



उत्तर प्रदेश मेट्रो रेल कॉर्पोरेशन लि०

UTTAR PRADESH METRO RAIL CORPORATION LTD.

(Formerly Known as Lucknow Metro Rail Corporation Ltd.)
(भारत सरकार एवं उत्तर प्रदेश सरकार का एक संयुक्त उपक्रम)
(A JOINT VENTURE OF GOVT. OF INDIA & GOVT. OF U.P.)

No. UPMRC/CE-Contract/AGSG -01/2022-23

Dated: 28.10.2022

ADDENDUM-05

Name of work: AGSG-01: Manufacturing, Supply, Installation, Testing and Commissioning of Signage and Graphics for 06 Nos. of Elevated Stations, 07 Nos. of Underground Stations & 01 Depot from Sikandra to Taj East Gate (Agra MRTS-corridor 1) for Agra Metro Rail Project.

Addendum-05 along with replies to pre-bid queries of above tender is being issued and uploaded on CPP Portal. Revised excel file of BOQ has also been uploaded on CPP Portal.

For any further modifications/changes (if any), bidders are advised to stay updated on e-tendering portal (<https://etenders.gov.in/e procure/app>) for information please.


(Indrajeet Verma)
CE/Contract

(AN ISO 9001:2015, ISO 14001:2015, OHSAS 18001:2007 Certified Company)

Administrative Building, Near Dr. Bhimrao Ambedkar Samajik Parivartan Sthal, Vipin Khand, Gomti Nagar, Lucknow 226010

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Tender AGSG-01 : Reply to Pre-Bid Queries

Tender AGSG-01: Manufacturing, Supply, Installation, Testing and Commissioning of Signage and Graphics for 06 Nos. of Elevated Stations, 07 Nos. of Underground Stations & 01 Depot from Sikandra to Taj East Gate (Agra MRTS-corridor 1) for Agra Metro Rail Project.

S. NO.	Clause No./ Volume/ Page No.	Existing Provision	Bidder's Query	UPMRC's Reply
1	Clause A2, Vol-1/NIT, Page 8	The Bidder shall obtain warranty certificate from O.E.M. regarding vinyl to be used in the project in original for 5 years of satisfactory field performance to be used in the project and upload the same during bid submission.	You had asked for "The bidder shall obtain Warranty Certificate from O.E.M regarding Vinyl to be used in the project in Original for 5 years of satisfactory Field performance to be used in the project and Upload the same during bid Submission. Kindly inform whether On Line Pre Qualification warranty is mandatory or not?"	5 Year on-site warranty for Vinyl signage is applicable. Clause A2 of 1.1.3.2 of NIT has been modified. Please refer Annexure 01 and 02 of addendum-05. Undertaking as per Appendix 18 (Annexure 2 of addendum 05) is mandatory.
2	Clause 1.19.1, Vol-4/Technical specifications of Page 14	Self Adhesive Vinyl should be of cast translucent type. Vinyl should be of approved from only 3M, LG or Equivalent.	In Volume 4 of Technical specifications for Vinyl/cast Vinyl/Retro Reflective Type XI/Block out films etc, you had mentioned 3 M / Avery make but in Clause no 1.19.1 (Page No 14, of Volume 4) under the head of Plotter cut self adhesive Vinyl Sheet graphics / text, you had included 3 M. LG or equivalent. a) in BOQ, all signage Items mentioned with 3M / Avery make. LG make is not mentioned b) Kindly clarify that can we consider LG/ Avery/3 M while quoting the tender?	Please refer Page 14R of Annexure 3 of Addendum 05. Revised BOQ has been uploaded in finance cover. Please refer Annexure 3 of Addendum 05.

Summary Sheet of ADDENDUM No.-05: Tender AGSG-01

Tender AGSG-01: Manufacturing, Supply, Installation, Testing and Commissioning of Signage and Graphics for 06 Nos. of Elevated Stations, 07 Nos. of Underground Stations & 01 Depot from Sikandra to Taj East Gate (Agra MRTS-corridor 1) for Agra Metro Rail Project.

S. NO.	Existing Clause / Pg. No.	Clause in Existing Tender Document	Revised Clause	Revised Clause placed as Annexure/ Pg. No.
1	Clause 1.1, to 1.1.18 of NIT Vol.-1/NIT, Page 1 to 11	-	Pages 1 to Page 11 of NIT has been replaced by Page 1R to Page 11R through this Addendum.	
(i)	Clause 1.1.2 of NIT	Tender Security amount : INR 15 Lakhs/-	Tender Security amount : INR 45- 30.00 Lakhs/-	
(ii)	Clause 1.1.3.2 A of NIT	<p>A-1 Work Experience: The tenderers will be qualified only if they have successfully carried out work(s) during last seven years ending last day of the month previous to the month of tender submission end date as given below: -</p> <p>(i) At least one “similar work” * of Rs 12.00 Crores or more. OR (ii) Two “similar works” * each of Rs 7.50 Crores or more. OR (iii) Three “similar works” * each of Rs 6.00 Crores or more.</p> <p>* “Similar work” for this contract shall be work involving Manufacturing and Supply (with or without installation) works of illuminated/reflective signages and graphics in infrastructure/ commercial projects like; Metro stations/ Airport/ Stadium/ Railway stations/ Highways/ Petrol pumps /commercial complexes etc.</p>	<p>A-1 Work Experience: The tenderers will be qualified only if they have successfully <u>completed or “substantially”** completed</u> carried out work(s) during last seven years ending last day of the month previous to the month of tender <u>Publish Date</u> submission end-date as given below: -</p> <p>(i) At least one “similar work” * of Rs 12.00 Crores or more. OR (ii) Two “similar works” * each of Rs 7.50 Crores or more. OR (iii) Three “similar works” * each of Rs 6.00 Crores or more.</p> <p>* “Similar work” for this contract shall be work involving Manufacturing and Supply (with or without installation) works of illuminated/reflective signages and graphics in infrastructure/ commercial projects like; Metro stations/ Airport/ Stadium/ Railway stations/ Highways/ Petrol pumps <u>Petroleum Sector/Banking Sector</u> /commercial complexes etc.</p> <p>** “Substantial” completion shall be based on 80 (eighty) per cent (value wise) or more works completed under the contract. Client Certificate for ‘substantial completion’ of project/work/asset should contain two parts. Part -I shall contain ‘financial value of work done’ and part-II shall contain ‘certificate of functional completion of project/work/asset’.</p>	Annexure 01 of Addendum-05, Page 1R to Page 11R
(iv)	Note of Clause 1.1.3.2 A of NIT	For completed works, value of work done shall be updated to last date of previous month of submission end of tender , price level assuming 5 % inflation for Indian Rupees every year and 2% for foreign currency portions per year	For completed works, value of work done shall be updated to last date of previous month of submission end of tender <u>Publish Date</u> , price level assuming 5 <u>7% per annum simple rate</u> inflation for Indian Rupees every year and 2% for foreign currency portions per year	
(v)	Clause 1.1.3.2 B (iv) of NIT	T4 - Annual Turnover: 'The average annual turnover from Signage works of last five audited financial years should be equal or more value of Rs. 6.00 Crores.	T4 - Annual Turnover: The average annual turnover from Signage works of last five audited financial years should be equal or more value of Rs. 6.00 Crores. <u>Average Annual Financial Turnover of the bidders during the last three years ending 31st March of the previous financial year should be at least Rs. 4.50 Crore.</u>	

S. NO.	Existing Clause / Pg. No.	Clause in Existing Tender Document	Revised Clause	Revised Clause placed as Annexure/ Pg. No.
(vi)	Clause 1.1.3.2 B (v) of NIT	Available Bid Capacity = 2*A*N – B	Available Bid Capacity = <u>1.5 2</u> *A*N – B	
2	Clause A2, Vol-1/NIT, Page 8	The Bidder shall obtain warranty certificate from O.E.M. regarding vinyl to be used in the project in original for 5 years of satisfactory field performance to be used in the project and upload the same during bid submission.	The Bidder shall obtain warranty certificate from O.E.M. regarding vinyl to be used in the project in original for 5 years of satisfactory field performance to be used in the project and upload the same during bid submission. <u>The bidder shall submit an undertaking for procurement of material as per Appendix-18 of Form of Tender(FOT). Offers without this undertaking are liable to be rejected.</u>	Annexure 01, Page 8R and Annexure 02 , Page 72 to Page 75 (Appendix- 18 along with Annexure A of FOT) of Addendum-05.
3	Page 1 to Page 29 of 'Vol-4/Technical Specifications		Pages 1 to Page 29 of Technical Specifications has been replaced by Page 1R to Page 29R through this Addendum.	Annexure 03 of Addendum-05, Page 1R to Page 29R.
4	Annexure 01 to Annexure 04 of NIT, Vol-1/NIT,Page 15 to Page 20	-	Pages 15 to Page 20 of NIT has been replaced by Page 15R to Page 20R through this Addendum.	Annexure 04 of Addendum-05, Page 15R to 20R
5	New Clause (Clause 14) of Employers requirement , Vol 3/Employers requirement, Page 06	-	New Clause 14 has been inserted in Page 6R through this addendum.	Annexure 05 of Addendum-05, Page 6R
6	Clause 24 (10.1 of GCC) of Vol. 2/SCC, Page 14	Defect liability period Following is added to Clause 10.1 of GCC. The Defect liability period (DLP) shall be 52 weeks.	Defect liability period Following is added to Clause 10.1 of GCC. The Defect liability period (DLP) shall be 52 weeks <u>5 years.</u>	Annexure 06 of Addendum-05, Page 14R
	Schedule 1(A) of Vol. 2/SCC, Page 23	(c) he will replace free of cost to the Employer any defect or failure of equipment provided in the Works for a period of 36 months from the date of Taking Over of the last Section of the Works; and (d) he agrees that should any design modification be required to any section or component due to any defect, the period of 36 months shall recommence from the date when the modified part is commissioned into service, and such modification shall be carried out free of cost to the Employer in all sub-systems and systems for all sections; and	(c) he will replace free of cost to the Employer any defect or failure of equipment provided in the Works for a period of 36 months <u>5 years</u> from the date of Taking Over of the last that Section of the Works; and (d) he agrees that should any design modification be required to any section or component due to any defect, the period of 36 months <u>5 years</u> shall recommence from the date when the modified part is commissioned into service, and such modification shall be carried out free of cost to the Employer in all sub-systems and systems for all sections; and	Annexure 07 of Addendum-05, Page 23R
	Appendix-01 of Vol 1 /FOT, Page 55	52 weeks after the date of issue of Taking-Over Certificate for the Whole of the Works.	52 weeks <u>5 years</u> after the date of issue of Taking-Over Certificate for the Whole of the Works.	Annexure 08 of Addendum-05, Page 55R
7	-	BOQ in excel format	<u>Revised excel file of BOQ uploaded in finance cover on CPP Portal.</u>	<u>Bidders are advised to go through the contents of revised BOQ and take note of it before quoting their offer.</u>

NOTICE INVITING TENDER (NIT)

1.1 GENERAL

1.1.1 Name of Work:

Uttar Pradesh Metro Rail Corporation (UPMRC) Ltd. invites open e-tenders from eligible applicants, who fulfil qualification criteria as stipulated in Clause 1.1.3 of NIT, for the work, **Contract AGSG-01: Manufacturing, Supply, Installation, Testing and Commissioning of Signage and Graphics for 06 Nos. of Elevated Stations, 07 Nos. of Underground Stations & 01 Depot from Sikandra to Taj East Gate (Agra MRTS-corridor 1) for Agra Metro Rail Project.**

The brief scope of the work and site information is provided in ITT clause A1 (Volume-1) & Employer Requirements (Volume-3).

1.1.2 Key details:

Approximate cost of work (NIT Value)	INR 15 Crores (inclusive of GST)
Tender Security amount	<p>INR 15 30.00 Lakhs/-</p> <p>The instrument type for payment of tender security/ EMD shall be Demand Draft, Bank Guarantee, RTGS, NEFT & IMPS. No other mode of payment will be accepted.</p> <p>(i) Payment of tender Security as per clause C 18.1.2(i) of ITT is to be made by RTGS, NEFT & IMPS. The details of bank account of UPMRC are mentioned below. The bidders are required to upload scanned copies of transaction of payment of tender security including e-receipt (clearly indicating UTR No. & tender reference must be entered in the remarks at the time of online transaction of payment, failing which payment may not be considered) at the time of online bid submission). (Copy of GST registration no. to be provided along with Tender security) Name of the Bank - HDFC Bank Banks Address - HDFC Bank Ltd, Tekari Chambers Ashok Marg, Lucknow Account Name - UPMRCL (Agra Project) Account No. - 50100301966491 IFSC code - HDFC0001267</p> <p>(ii) Payment of tender security as per clause C 18.1.2 (ii) of ITT is to be made by BG/Demand Draft. BG/Demand Draft shall be submitted in original in the office of CE/ Contract within due date and time of submission end date of tender.</p> <p>Validity of Tender Security in case of BG shall remain valid for a period of 45 days beyond the final bid validity period.</p>
Completion period of the Work	24 Months
Tender documents to	From 13th September 2022 (from 11:00 Hrs) to 17th October

be downloaded from e-tendering website	2022 (up to 15:00 Hrs) on e-tendering website https://etenders.gov.in/e procure/app Tender document can only be obtained on the website https://etenders.gov.in/e procure/app .
Cost of Tender documents	INR 23,600/- (inclusive of 18% GST) Non- Refundable (Payment of tender document cost/ tender fee is to be made only by RTGS, NEFT & IMPS. No other mode of payment will be accepted. The details of bank account of employer are mentioned below. The Tenderers are required to upload scanned copies of transaction of payment of tender document cost/tender fee including e-receipt (clearly indicating UTR No. & tender reference must be entered in the remarks at the time of online transaction of payment, failing which payment may not be considered at the time of evaluation of tenders). (Copy of GST registration no. to be provided along with Tender document cost/ tender fee, as applicable) Name of the Bank - HDFC Bank Banks Address - HDFC Bank Ltd, Tekari Chambers Ashok Marg, Lucknow Account Name - UPMRCL (Agra Project) Account No. - 50100301966491 IFSC code - HDFC0001267
Last date of Seeking Clarification	27th September 2022 upto 18:00 hrs. Tenderers to note that seeking clarification on the tender shall be done by sending it on e-tendering portal only. Seeking clarification by mail or post will not be considered. Queries/clarifications from Tenderers after due date and time shall not be acknowledged.
Pre-bid Meeting	27th September 2022 @ 15:00 Hrs The pre-bid meeting shall be conducted through video conferencing by software apps such as Google Meet, Microsoft Team, etc. All Prospective tenderers who have made online payment towards the cost of tender document shall provide the details of the person(s) (maximum up to two) who will be participating in such virtual meeting at least one day before the meeting to the registered official email of Employer i.e. cecontract@upmrcl.co.in along with scanned copy of transaction of payment of tender cost / tender fee, including e-receipt (clearly indicating UTR No. and tender reference, so that links having details such as software, meeting ID, password etc. can be mailed to these persons before the scheduled pre-bid meeting.
Date & time of Submission of Tender	Tender submission start date: 10th October 2022 (10:00 Hrs). Tender submission end date: 17th October 2022 (15:00 Hrs).
Date & time of opening of Tender	18th October 2022 @ 15:00 Hrs.

Authority and place for seeking clarifications etc.	Chief Engineer/ Contract, UPMRCL, Administrative Building, Vipin Khand, Gomti Nagar, Near Dr. Bhimrao Ambedkar Samajik Parivartan Sthal, Lucknow-226010, Uttar Pradesh, India https://etenders.gov.in/e procure/app
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Any clarification/corrigendum/addendum to the tender documents shall be uploaded on the official e-portal only, without any obligation of press notification.

For further details, please visit official e-portal <https://etenders.gov.in/e procure/app>.

For any additional information & help for downloading & uploading, please contact e-tendering service desk at the following ID: support-eproc@nic.in or at Toll Free No.: (91)120-4001002, (91)120-4001005, (91)120-6277787.

1.1.3 QUALIFICATION CRITERIA:

1.1.3.1 Eligible Applicants:

- i. The tenders for this contract will be considered only from those tenderers (proprietorship firms, partnerships firms, companies, corporations) who meet requisite eligibility criteria prescribed in the sub-clauses of clause 1.1.3 of NIT. **Joint Ventures and consortiums are not allowed to participate in the tenderer.**
- ii. A tenderer shall submit only one bid in the same tendering process. A tenderer who submits or participates in, more than one bid will cause all of the proposals in which the tenderer has participated to be disqualified. No tenderer can be a subcontractor while submitting a bid in the same bidding process.
- iii. **(a)** Tenderers shall not have a conflict of interest. All Tenderers found to have a conflict of interest shall be disqualified. Tenderers shall be considered to have a conflict of interest with one or more parties in this bidding process, if: **participation by a bidding firm or any of its affiliates that are either involved in the consultancy contract to which this procurement is linked; or if they are part of more than one bid in the procurement; or if the bidding firm or their personnel have relationships or financial or business transactions with any official of procuring entity who are directly or indirectly related to tender or execution process of contract; or improper use of information obtained by the (prospective) bidder from the procuring entity with an intent to gain unfair advantage in the procurement process or for personal gain.**
 - ~~(a) a tenderer has been engaged by the Employer to provide consulting services for the preparation related to procurement for on implementation of the project;~~
 - ~~(b) a tenderer is any associates/affiliates (inclusive of parent firms) mentioned in subparagraph (a) above; or~~
 - ~~(c) a tenderer lends, or temporarily seconds its personnel to firms or organisations which are engaged in consulting services for the preparation related to procurement for on implementation of the project, if the personnel would be involved in any capacity on the same project.~~**(b)** ~~(d)~~ The Tenderer / applicant, O.E.M must not have been blacklisted, debarred or convicted as on the due date of submission of bid by Government of India/ State Government / C.C.I / Government

undertaking. The **tenderer should submit an undertaking to this effect in Form of Tender. The tenderer shall also submit a "Verification Statement" to this effect as per proforma placed at Annexure 1A of ITT.**

iv. Participation by Subsidiary Company / Parent Company with credential of other Company

- a) Applicant in the capacity of a Subsidiary Company as a single entity is not permitted to use the credential of its Parent Company and/or its Sister Subsidiary Company/ Companies.
- b) Applicant in the capacity of a Parent Company as a single entity is not permitted to use the credential of its Subsidiary Company/ Companies.

v. Purchase Preference to Local Suppliers/Preference to Make in India:

a) Definitions:

- i. 'Local content' means the amount of value added in India which shall be the total value of the item procured (excluding net domestic indirect taxes) minus the value of imported content in the item (including all custom duties) as a proportion of the total value, in percent. Minimum local content shall be 80% for the subject tender.
- ii. 'Local Supplier' means a supplier or service provider whose product or service offered for procurement meets the minimum local content as prescribed at sr. no. i. above.
- iii. 'L1' means the lowest valid eligible tender or lowest bid received in a tender, bidding process or other procurement solicitation as adjudged in the evaluation process as per the tender or other procurement solicitation.
- iv. 'Margin of purchase preference' means the maximum extent to which the price quoted by a local supplier may be above the L1 for the purpose of purchase preference. Margin of purchase preference shall be 20% for the subject tender.

b) Procedure for Purchase Preference in procurement of goods or works which are divisible in nature: NOT APPLICABLE FOR THE SUBJECT TENDER.

- i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract for full quantity will be awarded to L1.
- ii. If L1 bid is not from a local supplier, 50% of the order quantity shall be awarded to L1. Thereafter, the lowest bidder among the local suppliers, will be invited to match the L1 price for the remaining 50% quantity subject to the local supplier's quoted price falling within the margin of purchase preference, and contract for that quantity shall be awarded to such local supplier subject to matching the L1 price.
- iii. In case such lowest eligible local supplier fails to match the L1 price or accepts less than the offered quantity, the next higher local supplier within the margin of purchase preference shall be invited to match the L1 price for remaining quantity and so on, and contract shall be awarded accordingly.
- iv. In case some quantity is still left uncovered on local suppliers, then such balance quantity may also be ordered on the L1 bidder.

c) Procedure for Purchase Preference in procurement of goods or works which are

not divisible in nature and in procurement of services where the bid is evaluated on price alone: APPLICABLE FOR THE SUBJECT TENDER.

- i. Among all qualified bids, the lowest bid will be termed as L1. If L1 is from a local supplier, the contract will be awarded to L1.
- ii. If L1 is not from a local supplier, the lowest bidder among the local suppliers, will be invited to match the L1 price subject to local supplier's quoted price falling within the margin of purchase preference, and the contract shall be awarded to such local supplier subject to matching the L1 price.
- iii. In case such lowest eligible local supplier fails to match the L1 price, the local supplier with the next higher bid within the margin of purchase preference shall be invited to match the L1 price and so on and contract shall be awarded accordingly.
- iv. In case none of the local suppliers within the margin of purchase preference matches the L1 price, then the contract may be awarded to the L1 bidder.

d) Minimum local content and verification of local content:

- i. The local supplier at the time of tender shall be required to provide self-certification that the item offered meets the minimum local content and shall give details of the location(s) at which the local value addition is made.
- ii. In case of procurement for a value in excess of Rs. 10 crores, the local supplier shall be required to provide a certificate from the statutory auditor or cost auditor of the company or from a practicing cost accountant or practicing chartered accountant giving the percentage of local content after completion of works to the Engineer.
- iii. If any false declaration regarding local content is found, the company shall be debarred for a period of three years from participating in tenders of all metro rail companies.
- iv. Supplier/bidder shall give the details of the local content in a format attached as **Appendix-15** and **Appendix-16** of FOT duly filled to be uploaded along with the technical bid. In case, bidder do not submit **Appendix-15** and **Appendix-16** of FOT duly filled along with their technical bid, local content shall be considered as 'Nil' in tender evaluation.

e) Complaints relating to implementation of Purchase Preference

Fees for such complaints shall be Rs. 2 Lakh or 1% of the value of the local item being procured (subject to maximum of Rs. 5 Lakh), whichever is higher. In case the complaint is found to be incorrect, the complaint fee shall be forfeited. In case, the complaint is upheld and found to be substantially correct, deposited fee of the complainant would be refunded without any interest.

- vi. **Restriction of Bidders from Countries sharing Land Borders with India as per Ministry of Finance order (Public Procurement No. 1) F.No.6/18/2019-PPD dated 23.07.2020.**

Any bidder from a country which shares a land border with India will be eligible to bid either as a single entity or as a member of a JV / Consortium with others, in any procurement whether of goods, services (including consultancy services and non-

consultancy services) or works (including turnkey projects) only if the bidder is registered with the Competent Authority. The Competent Authority for registration will be the Registration Committee constituted by the Department for Promotion of Industry and Internal trade (DPIIT). Political & Security clearance from the Ministries of External and Home Affairs respectively will be mandatory. However, above condition shall not apply to bidders from those countries (even if sharing a land border with India) to which the Government of India has extended lines of credit or in which the Government of India is engaged in development projects. *Updated lists of countries to which lines of credit have been extended or in which development projects are undertaken are given in the website of the Ministry of External Affairs.*

"The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority".

Definitions pertaining to "Restriction of Bidders from Countries sharing Land Borders with India" Clause

"Bidder" (including the term 'tenderer', 'consultant' 'vendor' or 'service provider' in certain contexts) means any person or firm or company, including any member of a consortium or joint venture (that is an association of several persons, or firms or companies), every artificial juridical person not falling in any of the descriptions of bidders stated hereinbefore, including any agency, branch or office controlled by such person, participating in a procurement process.

"Bidder from a country which shares a land border with India" means:

- a) An entity incorporated, established or registered in such a country; or
- b) A subsidiary of an entity incorporated, established or registered in such a country; or
- c) An entity substantially controlled through entities incorporated, established or registered in such a country; or
- d) An entity whose beneficial owner is situated in such a country; or
- e) An Indian (or other) agent of such an entity; or
- f) A natural person who is a citizen of such a country; or
- g) A consortium or joint venture where any member of the consortium or joint venture falls under any of the above

"Beneficial owner" will be as under:

- (i) In case of a company or Limited Liability Partnership, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person(s), has a controlling ownership interest or who exercises control through other means. Explanation—
 - a. **"Controlling ownership interest"** means ownership of, or entitlement to, more than twenty-five per cent of shares or capital or profits of the company;
 - b. **"Control"** shall include the right to appoint the majority of the directors or to control the management or policy decisions, including by virtue of their shareholding or management rights or shareholder's agreements or voting agreements;
- (i) In case of a partnership firm, the beneficial owner is the natural person(s) who,

whether acting alone or together, or through one or more juridical person, has ownership of entitlement to more than fifteen percent of capital or profits of the partnership;

- (ii) In case of an unincorporated association or body of individuals, the beneficial owner is the natural person(s), who, whether acting alone or together, or through one or more juridical person, has ownership of or entitlement to more than fifteen percent of the property or capital or profits of such association or body of individuals;
- (iii) Where no natural person is identified under (i) or (ii) or (iii) above, the beneficial owner is the relevant natural person who holds the position of senior managing official;
- (iv) In case of a trust, the identification of beneficial owner(s) shall include identification of the author of the trust, the trustee, the beneficiaries with fifteen percent or more interest in the trust and any other natural person exercising ultimate effective control over the trust through a chain of control or ownership.
 - i. "Agent" is a person employed to do any act for another, or to represent another in dealings with third persons.
 - ii. The successful bidder shall not be allowed to sub-contract works to any contractor from a country which shares a land border with India unless such contractor is registered with the Competent Authority. In this regard, bidder has to submit an undertaking as per **Appendix-17 of FOT**.

1.1.3.2 Minimum Eligibility Criteria:

A. The tenderers will be qualified only if they satisfy the criteria as given in para A-1 below ~~during last seven years ending last date of previous month of submission end date of tender.~~

A-1 Work Experience: The tenderers will be qualified only if they have successfully **completed or "substantially"*** completed** ~~carried out~~ work(s) during last seven years ending last day of the month previous to the month of tender **Publish Date** ~~submission end date~~ as given below: -

(i) At least one "similar work" * of **Rs 12.00 Crores or more.**

OR

(ii) Two "similar works" * each of **Rs 7.50 Crores or more.**

OR

(iii) Three "similar works" * each of **Rs 6.00 Crores or more.**

* "Similar work" for this contract shall be work involving Manufacturing and Supply (with or without installation) works of illuminated/reflective signages and graphics in infrastructure/ commercial projects like; Metro stations/ Airport/ Stadium/ Railway stations/ Highways/ ~~Petrol pumps~~ Petroleum Sector/Banking Sector/commercial complexes etc.

**** "Substantial" completion shall be based on 80 (eighty) per cent (value wise) or more works completed under the contract. Client Certificate for 'substantial completion' of project/work/asset should contain two parts. Part -I shall contain 'financial value of work done' and part-II shall contain 'certificate of functional completion of project/work/asset'.**

NOTE:

- The tenderer shall submit details of work executed by them, in the Proforma 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/purchase orders, bill of quantities, bill wise details of payment received certified by Chartered Accountant (C.A) and certification of all payments received from clients should be certified by bank. Tax Deducted at Source (TDS) 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~~ **Substantially completed** signage work up to last date of previous month of submission ~~and date of tender~~ **Publish Date shall** will also be considered for qualification of work experience criteria.

For completed works, value of work done shall be updated to last date of previous month of submission ~~and of tender~~ **Publish Date**, price level assuming ~~5%~~ **7% per annum simple rate** inflation for Indian Rupees every year and 2% for foreign currency portions per year. Selling rate of exchange rate at the close of business of the State Bank of India on the day twenty eighth days before the latest date of Tender Submittal shall be considered for calculating equivalent value in INR.

- Criteria for similar work experience shall be satisfied by a single entity.

A-2 . ~~The Bidder shall obtain warranty certificate from O.E.M. regarding vinyl to be used in the project in original for 5 years of satisfactory field performance to be used in the project and upload the same during bid submission.~~ **The bidder shall submit an undertaking for procurement of material along with tender offer as per Appendix-18 of Form of Tender(FOT). Offers without this undertaking are liable to be rejected.**

B. Financial Standing: The tenderers will be qualified only if they have minimum financial capabilities as below:

- (i) **T1 – Liquidity:** It is necessary that the firm can withstand cash flow that the contract will require until payments received from the Employer. Liquidity therefore becomes an important consideration.

This shall be seen from the balance sheets and/or from the banking reference. Net current assets and/or documents including banking reference, should show that the applicant has access to or has available liquid assets, lines of credit and other financial means to meet cash flow of **Rs. 1.07 Crores** for this contract, net of applicant's Commitments for other Contracts. Banking reference should contain in clear terms the amount that bank will be in a position to lend for this work to the applicant. In case the Net Current Assets (as seen from the Balance Sheets) are negative, only the Banking references will be considered. Otherwise, the aggregate of the Net Current Assets and submitted Banking references will be considered for working out the Liquidity.

The banking reference should be from a Scheduled Bank in India acceptable to UPMRC and it should not be more than **3 months** old as on date of submission of bids.

- (ii) **T2 - Profitability:** Deleted
- (iii) **T3 - Net Worth:** Net Worth of tenderer should be positive in last 2 (two) audited financial years.

(iv) **T4 - Annual Turnover:** ~~The average annual turnover from Signage works of last five audited financial years should be equal or more value of Rs. 6.00 Crores. Average Annual Financial Turnover of the bidders during the last three years ending 31st March of the previous financial year should be at least Rs. 4.50 Crore.~~

(v) **Bid Capacity Criteria**

Bid Capacity: The tenderers will be qualified only if their available bid capacity is more than the approximate cost of work as per NIT. Available bid capacity will be calculated based on the following formula:

$$\text{Available Bid Capacity} = 1.52 * A * N - B$$

Where,

A = Maximum of the value of ~~Signage~~ works executed in any one year during the last five financial years (updated upto ending last date of previous month of ~~submission end date of tender~~ **Publish Date**.) price level assuming ~~5%~~ **7%** per annum simple rate inflation for Indian Rupees every year and 2% for foreign currency portions per year).

N = No. of years prescribed for completion of the work

B = Value of existing commitments (as on ending last date of previous month of ~~submission end date of tender~~ **Publish Date** for on-going ~~signage~~ works during the period of work of this NIT starting from first date of month of ~~submission end date of tender~~ **Publish Date**.)

Notes :

- Financial data for latest last five audited financial years has to be submitted by the tenderer in **Annexure-2** along with audited balance sheets. The financial data in the prescribed format shall be certified by Chartered Accountant with his stamp and signature. In case audited balance sheet of the last financial year is not made available by the Tenderer, 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 last year is not submitted, tender may be considered as non-responsive.**
- Where the 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.
- Financial data for latest last five audited financial years has to be submitted by the tenderer in **Annexure-2** and **Annexure-3A** along with audited financial statements. The financial data in the prescribed format shall be certified by the Chartered Accountant with his stamp, signature, membership no & UDIN No. In case any discrepancy in data is found between the balance sheet and the financial information submitted, the data as available in the balance sheet will be considered.
- Value of existing commitments for on-going ~~signage~~ works during period of this NIT of this tender starting from first date of the month of ~~submission end date of tender~~ **Publish Date** has to be submitted by the tenderer in **Annexure-3B**. These data shall be certified by the Chartered Accountant with his stamp, signature, membership no and UDIN No.

1.1.3.3 The tenderer has to deploy minimum staff as per Annexure-3 of ITT. Tenderer should have in house availability of minimum plants & machinery mentioned in Annexure- 5 of ITT.

1.1.3.4 The offer of tenderers, who do not qualify the minimum eligibility criteria stipulated in the clauses 1.1.3.2 above, shall not be considered for further evaluation and therefore rejected. If the tenderer fails to meet the eligibility and qualification criteria, then further scrutiny of other technical parameters will not be done and Financial Proposals of such Tenderers shall not be opened. The mere fact that the tenderer is qualified as mentioned in sub clause 1.1.3.2 shall not imply that his bid shall automatically be accepted. The same should contain all technical data as required for consideration of tender prescribed in the ITT. Technical proposals meeting the Technical requirement and found substantially responsive only will be qualified for opening of their Financial Proposal.

1.1.4 TENDER DOCUMENTS

The Tender documents consist of:

(A) Technical Cover: -

Volume 1:

Notice Inviting Tender (NIT)
Instructions to Tenderers (ITT) - including Annexures
Form of Tender (FOT) - including Appendices

Volume 2:

General Conditions of Contract (GCC)
Special Conditions of Contract (SCC) - including Schedules

Volume 3:

Employer's Requirements with Appendices

Volume 4:

Technical Specifications

Volume 5:

Tender Drawings

Volume 7:

Condition of Contract on Safety, Health & Environment (SHE) Ver. 1.2

(B) Finance Cover: -

Volume 6:

Bill of Quantities (BOQ)

1.1.5 The contract shall be governed by the documents listed in Para 1.1.5 above along with latest edition of CPWD Specification, IRS Specifications & MORTH Specifications. These may be purchased from the market by the tenderer.

1.1.6 The tenderers may obtain further information/clarification, if any, in respect of these tender documents from the office of **Chief Engineer/Contract, Uttar Pradesh Metro Rail Corporation, Administrative Building, Vipin Khand, Gomti Nagar, Near Dr. Bhimrao Ambedkar Samajik Parivartan Sthal, Lucknow - 226010**

1.1.7 All tenderers are hereby cautioned that tenders containing any material deviation or reservations as described in Clause. E4 of "Instructions to Tenderers" and/or minor deviation without quoting the cost of withdrawal shall be considered as non-responsive and is liable to be rejected.

1.1.8 The intending tenderers must be registered on e-tendering portal <https://etenders.gov.in/eprocure/app> Those who are not registered on the e-tendering portal shall be required to get registered beforehand. After registration, the

tenderer will get user id and password. On login, tenderer can participate in tendering process and can witness various activities of the process. Instructions for online bid submission is attached as **Annexure A** to NIT.

- 1.1.9** The authorized signatory of intending tenderer, as per Power of Attorney (POA), must have valid **Class-II or Class-III digital signature certificate**. The tender document can only be downloaded or uploaded using **Class-II or Class-III** digital signature certificate. However, the tenderer shall upload their tender on <https://etenders.gov.in/eprocure/app> using class-II or class-III digital signature of the authorized signatory only.
- 1.1.10** Tender submissions shall be done online on **https://etenders.gov.in/eprocure/app** after uploading the mandatory scanned documents towards cost of tender documents such as scanned copies of transaction of payment i.e., RTGS, NEFT & IMPS and scanned copy of Tender Security/EMD and other documents as stated in the tender document. Instructions for on-line bid submission are furnished hereinafter.
- 1.1.11** Submission of Tenders shall be closed on e-tendering website of Employer at the date & time of submission prescribed in NIT after which no tender shall be accepted. It shall be the responsibility of the Tenderer / tenderer to ensure that his tender is submitted online on e-tendering website **https://etenders.gov.in/eprocure/app** before the deadline of submission. The Employer shall not be responsible for any delay, difficulties and/or inaccessibility of the downloading and/or uploading facility from the e-procurement portal for any reason whatsoever.
- 1.1.12** Tenders shall be valid for a period of **180 days** from the end date of submission of Tenders and shall be accompanied with a valid tender security/EMD for tender security of the requisite amount as per clause C18.1 of ITT.
- 1.1.13** Employer reserves the right to accept or reject any or all proposals without assigning any reasons. No tenderer shall have any cause of action or claim against the Employer for rejection of his proposal.
- 1.1.14** Tenderers are requested to visit e-tendering portal <https://etenders.gov.in/eprocure/app> regularly for any Employer's issued clarifications, addendum, corrigendum and/or due date extensions.
- 1.1.17** Employer will award the Contract to the Tenderers whose Tender has been determined to be substantially responsive and compliant to the requirements contained in the Tender Documents and who has offered the Lowest Evaluated Tender Price. Variant bids are not allowed.
- 1.1.18** Any suit or application, arising out of any dispute or differences on account of this tender shall be filed in a competent court at Lucknow, Uttar Pradesh only and no other court or any other district of the country shall have any jurisdiction in the matter.

Chief Engineer/Contract
Uttar Pradesh Metro Rail Corporation

FORM OF TENDER -APPENDIX -18

UNDERTAKING FOR PROCUREMENT OF MATERIALS

We hereby undertake that-

1. In case the above contract AGSG-01 is awarded to our firm, we will **procure materials given in Annexure-A of Appendix-18 only from approved make/s** as mentioned against each item of this Annexure-A. Documentary proof of such procurement shall be submitted by our firm.
2. We will submit **Warranty Certificate/s from the Original Equipment Manufacturer (O.E.M)** for the purchase of approved make/s for Contract AGSG 01.
3. The employer shall have the right of **random sampling upto 1% of finished product** for testing/ verification of procured material from O.E.M. We understand that entire cost in connection with testing/verification shall be borne by us. **Also, no payments shall be made for finished product, in case it is rendered unfit for use during testing process.**
4. **We have fully taken note of warranty periods alongwith approved make/s as specified in all BOQ items of Volume 06 uploaded in finance cover and undertake that in case of defect arising within warranty periods, we shall replace/rectify it free of charge (as per requirement such that the signage is restored to full working condition).**

STAMP & SIGNATURE OF AUTHORIZED SIGNATORY

Annexure A of Appendix 18		
AGSG-01		
BOQ Item No.	Item	Make
1	Blockout Vinyl	3M, Avery
	Cast Acrylic	Malesia, GSFC
	Pet-G	Spectra, Bayer
	VHB Tape	3M, Avery
	LED modules/strip	Philips, Osram, LT
	LED driver unit	Philips, Osram, LT
	Power Supply	Philips, Osram, LT
	Anchor fastener and fixing	Hilti, Fischer
2	Blockout Vinyl	3M, Avery
	Cast Acrylic	Malesia, GSFC
	Pet-G	Spectra, Bayer
	VHB Tape	3M, Avery
	LED modules/strip	Philips, Osram, LT
	LED driver unit	Philips, Osram, LT
	Power Supply	Philips, Osram, LT
	Anchor fastener and fixing	Hilti, Fischer
	ACP Sheet	Alucobond, Alpolic, Aludecor or any other make as approved by UPMRC
3	Blockout Vinyl	3M, Avery
	Cast Acrylic	Malesia, GSFC
	Pet-G	Spectra, Bayer
	VHB Tape	3M, Avery
	LED modules/strip	Philips, Osram, LT
	LED driver unit	Philips, Osram, LT
	Power Supply	Philips, Osram, LT
	Anchor fastener and fixing	Hilti, Fischer
4	Blockout Vinyl	3M, Avery
	Cast Acrylic	Malesia, GSFC
	Pet-G	Spectra, Bayer
	VHB Tape	3M, Avery
	LED modules/strip	Philips, Osram, LT
	LED driver unit	Philips, Osram, LT
	Power Supply	Philips, Osram, LT
	Anchor fastener and fixing	Hilti, Fischer
ACP Sheet	Alucobond, Alpolic, Aludecor or any other make as approved by UPMRC	
5	Vinyl Sheet	3M, Avery
	Digital Printing	3M/Avery printing platforms software with green inks on latex printer machine
	Laminate layer	3M, Avery
	VHB Tape	3M, Avery
	Anchor fastener and fixing	Hilti, Fischer
	ACP Sheet	Alucobond, Alpolic, Aludecor or any other make as approved by UPMRC

AGSG-01		
BOQ Item No.	Item	Make
6	Vinyl Sheet	3M, Avery
	Digital Printing	3M/Avery printing platforms software with green inks on latex printer machine
	Laminate layer	3M, Avery
	ACP Sheet	Alucobond, Alpolic, Aludecor or any other make as approved by UPMRC
	Primer	3M, Avery
	Edge Sealer	3M, Avery
	Sand Papers	3M, Avery
7	Cast Vinyl Sheet	3M, Avery
	Polycarbonate sheet	Sabic, GE Lexan, Ultralite
	Laminate layer	3M, Avery
	Primer	3M, Avery
	Edge Sealer	3M, Avery
	Sand Papers	3M, Avery
	LED modules/strip	Philips, Osram, LT
	LED driver unit	Philips, Osram, LT
	Power Supply	Philips, Osram, LT
	VHB Tape	3M, Avery
	Anchor fastener and fixing	Hilti, Fischer
8	Vinyl Sheet	3M, Avery
	Special Effect Film/Laminate	3M, Avery
	VHB Tape	3M, Avery
	Primer	3M, Avery
	Edge Sealer	3M, Avery
	Sand Papers	3M, Avery
	Anchor fastener and fixing	Hilti, Fischer
9	Vinyl Sheet	3M, Avery
	Special Effect Film/Laminate	3M, Avery
	Sand Papers	3M, Avery
	Chemical fastener	Hilti, Fischer
10	Vinyl Sheet	3M, Avery
	Photoluminiscent Film	3M, Avery
	VHB Tape	3M, Avery
11	Retro Reflective Prismatic Sheeting	3M, Avery
	Digital Printing	3M/Avery printing platforms software with green inks on latex printer machine
	Special Effect Film/Laminate	3M, Avery
	VHB Tape	3M, Avery
	ACP Sheet	Alucobond, Alpolic, Aludecor or any other make as approved by UPMRC
12	Polycarbonate sheet	Sabic, GE Lexan, Ultralite
	Vinyl Sheet	3M, Avery
	Acrylic Sheet	Malesia, GSFC
	Pet-G	Spectra, Bayer
	Anchor & Chemical fastener	Hilti, Fischer
	LED modules/strip	Philips, Osram, LT
	LED driver unit	Philips, Osram, LT
	Power Supply	Philips, Osram, LT
Special Effect Film/Laminate	3M, Avery	

AGSG-01		
BOQ Item No.	Item	Make
13	Vinyl Sheet	3M, Avery
	Cast Acrylic	Malesia, GSFC
	Anchor & Chemical fastener	Hilti, Fischer
	LED modules/strip	Philips, Osram, LT
	LED driver unit	Philips, Osram, LT
	Power Supply	Philips, Osram, LT
	ACP Sheet	Alucobond, Alpolic, Aludecor or any other make as approved by UPMRC
14	Vinyl Sheet	3M, Avery
	Digital Printing	3M/Avery printing platforms software with green inks on printer latex printer machine
	Special Effect Film/Laminate	3M, Avery
	Sand Papers	3M, Avery
	Primer	3M, Avery
	Edge Sealer	3M, Avery
15	Diffuser Cast Acrylic Sheet	GSFC / Malesia
	Special Effect Film/Laminate	3M, Avery
	Anchor & Chemical fastener	Hilti, Fischer

PART A -SIGNAGE SPECIFIC TECHNICAL SPECIFICATIONS

General :

Signage enclosures should be made of special Aluminum alloy profiles **anodized section** duly PU powder coated. The profiles should be structurally robust to withstand the wind loads verified by "finite element stress analysis". Powder coating to be minimum 80 microns having 10 years warranted durability.

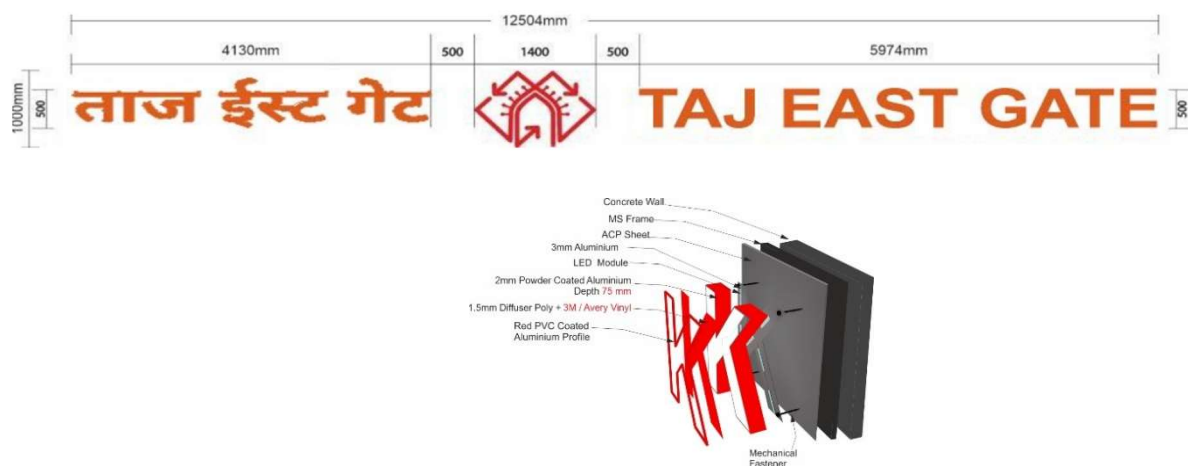
The box shall to be internally lit with LEDs of Philips/LT/Osram **Philips/Osram/LT** make and shall be fitted with IP rated power supply of **Philips/Osram/LT make same brand** which are to be fixed inside the box. Back side of box are to be bonded with magnetic tapes required for opening & closing for maintenance. LED's should be warranted for 5 years. All wiring are to be of FRLS grade.

Graphical messages as per approved artwork for Signages should be of CNC cut cast vinyl/block out vinyl sheeting of 3M/**Avery** make duly pasted on 3mm thick Pet-G/Acrylic/~~PMMA~~ sheets which are to be firmly bonded with main frame using 25mm -VHB of 3M/Avery make having properties to absorb thermal expansion.

Robust corrosion protected MS suspender for erection, designed and approved to sustain required wind loads. The suspenders should also to be equipped with Leveling mechanism for leveled and effective installation.

All signages are to be uniformly lit with NO Hot Spots/light leakages.

1. BACKLIT STATION NAME CHANNEL LETTERS SIGNAGE



Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC.

Sizes:

As per detailed design. Letters in Hindi and English with logo included. Letter heights from 500 to 600mm & Logo height **nearly 1200mm** 1000 to 1300mm. Sign length upto 11500mm.

Construction of sign:

Made out of ~~3mm~~ **4mm** thick aluminium sheet, duly powder coated for exterior grade finish, face covered with diffuser polycarbonate **of make Sabic/GE Lexan/Ultralite** pasted with 3M/Avery **coloured** cast Translucent east vinyl as per graphic colour selection. 3D

Channel letters shall be provided with 25mm wide wegner **Wagner** make jewelrite pigmented flexible colored trim at all peripherals of letters and edges.

Illumination of Sign:

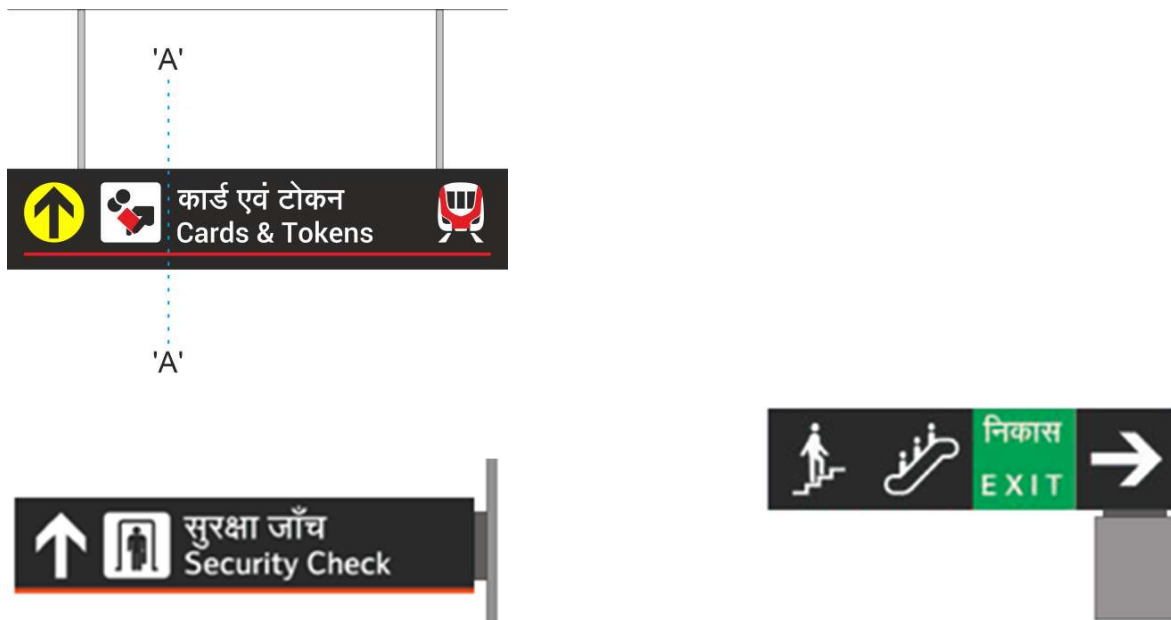
Internally Lighted with high performance branded LED (LT/OSRAM/PHILIPS) **Philips/Osram/LT make** modules with concealed driver **of make Philips/Osram/LT** IP rated unit to attain a minimum lux level of 45 candelas. Wiring arrangement to be concealed type by using conduit pipe.

Fixing of sign:

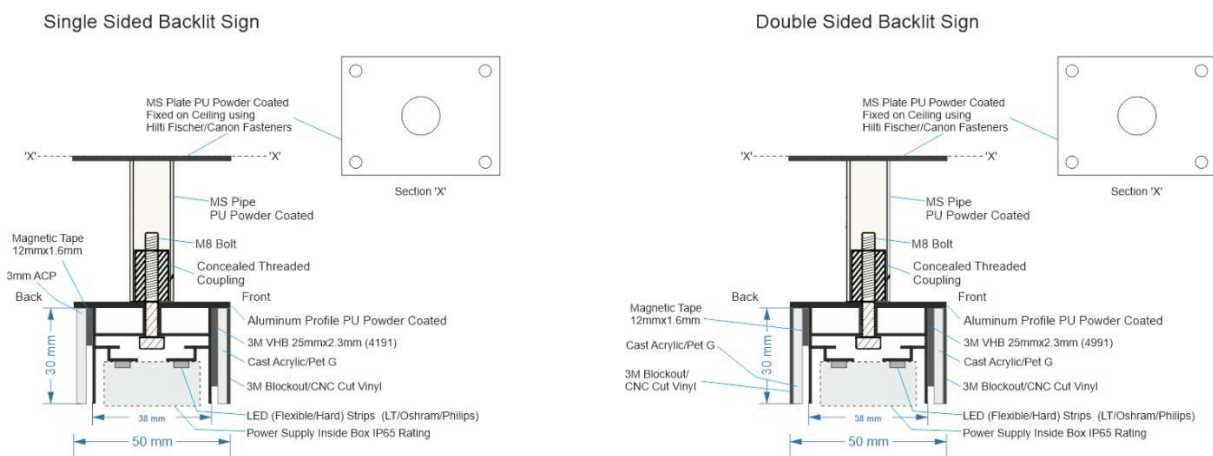
Fixing arrangement will include by using VHB **tape** 25mm wide of 3M/Avery make or Hilti / Fischer anchor fasteners and grouting chemicals suitable for holding substrate behind the sign.

Applicability – station name identification sign.

2. DOUBLE & SINGLE SIDED BACKLIT SIGNAGE (ILLUMINATED)



Section 'A'



Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC.

Sizes:

Various as per detailed design. Signage height 300mm/**400mm** and signage lengths ranging from 300mm to 2100mm

Construction of sign:

Made out of aluminium anodized extruded slim line profiles **anodized section** duly PU powder coated for exterior grade finish. Profile width of sign to be maximum 50mm, Signage face substrate shall be made up of spectrum 'PET-G' (**Spectra/Bayer**) /Cast Acrylic (**Malesia/GSFC**) of 3mm thick pasted with 3M/Avery Block Out film duly CNC cut 3M/Avery coloured graphics as per design with illuminated side. Substrate Sheet will be pasted with VHB **tape** 25mm wide of 3M/Avery make ~~tape~~ bonded with main box frame continuously. ~~Back side of signage shall be covered with aluminium composite panel sheet of minimum 3mm thickness and bonded with maganite tape for opening & closing the box for maintenance purpose.~~ **One side shall be pasted with -VHB tape 25mm wide of make 3M/Avery and another side by using magnetic strip 12 mm wide and 1.2 mm thick.**

Illumination of Sign:

Internally lighted with high performance branded LED (~~LT/OSRAM/PHILIPS~~) **Philips/Osram/LT make** flexible strips/Hard strips with concealed driver **of make Philips/Osram/LT** IP rated fixed inside of the sign box unit to attain a minimum lux level of 45 candelas. The internal lighting system shall be easily accessible for maintenance purposes. Wiring arrangement to be of concealed type i.e. suitable routed through the fixing members with appropriately sized holes.

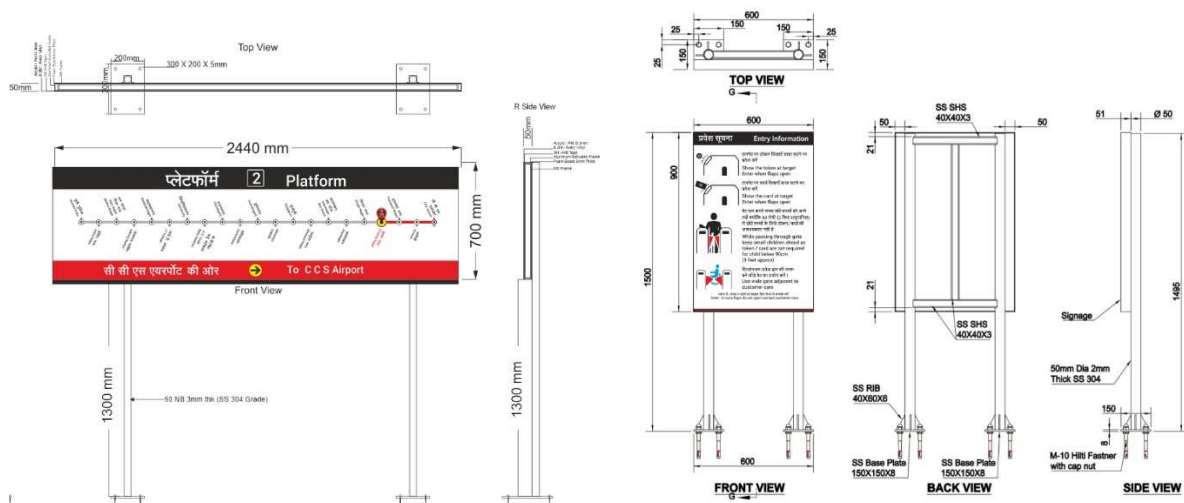
Fixing of sign:

4 types of fixing arrangements as per detailed design i.e. suspended, projected, face mounted or post mounted. Fixing hardware and accessories will include corrosion protected / PU powder coated / SS heavy duty, rigid, vibration free suspenders, projection supports or posts complete with base/top plates, concealed joints and bridging sub structures where needed. For post mounted systems the structure shall be strong to take crush load typical of public area.

Fixing arrangement will include Hilti / Fischer ~~Canon~~ anchor fasteners with matching colour head caps and grouting chemicals suitable for holding the signs in all four categories like post mounted, suspended, projected & face mounted.

Applicability – Way finding and egress directional signs.

3. DOUBLE & SINGLE SIDED SIGNAGE (NON ILLUMINATED)



Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC.

Sizes:

Various as per detailed design. Signage height 300mm **600mm** to 900mm and signage width ranging from 450mm to 2400mm.

Construction of sign:

Aluminium Box type signage - Made out of aluminium anodized extruded slim line profiles **anodized section** duly PU powder coated for exterior grade finish. Profile width to be maximum 50mm. Signage face substrate shall be made up of powder coated aluminium panel with 3M /Avery cast vinyl duly screen / digitally printed on 3M/Avery printing platform software using green ink technology and further one extra layer UV transparent over laminate film on entire face of sign.

Back side of signage shall be covered with aluminium composite panel (**Alucobond/ Alpolic/ Aludecor or any other make as approved by UPMRC**) sheet of minimum 3mm thickness and bonded by using 3M/Avery **make** VHB **2.5mm thick** tape with main frame.

Non illuminated type

Fixing of sign:

Post mounted. Fixing hardware and accessories will include corrosion protected / PU powder coated / SS (as per detailed design) heavy duty, rigid, vibration free posts complete with base plates, concealed joints. For post mounted systems the structure shall be strong to take crush load typical of public area.

Fixing arrangement will include Hilti / Fischer / ~~Canon~~ anchor fasteners with matching colour head caps and grouting chemicals suitable for holding substrate and providing concrete foundation where needed.

Applicability – Directional way finding and information signs.

4. VINYL SIGNS



Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC.

Construction of sign:

Graphics to be installed on vertical platform walls, with 3M/Avery white printable outdoor Dinoc / cast vinyl duly digitally printed using 3M/Avery printing platforms software with green inks on Latex machine **printer machine** with all designing and covered with extra layer of 3M/Avery transparent 1170 laminate film pasted by using squeeze roller machine and protected with transparent removable liner. Making proper smooth surface by using Birla/JK white cement and applying **3M/Avery** P94 primer and final pasting to be done on ready surface by hand squeeze rollers maintaining proper alignment and Peripherals of vertically pasted graphics shall be sealed by using **3M/Avery** Edge sealer complete to the entire satisfaction of Engineer-in-charge.

5. FACE PLATE SIGNS



Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC

Sizes:

Various **sizes** as per detailed design. Signage height 150mm to 1200mm and signage width ranging from 150mm to 1200mm or any suitable size.

Construction of sign:

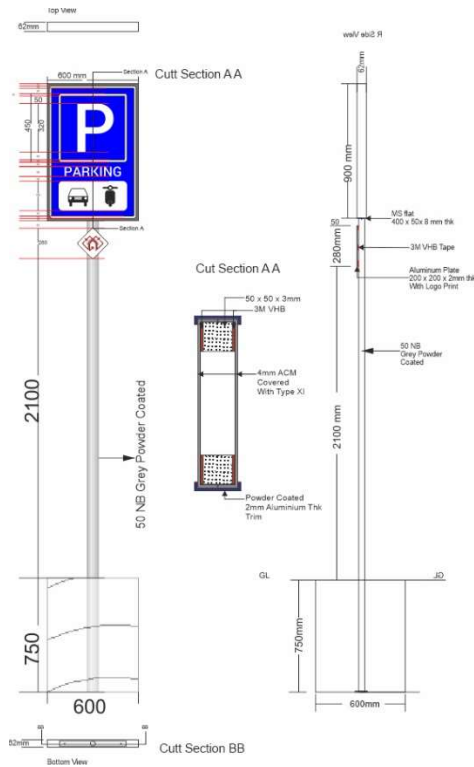
Face mounted plate type of signage made out of SS 304 grade sheet minimum 2mm thick, etched/special effect film to designed graphics and screen printed with colours as per design in required colour on the face side and protected with 3M/Avery Special effect film (as approved by engineer-in-charge) as per design complete back side of the SS plate provided with 3M/Avery-VHB 25mm wide tape.

Fixing of sign:

Mounted on wall by using VHB **tape** 25mm **wide** of 3M/Avery pasted on Aluminium strips which shall be mounted on wall by using counter shunk SS screws to take vertically load of SS plate.

Applicability – Facility Information signs, room name signs, statutory warning signs and prohibitory signs **or as approved in detail design.**

6. DOUBLE SIDED ROAD SIGNS-SPEED LIMIT/WARNING SIGNS.



Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC

Sizes:

Various as per detailed design. Signage height varies from 900mm to **1800mm** ~~2400mm~~ & width of 600mm to 1200mm

Construction of sign:

Double sided retro reflective signages in size **600x900mm or 1200x1800mm** ~~1800x1200mm~~. Both sides are to be made of **4mm** thick aluminium composite panels (**Alucobond/ Alpolic/ Aludecor or any other make as approved by UPMRC**), fully provided with 3M/Avery Type XI retro reflective sheeting duly digitally printed on 3M/Avery printing platform software using green ink further covered with UV transparent 3M/Avery 1170 series overlay sheeting to enhance the outdoor life for 10 years. These boards are to be bonded on MS Framing of SHS-50x50x3.6mm using 3M/Avery VHB tapes-25mm Wide continuously.

Both boards with frame are further attached to an additional frame of SHS-50x50x3mm to make it composite monolith unit.

The sides of both the signs are to be provided with powder coated Aluminium trim which are bonded with the frames using 3M/Avery VHB tape- 25mm wide in size continuously the monolithic sign.

Fixing of sign:

Post mounted. The board are to be fixed on 80NB (M)/150NB(M) M.S. Pipes duly shot blasted and PU-Powder coated. These are to be firmly fixed in ground in foundation pits of size 600x600x750mm/750x750x1200mm using M-20 M-25 concrete.

Applicability – roadside traffic signs.

7. STATION TOTEM / PYLON SIGNAGE.



Construction of sign:

6 mtr. high pole mounted of size 1200mm dia Station identification-double sided with Solid backlit letters of UPMRC & logo. The sign shall be made of 2mm thick Diffuser Poly **Polycarbonate** sheet 3D type (**Sabic/GE Lexan/Ultralite**) covered with 3M translucent 3630/Avery 5500 series vinyl duly plotted & cut as per approved graphics, cased in 304 grade stainless steel body provided with High Luminous LED's **of make Philips/Osram/LT** sandwiched between acrylic / poly sheets. The board is to be mounted on 200 NB stainless steel pipe of 304 grade, ~~6mm~~ 8mm thick duly polished and finished, as per drawing. The Pole & sign is to be erected on proper RCC foundation duly casted at given site by using SS Hilti/Fisher Chemical Fastener. **The contractor has to submit the RCC foundation drawing as per site conditions for its approval from UPMRC before execution at site.** LED modules & strip to be Philips/Osram/LT make double Row continuous all around with concealed driver unit **of make Philips/Osram/LT** and having power supply of Philips/Osram/GE/LT make with concealed wiring

arrangement. Internal signs shall be IP52 and external signs shall be IP65 certified.

Applicability – Station Name Totem – Identification sign

Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC

8. FLOOR GRAPHICS



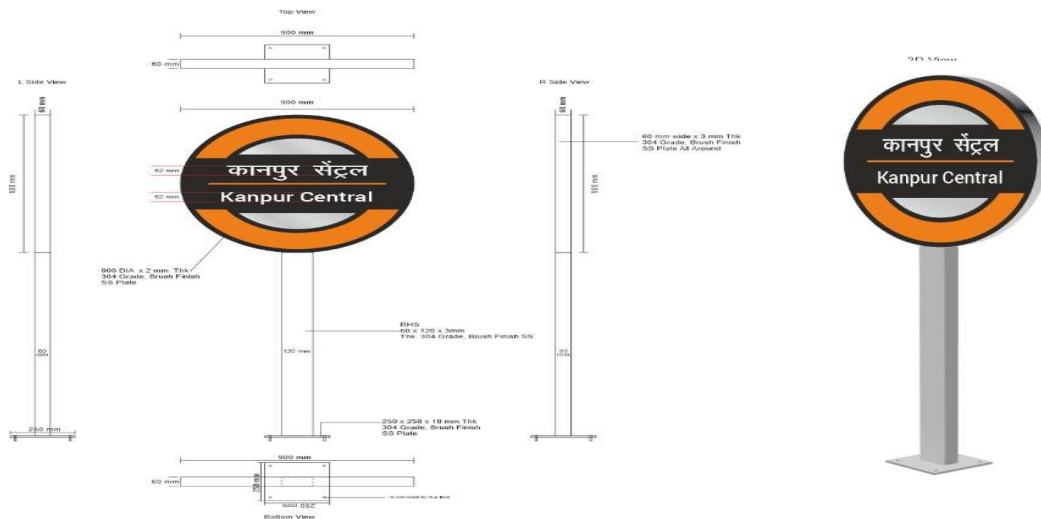
Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC

Construction of sign:

Provision of Floor Graphics by using 3M/Avery Envision 480CV3 as base cast vinyl/white block out printable film, digitally printed ~~on~~ **with green inks**/Gold standard (Ultra chrome

GS3) ink for outdoor application using 3M/Avery printing platform software on latex **printer** machine with all designing and covered with one extra layer of 3M/Avery transparent 3645 over laminate film pasted by using squeeze roller machine and protected with transparent protective removable liner. Surface preparation – surface are to be properly cleaned using 3M/Avery scotch brite and thereafter to be primed using P94 primer of 3M/Avery before pasting. Final pasting on required surface to be done maintaining proper alignment by hand squeeze rollers duly sealing all Peripherals of floor Graphics by using 3M/Avery Edge sealer complete to the entire satisfaction of engineer-in-charge.

9. 900MM DIAMETER LOLLIPOP TYPE



Note: Drawings are indicative and actual design will be on the basis of shop drawings submitted by signage contractor and approved by UPMRC

Construction of sign:

Station name board of size 900mm dia. The sign shall be made of (2mm) thick stainless steel grade 304 covered with 3M/Avery special effect film duly CNC cut as per approved graphics cased in 304 grade stainless steel body. Signs are to be mounted on 304 grade stainless steel pipe of 100mmx50mmx3.6mm upto 1 mtr. Height with base plate of 304 grade stainless steel plate of size 200mmx200mmx8mm. These are to be erected on floor using Hilti/Fischer chemical fasteners. All stainless steel material are to be duly polished.

Providing and fixing of circular station name board of dia 900mm. The signage shall be made of 54 mm thick (made of 2 mm thick SS 304 grade sheet on both side with 50 mm gap) covered with cast vinyl of make 3M 3630 /Avery 5500 series duly plotted & cutted as per approved graphics and cased in SS 304 grade body. Signage is to be fixed on floor by using Hilti/Fischer make chemical fastener on a 200 x 200 x 8 mm thick SS 304 grade base plate and mounted on a vertical SS post of height between 1m to 1.2 m and size 100mm x 50mm x 3.6mm thickness.

(Indicative signage images are shown for reference purposes. Signage design, colours, graphical content may change during detailed design stage on basis of selected prototypes).

Approved make/s in BOQ items have been specified to ensure high standards/quality of product. Normally approved make/s will only be used. However, in special circumstances if the contractor can demonstrate technical equivalence/Superiority of any other make/s he wants to use, UPMRC may consider the request based on merits. Bidder should note that in normal circumstances no such change in approved make/s shall be allowed and decision of UPMRC shall be final and binding in this regard.

PART B GENERAL TECHNICAL SPECIFICATIONS

1. FABRICATION OF SIGNAGES

1.1 General

The work in general shall be executed as per the description of items, special conditions, provision of this TENDER DOCUMENT, CPWD Specification Vol. I to VI, relevant IS codes Codes as referred in the NIT supplemented with the following specification, preferably entire process of cutting, bending, punching, powder coating, screen printing and fabricating should be done under one roof for all the signage.

1.2 Powder coating on Aluminum Plates

1.2.1 Wherever specified the aluminum plates shall be coated in approved colour and shade, with ~~pure polyester~~ powder of Berger/ Interpon/ Hardcastle/ Nerocoat to a minimum thickness of ~~75~~ **80** microns.

1.2.2 The ~~pure polyester~~ powder coating shall be got executed from specialized agency. The ~~pure polyester~~ powder shall have following properties:

Free Flow-ability	:	Satisfactory.
Particle size	:	< 100 microns suitable for electrostatic spray.
Specific gravity	:	1.1 to 1.5 depending on the colour.
Self-life	:	6 months.
Stoving Schedule	:	200° C for 10 mins. (metal temp.)

Test Certificates from approved laboratory for the representative samples shall be submitted by the Contractor. Testing will be done in presence of Employer's representatives at the cost of contractor.

1.2.3 The curing schedule shall be as specified by the manufacturer of ~~pure polyester~~ powder.

1.2.4 The properties of cured powder films shall be:-

Scratch hardness	:	Equal to or more than 4 Kg.
Impact resistance	:	Min 150-Kg cm
Pencil hardness	:	3H to 4H
Salt spray resistance	:	500 Hrs.
Water soak at room temperature:	:	No change after 500 Hrs.
Detergent resistance	:	No attack after 500 Hrs.
Cross Hatch adhesion	:	GT = O (ASTM D-3359)
Cured Film thickness	:	Min 80 microns.

Tests for properties of cured film as given above shall be carried out at frequency specified in relevant IS/BS/ASTM codes or as specified by the Engineer - in - Charge.

1.2.5 The surface of aluminum shall be prepared and pretreated as follows before powder coating:

- (i) Removal of all foreign matter.
- (ii) Chromatisation of aluminum surface as specified by manufacturer of ~~pure polyester~~ powder by at least a five stage process consisting of alkali degrease, rinse and chromate conversion followed by two rinses. The chromate coating and alkali degrease shall be as per requirement of the ~~pure polyester~~ powder manufacturer.
- (iii) Proper curing at required temperature shall be done for specified time period so as to achieve the desired properties.

1.2.6 The ~~pure polyester~~ coated surface shall be of uniform texture, colour and gloss and shall be free from cracks, warps and other imperfections.

1.2.7 The ~~pure polyester~~ powder is to be used within its shelf life from the date of manufacturing as specified by the manufacturer.

1.3 Powder coating on M.S and CRCA MILD Steel sheets

1.3.1 Wherever specified the M.S and CRCA mild Steel plates and sections shall be coated in approved colour and shade with ~~pure polyester~~ powder of Berger/ Interpon/ Hardcastle/ Nerocoat to a minimum thickness of 80 microns.

1.3.2 The ~~pure polyester~~ powder coating shall be got executed from specialised agency as given in 1.2 to 1.5, 1.7 and 1.8.

1.3.3 The surface of steel shall be prepared and pretreated as follows before powder coating:-

- (i) Removal of all foreign matter.
- (ii) Low weight Zinc Phosphate conversion treatment of M.S and CRCA mild Steel surface as specified by the manufacturer of ~~pure polyester~~ powder by at least a seven stage process consisting of oxide and scale removal, alkali degrease, rinse twice and Zinc Phosphate conversion treatment followed by two rinses. The Zinc Phosphate conversion treatment and alkali degrease shall be as per requirement of the pure polyester powder manufacturer. Last wash shall be from diluted acid and immediately after that powder coating process shall be started without wasting much time.
- (iii) Proper curing at required temperature shall be done for specified time period so as to achieve the desired properties.

1.3.4 The pure polyester coated surface shall be of uniform texture, colour and gloss and shall be free from cracks, warps and other imperfections.

1.4 Polycarbonate sheet

1.4.1 The polycarbonate sheet shall be of ~~GE~~ **(Sabic/GE Lexan/Ultralite)** make or ~~equivalent~~. The polycarbonate sheet shall have the following physical requirements and properties in conformity with IS- 14443 – 1997: -

- (i) Light stabilization - Rating "L" of Table 2 of IS-14443.
- (ii) Transparency - Rating "R" of Table 2 of IS-14443.
- (iii) Colour - Opal White.
- (iv) Coating - Rating "UV" of Table 2 of IS-14443.
- (v) Weight - Min. 1.2 Kg per Sq.m. per mm thickness
- (vi) Dart Drop Impact - >200 NM.
- (vii) Tensile strength at break ->70 N/mm².
- (viii) Flexural modulus - Equal to or more than 2500 N/mm².
- (ix) Light transmissions - Equal to or more than 35%.
- (x) Flame retardancy - Rating UL94HB of Table 3 of IS-14443
- (xi) Sheet shall not be scratch resistant.

1.4.2 Fabrication and installation of polycarbonate sheets shall be as specified in "Annex A – Code of good fabricating practices" of IS-14443-1997.

1.4.3 The tolerances in the width, length & thickness of sheet shall be as specified in Note 2 on page 3 of IS -14443-1997.

1.4.4 The sampling & testing of sheets for the properties given above shall be as per provisions of IS-14443-1997.

1.4.5 The polycarbonate sheet shall be in conformity to the panel widths and sizes shown in the drawings as well as to shape/ profile in plan and elevation. Nothing extra shall whatsoever be payable on this account.

1.5 Aluminum Plates and Sections

1.5.1 Aluminum plates and sections shall conform to aluminum alloy of grade 63400 WP of IS-733.

1.6 CRCA M. S. Sheets

1.6.1 The CRCA mild M.S sheets to be used in the work shall conform to IS 513 - normal D-grade type mild.

1.7 Designed EPDM gaskets of required thickness and width manufactured by Hanu Industries/Anand Lescuyer or equivalent shall be provided.

1.8 Dash Fasteners of required diameter and length manufactured by HILTI/ FISCHER ~~or equivalent~~ shall be provided. The Contractor shall make arrangements with the Dash Fastener suppliers –HILTI/ FISCHER ~~or other approved suppliers~~ to carry out random pull out tests at site of work to the satisfaction and directions of Engineer-in-charge.

1.9 Anodized Aluminium

1.9.1 Aluminum with an anodic coating, produced by an electrolytic oxidation process in which the surface of the aluminum is covered with a coating, generally an oxide, to give protective and decorative properties.

1.9.2 The anodic film may be either transparent or dyed as specified. The quality of anodized finish shall not be less than grade AC-10 of IS1868.

1.9.3 Method of testing anodic coating on aluminum and its alloy: IS5523

1.10 Fabrication work for CRCA MILD Steel sheets and Aluminum sheets (excluding the M.S channels, angles, plates, round and square tubes. SHS square tubes etc.)

1.10.1 The Metal handling and Fabrication work for CRCA mild Steel sheets and Aluminum sheets only (excluding the M.S channels, angles, plates, round and square tubes, SHS square tubes etc.) shall be got executed from a specialised agency.

1.10.2 Metal handling and Fabrication work for CRCA mild Steel sheets and Aluminum sheets only (excluding the M.S channels, angles, plates, round and square tubes, SHS square tubes etc.) shall be executed with CNC bending and CNC Laser and punching machines with precise work control and quality generation. Besides the specified machines, the Metal handling and Fabrication must have in-house welding and skilled CAD/CAM facilities, engineers and skilled and trained personnel and adequate storage facilities.

1.10.3 Laser Cutting Facility is mandatory for backlit signage made of Aluminum and CRCA mild steel sheets.

1.10.4 All surfaces exposed to view shall be clean and free from dirt, stains, grease, scratches, distortion, waves, dents, buckles, tool marks, burrs and other defects which mark the appearance of finished work. Cutting edges shall be smooth and free from all defects.

1.10.5 All surfaces exposed to view shall be straight and true to lines or curves. Arises and angles shall be as sharp as practicable. Mitres, if specified, shall be formed in true alignment with profiles accurately intersecting and all joints carefully eased to a radius of approximately 1 mm unless otherwise shown. Metal comers shall be bent to the smallest radius possible without causing grain separation or otherwise impairing the work.

1.10.6 All exposed connections shall be formed with hairline joints flush and smooth. All face panels must be flat, true and, free from weld stud witness or other surface imperfections/blemishes. Edges shall be machined and finished free from cutter marks (not guillotined).

1.10.7 The Tolerances in the fabrication work shall be as under:

- (i) Linear dimensions : +/- 0.5 mm
- (ii) Hole and Slot Punches : 0.3 mm
- (iii) Finished edge radius : 0.3 mm - 0.5 mm

(iv) The contractor shall be required to submit to the UPMRC copies of all the vouchers received from the approved fabricator and cheques/drafts paid by him to the approved fabricator as well as the copies of the documents establishing the excise paid by the fabricator for this work.

1.11 Printing of graphics and Text on the specified substrates

- 1.11.1 The graphics and text of the signage system on the specified substrates shall be screen printed as required.
- 1.11.2 The screen-printing of graphics and text of the signage system shall be got executed from specialized agency.
- 1.11.3 The screen-printing of the Graphics and text shall be without any blurred edges and blemishes and shall be sharp with uniform colour, texture and ambience. The thickness of the screen-printing on the substrate shall be uniform: Spillover and intermixing of more than one colour shall not be permitted. Same colours of the signages shall be uniform as specified and shall not vary from sign to sign. All colours as specified shall be of approved samples by the engineer in charge. Every new batch of paint/ ink shall also be got approved.
- 1.11.4 The ink to be used for screen printing shall be high gloss multi-purpose ink designed for long term outdoor application and shall provide a hard film to resist scuffing, scratching, blocking, and solvents, but be flexible enough to meet bending, die cutting, and embossing requirements. The screen printing ink shall have UV resistant properties and shall have an outdoor application life of five years.

1.12 Galvanizing

- 1.12.1 Galvanizing, wherever specified, shall be minimum 80 microns thick and shall conform to IS-4759.

1.13 Polyurethane Painting

- 1.13.1 The Polyurethane painting, wherever specified, shall conform to CPWD Specifications 1996, volume I – VI) relevant IS codes and standard specifications.

1.14 Plotter cut Retro-Reflective Vinyl sheet graphics/text

- 1.14.1 The Plotter cut Retro Reflective Vinyl sheet graphics/text work shall be got executed from specialized agency as explained in 1.2 to 1.7.
- 1.14.2 The graphics for the Retro-Reflective Vinyl sheet should be plotted in accordance with specified artwork accurately on a computerized plotter cutter. The edges of the plotter cut vinyl sheet should be clean and smooth. Vinyl sheet should be plotted in a dust free environment.
- 1.14.3 The plotted vinyl sheet should be applied to the substrates with the use of approved application tap to insure correct placement and accuracy. Vinyl sheet should be applied in a dust free environment
- 1.14.4 The final applied graphics shall be free from any kinds of wrinkles, air bubbles and placement/ orientation problems.
- 1.14.5 The bidder shall obtain on line warranty certificate from O.E.M regarding vinyl to be used in the project in original for 5 years of satisfactory field performance. Warranty certificate should be submitted by contractor after completion of

work as per Annexure V enclosed.

1.15 Variations in erection arrangements of Suspended Signages

- 1.15.1 The quoted rates of contractor for the suspended signages shall be for suspending the specified suspenders from any medium, RCC Beams/ Slabs, and Structural Steel Sections of any shape and size etc.. Nothing extra whatsoever shall be admissible on this account.
- 1.15.2 Nothing extra whatsoever shall be admissible for any variations of the required erection arrangements from sites to site of work.

1.16 Variations in erection arrangements of Post Mounted Signages

- 1.16.1 The quoted rates of contractor for the Post Mounted signages shall be for erection of the post mounted signs on base/floor of any medium, RCC or CC floor etc. with or without floor finishes of any type. Nothing extra whatsoever shall be admissible on this account
- 1.16.2 Nothing extra whatsoever shall be admissible for any variations of the required erection arrangements from site to site of work.

1.17 Variations in fixing arrangements of Face fixed Signages

- 1.17.1 The quoted rates of contractor for the Face fixed. signages shall be for face mounting the signs at all heights and to any medium, RCC Beams/ Slabs or Brick Wall etc. with or without cladding. Nothing extra whatsoever shall be admissible on this account.
- 1.17.2 Nothing extra whatsoever shall be admissible for any variations of the required face fixing arrangements from site to site of work.

1.18 CRCA mild M.S. Sheets

- 1.18.1 The CRCA mild M.S sheets to be used in the work shall conform to IS 513- normal D-grade type mild steel.

1.19 Plotter cut self Adhesive Vinyl sheet graphics/text

- 1.19.1 Self Adhesive Vinyl should be of cast translucent type. Vinyl should be of approved from only 3M, LG or Equivalent **Avery**.
- 1.19.2 The Plotter cut Self Adhesive Vinyl sheet graphics/text work shall be got executed from specialized agency.
- 1.19.3 The graphics for the Self Adhesive Vinyl sheet should be plotted in accordance with specified artwork accurately on a computerized plotter cutter. The edges of the plotter cut vinyl sheet should be clean and smooth. Vinyl sheet should be plotted in a dust free environment.
- 1.19.4 The final applied graphics shall be free from any kinds of wrinkles, air bubbles and placement/orientation problems.

2. SPECIFICATIONS FOR ELECTRICAL WORKS

2.1 Wiring for Indoor Signs

- 2.1.1 All lights mounted in an individual internally lit sign shall be switched ON & OFF in group, through a switch and controlled through a M.C.B. (The switches controlling circuits and M.C.Bs. are not in the scope of this tender.) The contractor shall provide a Bakelite connector on each sign for connection to feeding wire outside, which shall be extendable in flexible conduit upto a distance of 2.0 M. from the sign. This extendable wiring shall either be laid within the provision made in the supporting structure or in flexible conduit.
- 2.1.2 The contractor shall also ensure that all the connections inside the sign are made through Bakelite connectors and thimbles & screws are used for end terminations of wires. Thimbles wherever installed shall be properly covered with insulated sleeves and no temporary taping is done at any point.
- 2.1.3 The interconnecting wiring between light fixtures within the sign shall not be less than 2.5 Sq.mm and shall be LSZH, PVC insulated 1.1 KV grade, with multi-stranded copper conductor.
- 2.1.4 An earth terminal shall be provided on each of the lit sign, which shall be connected with the earthing conductor laid along with incoming circuit wiring.
- 2.1.5 All wiring within the sign enclosure shall be covered with flexible conduit, which shall be properly fixed with clamps, saddles etc. in such a way that no shadow is cast on the illuminated surfaces. In no case any loose wiring shall be left inside the sign enclosure.

2.2 Wiring for Outdoor Signs

- 2.2.1 The pole box proposed within the pillar of TOTEM shall have provision of one SPN M.C.B. of 6A (10 KA breaking capacity) for control/ Isolation of incoming and outgoing cable/ wires. The wiring within the sign from pole box shall be provided by the contractor, which shall be of 2.5 sq.mm. LSZH, PVC insulated 1.1 KV grade, with multi-stranded copper conductor for phase and neutral and 1.5 sq.mm. with solid copper conductor wire for earth. The incoming cable upto pole box shall not be in the scope of this tender, but its terminations shall be the responsibility of the contractor. An earth terminal for connecting the earth wire shall be provided in the pole box.

2.3 Index of Protection

Since most of the lights/ luminaries are to be installed within the signs the following Index of Protection are proposed for different locations to ward off ingress of dust, vermins and moisture:

- | | | | |
|-------|---------------|---|-----------|
| (i) | Indoor signs | - | I.P. – 52 |
| (ii) | Outdoor signs | - | I.P. – 65 |
| (iii) | Pole Box | - | I.P. – 65 |

2.4 LED specifications

State of art, branded ~~GE / OSRAM / Philips~~ Philips/Osram/LT make LEDs as per relevant standards.

3. CONCRETE WORKS

3.1 General

These specifications shall be read in conjunction with the CPWD specifications 1996 and other relevant specifications described in the Section 1 of these Specifications.

3.2 Blending of aggregates

In order to obtain optimum workability, individual aggregates of nominal size 20mm, 10mm, 4.75mm and 2.36mm will be blended in such a way that the grading curve for all in aggregates will be a smooth curve from size 0.15mm to 25mm falling within the established envelop grading curve. Contractor shall establish envelop grading curve for each grade of concrete for given maximum size of aggregates and get it approved by Engineer before finalising the mix design.

3.3 Grade of Concrete

The concrete is designated as follows: Concrete M 25

The letter M refers to the mix

The number 25 represents the characteristic compressive strength of 15cm cubes at 28 days in MPa (Mega Pascals : 1 Mpa : 10 kg/cm² approximately). M25 concrete thus has a characteristic strength of 250 kg/cm². Other design mixes will also be denoted in same way.

3.4 Mix Design

It is the complete responsibility of the Contractor to design the concrete mixes by approved standard methods and to produce the required concrete conforming to the specifications and the strength, workability requirements approved by the Engineer.

The approved mix design will contain strength requirements, grade of concrete, type of cement, maximum size of aggregates, workability, quality of water and admixture, if allowed.

Mix Design once approved must not be altered without prior approval of Engineer. However, should the contractor anticipate any change in quality of future supply of materials than that used for preliminary mix design, he should inform the Engineer quite in advance and bring fresh samples sufficiently in advance, to carry out fresh trial mixes. Design mix will indicate by means of graphs and curves etc., the extent of variation in the grading of aggregates which can be allowed.

Limits of Water and Cement Contents

Maximum water/cement ratio

For RCC members - 0.45

Cement Content

Cement content in concrete shall not be less than 380 kg/ cum for RCC under normal exposure. Ordinary Portland cement (OPC) of 43 and 53 grade conforming to IS: 8112 and IS: 12269 respectively shall be used. However for nominal mixes, CPWD specification and DSR will be followed.

The requirement of the relevant codes, standards and directions of the Engineer shall be followed.

3.5 Exposed Faces, Holes and Fixtures

On no account shall concrete surfaces be patched or covered up or damaged concrete rectified or replaced until the Engineer or his representative has inspected the works and issued written instructions for rectification. Failure to observe this procedure will render that portion of the works liable to rejection.

Holes for foundation or other bolts or for any other purposes shall be moulded, and steel angles, holdfasts or other fixtures shall be embedded, according to the drawing or as instructed by the Engineer.

3.6 Finishes

Unless otherwise instructed the face of exposed concrete placed against formwork shall be rubbed down immediately on removal of the formwork to remove irregularities. The face of concrete for which formwork is not provided other than slabs shall be smoothed with a float to give a finish equal to that of the rubbed down face, where formwork is provided. The top face of a slab which is not intended to be covered with other materials shall be leveled and floated to a smooth finish at the levels or falls shown on the drawings or as directed. The floating shall be done so as not to bring an excess of mortar to the surface of the concrete. The top face of a slab intended to be surfaced with other material shall be left with a spaded finish. Faces of concrete intended to be plastered shall be roughened by approved means to form of a key.

3.7 Grouting of base plates & bolt holes

i Mixing

Dry grout should be mixed in a mechanical mixer the conventional 200/400-litre capacity concrete mixer can be used to mix four bags of dry grout; alternatively, paddle type mortar mixers can be used. The quantity of grout to be mixed at one time should not exceed that amount which can be placed in approximately 10 to 15 minutes.

ii Cleaning and preparation of the surface

The base concrete should be clean and strong, and its surface should be properly hacked; all dust should be removed suction or compressed air. The surface should be thoroughly wetted with water for several hours. Before the grout is poured, all free water should be removed and the flat surfaces coated with a thin cement slurry.

iii Curing

The grout should not dry out where external restraint is provided in the form of form-work, the top opening and all stray openings should be covered with wet sack for at least 7 days.

3.8 Form Work

3.8.1 Materials

Formwork shall be of timber, plywood (including marine plywood), steel or any other suitable material capable of resisting damage to the contact faces under normal conditions of erecting forms, fixing steel and placing concrete. The selection of materials suitable for formwork shall be made by the Contractor based on the quality consistent with the specified finishes and safety. For designated areas prominently in public view such as piers, caps, portals, viaduct, parapets etc., preferably steel shuttering will be used. The material shall be approved by the Engineer before erected at site. However, the choice of material shall be decided by the Engineer. The entire responsibility of planning, designing, erection, dismantling, shifting and safety of false work lies with the contractor.

All formwork supports (centering, props, scaffolds etc.) shall only be in structural steel and preferably of pipes conforming to IS: 806, IS: 1161, IS: 1239, IS: 2750. Wooden ballies shall not be permitted as props/ formwork supports. All props shall be properly braced using x & k bracings.

3.8.1.1 Timber

Timber used for formwork shall be easily workable with nails without splitting. It shall be stable and not liable to warp when exposed to sun and rain or wetted during concreting.

3.8.1.2 Plywood

Plywood used for formwork shall be minimum 12 mm thick. Shuttering quality plywood complying with IS: 4990 and of make approved by the Engineer. Suitable stiffeners and walers shall be provided depending on the shuttering design.

3.8.1.3 Steel

Steel formwork shall be made of minimum 4 mm thick black sheets stiffened with angle iron frame made out of M.S. angles 40 mm x 6 mm supported at suitable spacing.

3.9 Age of Concrete at Removal of Formwork

In accordance with CPWD Specifications 96 or IS: 456.

The Engineer may vary the periods specified if he considers it necessary. Immediately after the forms are removed, they shall be cleaned with a jet of water and a soft brush.

- 3.10 Other specifications related to providing concrete for installation of signages will have to be followed as given in relevant IS, CPWD codes.

4. STRUCTURAL STEEL WORKS

4.1 General

These specifications shall be read in conjunction with the CPWD specifications 1996 and other relevant reference specifications described in the section 1 of these specifications.

The Contractor will provide all materials and equipment required to complete the works in every respect, whether such materials are required as part of the permanent structures or temporary for fabrication or erection or maintenance including specifically structural steel plates, flats, bars, welding rods, rivets, bolts and nuts, paint, welding sets in the shop and at site, all workshop facilities, derricks, cranes, pulley blocks, wire ropes, hemp or manila ropes, winches, erection cleats and temporary braces or supports and all other materials required to deliver the Works complete in every respect.

All labour required for fabrication and erection for any cleaning, making good, rectifying, hauling, painting and for any other ancillary work required to complete fabrication and erection.

The Contractor shall observe all safety requirements for erection of structural steelwork as covered in IS: 7205.

4.2 Drawings

- (i) The Engineer will supply to the Contractor profile drawings showing sizes of all structural members and typical connection details.
- (ii) Should there be any-discrepancy-in-the-drawings the Contractor is to refer the matter to the Engineer. The Contractor shall further provide a drawing showing the accurate setting out to line and level of all the anchor bolts intended for the work in sufficient time for their inclusion in the work so as to maintain the building program.
- (iii) The Contractor is to prepare all the necessary fabrication shop drawings and these shall be submitted to the Engineer in duplicate and be approved by him before fabrication is commenced. All such drawings shall show the dimensions of all parts, method of construction, welding and bolting. A further set of all approved fabrication drawings shall be supplied by the Contractor for use of the Engineer as required.
- (iv) Approval by the Engineer of drawings or any other particulars submitted by the Contractor shall not relieve the Contractor of full responsibility for any discrepancies, errors or omissions therein. The Contractor shall at his own expense supply such additional copies of his working drawings as are required for the use of the interested parties.

4.3 Material

- (i) **Structural Steel:** All structural steel shall be of tested quality and shall

conform to one of the following standards:

IS: 226 Structural steel (Standard Quality)

IS: 2062 Structural steel (Fusion welding quality)

IS: 961 High Tensile Structural Steel (Ordinary)

IS: 1161 Steel Tubes for Structural purposes

IS: 4923 Hollow steel sections for Structural use

The Contractor shall supply to the Engineer copies of the manufacturer certificate that the steel brought to the site for incorporation in the works is of a quality fully complying with the specification. If required by the Engineer, the Contractor shall arrange for testing of the steel samples as per IS: 1608 - 1599.

- (ii) **Welding Electrodes:** Welding electrodes used for the works shall conform to IS: 814/ latest and shall be supplied by manufacturer approved by the Engineer and shall be of the grade approved by the Engineer. All Electrodes shall be kept under dry conditions. Any electrode which has part of its flux coating broken away or is damaged shall be rejected.
- (iii) **Bolts and Nuts:** Bolts and nuts used for the works shall unless otherwise specified be black bolts and nuts supplied by manufacturer approved by the Engineer and shall conform to IS: 1367.

For the truss hot-dip galvanised (@ 300 gm/sqm) bolt sleeve of mild steel grade 'B' conforming to IS:2062 and 4 dia 12mm anchor bars welded to same as per detailed drawing and instruction of the engineer shall be provided. The Length and diameter of sleeve shall be 300mm and 60mm respectively. The sleeve shall receive hexagon head bolt IS: 1363 (part-I)- ISO 4016-M-20x90-8.8. Hexagon head bolt shall be provided with galvanised spring washer as per the detailed drawing and instruction of the Engineer.

- (iv) Washers: Plain washers shall be made of mild steel conforming to IS: 5369 (1975), unless otherwise specified. One washer shall be supplied with each bolt and, in case of special types of bolts, more than one washer as needed for the purpose shall be supplied. An additional double coil helical spring washer, conforming to IS: 6755 (1980), shall be provided for bolts carrying dynamic or fluctuating loads and those in direct tension. Tapered-washers, conforming to IS: 5372 (1975) and IS: 5374. (1975), shall be used for channels and beams respectively wherever required.
- (v) For all other material required for the works, the approval of the Engineer shall be obtained by the Contractor prior to the use of the material in the works.

4.4 Workmanship and Fabrication

- 4.4.1 For all the works, workmanship shall be of first class quality, throughout, in conformity with IS: 800-latest, and true to line, level and dimension as shown in the drawings or instructed by the Engineer.

- 4.4.2 All parts assembled for bolting shall be in close contact over the whole surface and all bearing stiffeners shall bear tightly at top and bottom without being drawn or caulked. The component parts shall be so assembled that they are neither twisted nor otherwise damaged as specified cambers if any shall be provided. Drilling done during assembling shall not distort the metal or enlarge holes. The butting surfaces at all joints shall be so cut and milled so as to butt in close contact throughout the finished joints.
- 4.4.3 Cutting shall be done automatically. Hand flame cutting will not be permitted.
- 4.4.4 The edges and ends of all cut/sheared flange plates, web plates of plate girders, and all cover plates, and the ends of all angles, tees, channels and other sections forming the flanges of plate girders, shall be planed/ground.
- 4.4.5 Holes for bolts shall be drilled to conform to clause 10 of IS: 7215 (1974). Punching of holes will not be permitted. All drilling shall be free from burrs. No holes shall be made by gas cutting process.
- 4.4.6 All welding for the works shall be carried out by first class welders and shall be in accordance with IS: 816, IS: 819, IS: 1024, IS: 1261, IS: 1323 and IS: 9595. - The Engineer may at his discretion order periodic tests of the welder and/or of the welds produced by them. All such tests, shall be carried out by the Contractor at his cost
- Safety requirements should conform to IS: 7205, IS: 7273 and IS: 7269 as applicable and should conform to safety, economy and rapidity.
- 4.4.7 As much work as possible shall be welded in shops. The pieces shall be manipulated to ensure down hand welding for all shop joints as far as possible. All parts to be welded shall be arranged so as to fit properly on assembly. After assembly and before the general welding- is to commence the parts are to be tack welded with small fillet or butt welds as the case may be. The tack welding must be strong enough to hold the parts together but small enough to be covered by the general welding. The 'welding procedure shall be so arranged that the distortion and shrinkage stresses are reduce to a minimum.
- 4.4.8 All joints required in structure to facilitate transport or erection shall be shown on the drawings or as specified by the Engineer. Should the Contractor need to provide joints in locations other than those specified by the Engineer he shall submit his proposals and obtain the prior sanction of the Engineer for such joints. The lengths of structural shall be the maximum normally available in the market jointing of shorter length in order to make up lengths required shall not be permitted.
- 4.4.9 Each piece of steel work shall be marked distinctly before delivery, indicating' the position and direction in which it is to be fixed. Three copies of a complete marking plan are to be supplied to the Engineer before erection commences.
- 4.4.10 In the case of welded fabrication any distortion remaining in the member after welding operations are completed shall be rectified -by and/or at the expense of the Contractor to the approval of the Engineer.

- 4.4.11 All members of trusses and lattice girders shall be straight throughout their length, unless shown otherwise on the drawings, and shall be accurately set to the lines shown on the drawings. Sheared edges of gussets or other members to be straightened and dressed where necessary.
- 4.4.12 Templates and jigs used throughout the work shall be all steel. In cases where actual materials have been used as templates for drilling similar pieces, the Engineer shall decide whether they are fit to be used as parts of the finished structure.
- 4.4.13 Apart from the requirements of welding specified under the above sub clauses, sections above, the Contractor shall ensure the following requirements in the welded joints.
- (i) Strength-quality with parent metal.
 - (ii) Absence of defects.
 - (iii) Corrosion resistance of the weld shall not be less than that of parent material in an aggressive environment.
- 4.4.14 No gasket or other flexible material shall be placed between the holes. The holes in parts to be joined shall be sufficiently well aligned to permit bolts to be freely placed in position. Driving of bolts is not permitted. The nuts shall be placed so that the identification marks are clearly visible after tightening. Nuts and bolts shall always be tightened in a staggered pattern and, where there are more than four bolts in any one joint, they shall be tightened from the center of the joint outwards.

4.5 Testing of Welds

- 4.5.1 Butt welds - Radiographic testing of 5% of welds as per IS 1182.
- 4.5.2 Fillet Welds- Ultrasonic testing of 5% of welds.
- 4.5.3 All welded connections shall be inspected as per IS:822.
- 4.5.4 All welds shall be tested by "dye penetration test" as per current practices.
- 4.5.5 Agency for testing of weld shall be approved by the Engineer prior to testing.
- 4.5.6 Defected welds shall be repaired or replaced as decided by the Engineer. The repaired or replaced welds shall be tested using the same methods as above. Additionally, when defective welds are found, the cause of the defective welding shall be determined and the contractor shall institute immediate corrective action.
- 4.5.7 No extra payable shall be made for the tests indicated above.

4.6 Protection of Steel Works (IS: 8629)

- 4.6.1 Sand blasting where specified shall be carried out in accordance with IS: 1477
- 4.6.2 Painting work shall be carried out in accordance with IS:8629 (Parts I to III). Painting shall be applied under the temperature requirement specified by the manufacturer.

4.6.3 The steel work prior to delivery, shall be cleaned from scale, rust, dirt and grease etc., but means of chipping, scraping and wire brushing using skilled operators as described in the painting systems below. The cleaning shall proceed each day over the extent of surfaces which can be painted on that day. The paint shall be applied by brushing or spraying as per approval of the Engineer.

Paint brushes round/oval and flat shall be conforming to IS: 487 and IS: 384 codes respectively, if painting with brushing is approved by Engineer.

The spraying equipment shall be compatible with the paint material, fitted with necessary gauges and controls and approved by the Engineer.

4.6.4 Site weld locations shall be left free from paint within 50mm of the weld position, and contact surfaces in connection using High Strength Friction Grip Bolts shall not be painted. Immediately after completion of erection all damaged paint shall be scraped off and made good to the approval of the Engineer.

The Steelwork specialist shall also clean down and apply one coat of primer to all site bolts, site bolted connections and site weld locations and the paint work generally shall be left in sound condition for any subsequent painting.

4.6.5 All paints and primers shall be of best quality and in original sealed containers as packed by the paint manufacturer conforming to the relevant Indian Standards and shall be procured directly from the manufacturers. All paint to be used shall be stored under cover in such conditions as will preserve it from extreme of temperature and the paint shall be used and applied strictly in accordance with the manufacturer's instructions.

4.6.6 In addition, the following specification shall apply to the shop painting of contact and inaccessible surfaces:

- (i) Surfaces to be painted shall be thoroughly cleaned from scale, rust, dirt, grease etc. by means of sand/ grit/ shot blasting or other equivalent means
- (ii) Surfaces which are to be brought permanently into close contact or made inaccessible either in the shops or upon erection shall, after cleaning, be given two coats of Red Lead Priming Paint. The surfaces shall be brought into contact while the paint is still wet
- (iii) Contact surfaces in connection using High Strength Friction Grip bolts shall not be painted or oiled and shall be free from dirt, loose scale, burrs, pits and any other defects which would prevent the solid seating of the parts and would interfere with the development of friction between them.
- (iv) All enclosed surfaces of box members shall be completely sealed by oiling or by coating with and approved bitumen paint and all such members and tubes shall have their ends closed by suitable plates welded in position.

4.6.7 Surfaces in contact during shop assembly shall not be painted. Surfaces which cannot be painted, but require protection, shall be given a rust inhibitive grease conforming to IS: 958 (1975), or solvent deposited compound conforming to IS: 1153 (1975) or IS: 1674 (1960), or treated as specified in the drawings.

- 4.6.8 Surfaces to be in contact with concrete shall not be painted.
- 4.6.9 The Contractor shall take all precautions to prevent dust and dirt coming in contact with freshly painted surfaces or with surface being painted. The second coat of paint shall only be applied when the first coat has dried
- 4.6.10 Surfaces not in contact but inaccessible after shop assembly shall receive the specified protective treatments before assembly.
- 4.6.11 Exposed machined surfaces shall be adequately protected.
- 4.6.12 A uniform film thickness of paint is to be ensured throughout the work.
- 4.6.13 Surfaces, which have not been shop coated, but require surface treatment shall be given necessary surface preparation and coats at site as specified in the painting system.

4.7 Erection & Site Work

- 4.7.1 The Contractor shall be responsible for checking the alignment and level of foundation and correctness of foundation bolt centres, well in advance of starting erection work, and shall be responsible for any consequences for non-compliance thereof. Discrepancies if any shall immediately be brought to the notice of the Engineer for his advice.

The structure should be divided into erectable modules as per the total scheme. This should be pre-assembled in a suitable yard/platform and its matching with members of the adjacent module checked by trial assembly before erection.

Immediately prior to erection any rust in the paint area shall be removed by power wire brushing to a standard equivalent to SA3.

- 4.7.2 During erection the rough handling of fabricated materials such as bending, straining or pounding with sledges shall be a Box. Any damage to the structure during transportation or erection shall be immediately rectified by the Contractor at his own cost. The straightening of bend edges of plates, angles and other sections shall be done by methods which will not cause fracture.

Following the completion of the straightening, the surface of the member shall carefully be inspected for damage and got approved by the Engineer before further use.

- 4.7.3 The Contractor shall be responsible for accurately positioning, leveling and plumbing of all steelwork and placing of every part of the structure in accordance with the approved drawings and to the satisfaction of the Engineer. All stanchion base, beam and girder bearings etc. shall be securely supported on suitable steel packs. All reference and datum points shall be fixed near the work site for facilitating the erection work.

- 4.7.4 All equipment used by the Contractor shall be sufficient for the purpose and for the erection of the steel work, in the time specified in the contract. Any lifting or erecting machinery shall be to the approval of the Engineer and shall be removed from site if he considers such appliances dangerous or unsuitable for their functions. The approval of the Engineer shall not relieve the Contractor of the responsibilities for the loads to which the erection equipment shall be called upon to carry. Adequate arrangement shall be made to resist wind loads and lateral forces arising at the time of erection.
- 4.7.5 The Contractor is entirely responsible for the stability of the structure during erection and shall arrange that sufficient tack bolts, braces or guy ropes are used to ensure that work will remain rigid until final bolting, riveting or welding is completed. The Contractor shall supply and fix, without extra charge, any temporary bracing which may be necessary.
- 4.7.6 All steelwork shall be erected in the exact position as shown on the drawings. All vertical members shall be truly vertical throughout and all horizontal members truly horizontal, fabrication being such that all parts can be accurately assembled and erected. No permanent bolting, welding or grouting shall be done until proper alignment has been obtained and checked by the Engineer.
- 4.7.7 At stanchion splices and at other positions where concrete cover to the steel is liable to be restricted, bolts will be placed with their heads on the outside of the members.
- 4.7.8 All field assembly bolting and welding shall be executed in accordance with the requirements for shop fabrication excepting such as manifestly apply to shop conditions only. Where steel has been delivered painted the paint shall be removed before field welding for a distance of at least 50mm on either side of the joints. The number of washers on permanent bolts shall not be more than two for the nut and one for the bolt head.

4.8 Rectification of damaged materials

Any error in shop work which prevents the proper assembly and lifting up of the parts by moderate use of drift pins or reaming or cutting shall be immediately reported to the Engineer and his approval of the method of rectification obtained in writing. Wrongly fabricated material whose erection in the field necessitates extra work shall be the responsibility of the contractor. The entire costs of such operation including the replacement of defective members, if required, shall be borne by the contractor.

4.9 Inspection

- 4.9.1 The contractor shall inform the Engineer of the progress in fabrication and as to when individual pieces are ready for inspection. All gauge templates necessary to satisfy the Engineer shall be supplied by the contractor. The Engineer may at his discretion check the results obtained at the contractor's works by independent tests and should the material so tested be found unsatisfactory, the cost of such tests shall be borne by the contractor.
- 4.9.2 Structural steel and components viz. bolts, nuts, washers, welding consumables, etc. should be tested for mechanical and chemical properties

as per the requirement of the relevant IS or any other specified codes/standard.

4.9.3 During Inspection, the component/member shall not have any load or external restraint.

4.10 Holding down and Anchor bolts

4.10.1 The holding down and anchor bolts should conform to the requirements laid down in IS: 624 or as directed by the Engineer.

4.10.2 Installation: Individual bolts in groups of holding down bolts shall be positioned accurately within a tolerance of +6mm. The bolts shall be set vertically to a tolerance of not more than 1 in 250.

4.10.3 During the casting of concrete the contractor shall ensure that space between the bolt and sleeves is kept clean after removal of shuttering. The contractor shall provide and fix timber plugs to maintain this space in a clean condition. The projecting threads of bolts shall be protected by approved wrapping materials.

4.10.4 Grouting of bolt tubes shall be carried out after the steelwork or equipment have been aligned, plumbed and leveled.

4.11 Tolerances

4.11.1 All tolerances shall be in accordance with IS: 7215 unless otherwise specified.

4.11.2 The maximum deviation for line and level shall be + 3.0mm for any part of the structure including for location of column centres.

4.11.3 The maximum deviation from plumb for columns shall be + 3.0mm in 10.0m height subject to a maximum of + 6.0mm in a total height of 30.0m.

4.11.4 The deviation at the centre of the upper chord member from vertical plane running through the centre of the bottom chord shall not be more than 1/1500 of span but in no case more than 10.0mm. The lateral displacement of top chord at centre of span from vertical plane running through centre of supports shall not be more than 1/250 of the depth of truss but in no case more than 20.0mm.

4.12 List of Approved Manufacturers & Suppliers – As per UPMRC approved vendor list

4.13 Reference of Codes

S. NO.	CODE NO.	TITLE
1.	IS: 226 – 1975	Specifications for structural steel (standard quality)
2.	IS: 269 – 1976	Specifications for Ordinary and Low Heat Portland Cement.
3.	IS: 383 – 1970	Specifications for coarse and fine aggregate from natural Sources for concrete.

4. IS: 456 – 1978 Code of Practice for Plain and Reinforced Concrete.
5. IS: 733 – 1986 Specifications for Aluminum Alloy sheet
6. IS: 800 – 1984 Code of Practice for General construction in steel.
7. IS: 3618 – 1966 Specifications for phosphate treatment of iron and steel protection against concrete.
8. IS: 8112 – 1989 Specifications for 43 Grade Ordinary Portland Cement.
9. IS: 9103 – 1979 Specifications for Admixtures for Concrete.
10. IS: 12269 – 1987 Specifications for 53 Grade Ordinary Portland Cement.
11. IS: 2062 – 1984 Specifications for Weld-able structural Steel.
12. IS: 14443 – 1997 Specifications for Polycarbonate sheet
13. IS: 4759 – 1997 Specifications for galvanizing on steel.
14. ACI: 318 – 95 Building Code Requirements for Structural Concrete.
15. BS: 5075 – 1985 Specifications for Super plasticizing Admixture Part III

5. TESTING OF MATERIAL, COMMISSIONING, MAINTENANCE AND VARIATIONS IN FIXING ARRANGEMENTS

5.1 General

In general all the materials will be tested to ensure the quality as specified in the relevant IS codes, CPWD specifications of works and BS codes. However few specific requirements are mentioned here under which will govern and over rule any other provision in case of any deviation or difference noticed to that one specified in foregoing lines and other relevant codes. It will be the contractor's responsibility to ascertain the quality of material. In absence of any test result if found later on that material of poor quality has been used then contractor shall have to replace the material, re-do the work and bear all the cost and responsibilities in this respect during whole life span of the work done.

5.2 Powder coating on aluminum plates

5.2.1 Wherever specified the aluminium plates shall be coated in approved colour and shade with ~~pure~~ polyester powder of Berger/Interpon/Hardcastle/Nerocoat to a minimum thickness of 75 **80** microns.

5.2.2 The pure polyester powder coating shall be got executed from specialised agency.

In case the contractor associates himself with a specialized powder coating agency and submits the "association agreement" between himself (the contractor) and the said specialised powder coating agency at the time of

pre-qualification or tender submission, the work of powder coating shall be got executed through the said specialised powder coating agency. Any change in the agency from that submitted earlier shall require specific approval, in writing, from UPMRC before start of work. The successful contractor shall draw an MOU with said specialised powder coating agency and submit to UPMRC within a week of such approval. The contractor will not be allowed to start the powder coating work without completion of above stated formalities.

- (i) The pure polyester powder shall have following properties:-
- (ii) Free Flow-ability : Satisfactory
- (iii) Particle size : < 100 microns suitable for Electrostatic spray.
- (iv) Specific gravity : 1.1 to 1.5 depending on the colour.
- (v) Shelf life : 6 months.
- (vi) Stoving Schedule : 200° C for 10 mins. (Metal temp.)

Test Certificates from approved laboratory for the representative samples shall be submitted by the Contractor. Testing will be done in presence of Employer's representatives at the cost of contractor. It is at the discretion of Employer's Representative to dispense with this test on being satisfied the quality of Polyester powder samples at the workshop of powder coating agency.

5.2.3 The curing schedule shall be as specified by the manufacturer of ~~pure~~ polyester powder.

5.2.4 The properties of cured powder films shall be:-

- 1.4.1 Scratch hardness : Equal to or more than 4 Kg.
- 1.4.2 Impact resistance : Min 150-Kg cm
- 1.4.3 Pencil hardness : : 3H to 4H
- 1.4.4 Salt spray resistance : 500 Hrs.
- 1.4.5 Water soak at room: No change after 500 Hrs.
temperature
- 1.4.6 Detergent resistance : No attack after 500 Hrs.
- 1.4.7 Cross Hatch adhesion : GT= O (ASTM D-3359)
- 1.4.8 Cured Film thickness : Min 75 microns.

5.2.5 Tests for properties of cured film as given above shall be carried out at frequency specified in relevant IS/BS/ASTM codes or as specified by the Engineer – in – charge.

5.3 Powder coating on M.S and CRCA Steel sheets only

5.3.1 Wherever specified the M.S and CRCA Steel plates and sections shall be coated in approved colour and shade with ~~pure polyester~~ powder of Berger/Interpon/Hardcastle/Nerocoat to a minimum thickness of 75 **80** microns.

5.3.2 The ~~pure polyester~~ powder coating shall be got executed from specialised

agency as given in 1.2 to 1.5. Testing of polyester powder and cured powder film shall be got done in the similar manner as specified in 1.

5.4 Polycarbonate sheet

5.4.1. The polycarbonate sheet shall be of GE (**Sabic/GE Lexan/Ultralite**) make or equivalent. The polycarbonate sheet shall have the following physical requirements and properties in conformity with IS-14443 –1997: -

- (i) Light stabilization – Rating “L” of Table 2 of IS-14443.
- (ii) Transparency – Rating “R” of Table 2 of IS-14443.
- (iii) Colour – Opal White.
- (iv) Coating – Rating “UV” of Table 2 of IS-14443.
- (v) Weight – Min. 1.2 Kg per Sq.m. per mm thickness
- (vi) Dart Drop Impact - >200 NM.
- (vii) Tensile strength at break ->70 N/mm².
- (viii) Flexural modulus – Equal to or more than 2500 N/mm².
- (ix) Light transmissions – Equal to or more than 35%.
- (x) Flame retardancy - Rating UL94HB of Table 3 of IS-
- (xi) Sheet shall not be scratch resistant.

5.4.2 Fabrication and installation of polycarbonate sheets shall be as specified in “Annex A – Code of good fabricating practices “of IS-14443-1997.

5.4.3 The tolerances in the width, length & thickness of sheet shall be as specified in Note 2 on page 3 of IS –14443-1997.

5.4.4 The sampling & testing of sheets for the properties given above shall be as per provisions of IS-14443-1997.

5.5 Aluminium Plates and Sections :

5.5.1 Aluminium plates and sections shall conform to aluminium alloy of grade 63400 WP of IS-733.

5.6 Designed **EPDM gaskets** of required thickness and width manufactured by Hanu Industries/Anand Lescuyer or equivalent shall be provided.

5.7 **Dash Fasteners** of required diameter and length manufactured by HILTI/FISCHER or equivalent shall be provided.

The Contractor shall make arrangements with the Dash Fastener suppliers – HILTI/FISCHER or other approved suppliers to carry out random pull out tests at

ANNEXURE-1
WORK EXPERIENCE

Tenderer's name

Date

Details of works executed by tenderer/s to be considered for qualification of work experience criteria at the price level on ending last date of previous month of submission end date of tender Publish Date.		
Similar Contract Numbers.....	Information	
Contract Identification and details		
Award date Completion date		
Employer's Name		
Employer's Address: Telephone / Fax number: E Mail		
Role in Contract (Individual/JV-Consortium member)	Individual	JV member
Completion Cost	Currency (as stated in Clients Certificate)	In equivalent INR as on last date of previous month of submission end date of tender <u>Publish Date</u> price level
If JV member specify percentage participation in contract & amount (Please refer Note-1)	% participation	In equivalent INR as on last date of previous month of submission end date of tender <u>Publish Date</u> price level
Details / Quantum of Similar work in support of clause no. 1.1.3.2		In case of JV/Consortium, actual Work / length executed by the Applicant (duly substantiated with Client Certificate)

NOTE:

1. Only the value of contract as executed by the applicant/member in his own name should be indicated.
2. Separate sheet for each work along with Clients Certificate to be submitted.

ANNEXURE - 1A: Summary of Information provided in Annexure-1

Tenderer's name

Date

Details of experience -

Name of Applicant (each member in case of group)	Total Number of works as per clause 1.1.3.2 at the price level of last date of previous month of submission end date of tender <u>Publish Date</u>	No. of contracts delayed, i.e., completed beyond the original date of completion
Total cost of eligible work experience		

NOTE: -

1. In case the work was done as JV/Consortium, only the value of work done by the applicant as per his Percentage participation in such JV/ Consortium must be given.
2. Reasons of delay whether on contractors account or on account of Employer in each applicable case need to be enclosed separately.

ANNEXURE- 2

Financial DATA

Tenderer's name

Date.....

(Each Applicant or member of a JV must fill this form separately)

S.N.	Description	Financial Data for Latest Last 5 Years (Amount Rupees in Crore)				
		2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
1.	Total Assets					
2.	Current Assets					
3.	Total External Liabilities					
4.	Current Liabilities					
5.	Annual Profits Before Taxes					
6.	Annual Profits After Taxes					
7.	Net Worth [= 1 - 3]					
8.	Working Capital [= 2 - 4]					
9.	Return on Equity					
10	Annual Turnover (from Signage work)					
11	Gross Annual turnover					
	<p>Attach copies of the audited balance sheets, including all related notes, income statements for the last Five audited financial years, as indicated above, complying with the following conditions.</p> <ol style="list-style-type: none"> 1. Separate Proforma shall be used for each member in case of JV/Consortium. 2. All such documents reflect the financial data of the Applicant or member in case of JV, and not sister or Parent Company / JV. 3. Historic financial statements shall be audited by Statutory Auditor of the Company under their seal & stamp and shall be strictly based on Audited Annual Financial results of the relevant period(s). No statements for partial periods will be accepted. 4. Historic financial statements must be complete, including all notes to the financial statements. 5. Foreign applicants, in whose country calendar year is also the financial year, may submit all relevant data for the last 5 years i.e., 2017, 2018, 2019, 2020 and 2021. 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. 6. Return on Equity = Net Income / Shareholders Equity Return on Equity = Net Income is for the full fiscal year (before dividends paid to common stock holders but after dividends to preferred stock). Shareholders equity does not include preferred shares. 7. The above Annexure shall be duly certified by Chartered Accountant / Company Auditor under his stamp, signature membership no and UDIN No. 					

ANNEXURE- 3A

FINANCIAL DATA

(SIGNANGE WORK DONE DURING THE LATEST LAST FIVE FINANCIAL YEARS)

NAME OF THE TENDERER (CONSTITUENT MEMBER IN CASE OF JV/CONSORTIUM):

(All amounts in Rupees in Crores)

S.N.	Description	Financial Data for Latest Last 5 Years (Amount Rupees in Crore)				
		2017-2018	2018-2019	2019-2020	2020-2021	2021-2022
1	2	3	4	5	6	7
	Total value of signage work done as per financial statements					

NOTE:

1. Attach attested copies of the Audited Financial Statements of the last Five financial years as Annexure.
2. The financial data in above prescribed format shall be certified by Chartered Accountant / Company Auditor under his signature, stamp, membership no and UDIN no.
3. The above financial data will be updated to last date of previous month of ~~submission end date~~ of tender **Publish Date** price level assuming 5 **7% per annum simple rate** 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.
4. Foreign applicants, in whose country calendar year is also the financial year, may submit all relevant data for the last 5 years i.e., 2017, 2018, 2019, 2020 and 2021. 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.

ANNEXURE- 3B

WORKS IN HAND

Tenderer's name

Date.....

Name and brief particulars of contract (Clearly indicate the part of the work assigned to the applicant(s))	Name of client with telephone number and fax number	Contract Value (Give only the value of work assigned to the applicant(s) (in Lacs)	Value of balance signange work yet to be done as on last date of previous month of <u>submission of tender Publish Date</u> (in Lacs)	Date of Completion as per Contract Agreement	Expected Completion Date	Value of balance signage work to be done during completion period of this NIT (From first date of month of submission end date of tender <u>Publish Date</u> to next N Years where N= number of years prescribed for completion of work in NIT) (B) (Lacs)
1						
2						
3						
<u>Total</u>						

Note: - The financial data in above prescribed format shall be certified by Chartered Accountant / Company Auditor under his stamp, signature, membership no and UDIN No.

Annexure 4 of NIT
AVAILABLE BID CAPACITY

(The financial data in this prescribed format shall be certified by Chartered Accountant /Company Auditor under his signature & stamp with UDIN).

Applicant's legal name**Date.....**

Financial Year	Annual turnover from Signage works of Firm (Rs in Lacs)	Escalated Annual turnover of Firm (Rs in Lacs) @ 5 7% <u>per annum simple rate</u> per year upto last date of previous month of submission end date of tender <u>Publish Date</u>
2017-18		
2018-19		
2019-20		
2020-21		
2021-22		
Average of Annual turnover from Signage works Rs in Lacs		
Maximum of Escalated Annual turnover from Signage works Rs in Lacs (A)		
Value of Balance signage work in hand during completion period of this NIT (Rs in Lacs) (B)		
Available Bid Capacity = 2 $1.5 \times A \times N - B$ (Rs in Lacs) should be more than NIT Value (Where N is number of years prescribed for completion of work in NIT)		

9. TRAFFIC MANAGEMENT

The Contractor shall follow the approved traffic diversion plans in liaison with the civil contractor for traffic management.

10. PRELIMINARY DRAWINGS

Preliminary drawings provided with tender documents, represent Employer's proposal based on preliminary design. Detailed working drawings will be given for construction of work subsequently.

11. TENDER PRICES

The tender price as mentioned in Clause 10.0 of ITT shall include all the above listed Items in the scope of the work (Clause 2.1 to 2.9).

12. MANUFACTURING UNIT

- (a) The tenderer shall submit proof of ownership of the factory premises either of its own or through Lease agreement.
- (b) The tenderer should mandatorily ensure that they are in possession of the factory throughout the period of contract.
- (c) Mandatory Registration: Should have Mandatory registrations such as PF , GST etc.

13. SAMPLE/MOCKUP REQUIREMENT

Mass production of signage of each type shall be done after due approval of mockup/ sample done in actual scale & working prototype.

14. PROCUREMENT OF MATERIAL

- a) The Contractor shall procure materials given in Annexure-A of Appendix-18 only from approved make/s as mentioned against each item of this Annexure-A. Documentary proof of such procurement shall be submitted by our firm.
- b) The Contractor shall submit Warranty Certificate/s from the Original Equipment Manufacturer (O.E.M) for the purchase of approved make/s for Contract AGSG 01.
- c) The employer shall have the right of random sampling upto 1% of finished product for testing/ verification of procured material from O.E.M. We understand that entire cost in connection with testing/verification shall be borne by us. Also, no payments shall be made for finished product, in case it is rendered unfit for use during testing process.
- d) **Contractor shall fully take note of warranty periods alongwith approved make/s as specified in all BOQ items of Volume 06 uploaded in finance cover and undertake that in case of defect arising within warranty periods, we shall replace/rectify it free of charge (as per requirement such that the signage is restored to full working condition).**

handover areas and plant rooms as per the key dates stipulated in Appendix 1A of Employers Requirement before the final completion date of the contract. Liquidated damages as per the rates given in the Appendix 1A shall be levied for any delay in completing these areas as per these key dates including an overall completion of the work.

ii) The maximum limit of liquidated damages on key dates shall be limited to 10% of the contract value. However, this limit of liquidated damage shall be 15% of the contract value after including any sums accepted by employer for payment to any designated contractor on account of default of contractor.

23. Clause 9.1 Deleted

24. Clause 10.1 Defect liability period

Following is added to Clause 10.1 of GCC.

The Defect liability period (DLP) shall be ~~52 weeks~~ **5 years**. If Taking over Certificate is issued in parts, the defect liability period for different parts of works shall start from the date of issue of Taking Over Certificate for that part of work.

Work by persons other than the Contractor.

If by reason of any accident or failure or other event occurring to, in, or in connection with the Works any remedial or other work shall, in the opinion of the Engineer, be urgently necessary and the Contractor is unable or unwilling at once to do such remedial or other work, the Engineer may authorise the carrying out of such remedial or other work by a person other than the Contractor. If the remedial or other work so authorised by the Engineer is work, which, in the Engineer's opinion, the Contractor was liable to do under the defect liability period Contract, all expenses properly incurred in carrying out the same shall be recoverable by the Employer from the Contractor, provided that the Engineer shall, as soon after the occurrence of any such emergency as may be reasonably practicable, notify the Contractor thereof in writing.

25. Clause 11.1.1 The Contract Price Inclusion/Exclusion

Sub Clause 11.1.1 (i) of GCC is replaced as under:

(a) The contract price, subject to any adjustment thereto in accordance with the contract shall be all inclusive (including all taxes, duties, royalties etc.) including Goods and Services Taxes (GST).

(b) The contract price shall be quoted in Indian Rupees only.

(c) Taxes and duties paid to the sub-vendors shall not be paid separately and therefore are to be included in the price.

Schedule 1 A
CONTRACTOR'S WARRANTY
(Refer Sub-Clause 4.2.4 of GCC)

THIS AGREEMENT is made on the day of between:

- (1) [.....] of [.....] [and [see Note 1]]
([jointly] "the Contractor")
- (2) [Uttar Pradesh Metro Rail Corporation Limited] [of]/[whose registered office is at]
[Administrative Building, Vipin Khand, Gomti Nagar, Lucknow - 226010] (together with
its successors and assigns, "the Employer").

WHEREAS

- (A) By a contract ___ dated [] ("the Contract") made between (1) the Uttar Pradesh Metro Rail Corporation Limited ("the Employer") and (2) the Contractor, the Contractor has agreed to design, execute, complete, test and commission (including Integrated Testing and Commissioning) and remedy any defect in the Works upon the terms and conditions contained in the Contract.
- (B) [See Note 3].
- (C) At the request of the Employer and pursuant to the terms of the Contract the Contractor has agreed to enter into this Warranty.

NOW IT IS AGREED AS FOLLOWS:

1. The Contractor hereby warrants and undertakes that:
 - (a) he will design, execute, complete, test and commission (including Integrated Testing and Commissioning) and remedy any defect in the Works in accordance with the terms of the Contract; and
 - (b) he owes a duty of care to the Employer in relation to the performance of its duties under the Contract; and
 - (c) he will replace free of cost to the Employer any defect or failure of equipment provided in the Works for a period of ~~36 months~~ **5 years** from the date of Taking Over of the ~~last~~ **that** Section of the Works; and
 - (d) he agrees that should any design modification be required to any section or component due to any defect, the period of ~~36 months~~ **5 years** shall recommence from the date when the modified part is commissioned into service, and such modification shall be carried out free of cost to the Employer in all sub-systems and systems for all sections; and
 - (e) he shall maintain the manufacture or spare of replacement parts for at least 10 years.
2. The liability of [the companies comprising [see Note 3]] the Contractor under this Warranty [shall be joint and several and [see Note 3]] shall not be released, diminished or in any way affected by any independent inquiry or investigation into the Works or any matter related to the Contract whether carried out by or on behalf of the Employer or any liability or right of action which may arise out of such inquiry or investigation.

FORM OF TENDER – APPENDIX-1

[REQUIREMENTS UNDER GENERAL CONDITIONS OF CONTRACT (GCC)]

S.N	DESCRIPTION	REF TO CLAUSE NO.	REQUIREMENT
i	Amount of Performance Security	Clause 4.2 of the GCC	3% of the Contract Price in types and proportions of currencies in which the contract price is payable. In the event of variations during the execution of the contract which result in payments to the Contractor over and above the contract price, the Performance Security shall be adjusted in accordance with clause 4.2 of GCC.
ii	Latest 'date for commencement' of the Works	Clause 8.1 of the GCC	Date given in LOA or Employer's Notice to Proceed
iii	'Time for completion' of the work from the date of commencement of the work	Clause 8.2 of the GCC	24 Months
vi	Liquidated Damages	Clause 8.5 of the GCC	(i)The maximum limit of Liquidated Damages on key dates shall be 10% of the total Contract Value. (ii) Total maximum limit of LD including sums payable by the employer to designated contractors is 15% as mentioned in GCC.
v	'Defects Liability Period' for the whole of the Works	Clause 10 of the GCC	52 weeks 5 years after the date of issue of Taking-Over Certificate for the Whole of the Works.
vi	Amount of advance payment	Clause 11.2 of the GCC	As per clause No. 11.2.1 & 11.2.2 of SCC
vii	Amount of Professional Indemnity Insurance (PII).	Clause 15.1 and 15.5 of the GCC	Deleted
viii	Insurance cover for Contractor's All Risk and other requirements as specified in the GCC	Clause 15 of the GCC	100% of the Total Contract Price.
ix	Amount of Third Party Insurance	Clause 5.8 and 15.3 of the GCC	INR 0.50 Million for any one incident, with no. of incidents unlimited.
X	Period in which all insurances have to be effected	Clause 15.5 of the GCC	Within 4 weeks from the "date of commencement"
Xi	Contract Key Dates	Clause 8.5 of the GCC	Refer Appendix 2B of the Employer's Requirement
Xii	(a) Contractor name and address (To be filled in by Tenderer)	GCC clause 18.1	
	(b) Employer's Name and Address	GCC clause 18.2	Uttar Pradesh Metro Rail Corporation Ltd. Administrative Building, Vipin Khand, Gomti Nagar, Lucknow- 226010

Date :

Place :

Signature of authorized signatory of Tenderer