct and 3 Nos. elevated stations (viz. Taj East Gate, Basai & Fatehabad Road Metro Station) including Civil, Architectural Finishes, Water Supply, Sanitary Installation, Drainage, External Development, Fire Fighting, Fire Detection, E&M works and PEB structures for on Priority Section of Corridor-1, Phase-I of Agra Metro at Agra, Uttar Pradesh, India.

**Annexure 1**

(i) At least one "similar work"\*\*\* of value of **Rs. 232 Crores** or more

OR

(ii) Two "similar work"\*\*\* each of value of **Rs. 145 Crores** or more

OR

(iii) Three "similar work"\*\*\* each of value of **Rs. 116 Crores** or more

- **\*\*\*Similar Work** for this contract shall be work of construction of Metro Viaduct/Bridge/Flyover (excluding approaches & embankments) having a pre-stressed concrete super structure, with or without elevated metro station (which may/may not include finishing work and E&M works)
- The tenderer should have constructed at least one elevated metro station as a part of at least one **\*\*\*Similar Work** referred in para (i) / (ii) / (iii) above **or in any other separate contract of Metro Railway.**

**Notes :**

- The tenderer shall submit details of work executed by them, in the Performa of **Annexure-1** for the works to be considered for qualification of work experience criteria. Documentary proof such as completion certificates from client clearly indicating the nature/scope of work, actual completion cost and actual date of completion for such work should be submitted. **The offers submitted without this documentary proof shall not be evaluated.** In case the work is executed for private client, copy of work order, bill of quantities, bill wise details of payment received certified by C.A., T.D.S certificates for all payments received and copy of final/last bill paid by client shall be submitted.
- Value of successfully completed portion of any ongoing work up to **31.07.2020** will also be considered for qualification of work experience criteria.
- For completed works, value of work done shall be updated to **31.07.2020** price level assuming 5% inflation for Indian Rupees every year and 2% for foreign currency portions per year. Selling rate of exchange at the close of business of the State Bank of India on the day twenty-eight days before the latest date of Tender Submittal shall be considered for calculating equivalent value in INR.
- In case, the qualifying work(s) were done by tenderer in JV/Consortium, then the value of work as per their percentage participation in such JV/Consortium shall be considered.
- If the tenderer does not have the experience of executing E&M works, then the tenderer will not be permitted to take up E&M works. In such case, tenderer will have to propose a sub-contractor. **The eligibility of the subcontractor shall be evaluated after award of work.** The contractor shall be required to submit undertaking for engaging subcontractor in Appendix 19.



**Contract AGCC-01:** Construction of elevated viaduct and 3 Nos. elevated stations (viz. Taj East Gate, Basai & Fatehabad Road Metro Station) including Civil, Architectural Finishes, Water Supply, Sanitary Installation, Drainage, External Development, Fire Fighting, Fire Detection, E&M works and PEB structures for on Priority Section of Corridor-1, Phase-I of Agra Metro at Agra, Uttar Pradesh, India.

Annexure 2

**FORM OF TENDER - APPENDIX 14 B**

**RESOURCES PROPOSED FOR THE PROJECT- PLANTS & EQUIPMENTS**

The figures indicated below are the minimum number of equipment required.

S. No.	Type of equipment required for the work	Minimum No. of Units of equipment required for the work (in good working conditions)
1	<b>Construction Equipments</b>	
a)	Piling Equipment Rotary Rig	15 6
b)	Fully Automatic and Computerized Batching Plant - <b>1 No (60 Cum/hr)/ 2 Nos. (each of 60 30 Cum/hr)</b> minimum or equivalent capacity in different configuration at casting yard with an RO of suitable capacity for proper quality of water.	120 60 cum/hr.
c)	Concrete Pumps	3 2
d)	Boom Placers	4 2
e)	Cranes in casting yard/site of suitable capacity	4 2
f)	Cranes of suitable capacity for station works	3
g)	Cranes of suitable capacity for launching /Erection (400MT/ 350 MT)	4+1 2+1
h)	Gantry of suitable capacity in casting yard	4 2
i)	Minimum no. of Pre-casting beds (typical)	21 6
j)	Transit Mixtures	10 6
k)	Trailers for carrying U Girder -150T capacity	4 2
l)	Lab Testing equipments-fully equipped for site tests.	As per requirement

**Seal & Signature of Authorised Signatory of the Tenderer**

**Note:**

1. In case contractor opts for short line method for casting, the no. of precasting beds would increase accordingly.





**Annexure 3**

**Contract AGCC-01:** Construction of elevated viaduct and 3 Nos. elevated stations (viz. Taj East Gate, Basai & Jhansi Road Metro Station) including Civil, Architectural Finishes, Water Supply, Sanitary Installation, Drainage, External Development, Fire Fighting, Fire Detection, E&M works and PEB structures for on Priority Section of Corridor-1, Phase-I of Agra Metro at Agra, Uttar Pradesh, India.

VENDOR LIST FOR E&M WORKS		
SN	Items	Approved makes
1	GI conduit pipes ISI Marked	BEC, AKG, Steelkraft and other equivalent ISI marked
2	GI Conduit Accessories	BEC, AKG and equivalent Conforming to BIS/ISI as per approved samples
3	Copper conductor FRLS PVC insulated wires ISI marked	Ecko, KEI, Finolex, Havell, Bonton, Skytone, Polycab, Fort Gloster, NICCO, Universal, L&T, <b>Seiko</b>
4	Modular System switches, socket outlets, and wiring accessories with moulded cover plates	Crabtree, MK Electric, CPL-obsession, MDS, Schneider, SSK, ABB North-West, Anchor, Legrand, Clipsal (Opel Series), L&T Clipsal series 2000
5	Miniature circuit breakers	L&T Hager, MDS, Siemens, Schneider, ABB, Legrand (Lexic)
6	Residual Current Earth Leakage circuit breakers	L&T Hager, MDS, Siemens, Merlin-Gerin, ABB, Schneider, Legrand (Lrxic)
7	MCB Distribution Boards	L&T Hager, MDS, Siemens, ABB, INDO ASIAN, Havells, GE, Tricolite, ECS, Associated Switchgears, Schneider, Unilec, Neptune, Anand Power, Adlec, Sudhir Genset Ltd, Legrand, Indoasian
8	Moulded Case Circuit Breakers	L&T, Siemens, ABB, Merlin Gerin, MDS Legrand, Schneider-NSX
9	Switch fuse units with HRC fuses	L&T, GE, Siemens, Control & Switchegear Limited, ABB, Merlin-Gerin, Crompton-Greaves
10	415 Volts ACBs	L&T, Siemens, ABB-Emax, Schneider, Merlin-Gerin, Electric-NW
11	Protective relays	Alsthom (AREVA), ABB, L&T, Siemens, Schneider, EPCOS
12	APFC Relay	Enercon, L&T, DUCATI, EPCOS AVOMECC, Syntron
13	MV/LV Switchboards	Tricolite-Schneider, ECS, L&T, GE, Associated Switchgears, Schneider-Electric, Unilec, Neptune (Elsteel) JV (Sri Lanka), Anand Power, Adlec, Sudhir Genset Limited, ABB, Advance, Ambit, Rittal, ABB-MAK Engineers, Sterling Generators, Control & Switchgear, Siemens
14	Copper/Aluminium, [Crimping type] Cable lugs for 1100 volt grade cables.	Dowells, Jainson
15	XLPE Cables (FRLSH)	Finolex, Asian/RPG, KEI, Cords Cable, Scot Innovation, Bonton. Fort-Gloster, SKYTONE, Polycab, NICCO, Universal, Havells
16	Compression glands for 1100 volt grade cables	Peeco, Comet, Dowells



- (d) the character of equipment and facilities needed preliminary to and during the manufacture, installation, execution, testing, Integrated Testing, and commissioning of the Works and remedying of any defects;
- (e) the protection of the environment and adjacent structures which will be necessary preliminary to and during the manufacture, installation, execution, testing, Integrated Testing, and commissioning of the Works and remedying of any defects;
- (f) the location of and the authorisation required for and the means of diversion of any services and facilities required for the purposes of the Works.

The Contractor shall whenever required by the Engineer, submit details of the arrangement and methods which the Contractor proposed to adopt for the execution of the Works. No alteration to these arrangements or methods shall be made without the approval of the Engineer.

**Performance  
security  
Amount**

**4.2  
4.2.1**

Within 30 days from date of issue of the Letter of Acceptance, the successful Tenderer shall furnish Performance Security, for an amount of ten per cent of the Contract value in types and proportions of currencies in which the Contract Price is payable either in the form of a Bank Draft, FDR or in the form of a Bank Guarantee from a branch in India of a scheduled foreign bank or from a scheduled commercial bank in India acceptable to the Employer. ~~The Extension of time for submission of Performance Security beyond 30 (Thirty) days up to 60 days from date of issue of LOA may be given by the Authority who is competent to sign the Contract Agreement. However, a Penal Interest of 15% per annum shall be charged for the entire period i.e. from the date of issue of LOA to the date of submission of Performance Security.~~ In case the Contractor fails to submit the requisite Performance Security within ~~60~~ **30** days from the date of issue of LOA, the Contract shall be annulled duly forfeiting Tender Security and other dues, if any payable against the Contract. The failed Contractor shall be debarred not only from participating in re-tender for that work but also in any other tender of UPMRC for a period of one year from date of issue of LOA. The approved form provided in the "Instructions to Tenderers" shall be used for Bank Guarantee.

The successful Tenderer shall have the following options for submission of Performance Security;

- i) Performance Security for an amount of 10% of Contract value, if the same is in the form of Bank Guarantee/FDR, it shall be valid up to 6 months beyond the Defect Liability Period, or
- ii) Performance Security in the form of two Bank Guarantees/FDRs, each for an amount of 5% of Contract Value with one Bank Guarantee/FDR valid up to 6 months beyond the date of completion of work and second Bank Guarantee/FDR valid up to 6 months beyond the Defect Liability Period, or



AGCC-01: Construction of elevated viaduct and 3 Nos. elevated Metro Stations (viz. Taj East Gate, Basai & Fatehabad Road) including Civil, Architectural Finishes, Water Supply, Fire-Fighting, Fire detection, E&M works and PEB structures on Priority Corridor-I of Agra Metro at Agra, Uttar Pradesh, India.

V04	PRECAST CONCRETE FOR SUPERSTRUCTURE / PIER CAP				
1a	Providing M 45/20 and M-50/20 concrete (cement as per technical specification) for casting, pre-stressing and curing of precast Normal/Cantilever Pier Caps/Cross arm pier cap supporting superstructure, in-situ connection with pier. The item includes lifting the pier caps from the mould and shifting the same to the stacking yard. The item includes provision of holes for lifting and filling of holes after erection using non-shrink cement mortar. (Note: the cost shall be inclusive of the cost of casting yard, gantry, moulds, providing cut outs where specified, curing arrangements as required, all handling, non-shrink cement mortar, non-shrink concrete for in-situ connection with pier, temporary support etc. complete). Reinforcement, anchorages, and HT strands sheathing shall be paid separately. Rate shall include cost of using required dosage of admixture in concrete for obtaining required workability as per approval of Engineer.	m <sup>3</sup>	2,064.00	12,825.35	2,64,71,522.40
1b	Providing M 50/20 (cement as per technical specification) for casting, pre-stressing and curing of precast Normal/Cantilever Pier Caps/Cross arm pier cap supporting superstructure, in-situ connection with pier. The item includes lifting the pier caps from the mould and shifting the same to the stacking yard. The item includes provision of holes for lifting and filling of holes after erection using non-shrink cement mortar. (Note: the cost shall be inclusive of the cost of casting yard, gantry, moulds, providing cut-outs where specified, curing arrangements as required, all handling, non-shrink cement mortar, non-shrink concrete for in-situ connection with pier, temporary support etc. complete). Reinforcement, anchorages, and HT strands sheathing shall be paid separately. Rate shall include cost	m <sup>3</sup>	672.25	12,825.35	86,21,867.19



AGCC-01: Construction of elevated viaduct and 3 Nos. elevated Metro Stations (viz. Taj East Gate, Basai & Fatehabad Road) including Civil, Architectural Finishes, Water Supply, Fire-Fighting, Fire detection, E&M works and PEB structures on Priority Corridor-1 of Agra Metro at Agra, Uttar Pradesh, India.

SUMMARY OF SCHEDULE-F (DSR 2018 ITEMS)		
S/NO.	ITEMS	AMOUNT (Rs.)
1	Earth work	15,04,687
2	Cement concrete & RCC concrete work	61,99,743
3	Brick work	1,93,42,448
4	Granite stone work	67,81,419 2,80,83,130
5	Metal works	98,67,667
6	Flooring work	14,73,576
7	Roofing work	2,81,560
8	Finishing work	69,11,591
9	Site development work	3,49,091
10	Waterproofing work	1,27,28,263
11	Structural glazing and aluminium composite panel work	3,47,92,863 1,33,73,158
12	Aluminium work	31,40,117
13	Water supply works	17,21,705
14	Drainage works	10,65,376
15	Rain water pipes works	2,71,946 1,17,993
16	Horticulture work	8,17,618 2,71,946
17	Any other items under DSR-2018.	1,66,66,668
	<b>GRAND TOTAL OF SCHEDULE F</b>	<b>12,30,98,719</b>



AGCC-01: Construction of elevated viaduct and 3 Nos. elevated Metro Stations (viz. Taj East Gate, Basai & Fatehabad Road) including Civil, Architectural Finishes, Water Supply, Fire-Fighting, Fire detection, E&M works and PEB structures on Priority Corridor-I of Agra Metro at Agra, Uttar Pradesh, India.

		Cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.				
4.8	8.32	Designing, fabricating, testing, installing and fixing in position Curtain Wall with Aluminium Composite Panel Cladding, with open grooves for linear as well as curvilinear portions of the building, for all heights and all levels etc. including:				
	a)	Structural analysis & design and preparation of shop drawings for pressure equalisation or rain screen principle as required, proper drainage of water to make it watertight including checking of all the structural and functional design.				
	b)	Providing, fabricating and supplying and fixing panels of aluminium composite panel cladding in pan shape in metallic colour of approved shades made out of 4 mm thick aluminium composite panel material consisting of 3mm thick FR grade mineral core sandwiched between two Aluminium sheets (each 0.5mm thick). The aluminium composite panel cladding sheet shall be coil coated, with Kynar 500 based PVDF / Lumiflon based fluoropolymer resin coating of approved colour and shade on face # 1 and polymer (Service) coating on face # 2 as specified using stainless steel screws, nuts, bolts, washers, cleats, weather silicone sealant, backer rods etc.				
	c)	The fastening brackets of Aluminium alloy 6005 T5 / MS with Hot Dip Galvanised with serrations and serrated washers to arrest the wind load movement, fasteners, SS 316 Pins and anchor bolts of approved make in SS 316, Nylon separators to prevent bi-metallic contacts all complete required to perform as per specification and drawing. The item includes cost of all material & labour component, the cost of all mock ups at site, cost of all samples of the individual components for testing in an approved laboratory, field tests on the assembled working curtain wall with aluminium composite panel	Sqm	1530 6472.62	4,309.80	65,93,994 2,78,95,704



AGCC-01: Construction of elevated viaduct and 3 Nos. elevated Metro Stations (viz. Taj East Gate, Basai & Fatehabad Road) including Civil, Architectural Finishes, Water Supply, Fire-Fighting, Fire detection, E&M works and PEB structures on Priority Corridor-I of Agra Metro at Agra, Uttar Pradesh, India.

		cladding, cleaning and protection of the curtain wall with aluminium composite panel cladding till the handing over of the building for occupation. Base frame work for ACP cladding is payable under the relevant aluminium items The Contractor shall provide curtain wall with aluminium composite panel cladding, having all the performance characteristics all complete, as per the Architectural drawings, as per item description, as specified, as per the approved shop drawings and as directed by the Engineer-in-Charge. However, for the purpose of payment, only the actual area on the external face of the curtain wall with Aluminium Composite Panel Cladding (including width of groove) shall be measured in sqm. up to two decimal places.				
		<b>Total for Granite Stone Works</b>				67,84,449 2,80,83,130
<b>5</b>		<b>METAL WORKS</b>				
5.1	10.25	Steel work welded in built up sections/ framed work including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required.				
5.1.1	10.25.1	In stringers, treads, landings etc. of stair cases, including use of chequered plate wherever required, all complete	kg	399	93.65	37,366
5.1.2	10.25.2	In gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	kg	18	131.00	2,358
5.2	10.16	Steel work in built up tubular (round, square or rectangular hollow tubes etc.) trusses etc., including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer, including welding and bolted with special shaped washers etc. complete.				
5.2.1	10.16.1	Hot finished welded type tubes	kg	68,493	143.45	98,25,321
5.3	10.26	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying priming coat of approved steel primer.				
5.3.1	10.26.1	M.S. tube	kg	18.00	145.65	2,622
		<b>Total for Metal Works</b>				98,67,667
<b>6</b>		<b>FLOORING WORK</b>				



AGCC-01: Construction of elevated viaduct and 3 Nos. elevated Metro Stations (viz. Taj East Gate, Basai & Fatehabad Road) including Civil, Architectural Finishes, Water Supply, Fire-Fighting, Fire detection, E&M works and PEB structures on Priority Corridor-I of Agra Metro at Agra, Uttar Pradesh, India.

	6	Onsite Test for Water Leakage for a pressure range 50 kpa to 240 kpa (35psi) upto 2000 ml	Sqm	399.00	2,949.30	11,76,771
11.3	25.3	Providing, assembling and supplying vision glass panels (IGUs) comprising of hermetically-sealed 6-12-6 mm insulated glass (double glazed) vision panel units of size and shape as required and specified, comprising of an outer heat strengthened float glass 6mm thick, of approved colour and shade with reflective soft coating on surface # 2 of approved colour and shade, an inner Heat strengthened clear float glass 6mm thick, spacer tube 12mm wide, desiccants, including primary seal and secondary seal (structural silicone sealant) etc. all complete for the required performances, as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer-in-Charge. The IGUs shall be assembled in the factory/workshop of the glass processor. (Payment for fixing of IGU Panels in the curtain glazing is included in cost of item No.25.2) For payment, only the actual area of glass on face # 1 of the glass panels (excluding the areas of the grooves and weather silicone sealant) provided and fixed in position, shall be measured in sqm. (i) Coloured tinted float glass 6mm thick substrate with reflective soft coating on face # 2, + 12mm Airgap + 6mm Heat Strengthened clear Glass of approved make having properties as visible Light transmittance (VLT) of 25 to 35 %, Light reflection internal 10 to 15%, light reflection external 10 to 20 %, shading coefficient (0.25-0.28) and U value of 3.0 to 3.3 W/m2 degree etc. The properties of performance glass shall be decided by technical sanctioning authority as per the site requirement.	sqm	6,900.00 311.247	3,250.95	2,24,31,555 10,11,849
11.4	25.4	Extra for openable side / top hung vision glass panels (IGUs) including providing and supplying at site all accessories and hardware's for the openable panels	sqm	2,261.25	3,163.10	71,52,560



AGCC-01: Construction of elevated viaduct and 3 Nos. elevated Metro Stations (viz. Taj East Gate, Basai & Fatehabad Road) including Civil, Architectural Finishes, Water Supply, Fire-Fighting, Fire detection, E&M works and PEB structures on Priority Corridor-1 of Agra Metro at Agra, Uttar Pradesh, India.

		as specified and of the approved make such as heavy duty stainless steel friction hinges, min 4-point criminalising sets with stainless steel plates, handles, buffers etc. including necessary stainless steel screws/ fasteners, nuts, bolts, washers etc. all complete as per the Architectural drawings, as per the approved shop drawings, as specified and as directed by the Engineer in- Charge.					
		<b>Total for Structural Glazing and Aluminium Composite Panel</b>					3,47,92,863 1,33,73,158
12		<b>ALUMINIUM WORK</b>					
12.1	21.1	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / paneling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in- charge. (Glazing, paneling and dash fasteners to be paid for separately):					
12.1.1	21.1.1	For fixed portion					
12.1.1.1	21.1.1.3	Polyester powder coated aluminium (minimum thickness of polyester powder coating 50 micron)	kg	6,666.00	464.70		30,97,690
12.2	21.8	Filling the gap in between aluminium frame & adjacent RCC/ Brick/ Stone work by providing weather silicon sealant over backer rod of approved quality as per architectural drawings and direction of Engineer-in-charge complete.					
12.2.1	21.8.1	Up to 5mm depth and 5 mm width	metre	534.00	79.45		42,426
		<b>Total for Aluminium Work</b>					31,40,117





AGCC-01; Construction of elevated viaduct and 3 Nos. elevated Metro Stations (viz. Taj East Gate, Basai & Fatehabad Road) including Civil, Architectural Finishes, Water Supply, Fire-Fighting, Fire detection, E&M works and PEB structures on Priority Corridor-1 of Agra Metro at Agra, Uttar Pradesh, India.

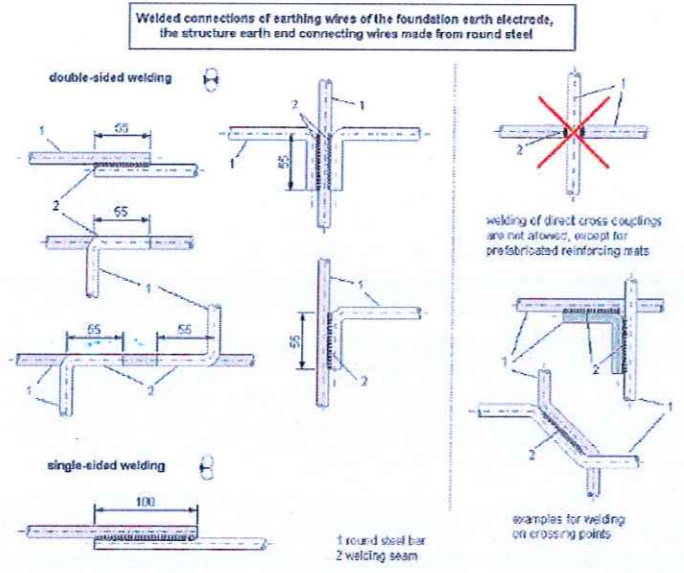
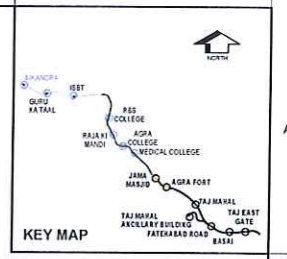
	specification and approved architectural drawings.				
2.6	Providing & Fixing 25 mm thick Polished Granite Coping (Polished up to diamond level and Sample should be approved by Engineer-in-Charge) one side bull-nosed on wall clading of any colour and shade (jet black/Lakha red or any as approved by engineer-in-charge) using cement mortar 1:4 (1 cement : 4 coarse sand), laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade, including rubbing, curing and polishing etc. including Chissel in wall and fixing, Rubbing, Curing, Moulding & polishing to edge to give high gloss finish etc. complete.	SQM	435	5549.64	24,14,093
2.7	Providing and laying Polished Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building, all complete as per the architectural drawings, with 25 mm thick Granite stone slab using cement mortar 1:4 (1 cement : 4 coarse sand), laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade, including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge.				
2.7.1	Polished Granite stone slab of any colour and shade (Jeerawal White or equivalent as approved by engineer-in-charge).	SQM	8000 7500	3559.12	2,84,72,960 2,66,93,400
2.7.2	Extra for using Honed granite in place of Polished granite 25 mm thickness	SQM	66	135.69	8,956
2.9	Extra of fixing of granite stone of 18 mm / 25 mm / 30 mm using chemical adhesive of approved make (BAL Endura / Duo-Bond / Laticrete / Bafer - mappai Of diamond rated) and epoxy grout mentioned in above items in place of cement mortar 1:4 (1 cement : 4 coarse sand), laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade.	SQM	166.68	482.59	80,438



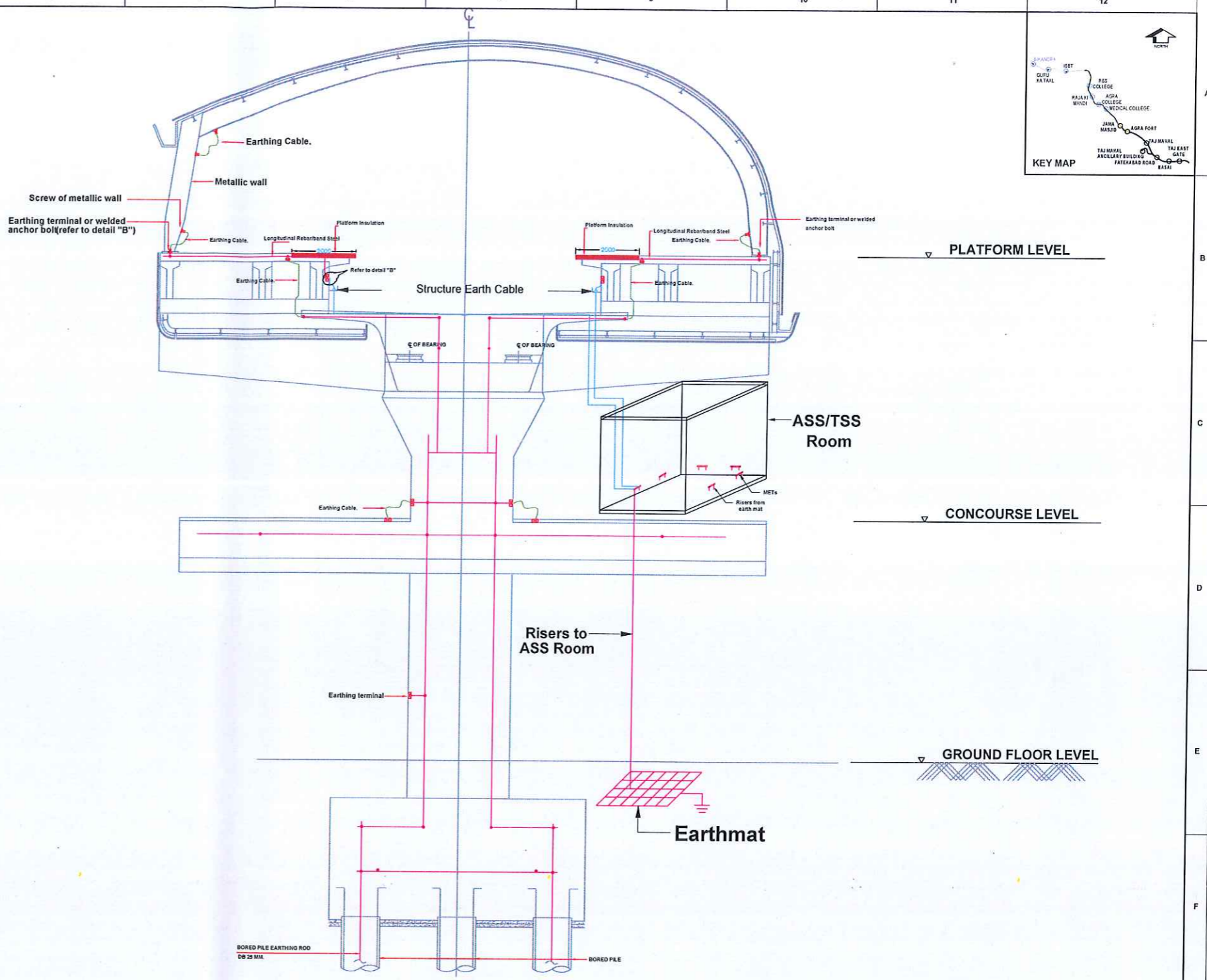
AGCC-01: Construction of elevated viaduct and 3 Nos. elevated Metro Stations (viz. Taj East Gate, Basai & Fatehabad Road) including Civil, Architectural Finishes, Water Supply, Fire-Fighting, Fire detection, E&M works and PEB structures on Priority Corridor-1 of Agra Metro at Agra, Uttar Pradesh, India.

	to complete the work. Nothing shall be paid extra.				
2.12	Providing and fixing heavy duty vitrified tiles of thickness between and equal to 15 mm to 17 mm on floor of any colour and shade as approved by Engineer-in-Charge. The tile should be fixed with chemical adhesive of approved make (BAL Endura / Duo-Bond / Laticrete Baber of diamond rated). The floor tile should be used with minimum gap by using spacer and the gap should be properly grouted with transparent epoxy grout of make (BAL Endura / Duo-Bond / Laticrete Baber of diamond rated), complete in all respect and as per specification and relevant architectural drawings. Before laying of the tile the Contractor should prepare smooth surface with level and gradients required for drainage system, well-coordinated with cable trenches, raceways, hume pipe and any utility as per approved combined services drawings and should take approval from Engineer-				
	in Charge. The rates include all materials (Heavy duty tile, Chemical Adhesive, epoxy grout, spacer and any if required), Labours, tools, plant and equipment surface preparation include free from efflorescence, laitance, dirt and other loose material. Nothing shall be paid extra.				
2.12.1	Heavy Duty Tile (Size: 600 mm x 600 mm)	SQM.	1440	1900.00	27,36,000
2.12.2	Heavy Duty Tile (Size: 1200 mm x 100 mm) of Yellow Colour	SQM.	36	2,307.50	83,070
2.13	Providing and fixing 15 mm thick engineered marble cladding on blockwork/brickwork/MS framework with SS pins or clamps as approved by engineer in charge. Cost includes engineered marble stone, clamps, pins etc. but not inclusive of MS framework. MS framework will be paid extra.	SQM.	370.74	4,800.00	17,79,560
	<b>Total sub head Granite/Stone/Tile Work</b>				5,02,73,571
3	<b>FLOORING WORKS</b>				
3.1	Providing and fixing access raised floor of light grade of minimum 15 KN/m <sup>2</sup> UDL panels manufactured from pressed formed corrosion resistant galvanised steel with total overwrap of one piece top,				





Details "A"



**Station Contactors Scope of Work**

- All dimensions are in mm unless specified otherwise.
- This Drawing is for tender purpose only. Detailed drawings shall be developed by Power Supply & Traction contractor in coordination with Station civil contractor and all embedded earthing works shall be implemented by station Civil Contractor.
- In all structure parts such as platform structure, concourse etc. either nominated rebars of 20mm diameter (314 mm<sup>2</sup> cross section) or dedicated steel of 500mm size shall be embedded in the following manner:
  - Longitudinal rebar / band steel from end to platform / concourse slab on either side (i.e. total for concourse slab and each for each platform)
  - Transverse rebar / band steel at the end (about 10m inside) of concourse / platform slabs
- The steel / nominated rebar shall be laid over the structural reinforcement and it should be ensured that it touches the reinforcement rebars adequately.
- The longitudinal steel / rebars shall be welded to structural reinforcement every 2m to ensure electrical continuity of the reinforcement.
- All embedded earthing conductors shall be covered by adequate concrete layers for corrosion protection.
- The intersection of Longitudinal / transverse rebar / band steel shall be welded connections.
- Reinforcement of station viaduct piers and other station piers shall be interconnected to concourse slabs' nominated rebar / steel by welded connection.
- Each platform at both end shall be connected to structure earth cable / conductor. The earth terminals (indicative location 'x' at about 10m inside the ends) shall be brought out near the location of structural earth cables. In addition to this, the earth terminals are required, as a minimum, for the following connection:
  - Connection of embedded conductors to other parts of the earthing system.
  - Connections between different parts of concrete structure (e.g. pre-fabricated parts, expansion joints)
  - Connection from structure earth to steel works.
  - Connection from structure earth to large metallic parts (e.g. escalator guide rails, escalator housing, handrails, large E&M Equipment like AFC ticket vending machine, access gates etc.)
- Each MET shall be connected to structure earth (or earth mat) through minimum two independent risers. The different METs shall also be interconnected inside ASS/TSS room.
- METs shall also be provided in other equipment rooms (to be interfaced between station E&M contractor and other respective designated contractors).
- All other equipment in station (lift, escalator, AFC equipment etc.) shall be earthed suitably using the connection points available from band steel arrangement or other suitable means.
- All station metallic structures (station metallic roof, its metallic columns etc.) shall be earthed likewise. 120mm<sup>2</sup> Al cable may be used, wherever required for connection and continuity.
- All structural expansion joints, the continuity of reinforcement / earthing shall be carried out through use of flexible Al cable of minimum 120mm<sup>2</sup> Al size (or 70mm<sup>2</sup> Cu cable), wherever required for connection and continuity.
- For validation of earthing installation embedded in the concrete of civil structures a declaration of conformity shall be handed over by civil works contractor for each civil structure the following as a minimum:
  - Proof of completeness and accessibility of all earthing terminal per segment
  - Electrical continuity test of all earthing terminals per segment
  - Measurement of resistance to earth of each pile foundation
- For lightning Protection of station building, down conductors shall be bonded to structure earth. The detail designing of this system is under the scope of station E&M contractor.
- The earth mat shall be provided as near to ASS/TSS room as practically possible.

**LEGEND**

01.		300 Sqmm (20mm diameter) rebar / band Steel
02.		Earthing Cable (120 mm <sup>2</sup> Al or 70mm <sup>2</sup> Cu)
03.		Structure Earth Cable
04.		METs
05.		Welded Joint
06.		b1,b2...b21 Earth Terminal

**NOTES**

- This is an indicative scheme for tender purpose only. It shall be contractor's responsibility to develop final scheme duly interfacing with designated contractors and obtain approval of Engineer.
- The Power Supply & Traction Contractor is the custodian of Earthing, Bonding, and Stray Current Control strategy for the entire project and therefore shall assume proactive & Lead role for all matters related to E&B and Stray Current Control measures.
- The Scheme shall be read in conjunction with Technical specifications and other tender documents as relevant.
- Exposed portion of MS strip to be galvanized.
- Minimum weld length shall be 55mm for double side weld and 100mm for single side weld.
- The number of the longitudinal rebar on concourse level is dependent on the width of the station. The longitudinal rebar to be connected to all plant rooms earthing bar as needed and to all metallic parts in station.
- Earth rebar on each column shall be interconnected and shall be connected to the earth rebar from last pier of the viaduct.
- The longitudinal connected of rebar inside track bed shall be same as cross section provided along the viaduct. This rebar shall have terminal to be connected at each end of platform to the structure earth cable running along the line.
- This Drawing is not to scale.

**REFERENCE DRAWINGS**

ISSUED FOR

AS BUILT DRAWING       TENDER PURPOSE

GOOD FOR CONSTRUCTION       PRELIMINARY/CONCEPTUAL DESIGN

CONSTRUCTION REFERENCE DRAWING

DO NOT SCALE

P, (PRELIMINARY) ISSUES ARE NOT TO BE USED FOR CONSTRUCTION / FABRICATION BUT ARE ISSUED FOR LIMITED PURPOSES ONLY AS INDICATED IN THE SMALL BLOCK ABOVE THIS BLOCK. CONSTRUCTION / FABRICATION WORK IS PERMITTED ON 'P' (RELEASED) ISSUES ONLY. INFORMATION CONTAINED WITHIN 'HOLD' IS NOT RELEASED FOR CONSTRUCTION / FABRICATION. FIELD MUST GET DESIGN OFFICE TO CLEAR HOLD IN TIME BEFORE PROCEEDING WITH ANY CONSTRUCTION / FABRICATION WORK RELATED TO 'HOLD'S.

PROPRIETARY RIGHTS OF THE INFORMATION CONTAINED HEREIN BELONGS TO AGCC. THIS INFORMATION IS INTENDED TO BE USED FOR THE MENTIONED PURPOSE / PROJECT ONLY. IN CASE OF MISUSE OF INFORMATION AND ANY CLAIM ARISING THEREOF, COST AND CONSEQUENCE WILL BE ON THE PARTY MISUSING THE INFORMATION.

FILE NAME: AGCC01-11718A-TDR-EST-TR-EBS-71623

PO	SIGN.	Pratik Thapar	Anil Jangid	Anil Jangid	29-07-2020					
ISSUE	DRN	DSN	CHD	AR	EL	IC	ME	PE/PM	APPD	DATE
CLEARED										
UTTAR PRADESH METRO RAIL CORPORATION LTD. AGDD-01(R1)-SIKANDRA TO TAJ EAST GATE CORRIDOR-1										
TYPICAL DETAILS OF STRUCTURE EARTHING AND BONDING FOR ELEVATED STATIONS (SHEET 1)										
TATA CONSULTING ENGINEERS LIMITED MUMBAI										
3TI PROGETTI S.p.A. ROME, ITALY										
LEAP INFRASYS PRIVATE LIMITED FARIDABAD										
SCALE: NTS	DC & DISC: DEL-TR	DRG NO: AGCC01-11718A-TDR-EST-TR-EBS-71623	ISSUE PO							

**IMPLEMENTED BY UPMRC**

NO OBJECTION FROM EMPLOYER IS BEING ACCORDED FOR DESIGN PRINCIPLES. HOWEVER, THE OVERALL RESPONSIBILITY FOR THE DESIGN ACCURACY LIES WITH THE DETAILED DESIGN CONSULTANT.

DESIGNATION	REMARKS	DATE	SIGNATURE

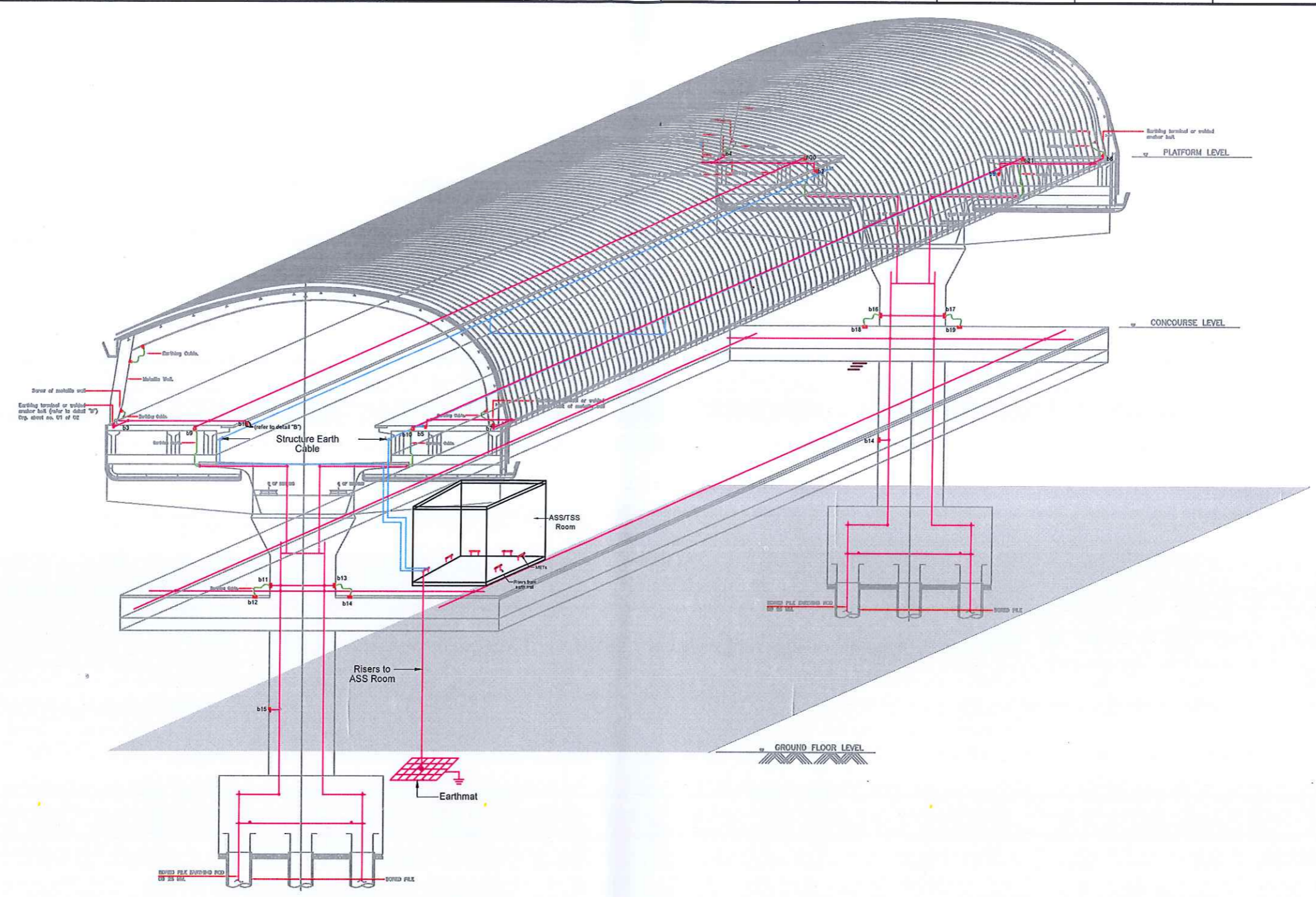
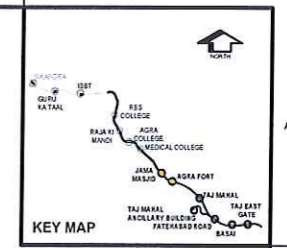
**REVISION SCHEDULE**

REV NO.	DESCRIPTION	DATE

DESIGNATION	REMARKS	DATE	SIGNATURE



*Handwritten signature and date: 29/07/20*



**LEGEND**

01.		300 Sq.mm(20mm diameter) rebar / band Steel
02.		Earthing Cable (120 mm <sup>2</sup> Al or 70mm <sup>2</sup> Cu)
03.		Structure Earth Cable
04.		METs
05.		Welded Joint
06.		b1,b2...b21 Earth Terminal

**NOTES**

01. This is an indicative scheme for tender purpose only. It shall be contractor's responsibility to develop final scheme duly interfacing with designated contractors and obtain approval of Engineer.
02. The Power Supply & Traction Contractor is the custodian of Earthing, Bonding, and Stray Current Control strategy for the entire project and therefore shall assume proactive & Lead role for all matters related to E&B and Stray Current Control measures.
03. The Scheme shall be read in conjunction with Technical specifications and other tender documents as relevant.
04. Exposed portion of MS strip to be galvanized.
05. Minimum weld length shall be 55mm for double side weld and 100mm for single side weld.
06. The number of the longitudinal rebar on concourse level is dependent on the width of the station. The longitudinal rebar to be connected to all plant rooms earthing bar as needed and to all metallic parts in station.
07. Earth rebar on each column shall be interconnected and shall be connected to the earth rebar from last pier of the viaduct.
08. The longitudinal connected of rebar inside track bed shall be same as cross section provided along the viaduct. This rebar shall have terminal to be connected at each end of platform to the structure earth cable running along the line.
09. This Drawing is not to scale.

**REFERENCE DRAWINGS**

ISSUED FOR

AS BUILT DRAWING       TENDER PURPOSE

GOOD FOR CONSTRUCTION       PRELIMINARY/CONCEPTUAL DESIGN

CONSTRUCTION REFERENCE DRAWING

DO NOT SCALE

P/P (PRELIMINARY) ISSUES ARE NOT TO BE USED FOR CONSTRUCTION/FABRICATION BUT ARE ISSUED FOR LIMITED PURPOSES ONLY AS INDICATED IN THE SMALL BLOCK ABOVE THIS BLOCK. CONSTRUCTION/FABRICATION WORK IS PERMITTED ON 'R' (RELEASED) ISSUES ONLY. INFORMATION CONTAINED WITHIN 'HOLD'S' IS NOT RELEASED FOR CONSTRUCTION/FABRICATION FIELD MUST GET DESIGN OFFICE TO CLEAR 'HOLD'S' IN TIME BEFORE PROCEEDING WITH ANY CONSTRUCTION/FABRICATION WORK RELATED TO 'HOLD'S'.

PROPRIETARY RIGHTS OF THE INFORMATION CONTAINED HEREIN BELONG TO TATA. THIS INFORMATION IS INTENDED TO BE USED ONLY FOR THE MENTIONED PURPOSE PROJECT ONLY. IN CASE OF MISUSE OF INFORMATION AND ANY CLAIM ARISING THEREOF, COST AND CONSEQUENCE WILL BE ON THE PARTY MISUSING THE INFORMATION.

FILE NAME: AGCC01-11718A-TDR-C01-TR-PWR-71928

PO	SIGN.	DATE	29-07-2020
ISSUE	DRN	DSN	CHD
CLEARED			
PE/PM    APPD    DATE			
<b>UTTAR PRADESH METRO RAIL CORPORATION LTD.</b> AGDD-01(R1)-SIKANDRA TO TAJ EAST GATE CORRIDOR-1			
TYPICAL DETAILS OF STRUCTURE EARTHING AND BONDING FOR ELEVATED STATIONS (SHEET 2)			
<b>TATA CONSULTING ENGINEERS LIMITED</b> MUMBAI			
<b>3TI PROGETTI S.p.A.</b> ROME, ITALY			
<b>LEAP INFRASYS PRIVATE LIMITED</b> FARIDABAD			
SCALE: NTS	DC & DISC: DEL/TR	OWG NO: AGCC01-11718A-TDR-C01-TR-PWR-71928	ISSUE P0
<small>AGDOC FORM NO. 091 R0</small>			

**REVISION SCHEDULE**

REV NO.	DESCRIPTION	DATE
P0		29-07-2020

**IMPLEMENTED BY UPMRC**

**"NO OBJECTION" FROM EMPLOYER**

NO OBJECTION FROM EMPLOYER IS BEING ACCORDED FOR DESIGN PRINCIPLES. HOWEVER, THE OVERALL RESPONSIBILITY FOR THE DESIGN ACCURACY LIES WITH THE DETAILED DESIGN CONSULTANT.

DESIGNATION	REMARKS	DATE	SIGNATURE



*Handwritten signature/initials in blue ink.*