HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED
(A Joint Venture Govt. of Haryana and Ministry of Railways)
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Tender No.: HORC/HRIDC/C-5/2023 **Date: 20.12.2023**

Reference: Specific Procurement Notice dated 03.11.2023.

CORRIGENDUM NO. 1

Name of Work: Contract Package C-5: Composite Contract package in connection with New BG Double Railway Line of HORC project between stations Prithla and Dhulawat for:

(i) Design and Construction of Civil Works (Earthwork, Bridges, Stations and Retaining Walls) from km -2.296 to km 12.00 & km 18.00 to km 20.942;

(ii) Design & Construction of viaduct from km 20.942 to km 24.844;

(iii) Design & Construction of Ballastless track from km 20.842 to km 24.844; and

(iv) Design, Supply, Installation, Testing & Commissioning of General Electrical Services from km -2.296 to km 12.00 and Km 18.00 to Km 24.844.

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
1.	Part 1, Section IV, Tender Forms, Appendix A to Financial Part: Schedule of Adjustment Data, Sub-Clause 1.2 e) and Sub-Clause 1.2 f)		The existing Sub-Clause 1.2 e) and Sub-Clause 1.2 f) is replaced and annexed as **Attachment 1** of Corrigendum No. 1.
2.	Part 1, Section IV, Tender Forms, Appendix B to Financial Part: Price Schedules, Sub-Clause 1.1	The Price Schedules shall be read in conjunction with the Instructions to Tenderers, the General Conditions, the Particular Conditions and the Employer's Requirements General, Functional, Design (Civil & BLT), Construction (Civil & BLT), Outline Design Specifications (ODS)- Civil & BLT, Outline Construction Specifications (OCS)-Civil & BLT, General Electrical Services, Signalling &	The Price Schedules shall be read in conjunction with the Instructions to Tenderers, the General Conditions, the Particular Conditions and the Employer's Requirements General, Functional, Design (Civil & BLT), Construction (Civil & BLT), Outline Design Specifications (ODS)- Civil & BLT, Outline Construction Specifications (OCS)-Civil & BLT,

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		Telecommunication (S&T) Works, Tender Drawings and Documents, Appendices and the Addenda/Corrigenda (if any).	General Electrical Services, Signalling & Telecommunication (S&T) Works, Tender Drawings and Documents, Appendices and the Addenda/Corrigenda (if any). *The price quoted by the Contractor for Price Schedules Schedule 'A', Schedule 'B', Schedule 'C' and Schedule 'D' shall include cost of the Works as per Part 2-Employer's Requirements (General, Functional, Design- Civil & BLT, Construction - Civil & BLT, Outline Design specifications (ODS) - Civil & BLT, Outline Construction Specifications (OCS) - Civil & BLT, General Electrical Services, Signalling & Telecom (S&T) Works, Tender Drawings and Documents, Appendices and the Addenda/Corrigenda (if any).*
3.	Part 1, Section IV, Tender Forms, Appendix B to Financial Part: Price Schedules, Sub-Clause 1.2	**Schedule 'A'** comprises scope of work to be executed under lump sum contract as detailed in Part 2- Employers' Requirements of Tender Document. Cost of Schedule 'A' also includes cost of tree cutting for entire package C-5 as per Sub-Clause 10.14 of Appendix 10, Section VII-9: Appendices, Part 2 -Employer's Requirements of Tender Documents. The Tenderer has to quote a single lump sum amount against Schedule 'A'. Payment to the Contractor will be made in accordance with payment stages/Milestones defined for each Cost Centre detailed in Clause 5.0 below unless otherwise specified in the Contract.	**Schedule 'A'** comprises *cost* of works to be executed under lump sum contract as detailed in Part 2- Employers' Requirements of Tender Document. *Design of all permanent work included in the Scope of Works of Schedule 'A' and Schedule 'B' shall be included in Schedule 'A'.* The Tenderer has to quote a single lump sum amount against Schedule 'A'. Payment to the Contractor will be made in accordance with payment stages/Milestones defined for each Cost Centre detailed in Clause 5.0 below unless otherwise specified in the Contract.
4.	Part 1, Section IV, Tender Forms, Appendix B to Financial Part: Price Schedules, Sub-Clause 3.2	If during execution of the Contract, it is decided by the Employer/Engineer that one or more items of Work/Milestone of a Cost Centre in a particular Price Schedule is not required to be executed, the proportionate amount against that particular Item of Work/Milestones shall not be paid. The Engineer's decision in this regard shall be final.	If during execution of the Contract, it is decided by the Employer/Engineer that one or more items of Work/Milestone of a Cost Centre in a particular Price Schedule is not required to be executed, the proportionate amount against that particular Item of Work/Milestones shall not be paid. *No claim by the Contractor on this account shall be payable by the Employer.* The Engineer's decision in this regard shall be final.

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
5.	Part 1, Section IV, Tender Forms, Appendix B to Financial Part: Price Schedules, Sub-Clause 5.2.2 Stages of Payment i.e. Milestones of Cost Centre 'CV'- Viaduct, Item of Work No. CV.1.3.3	CV.1.3.3 | | On fixing of bearings in position true to line & level and placement of superstructure on bearings including grouting of holding down bolts complete. | 4.00%	CV.1.3.3 | | On fixing of bearings in position true to line & level and placement of superstructure on bearings including grouting of holding down bolts complete. *This item shall also include load testing of required numbers of spans as per Employer's Requirements.* | 4.00%
6.	Part 1, Section IV, Tender Forms, Appendix B to Financial Part: Price Schedules, Sub-Clause 5.2.2 Stages of Payment i.e. Milestones of Cost Centre 'CV'- Viaduct, Item of Work No. CV.1.4	**CV.1.4** | **Installation of BLT on Viaduct** | |	**CV.1.4** | **Installation of BLT on Viaduct *including transition on approach of Abutment A-1*** | |
7.	Part 1, Section IV, Tender Forms, Appendix B to Financial Part: Price Schedules, Sub-Clause 5.2.5 Stages of Payment i.e. Milestones of Cost Centre 'CS'- Stations Buildings, Item of Work No. CS.3.1	**CS.3.1** | **Station building** | Construction of station building and Auto Location Huts (ALH) complete in all respects. | 4.20%	**CS.3.1** | **Station building** | Construction of station building and *S&T huts* complete in all respects. | 4.20%

<table>
<tr><th>S. No.</th><th>Tender Document Part / Section/ Clause No.</th><th>Description of Existing Clause</th><th>Modified Description of Existing Clause / New Clause</th></tr>
<tr><td>8.</td><td>Part 1, Section IV,
Tender Forms, Appendix B to Financial Part: Price Schedules, Schedule ‘B’</td><td>Schedule ‘B’</td><td>The existing Schedule ‘B’ is replaced with Schedule ‘B’/R1 and annexed as “Attachment 2” of this Corrigendum No. 1.</td></tr>
<tr><td>9.</td><td>Part 1, Section IV,
Tender Forms, Appendix B to Financial Part: Price Schedules, Schedule ‘B’</td><td>Schedule ‘C’</td><td>The existing Schedule ‘C’ is replaced with Schedule ‘C’/R1 and annexed as “Attachment 2” of this Corrigendum No. 1.</td></tr>
<tr><td>10.</td><td>Part 1, Section IV,
Tender Forms, Appendix B to Financial Part: Price Schedules, Schedule ‘D’</td><td></td><td>The existing Schedule ‘D’ is replaced with Schedule ‘D’/R1 and annexed as “Attachment 2” of this Corrigendum No. 1.</td></tr>
<tr><td>11.</td><td>Part 1, Section IV,
Tender Forms, Appendix A to Financial Part: Price Schedule, BoQ, MS-Excel Sheet</td><td>MS-Excel sheet for quoting price on eProcurement portal</td><td>The existing BoQ MS-Excel sheet for quoting price on eProcurement portal is replaced through this Corrigendum No. 1.</td></tr>
<tr><td>12.</td><td>Part 2, Section VII – 1, General Sub-Clause 1.2</td><td>1.2 Forest and Environmental Clearance
It is mentioned that for Railway projects no prior environmental clearance is required as per Environment Impact Assessment (EIA) Notification, 2006. Further, the Forest (Conservation) Act, 1980 is not applicable to the Project in terms of Ministry of Environment, Forest and Climate Change (MoEFCC’s) OM No.11-37/2016 FC dated 10.03.2022.</td><td>1.2 Forest and Environmental Clearance
It is mentioned that for Railway projects no prior environmental clearance is required as per Environment Impact Assessment (EIA) Notification, 2006. However, as per Ministry of Environment, Forest and Climate Change (MoEF&CC) clarification dated 19.10.2023, forest clearance is required for the Protected Forest portion of Project. List of crossings where Protected Forest clearance is required is given in the Table below:
<table>
<tr><th>S. No.</th><th>Chainage (m)</th><th>Name of Crossings</th><th>Type of Structure</th><th>District</th></tr>
<tr><td>1.</td><td>Ch:-795.733</td><td>Gaunchi drain</td><td>Bridge No. 4</td><td>Palwal</td></tr>
<tr><td>2.</td><td>Ch:-592.612</td><td>Village road from</td><td>Bridge No. 5</td><td>Palwal</td></tr>
</table></td></tr>
</table>

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause				
						Prithla to Chaprola		
				3.	Ch:371.033	Dhatir distributary	Bridge No. 10	Palwal
				4.	Ch:1696.624	Village road from Alhapur to Kalwaka	Bridge No. 12	Palwal
				5.	Ch:2493.015	Chandpur minor canal	Bridge No. 14	Palwal
				6.	Ch:3472.548	Village road from Sehrala to Paroli	Bridge No. 16	Palwal
				7.	Ch:4373.615	Village road from Jaindapur to Paroli	Bridge No. 18	Palwal
				8.	Ch:7753.296	Village road from Khuntpuri to Bhogpur	Bridge No.26	Gurgaon
				9.	Ch:8036.354	Gurugram Canal	Bridge No. 28	Gurgaon
				10	Ch:8298.110	Nuh drain	Bridge No. 30	Gurgaon
				11	Ch:10709.675	Permit line from Silani to Karnki	Bridge No. 41	Gurgaon
				12	Ch:11543.518	Palwal Sohna Rewari Road	Bridge No. 45	Gurgaon

<table>
<tr><th>S. No.</th><th>Tender Document Part / Section/ Clause No.</th><th>Description of Existing Clause</th><th>Modified Description of Existing Clause / New Clause</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>13</td><td>Ch:18310.000</td><td>Indri distributary</td><td>Bridge No. 63</td><td>Nuh</td></tr>
<tr><td>14</td><td>Ch:19435.000</td><td>Rewasan drain</td><td>Bridge No. 67</td><td>Nuh</td></tr>
<tr><td>15</td><td>Ch:20184.000</td><td>Gurugram Alwar Road</td><td>Bridge No. 68</td><td>Nuh</td></tr>
<tr><td>16</td><td>Ch:23720</td><td>Nuh sub branch</td><td>Canal (Nuh-sub Branch)</td><td>Nuh</td></tr>
<tr><td>17</td><td>Ch:24085</td><td>GA road to Khor Basai</td><td>GA Road to Khor Basai</td><td>Nuh</td></tr>
</table>
Protected Forest clearance will be taken by the Employer which is under process. Aravalli clearance is required between Ch. 24635.000 m to Ch. 24850.000m .

Tree cutting permission is available from Ch:-2.296 to Ch:5.547. For remaining portion, tree cutting permission is under process. Permission for cutting of trees wherever required will be obtained by the Employer. Cutting of trees within ROW wherever required for execution of the Works shall be done by the Contractor.

Compensatory plantation is not included in the Scope of Works.
</td></tr>
<tr><td>13.</td><td>Part 2, Section VII – 1, General Clause 2</td><td>“Works Areas” means the areas of the Site within the Right of Way and any additional areas which may be obtained by the Contractor and agreed by the Engineer as additional working area.</td><td>“Works Areas” means the areas of the Site within the Right of Way of HORC including land in KMP ROW, land in DFC ROW and land in ROW of Road Authority for the Work of construction/ regrading of road of RUB and any additional areas which may be obtained by the Contractor and agreed by the Engineer as additional working area.</td></tr>
</table>

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
14.	Part 2, Section VII – 1, General Clause 10	**IMPLEMENTATION OF SOFTWARE BASED BILLING & PROJECT MANAGEMENT SYSTEMS** The Contractor shall perform all billing processes through the software-based billing system as and when introduced by HORC free of cost. The Contractor shall also introduce appropriate Project Management Systems during the project execution phase.	**Deleted**
15.	Part 2, Section VII – 1, General Clause 14	**PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)** The Contractor shall utilise an available PMIS such that all documents generated by the Contractor can be transmitted to the Engineer by electronic means (and vice versa) and that all documents generated by either party are electronically captured at the point of origin and can be reproduced later, electronically and in hard copy. A similar link shall also be provided between the Engineer office at site and the Employer's Office by the Contractor. In case of non-availability, the Contractor may devise a PMIS of its own.	**PROJECT MANAGEMENT INFORMATION SYSTEM (PMIS)** *The Employer is using SPEED (Systematic Program Evaluation for Efficient Delivery of Project) software for Project Management. The Contractor shall use the SPEED Software for Project Management which will be made available by the Employer to the Contractor free of cost.* Necessary *Training in software for Contractor's staff will be arranged by the Employer*. *The Contractor shall develop Work Breakdown Structure of the Works Programme specified in Appendix 6 of Section VII-9: Appendices in Primavera suiting to the Work Breakdown Structure of SPEED.* *The Contractor's application for payment shall be submitted through Billing module of SPEED Software.* *The Contractor shall process and update all data related to Project and progress monitoring viz., Progress updates, RFI(s), NCR and NCN compliances etc. through SPEED Software.*
16.	Part 2, Section VII – 2, Functional		The existing "Section VII 2: Employer's Requirements – Functional" is replaced and annexed as **"Attachment 3"** of this Corrigendum No. 1.

<table>
<tr><th>S. No.</th><th>Tender Document Part / Section/ Clause No.</th><th>Description of Existing Clause</th><th>Modified Description of Existing Clause / New Clause</th></tr>
<tr><td>17.</td><td>Part 2, Section VII-4: Construction – Civil & BLT, ATTACHMENT C-2, S. No. 14</td><td>
<table>
<tr><td>Health & Safety Expert</td><td>Bachelor degree in any science stream with one-year full time Diploma in Industrial Safety.
(Or)
Diploma in Engineering with one year full time Diploma in Industrial Safety.
(Or)
Graduate in Engineering with one year full time Diploma in Industrial Safety</td><td>Minimum total experience of 02/03 years for with relevant experience of 01/02 years (degree/diploma) in infrastructure projects.</td></tr>
</table>
</td><td>
<table>
<tr><td>Health & Safety Expert</td><td>Bachelor degree in any science stream with one-year full time Diploma in Industrial Safety.
(Or)
Diploma in Engineering with one year full time Diploma in Industrial Safety.
(Or)
Graduate in Engineering with one year full time Diploma in Industrial Safety</td><td>Minimum total experience of 03 years with relevant experience of 02 years in infrastructure projects.
(Or)
Minimum total experience of 03 years with relevant experience of 02 years in infrastructure projects.
(Or)
Minimum total experience of 02 years with relevant experience of 01 years in infrastructure projects.</td></tr>
</table>
</td></tr>
<tr><td>18.</td><td>Part 2, Section VII-4: Construction – Civil & BLT, ATTACHMENT C-2, Note No. 2</td><td></td><td>Add the following Note No. 3 at the end of Note No. 2
3. The candidates must have obtained Degree/Diploma as full time regular candidates.</td></tr>
</table>

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
19.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 2: Outline Design Specifications-General, Sub-Clause 2.7 p)	**p)** Bridges shall have standard RDSO span lengths. PSC superstructure can be adopted upto 18.3 m clear span only.	**p)** Bridges shall have standard RDSO span lengths. PSC superstructure can be adopted upto 18.3 m clear span only. *Load testing of non-standard superstructure (one number of each typical span) shall be carried out as per the scheme designed by the Contractor and approved by the Engineer.*
20.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 2: Outline Design Specifications-General, Sub-Clause 2.7 t)	t) The approach roads to the RUBs shall be provided from RCC box to ROW of HORC for the width equal to clear opening of RCC box in concrete of M35 grade.	t) The approach roads to the RUBs shall be provided from RCC box to ROW of HORC for the width equal to clear opening of RCC box in concrete of M35 grade *as shown in Tender drawings.*
21.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 2: Outline Design Specifications-General, Sub-Clause 2.7 v)	**v)** Height gauge shall be provided at Road Under Bridges (RUB) on all approach roads as per approved Design.	**v)** Height gauge shall be provided at Road Under Bridges (RUB) on all approach roads as per approved *design. Span of height gauge shall be at least equal to clear opening of RUB + 2 m. Height Gauge shall be of single span for roads without median. In case of roads with median(s), height gauges having multiple spans can be provided. However, the Contractor shall be required to provide Height Gauge as per span agreed by Road Authority. No Claim by the Contractor on account of additional span length shall be admissible.* *The Contractor shall obtain approval/NOC of Road authority for GAD of height gauge(s) and its installation.*
22.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 2: Outline Design Specifications-General, Sub-Clause 2.7 z)	**z)** Compensated Ruling Gradient for the Section is 1 in 150. Station yard gradients shall be as shown in the Conceptual ESPs.	**z)** Compensated Ruling Gradient for the Section is 1 in 150. Station yard gradients shall be as shown in the Conceptual ESPs. *The Contractor shall design vertical curves at all locations where change in gradient is more than 0.4 %. Length of vertical curve shall be in multiple of 10 m & minimum radius 4000 m. Equilibrium speed for*

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
			horizontal curves shall be taken as 90 kmph.
23.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 3 Outline Design Specifications - Earthwork in Formation, Sub-Clause 3.3.3 viii)		***Add new para viii at the end of para vii*** All drains shall be designed for a return period of 15 years.
24.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.2.1 xviii.	xviii. Construction methodology and launching scheme (including casting of deck slab)	xviii. Construction methodology, launching scheme (including casting of deck slab) *and span load deflection test scheme.*
25.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.2.2, first para	4.2.2 Bridges with superstructure of Composite Plate Girders (CG) This group includes 06 Nos. of bridges (Br No. 04, 28, 30, 34, 68 & 69) having superstructure of steel CG. For Br No.28 and Br. No. 68, only composite girders are covered in this group. OWG portion of Br.No.28 and Br. No.68 is covered in Sub-Clause 4.2.3.	4.2.2 Bridges with superstructure of Composite Plate Girders (CG) This group includes 4 Nos. of bridges (Br. Nos. 4, 30, 34 & 69) having superstructure of steel composite plate girders.
26.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges , Sub-Clause 4.2.2 i.	i. Composite girder superstructure for bridge No. 28 & 68 for ballastless track	i. Composite girder superstructure *with ballasted* track.
27.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges , Sub-Clause 4.2.3	4.2.3 Bridges with superstructure of Open Web Girder (OWG) with concrete deck for providing Ballastless/ ballasted track	4.2.3 Bridges with superstructure of Open Web Girder (OWG) with concrete deck for providing *Ballastless* track.

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		This group includes 04 Nos. of bridges (Br. Nos. 17,28,45 & 68) having steel OWG superstructure with concrete deck for providing BLT. Bridge elements to be designed by the Contractor includes, but not limited to, the following: - i. Superstructure (OWG with deck for BLT/Ballastless Track).	This group includes 04 Nos. of bridges (Br. Nos. 17,28,45 & 68) having steel OWG superstructure. *Br. No. 28 has two spans of CG one on either side of OWG*. Bridge elements to be designed by the Contractor includes, but not limited to, the following: - i. Superstructure *with RCC deck and BLT (over OWG and CG both)*
28.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.2.3 xvii.	xvii. Construction methodology and launching scheme (including casting of deck slab)	xvii. Construction methodology, launching scheme (including casting of deck slab) *and span load deflection test scheme.*
29.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.2.3 Note:	Note: In case BLT /ballasted track on OWG is not considered feasible due to site conditions or any other reason, standard RDSO drawings of OWG for "DFC loading (32.5t axle load)" shall be followed for the superstructure. Item No.(i) & (xvi) mentioned above will not be required to be designed and in that case the payment against Milestone CD 1.4.2 under Cost Centre CD1-Design of Price Schedule shall not be made.	Note: In case *BLT* on OWG is not considered feasible due to site conditions or any other reason, standard RDSO drawings of OWG for "DFC loading (32.5t axle load)" shall be followed for the superstructure. Item No.(i) & (xvi) mentioned above will not be required to be designed and in that case the payment against Milestone CD 1.4.2 under Cost Centre CD1-Design of Price Schedule shall not be made.
30.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.3 a) i.	i. The superstructure shall consist of composite girder of standard RDSO span length of 24.4m or more and one non-standard span near abutment A2. Superstructure shall be designed for "25t Loading-2008" considering ballastless track with LWR/CWR. However, sections of various components of superstructure adopted shall not be less than the sections adopted in the corresponding RDSO standard drawing. Load on side pathway shall be considered as per IRS Bridge Rules.	i. The superstructure shall consist of composite girder of standard RDSO span length of 24.4m */ 30.5 m / 45.7 m / 61.0 m / 76.2 m* and one non-standard *slab* at abutment A2. Superstructure shall be designed for "25t Loading-2008" considering ballastless track with LWR/CWR. However, sections of various components of superstructure adopted shall not be less than the sections adopted in the corresponding RDSO standards drawings.

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
			Load on side pathway shall be considered as per IRS Bridge Rules.
31.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.3 a) v.	v. A pathway of 1.0 m width with railing shall be provided at deck slab of level girders, on outer sides of the tracks, as shown in the Tender drawings. Space below the openable pathway slab shall be used as duct for cables. Arrangements shall be designed on the viaduct for providing electrical/ telecommunication cables and other utilities as required.	v. *Deck slab of CG shall have minimum 1.0 m wide pathway with railing and duct underneath at outside of UP & DN line tracks* as shown in the Tender drawings. *Duct* shall be used for *laying of electrical and S&T* cables.
32.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.3 a) xvi.		***Add New Para "xvii" at the end of existing Para "xvi":*** *xvii. Span load deflection test shall be carried out on each typical girder. Load testing scheme shall be as per IRC SP-51.* *Note: If same span girder is fabricated by different fabricators, separate load testing shall be conducted on girders fabricated by each fabricator.*
33.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.3 c) xix.		***Add New Para "xx" at the end of existing Para "xix":*** *xx. Span load testing shall be carried out on all typical OWGs in case of OWG with deck system. Load testing scheme shall be as per IRC SP-51.* *Note: If same span girder is fabricated by different fabricators, separate load testing shall be conducted on girders fabricated by each fabricator.*

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
34.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.3 e) iv.	iv. In case of RUB, the top of bottom slab of RCC box shall be below the natural ground level of the approach road. However, road level and vertical clearance above the road shall be maintained as shown in Tender drawings. Any variation due to site conditions as mentioned above shall be got approved from the Engineer.	*iv. For Road under bridges (RUBs) top (including wearing coarse) of bottom slab of RCC box shall not be kept above the surrounding natural ground level. However, road level and vertical clearance above road level shall be maintained as shown in Tender drawings. Overall height of the box shown in Tender drawings may need modification in such cases. Financial cost incurred due to change in design and construction on account of above mentioned situations shall be borne by the Contractor and shall be deemed to have been included in Price Schedule 'A'.*
35.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.3 e) vii.		***Add New Para "viii" at the end of existing Para "vii":*** *viii. Unless otherwise shown in Tender drawings or in Tender Documents, a well compacted layer of coarse sand shall be provided under RCC box upto bottom of the shear key.*
36.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.8.3 a).	a) Foundation analysis and design will be based on IRS Code for Substructure & IRC-78. The forces applied by the pier are transferred to the bottom of the pile cap for this purpose. Reactions in pile are calculated using rivet theory. Various specific assumptions made for the pile and pile cap design are as follows:	a) Foundation analysis and design will be based on IRS Code for Substructure & IRC-78. The forces applied by the pier are transferred to the bottom of the pile cap for this purpose. Reactions in pile are calculated using rivet theory. *The* pile and pile cap *shall be designed* as follows:
37.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 4 Outline Design Specifications - Viaduct & Bridges, Sub-Clause 4.8.3 c).	When designing element forces or estimating displacements the soil stiffness and other parameters shall be assessed based on the design ground water table.	*Soil structure interaction shall be considered during RSI analysis to evaluate the forces & displacements on structures due to LWR.* While evaluating element forces or estimating displacements *during RSI* the soil stiffness and other parameters shall be assessed based on the design ground water table.

<table>
<tr><th>S. No.</th><th>Tender Document Part / Section/ Clause No.</th><th>Description of Existing Clause</th><th>Modified Description of Existing Clause / New Clause</th></tr>
<tr><td>38.</td><td>Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.1 General ii a)</td><td>ii. Operating Regime on HORC:
a) Axle load and Speed<table><tr><td>Traffic Type</td><td>Axle Load</td><td>Speed</td></tr><tr><td>Goods Train</td><td>25T</td><td>100 kmph</td></tr><tr><td>Passenger Train</td><td>22.5T</td><td>160 kmph</td></tr></table></td><td>ii. Operating Regime on HORC:
a) Axle load and Speed<table><tr><td>Traffic Type</td><td>Axle Load</td><td>Speed</td></tr><tr><td>Goods Train</td><td>25T</td><td>100 kmph</td></tr><tr><td>Passenger Train</td><td>22.5T</td><td>200 kmph</td></tr></table></td></tr>
<tr><td>39.</td><td>Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.2 xi).</td><td>No appreciable cracks or settlements or separation of parts shall be developed during service in the BLT leading to impaired service or failure. Minimum reinforcement must be ensured to achieve design crack width of 0.1 mm notwithstanding any provision in codes.</td><td>No appreciable cracks or settlements or separation of parts shall be developed during service in the BLT leading to impaired service or failure.</td></tr>
<tr><td>40.</td><td>Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.13, ii</td><td>ii. Track tolerances to be maintained at the time of construction & during trial/service should be as per para 7.3.</td><td>ii. Track tolerances to be maintained at the time of construction & during trial/service should be as per para 8.3.</td></tr>
<tr><td>41.</td><td>Part 2, Section VII-6: Outline Construction Specifications (OCS) – Civil & BLT, Chapter 2. Earthwork In Formation, Hume Pipes and Retaining Walls, Sub-Clause 2.3.</td><td></td><td>Add the following after the last line of Sub-Clause 2.3

Concrete and reinforcement used in construction shall comply with the provisions of Annexure OCS-1 & OCS-2 of these specifications.</td></tr>
<tr><td>42.</td><td>Part 2, Section VII-6: Outline Construction Specifications (OCS) – Civil & BLT, Chapter 3. Bridges, Sub-Clause 3.6.8 d) iv.</td><td>iv. Pile integrity test shall be carried out on each pile by:
a. The Low Strain Method as per IS 14893 to verify the structural integrity, shape and continuity of pile as detailed in Sub-Clause 3.6.8(i).
b. Cross Hole Sonic Logging test as per ASTM D 6760</td><td>iv. Pile integrity test shall be carried out as follows:
a. The Low Strain Method as per IS 14893 for 60 % Piles to verify the structural integrity, shape and continuity of pile as detailed in Sub-Clause 3.6.8(i).
b. Cross Hole Sonic Logging test as per ASTM D 6760</td></tr>
</table>

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
			for 40% Piles.
43.	Part 2, Section VII-6: Outline Construction Specifications (OCS) – Civil & BLT, Chapter 3. Bridges, Sub-Clause 3.1.1	3.1.1 Scope of Specifications This specification shall be applicable for carrying out bridge works.	3.1.1 Scope of Specifications This specification shall be applicable for carrying out bridge works. *All concrete works shall be carried out in accordance with Annexure OCS-1 and Annexure OCS-2 of these Specifications.*
44.	Part 2, Section VII-6: Outline Construction Specifications (OCS) – Civil & BLT, Chapter 3. Bridges, Sub-Clause 3.10.5	Open web girders are proposed to be provided with ballastless/ballasted track & LWR/CWR. a) OWG with BLT For Open web girders where BLT is provided, the rails and fastening systems shall be procured and provided by the Contractor. Construction of deck slab for BLT shall be carried out as per specification b) OWG with ballasted track For Open web girders where ballasted track is provided, the Contractor shall construct only deck slab. Ballast and track are not in the scope of C-5 contractor and shall be provided by the Track contractor. Construction of deck slab shall be carried out as per specification c) In case, it is decided to adopt standard RDSO spans with track on H-beam sleepers, Galvanised H-beam bridge sleepers shall be as per RDSO Drawing No. B-1636/4/R, 5 & 9. Zero toe load fastening shall be as per RDSO Drawing No. T-8759 to T-8765 for 60kg running rail and 52 kg guard rail. Both H-beam bridge sleepers and track fittings/fastenings shall be procured from RDSO approved source. Inspection of material shall be done by the Engineer or any other agency nominated by the Employer at factory	Open web girders shall be provided with ballastless track & LWR/CWR. Rails and fastening systems shall be procured and provided by the Contractor. Concreting of deck slab and BLT shall be carried out as per *Annexure OCS-2 and Annexure OCS-3*. In case, it is decided to adopt standard RDSO spans with track on H-beam sleepers, Galvanised H-beam bridge sleepers shall be as per RDSO Drawing No. B-1636/4/R, 5 & 9. Zero toe load fastening shall be as per RDSO Drawing No. T-8759 to T-8765 for 60kg running rail and 52 kg guard rail. Both H-beam bridge sleepers and track fittings/fastenings shall be procured from RDSO approved source. Inspection of material shall be done by the Engineer or any other agency nominated by the Employer at factory premises before dispatch. The Contractor shall arrange for necessary inspection/testing of material at factory premises.

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		premises before dispatch. The Contractor shall arrange for necessary inspection/testing of material at factory premises.	
45.	Part 2, Section VII-6: Outline Construction Specifications (OCS) – Civil & BLT, Chapter 8. Ballastless Track, Sub-Clause 8.1 a)	a) BLT on bridges has to be laid ~~over the tunnel invert concrete base~~.	a) Deleted
46.	Part 2, Section VII-6: Outline Construction Specifications (OCS) – Civil & BLT, Chapter 8. Ballastless Track, Sub-Clause 8.10	8.10 MAINTENANCE AND PERFORMANCE MONITORING a) The Defects Notification Period (DNP) will be for 3 years from the date opening of traffic. b) After Construction of Ballastless track, HRIDC will monitor the performance jointly with the Contractor on quarterly basis & for 3 years. The performance monitoring will be based broadly upon following parameters: c) Efficacy of fastening: Fastening system should be able to maintain track geometry (gauge, cross level, loose fitting etc.) at all times within track tolerances during service without any components breakage, excessive wear & tear. d) Track tolerances to be maintained at the time of construction & during trial/services should be as per Section VII-5 Outline Design Specification (ODS) - Civil. e) Any track settlement which impairs the functionality of ballastless track.	8.10 Deleted

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		f) Any visible crack of width more than 0.1 mm in concrete/RCC portion of slab which impairs the functionality of ballastless track. g) Efficacy of drainage system e.g. the slope and drains constructed should function properly during Monsoon period. h) Any special observation. The decision of HRIDC about performance of the ballastless track after monitoring period shall be final.	
47.	Part 2, Section VII-6: Outline Construction Specifications (OCS) – Civil & BLT, Chapter 8. Ballastless Track, Annexure OCS-3, Clause 14	The Contractor shall ensure that traffic management on roads and railways is carried out in accordance with Sub-Division 6070 of the General Specifications.	The Contractor shall ensure that traffic management on roads and railways is carried out in accordance with *Appendix 10, Section VII-9: Appendices, Part 2-Employer's Requirements*.
48.	Part 2, Section VII-6: Outline Construction Specifications (OCS) – Civil & BLT, Chapter 7 Items included in Schedule -B, Sub-Clause 7.3.17	NS Item No. 17: H-Beam sleeper	Add the following at the end of Sub-Clause 7.3.17 The rate also include supply of 10% of spare fittings as per Annexure F-8, Section VII-2: Employer's Requirements-Functional.
49.	Part 2, Section VII –7A, General Electrical Services: Chapter-1 – Introduction and Objective, Clause 1.2, Scope of Work	Sub-Clause 1.2, Scope of Work	The existing Sub-Clause 1.2 "Scope of Work" is replaced and annexed as "**Attachment 4".**
50.	Part 2, Section VII –7A, General Electrical Services, Chapter 3 – Explanatory Notes For Indicative Book of Quantities	Sub-Clause 3.1 Explanatory Notes for BOQ Items	The existing Sub-Clause 3.1 "Explanatory Notes for BOQ Items" is replaced and annexed as "**Attachment 4".**

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
	(BOQ): Clause 3.1 Explanatory Notes for BOQ Items.		
51.	Part 2, Section VII –7A, Chapter 7, Appendix-1: Intelligent Addressable Fire Detection and Alarm System.	Appendix-1: Intelligent Addressable Fire Detection and Alarm System.	DELETED.
52.	Part 2, Section VII –7B: Signalling & Telecom (S&T) Works, Sub-Clause 2.1.4	2.1.4 Supply of 24F OFC as per RDSO specification IRS-TC-55/2006/ (latest).	2.1.4 Supply of 24F OFC as per RDSO specification IRS-TC-*110/2020*/ (latest).
53.	Part 2, Section VII –7B: Signalling & Telecom (S&T) Works, Sub-Clause 2.1.6	2.1.6 Supply of HDPE duct as per RDSO specification- no. RDSO/SPN/TC/45/2012 Rev 2.0/ (latest)	2.1.6 Supply of HDPE duct as per RDSO specification- no. RDSO/SPN/TC/45/*2013* Rev 2.0/ (latest)
54.	Part 2, Section VII-8:, Tender Drawings and Documents	Section VII-8A: Tender Drawings and Documents List of Tender Drawings	The existing "List of Tender Drawings" is revised and Annexed as **Attachment 5** of this Corrigendum No. 1.
55.	Part 2, Section VII-8: Tender Drawings and Documents	Section VII-8A: Tender Drawings and Documents	The new and revised drawings added to existing Section VII-8A: Tender Drawings are Annexed as **Attachment 5** of this Corrigendum No. 1.
56.	Part 2, Section VII-8:, Tender Drawings and Documents	Section VII-8B: Documents List of Documents	The existing "List of Documents" is revised and Annexed as **Attachment 5** of this Corrigendum No. 1.
57.	Part 2, Section VII-8:, Tender Drawings and Documents	3. List of Charted Utilities	The existing "List of Charted Utilities" is replaced and Annexed as **Attachment 5** of Corrigendum No. 1.

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
58.	Part 2, Section VII-8:, Tender Drawings and Documents		Additional Geotechnical Investigation Report is added at S. No. 7.3 under existing Section VII-8B Documents and is annexed as **Attachment 5** of Corrigendum No.1.
59.	Part 2, Section VII-9: Appendices, Appendix 5: Interface, Coordination and Cooperation with other Parties, Sub-Clause 5.11	5.11 Interface Table	The existing Sub-Clause 5.11 "Interface Table" is revised and annexed as **Attachment 6** of Corrigendum No.1
60.	Part 2, Section VII-9: Appendices, Appendix-10 Construction & Site Management, Sub-Clause 10.14	**Site Clearance** The Contractor shall clear the Site as required by demolishing all buildings, structures (above and below ground such as brick, concrete, steel, etc.) and removing all rubbish as agreed by the Engineer. If any payment/compensation is payable to the structures owner, the same shall be paid by the Employer to the structures owner. The Site shall also be cleared of vegetation, trees, stumps roots, etc. Cutting of trees within ROW wherever required for execution of the Works shall be done by the Contractor. Permission for cutting of trees will be obtained by the Employer. Compensatory plantation is not included in the Scope of the Works. All material so cleared from the site shall be disposed off by the Contractor outside the ROW as directed by the Engineer. The list of structures to be demolished is given in Section VII:8-Tender Drawings and Documents, Part-2 Employer's Requirements. The above list is indicative and the Contractor shall visit the site and ascertain all the existing structures required to be demolished for clearing the site.	**Site Clearance** The Contractor shall clear the Site as required by demolishing all buildings, structures, *Borewells/wells* (above and below ground such as brick, concrete, steel, etc.) and removing all rubbish *outside the ROW*. *Dismantled structure shall be the property of the Contractor. Borewell/Wells shall be filled with sand in layers and watered.* If any payment/compensation is payable to the structures owner, the same shall be paid by the Employer to the structures owner. The Site shall also be cleared of vegetation, trees, stumps roots, etc. Cutting of *trees and dismantling of structures* within ROW *in entire C-5 Package* wherever required for execution of the Works shall be done by the Contractor. Permission for cutting of trees will be obtained by the Employer. Compensatory plantation is not included in the Scope of the Works. All material so cleared from the site shall be *the property of the Contractor and shall be* disposed off by the Contractor outside the ROW. The list of structures to be demolished is given in Section VII:8-Tender Drawings and Documents, Part-2 Employer's Requirements. The above list is indicative and the Contractor shall visit the site and ascertain all the existing structures required to be demolished for clearing the site. *The cost for above items shall be deemed to be included in Lumpsum cost of Schedule 'A' for the whole C-5 Package.*
61.	Part 2, Section VII-9: Appendices, Appendix-10 Construction & Site Management, Sub-Clause 10.46.2	**10.46.2 Charted Utility** The Charted Utilities identified by the Employer are enclosed in Part 2, Section VII-8-Employer's Requirements, Tender	**10.46.2 Charted Utility** The Charted Utilities identified by the Employer are enclosed in Part 2, Section VII-8-Employer's

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		Drawings and Documents. These are further categorised as discussed under: i. Type A –Overhead Electrical Crossings a. These are Overhead Electrical Crossings, traversing the proposed HORC alignment and likely to infringe during execution of the work primarily due to inadequate ground clearance. The Employer has already taken action to remove these infringements by either raising or laying underground cables. 75% of infringements due to LT and HT (up to 33 KV) utilities shall be removed by the Employer within 90 days of the Commencement Date. Balance 25% shall be removed in a phased manner within 180 days of the Commencement Date. It is pertinent to point out that these infringements are of minor nature and are unlikely to significantly hamper the progress of the work. Hence, for any delay in removal of any of these utilities, no claims on these grounds by the Contractor shall be accepted. The Contractor shall plan his works taking this aspect into consideration. The Crossings shifted underground shall normally be laid within ten (10) meters of the chainages given in the list of Overhead Electrical Crossings except at locations where stations and buildings of HORC are proposed. At the stations and HORC buildings, the utility will be shifted beyond the structure area. For cables crossing the HORC alignment, extra length of 3m to 5m is being provided on both sides, so that cable can be slewed if required during construction. The Contractor shall consider the effect of these shifted utilities in his work planning and price. The coordinates of the new locations where utilities have been shifted will be shared with the Contractor once the shifting is completed. Electrical utilities which have been laid underground will be considered as charted utilities. The Contractor shall design the span in such a way that further utility shifting	Requirements, Tender Drawings and Documents. These are further categorised as discussed under: i. Overhead Electrical Crossings a. **LT and HT Crossings:** These are Overhead Electrical Crossings, traversing the proposed HORC alignment and likely to infringe during execution of the work primarily due to inadequate ground clearance. The Employer has already taken action to remove these infringements by either raising or laying underground cables. *50%* of infringements due to LT and HT (up to 33 KV) utilities shall be removed by the Employer within *120* days of the Commencement Date. Balance *50%* shall be removed in a phased manner within *240* days of the Commencement Date. It is pertinent to point out that these infringements are of minor nature and are unlikely to significantly hamper the progress of the work. Hence, for any delay in removal of any of these utilities, no claims on these grounds by the Contractor shall be accepted. The Contractor shall plan his works taking this aspect into consideration. The Crossings shifted underground shall normally be laid within ten (10) meters of the chainages given in the list of Overhead Electrical Crossings except at locations where stations and buildings of HORC are proposed. At the stations and HORC buildings, the utility will be shifted beyond the structure area. For cables crossing the HORC alignment, extra length of 3m to 5m is being provided on both sides, so that cable can be slewed if required during construction. The Contractor shall consider the

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		is avoided unless inescapable. However, in case such utilities are not dismantled by the Employer and which may affect execution of work, the Contractor will be asked for relocation /diversion/ shifting/ modification of utilities. The cost of relocation/diversion/shifting/modification of utilities shall be payable by the Employer as per Conditions of the Contract. If any payment/compensation is payable to the utility owner, the same shall be paid by the Employer to the Utility owner. b. The infringements due to EHT (above 33 KV) Utilities will be progressively removed by the Employer and is likely to be completed within 12 months from the Commencement Date. It is pertinent to point that these infringements are of minor nature and are unlikely to significantly hamper the progress of the work. Hence, for any delay in removal of any of these utilities, no claims on these grounds by the Contractor shall be applicable. The Contractor shall plan his works taking this aspect into consideration. ii. Type C- Underground S&T Cables Between Chainage (-) 2296m to 10000m S&T signal and telecom cables of DFCCIL runs generally parallel to HORC alignment. These cables will get buried under the HORC embankment and will be required to be shifted. Shifting of cables shall be done by the Contractor and shall be paid under Schedule 'D'	effect of these shifted utilities in his work planning and price. The coordinates of the new locations where utilities have been shifted will be shared with the Contractor once the shifting is completed. Electrical utilities which have been laid underground will be considered as charted utilities. The Contractor shall design the span in such a way that further utility shifting is avoided unless inescapable. *However*, in case such utilities are not dismantled by the Employer and which may affect execution of work, the Contractor will be asked for relocation /diversion/ shifting/ modification of utilities. The cost of relocation/diversion/ shifting/ modification of utilities shall be payable by the Employer *under Provisional Sum*. If any payment/compensation is payable to the utility owner, the same shall be paid by the Employer to the Utility owner. b. **EHT:** The infringements due to EHT (above 33 KV) Utilities will be progressively removed by the Employer *through utility owner agencies* and is likely to be completed within 12 months from the Commencement Date. It is pertinent to point that these infringements are of minor nature and are unlikely to significantly hamper the progress of the work. Hence, for any delay in removal of any of these utilities, no claims on these grounds by the Contractor shall be applicable. The Contractor shall plan his works taking this aspect into consideration.

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
			List of LT/HT & EHT crossings is given in Table 3. List of Charted Utilities, VII-8B:Documents of Section VII – 8 Tender Drawings and Documents.
62.	Part 2, Section VII-9: Appendices, Appendix-10 Construction & Site Management, Sub-Clause 10.46.2 and 10.46.3	**10.46.3 Uncharted Utility** The Uncharted Utilities will be those unknown utilities which get identified during execution of the Works. These may be identified during Ground Penetration Survey or anytime during execution of the Works.	**10.46.3 Uncharted Utility** i. The Uncharted Utilities will be those unknown utilities which get identified during execution of the Works. These may be identified during Ground Penetration Survey or anytime during execution of the Works. ii. *Underground S&T Cables* c. *S&T signal and telecom cables of DFCCIL runs generally parallel to HORC alignment approximately between Chainage (-) 2296m to 10000m in Prithla yard of DFC and between Prithla and Silani stations. These cables will get buried under the HORC embankment and will be required to be shifted. Shifting of cables shall be done by the Contractor and shall be paid under Schedule 'D'.*
63.	Part 2, Section VII-9: Appendices, Appendix-10 Construction & Site Management, Sub-Clause 10.46.8 last para	Any relocation/removal/diversion of Charted Utility shall be entirely the Contractor's responsibility and any cost on this account shall be borne by the Contractor.	Deleted
64.	Part 3, Section IX Particular Conditions of Contract (PCC), Part A-Contract Data, Sub-Clause 2.1	**Land for Formation** i. Land for formation for about 80% of the project length (main line and connectivities) will be handed over within 7 days after the Commencement Date. ii. In the balance 20% of the project length, LT/HT lines run parallel to the HORC. Action for shifting of the same has been taken by the Employer. The land in this portion shall be handed over in a phased	**Land for Formation** i. Land for formation for about 80% of the length of C-5 Package (main line and connectivities) will be handed over within 7 days after the Commencement Date.

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		manner within 180 days of the Commencement Date. iii. In case, the Employer is not able to hand over the complete land at a few isolated locations due to any reasons within 180 days of the Commencement Date and such isolated patches do not affect the progress of work at other locations, no claims shall be accepted by the Employer for delay in handing over of such isolated patches of land. The Contractor shall plan his works taking this aspect into consideration. Notwithstanding the above, where the Contractor considers that the works are likely to be affected due to non-handover of the land at certain locations (being on the critical path), any claim for additional time and cost by the Contractor shall be supported by justifications/ calculations with respect to the latest work program, and other schedules which shall be dealt with in accordance with GCC 2.1, 20.1, 3.7 and other applicable provisions of the Contract.	ii. In the balance 20% of the length of C-5 package shall be handed over in a phased manner within *240* days of the Commencement Date. iii. In case, the Employer is not able to hand over the complete land at a few isolated locations due to any reasons within *240* days of the Commencement Date and such isolated patches do not affect the progress of work at other locations, no claims shall be accepted by the Employer for delay in handing over of such isolated patches of land. The Contractor shall plan his works taking this aspect into consideration. Notwithstanding the above, where the Contractor considers that the works are likely to be affected due to non-handover of the land at certain locations (being on the critical path), any claim for additional time and cost by the Contractor shall be supported by justifications/ calculations with respect to the latest work program, and other schedules which shall be dealt with in accordance with GCC 2.1, 20.1, 3.7 and other applicable provisions of the Contract.
65.	Part 3, Section IX Particular Conditions of Contract (PCC), Part B-Specific Provisions, Sub-Clause 8.3	Replace the first sentence of the of the first paragraph of Sub-Clause 8.3 with the following: The Contractor shall submit an Initial Programme for the execution of the Works to the Engineer within 28 days after issue of Letter of Acceptance.	Replace the first sentence of the of the first paragraph of Sub-Clause 8.3 with the following: The Contractor shall submit an Initial *Works* Programme for the execution of the Works to the Engineer *as per the Key Date mentioned in Appendix 2, Section VII-9: Appendices, Part 2-Employer's Requirements.*

66.	Part 2, Section VII-3: Design (Civil & BLT), Clause 13	***13. Detail Design Consultant (DDC) for Ballastless Track (BLT) System*** **13.1** Upon award of the Contract, the Contractor shall engage Detail Design Consultant for design of BLT. The Contractor shall submit details of DDC proposed to be engaged for Design of Ballastless track system for the approval of the Engineer. DDC shall be engaged within twelve months of the Commencement Date. **13.2** DDC shall have the experience of design of BLT of at least 10 Km length having satisfactory working performance under mixed traffic conditions with at least 22 tonne axle load and at an operational speed of at least 100 kmph for at least 5 years since the date of its operation as on date of opening of the Tender. **13.3** DDC shall submit experience certificate for design of ballastless track system issued by the user railway administration. The certificate shall specifically indicate that the designer has designed ballastless track system (including fastening system) of at least 10 Km length. The certificate shall clearly state that ballastless track system is having satisfactory working performance under mixed traffic conditions with at least 22T axle load and at an operational speed of at least 100Kmph. The certificate shall state the date of start of operation on ballastless track system and the duration for which ballastless track system has been in continuous operation. In case the user railway administration is from foreign country and the certificate is issued in language other than English, the supporting documents shall be translated into English. The translation of the certificate shall be either stamped by Embassy/High Commission of India or Partner Countries of Hague convention may submit these documents with "Apostille" stamp. The experience certificate issued	***13. System Provider for Ballastless Track (BLT) System*** ***13.1*** *Upon award of the Contract, the Contractor shall engage System Provider for design of BLT. The Contractor shall submit details of System Provider proposed to be engaged for Design of Ballastless track system for the approval of the Engineer. System Provider shall be engaged within twelve months of the Commencement Date.* ***13.2*** *System Provider shall has successfully developed a proven ballastless track system along with a fastening system and have either of (i) or (ii)* *i. has experience of designing of ballastless track and can modify it to suit the HORC technical requirements.* *ii. has a MOU with a designer firm who has experience of designing of ballastless track and can modify it to be suit to HORC technical requirements.* ***Definition of Proven Ballastless Track System:*** *A Ballastless Track System in conjunction with a fastening system, which in operation for a minimum length of 10Km, with minimum operational axle load of 22T & operational speed of 100Km/h, for a last five years before the deadline for submission of the Tender.* ***13.3*** *In case of proven Ballastless Track system for which patent of some of the component(s) has expired or does not exist and manufacturing of these component(s) is proposed to be done in India, the Contractor (who may not have successfully developed a proven Ballastless Track System but fulfils one of the conditions stipulated in sub-para(i) or (ii) of para13.2 above shall submit following undertakings/documents:* *i. An undertaking that the Patent Rights have expired for the specific components(s) of the Proven*

			by foreign user railway administration in English shall also be either stamped by Embassy/High Commission of India or submitted with "Apostille" stamp. Note: The qualifications of DDC given above are based on Railway Boards letter No. EBS/CB-I/BLT/Committee dated 10.03.2023. If the criteria given in Railway Boards letter is modified by Railway Board / concerned government authority / RDSO, the same will be followed. However, the modified criteria will not be stricter than the criteria given above. **13.4** DDC proposed to be engaged shall submit details containing, but not limited to, the name of line in which the system is in use for minimum 5 years, details of user railway administration such as name of the Railway administration and its contact person, address, telephone number, E-mail id etc. **13.5** The Contractor shall submit test report of the proposed fastening system from a reputed independent institute/laboratory. The test report shall be accompanied with the drawing of the fastening system including its components which have been tested and reported upon. The Contractor shall propose the same fastening system for which test report has been submitted. The testing shall be done for Cat 'C' as specified in EN-13481 Pt-1:2012 & EN-13401 Pt-5:2017 for 60Kg UIC rail section. The Contractor shall also submit a statement showing compliance or otherwise, in juxtaposition to each Clause and Sub-Clause as specified in EN-13481 Pt-1:2012 & EN-13481 Pt-5:2017. The above Specifications are based on Railway Boards letter No. EBS/CB-I/BLT/Committee dated 10.03.2023. If the Specifications given in Railway Boards letter are modified by Railway Board / concerned government authority / RDSO, the same	*Ballastless Track System (Name) which was earlier patented.* *OR* *An undertaking that the Proven Ballastless Track System is not Patented.* *ii. An undertaking that the proposed Ballastless Track System along with fastening system shall be provided as per the design, drawing and specification of Proven Ballastless Track System subject to HORC requirements.* *iii. An undertaking that the Test Report of the proposed Ballastless Track System along with fastening system are in accordance with Cat 'C' requirement as specified in EN-13481 Part-1& EN-13481 Part-5 (Latest version) to suit HORC requirements. Tenderer shall also submit test report of category "C" requirement. The test plan and testing criteria of Ballastless Track System shall meet the permissible values given in IRPWN including all updates correction slips published by Indian Railway.* *iv. The Contractor will submit declaration regarding manufacturing source(s) of component of BLT along with fastening system of India, given details of components which will be manufactured directly by the tenderer and other components which will be out sourced from other manufacturing firms in India.* *Acceptance of the proposed system and capability assessment of unproven source(s) proposed for manufacturing of components (s) to be examined and certified by RDSO. For this purpose, requisite documents such as Schedule of Technical Requirement (STR), Quality Assurance Plan (QAP) and inspection Test Plan (ITP) etc. shall be furnished by the Contractor.*

			will be followed. The Contractor shall design and construct the BLT system as per the modified Specifications without any additional cost to the Employer.	*The Employer shall refer the schedule of Technical Requirement (STR), Quality Assurance Plan (QAP) and Inspection Test Plan (ITP) etc. to RDSO for examination and certification.*
			13.6 The Contractor shall submit detailed design and drawings of ballastless track for viaduct including fastening system, derailment prevention arrangement, arrangement for provision of ducts for signal/telecommunication/electrical in longitudinal and transverse direction, transition system, drainage system with construction procedure & maintenance /repair procedure, QAP etc. to the Engineer for approval.	***13.4*** *The detailed design of Ballastless track system including compatible fastening system shall not deviate from the proven ballastless track system on the basis of which the proposal is accepted except for detailed design customization to suit HORC requirements.* ***13.5*** *The contractor shall submit following documents to establish technical eligibility of system provider as mentioned as para 13.2 & 13.3 above.* *i. Documents as proof of proven Ballastless track system as mentioned in para 13.2. In case user Railway/Operator documents do not contain required details, the Service Provider shall give self-certification by MD/CMD of the firm, to this effect. The Employer, if required, may confirm the validity of provenness from user Railway/Operator, contact details of which will be arranged by the Contractor.* *Note: In case the user railway /operator is from foreign country and the certificate is issued in language other than English, the supporting documents shall be translated into English. The translation of the certificate shall be either stamped by Embassy/High Commission of India or Partner Countries of Hague convention may submit these documents with "Apostille" stamp. The experience certificate issued by foreign user railway administration in English shall also be either stamped by Embassy/High Commission of India or submitted with "Apostille" stamp.* *ii. Undertaking to the effect that Service Provider has experience of designing of ballastless track and can modify it to suit the HORC technical requirements as*
			13.7 The Contractor shall indemnify HORCL and HRIDC against any claims from any other party in connection with the intellectual property rights of the drawings and design/fastening system/ballastless track system or any other documents submitted by the Contractor or any other patent rights.	

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
			per para 13.2 (i). *iii. Documents as proof of MOU duly apostilled, with designer firm as per para 13.2(ii), if applicable.* *iv. Certificate for fulfilment of proven fastening system as per Cat 'C" requirement as specified in EN-13481-Part-1 & EN-13481-Part-5 (Latest Version) to suit HORC requirements.* *v. Undertaking by the Contractor to the effect that detailed design will not deviate from proven ballastless system as per para13.4* *vi. Undertaking by the Contractor to the effect that they shall furnish copy of agreement between the Contractor and the patent holder permitting the use the patented items as per para 13.6 below.* *vii. Indemnity Bond as per para 13.7 indemnifying the HORC & HRIDC for use of Intellectual Property Rights.* *viii. Indemnity Bond as per para 13.8 indemnifying the HORC & HRIDC for use of fastening system for future maintenance.*

			13.6	*In case the system of track and /or fastening system offered by the Contractor is a patented one, the Contractor shall furnish copy of agreement entered into between the Contractor and the patent holder permitting the Contractor to use the patented items for work.*
			13.7	*The Contractor shall indemnify HORC & HRIDC against any claims for any other party in connection with the intellectual property rights of the drawings and design /fastening system/ ballastless track system or any other documents submitted by the Contractor or any other patent rights.*
			13.8	*The Contractor shall indemnify HORC & HRIDC against any claim for any other party for use of fastening system for future maintenance of ballastless track and will not charge any royalty on account of Intellectual Property Rights.*
			13.9	*The component(s) of proven Ballastless Track System including fastening system which is no longer patented and proposed to be manufactured in India as per para 13.3 above, can be manufactured as per specification(s) with Quality Assurance / Quality Control plan approved by RDSO. The initial quantity (15%) shall be inspected by RDSO. Subsequent regular product inspection shall be done by the Employer/Engineer or the Third party under the supervision of the Engineer as per QAP approved by RDSO.* *Note:* *The qualifications of Service Provider given above are based on Railway Boards letter No. EBS/CB-I/BLT/Committee dated 17.10.2023. If the criteria given in Railway Boards letter is modified by Railway Board / concerned government authority / RDSO, the*

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
			same will be followed. However, the modified criteria will not be stricter than the criteria given above. ***13.10*** *The Contractor shall submit detailed design and drawings of ballastless track for viaduct including fastening system, derailment prevention arrangement, arrangement for provision of ducts for signal/telecommunication/electrical in longitudinal and transverse direction, transition system, drainage system with construction procedure & maintenance /repair procedure, QAP etc. to the Engineer for approval.*
67.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.2 Design Requirements, i)	**8.2 Design Requirements** i) BLT shall be designed for the following:- a Goods Traffic - 25T axle load & speed 100 kmph b Passenger Traffic-Main line for 22.5T axle load & speed 160 kmph (for passenger traffic)	**8.2 Design Requirements** *Designing of ballastless track for straight and curved track on HORC shall be as per Indian Railways Permanent Way Manual (IRPWM)-2020 including all updated correction slips published by IR with latest amendments. However, for guidance purpose, the following parameter shall be considered.* i) BLT shall be designed for the following:- a. Goods Traffic - 25T axle load & speed 100 kmph *b.* Passenger Traffic-22.5T axle load & speed *200* kmph (for passenger traffic)
68.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.2 Design Requirements, iii)		**Add the following at the end of para iii** For SWP Section – 30.25 N/mm^2 For FP Section – 36.0 N/ mm^2

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
69.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.2 xii	xii. BLT shall be designed for almost maintenance free conditions except replacement of worn-out fastening components after their service life is over. 10% of the fastening components and other replacement items which are likely to be worn out / damaged, shall be supplied as spares for need based replacement in this work. The offer shall be inclusive of the cost of 10% fastening components as spare. No additional cost shall be paid for the spares.	xii. BLT shall be designed for almost maintenance free conditions except replacement of worn-out fastening components after their service life is over. *05%* of the fastening components and other *replaceable* items which are likely to be worn out / damaged, shall be supplied as spares for need based replacement in this work. The offer shall be inclusive of the cost of *05%* fastening components as spare. No additional cost shall be paid for the spares.
70.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.3, Track Details	**8.3 Track Details** BLT for HORC shall be designed for following track details:- i. Rail section: Rail profile shall conform to UIC 60 (R260) and Rail material shall conform to IRS-T-12-2009 class-'A' including manufacturing and testing in accordance with IRS-T-12-2009 with latest amendments. ii. Schedule of Dimensions (SOD) and Maximum Moving Dimension (MMD) of Indian Railways for BG shall be followed. iii. Rail cant at Rail seat (inward): 1 in 20. iv. Traffic: Mixed – passenger & freight. v. During service if some parameter goes out in case of any unforeseen circumstances, the leeway / margin available to correct the parameter. Vertical: +10 mm / - 3mm, Horizontal: ±	**8.3 Track Details** BLT for HORC shall be designed for following track details:- i. Rail section: Rail profile shall conform to UIC 60 (110 UTS)/60 E1 and Rail material shall conform to IRS-T-12-2009 class-'A' including manufacturing and testing in accordance with IRS-T-12-2009 with latest amendments. ii. Schedule of Dimensions (SOD) and Maximum Moving Dimension (MMD) of Indian Railways for BG shall be followed. iii. Ruling gradient: 1:150 iv. Rail cant at Rail seat (inward): 1 in 20. v. Maximum permissible cant: as per IRPWM with latest amendments. vi. Speed potential: 200Kmph. vii. Traffic: Mixed – passenger & freight. viii. During service if some parameter goes out

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		3 mm. vi. Design temperature range: 70 degree celsius variation of rail temperature as per zone & chart of Indian Railway Permanent Way Manual and 40 Degree variation of ambient temperature. vii. Long welded rails (LWR) are to be used. The entire ballastless track shall be designed as LWR including viaduct and its approaches. The proposed design of BLT shall take into consideration the forces due to LWR and interaction of LWR. viii. It should be possible to do in-situ AT/Flash Butt welding as per the Indian Railways welding manuals. ix. Track tolerances: Track tolerances over BLT when installed and later during service under floating condition shall be as under. **Note:** The temperature range shall be commensurate with other provisions / guidelines through codes / manuals / specific circulars.	in case of any unforeseen circumstances, the leeway / margin available to correct the parameter. Vertical: +10 mm / - 3mm, Horizontal: ± 3 mm. ix. Design temperature range: 70 degree celsius variation of rail temperature as per zone & chart of Indian Railway Permanent Way Manual and 40 Degree variation of ambient temperature. x. Long welded rails (LWR) are to be used. The entire ballastless track shall be designed as LWR including viaduct/ bridges and its approaches. The proposed design of BLT shall take into consideration the forces due to LWR and interaction of LWR. xi. It should be possible to do in-situ AT/Flash Butt welding as per the Indian Railways welding manuals. xii. Track tolerances: Track tolerances over BLT when installed and later during service under floating condition shall be as under.
71.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.8.1, General	8.8 Performance Required of Fastening System **8.8.1 General** i. The fastening shall be designed to hold the two rails of the track strongly to the supporting structure in upright position by resisting the vertical, lateral and longitudinal forces (including thermal forces) and	**8.8 Performance Required of Fastening System** *The supplier shall furnish the 'Installation and Maintenance Manual' which shall be approved by the Engineer.* **8.8.1 General** **i.** The fastening shall be designed to hold the two

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
		vibrations. ii. The fastening shall be with a proven track record. Fastening system should have satisfactory performance record of minimum 5 years in service in BLT on any established railway system. In this regard, supplier should submit certificate of performance from user railways administration including proof of use of the fastening system. iii. The fastening shall provide insulation to take care of return current traction system. Fastening shall satisfy the required performance norms as stated in the following paragraphs.	rails of the track strongly to the supporting structure in upright position by resisting the vertical, lateral and longitudinal forces (including thermal forces) and vibrations. ii. The fastening shall provide insulation to take care of return current *of* traction system. iii. Fastening shall satisfy the required performance norms as stated in the following paragraphs.
72.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.8.2, Technical Performance Requirements of Fastening	ix. The Contractor shall furnish the 'Installation and Maintenance Manual' which shall be approved by the Engineer.	**Deleted**
73.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.9, Testing of fastening system	**8.9 Testing of fastening system** The testing of fastening system including its components is to be done for Cat "C" requirement as specified in EN-13481- part-1 & EN-13481-Part-5 (Latest Version) to suit HORC project requirements with 60 kg rail section. The test plan and testing criteria of Fastening system should meet the permissible values in IRPWM 2020 including all updated Correction slips published by IR. The test report should be accompanied with the drawing of the fastening system including its component which have been tested and reported upon.	**8.9 Testing of fastening system** The testing of fastening system including its components is to be done for Cat "C" requirement as specified in EN-13481- part-1 & EN-13481-Part-5 (Latest Version) to suit HORC project requirements with 60 kg rail section. The test plan and testing criteria of Fastening system should meet the permissible values in IRPWM 2020 including all updated Correction slips published by IR. The test report should be accompanied with the drawing of the fastening system including its component which have been tested

S. No.	Tender Document Part / Section/ Clause No.	Description of Existing Clause	Modified Description of Existing Clause / New Clause
			and reported upon *and shall be exactly same as the fastening system including its components that has been submitted for fulfilling the eligibility by the Contractor as per Clause 13, Section VII-3: Employer's requirements- Design (Civil & BLT).*
74.	Part 2, Section VII-5: Outline Design Specifications (ODS) – Civil & BLT, Clause 8 Outline Design Specifications - Ballastless Track (BLT), Sub-Clause 8.12, Spares	**8.12 Spares** The Contractor shall supply spare track fastening components equal to 10% of the total requirement for the permanent works.	**8.12 Spares** The Contractor shall supply spare track fastening components equal to 05% of the total requirement for the permanent works.

Enclosures: Attachment 1 to Attachment 6

List of Attachments of Corrigendum No. 1

S. No.	Attachment	Description
1.	Attachment 1	Part 1, Section IV– Tender Forms, Appendix A to Financial Part: Schedule of Adjustment Data 1. Revised Sub-Clause 1.2 e) and Revised Sub-Clause 1.2 f)
2.	Attachment 2	Part 1, Section IV – Tender Forms Appendix B to Financial Part: Price Schedules 1. Clause 6: Schedule 'B'/R1 2. Clause 7: Schedule 'C'/R1 3. Clause 8: Schedule 'D'/R1
3.	Attachment 3	Part 2, Section VII-2: Employer's Requirements –Functional/R1
4.	Attachment 4	Part 2, Section VII-7A: Employer's Requirements- General Electrical Services 1. Revised Sub-Clause 1.2 - Scope of Work 2. Revised Sub-Clause 3.2 – Explanatory Notes for BOQ Items
5.	Attachment 5	Part 2, Section VII-8: Employer's Requirements- Tender Drawings and Documents 1. Section VII: 8A: List of Tender Drawings/R1 2. Section VII: 8A: Revised and New Drawings 3. Section VII: 8B: List of Documents/R1 4. Section VII: 8B: List of Charted Utilities/R1 5. Section VII: 8B: Additional Geotechnical Investigation Reports
6.	Attachment 6	Part 2, Section VII-9: Employer's Requirements – Appendices, Appendix 5: Interface, Coordination and Cooperation with other Parties 1. Sub Clause 5.11: Interface Table/R1

Tender No. HORC/HRIDC/C-5/2023

Attachment 1

to

Corrigendum No. 1

Part 1, Section IV. Tender Forms

Appendix A to Financial Part: Schedule of Adjustment Data

1. Price adjustment

Sub-Clause – 1.2 e) and Sub-Clause – 1.2 f)

Appendix A to Financial Part: Schedule of Adjustment Data

Sub-Clause 1.2 e) and 1.2 f)

e) Price adjustment for change in costs of civil works shall be paid in accordance with the following formula:

i) VEW= 0.85 EW x [PLB x (LBi – LBo)/LBo + PF x (Fi –Fo)/Fo + PMACH x (MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

ii) VBR = 0.85 BR x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PSR x (SRi – SRo)/SRo + PF x (Fi – Fo)/Fo + PMACH x (MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

iii) VSTN = 0.85 STN x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PSR x (SRi – SRo)/SRo + PF x (Fi – Fo)/Fo + PMACH x ((MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

iv) VVIA = 0.85 VIA x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PSR x(SRi – SRo)/SRo + PSS x(SSi – SSo)/SSo+ PF x (Fi – Fo)/Fo + PMACH x ((MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

v) VCW = 0.85 CW x [PLB x (LBi – LBo)/LBo + PC x (Ci – Co)/Co + PSR x (SRi – SRo)/SRo+ PSS x(SSi – SSo)/SSo + PF x (Fi – Fo)/Fo + PMACH x (MACHi – MACHo)/MACHo + POTH x (OTHi - OTHo)/OTHo];

Where,

vi) VEW = Increase or decrease in the cost under the Cost Centre 'CE' of Price Schedule 'A' during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (f);

vii) VBR = Increase or decrease in the cost of Cost Centre 'CB' of Price Schedule 'A' during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (f);

viii) VSTN = Increase or decrease in the cost of Cost Centre 'CS' of Price Schedule 'A' during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (f);

ix) VVIA = Increase or decrease in the cost of Cost Centre 'CV' of Price Schedule 'A' during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (f);

x) VCW = Increase or decrease in the cost of work done under Price Schedule 'B' during the period under consideration due to changes in the rates for relevant components as specified in sub-paragraph (f);

PC, PF, PLB, PMACH, POTH, *PSR and PSS* are the percentages of cement, fuel and lubricants, labour, Plant Machinery and tools, other materials, *Reinforcement steel/ steel components (including strands and steel cables) and Structural Steel*, respectively for the relevant item as specified in sub-paragraph (f);

xi) Co = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "WPI") for sub-group Cement, Lime & Plaster for the Base Month;

Ci = The WPI for sub-group Cement, Lime & Plaster for the average price index of the 3 months of the quarter under consideration;

xii) Fo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "WPI") for group Fuel & Power for the Base Month;

Fi = The WPI for group Fuel & Power for the average price index of the 3 months of the quarter under consideration

xiii) LBo = The consumer price index for industrial workers – All India, published by Labour Bureau, Ministry of Labour, Government of India, (hereinafter called "CPI") for the Base Month;

LBi = The CPI for industrial workers – All India for the average price index of the 3 months of the quarter under consideration;

xiv) MACHo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "WPI") for category- k "Manufacturing of Machinery for Mining, quarrying and construction' under (R) Manufacturing of Machinery and Equipment for the Base Month;

MACHi = The WPI for category- k "Manufacturing of Machinery for Mining, quarrying and construction' under (R) Manufacturing of Machinery and Equipment for the average price index of the 3 months of the quarter under consideration;

xv) OTHo = The wholesale price index as published by the Ministry of Commerce and Industry, Government of India (hereinafter called "WPI") for all commodities for the Base Month;

OTHi = The WPI for all commodities for the average price index of the 3 months of the quarter under consideration;

xvi) SRo = Average Rate of RINL for Rebar 8 mm (coil) as published for Ludhiana Branch on their website for the Base Month;

SRi = Average rate of RINL for Rebar 8 mm (coil) as published for Ludhiana Branch on their website for the 3 months of the quarter under consideration;

If only one rate is published for the 3 months of the quarter under consideration, the published rate for that quarter shall be considered for the quarter under consideration.

If no rate is published by RINL for Rebar 8mm (coil) for the 3 months of the quarter under consideration, the value of Si and So will be taken as under:

"SRo": Wholesale Price Index for 'MS Bright Bars' individual commodity of group item (d) Mild Steel- Long products under (N) MANUFACTURE OF BASIC METALS, published by Office of Economic Adviser, Government of India, Ministry of Commerce & Industry Department of Industrial Policy & Promotion (DIIP) for the Base Month;

"SRi": Average Wholesale Price Index for 'MS Bright Bars' individual commodity of group item (d) Mild Steel- Long products under (N) MANUFACTURE OF BASIC METAL, published by Office of Economic Adviser, Government of India, Ministry of Commerce & Industry Department of Industrial Policy & Promotion (DIIP) for the 3 months of the quarter under consideration;

xvii) "*SSo": Whole Sale Price Index for group item (e) Mild Steel- Flat products under (N) MANUFACTURE OF BASIC METAL, published by Office of Economic Adviser, Government of India, Ministry of Commerce & Industry, Department for Promotion of Industry and Internal Trade (DPIIT) for the Base Month;*

"SSi": Whole Sale Price Index for group item (e) Mild Steel- Flat products under (N) MANUFACTURE OF BASIC METALS, published by Office of Economic Adviser, Government of India, Ministry of Commerce & Industry, Department for Promotion of Industry and Internal Trade (DPIIT) for the 3 months of the quarter under consideration;

f) The following percentages shall govern the price adjustment of the Contract Price for cost of civil works:

Component	EW (Cost Centre CE of Price Schedule 'A')	BR (Cost Centre CB of Price Schedule 'A')	STN (Cost Centre CS of Price Schedule 'A')	CV (Cost Centre CV of Price Schedule 'A')	CW (Price Schedule 'B')
(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Cement (PC)	-	20%	15%	20%	20%
Fuel and lubricants (PF)	30%	20%	15%	*15%*	*15%*
Labour (PLB)	20%	10%	25%	10%	10%
Machinery and Plants (PMACH)	40%	15%	05%	*10%*	*10%*

Component	EW (Cost Centre CE of Price Schedule 'A')	BR (Cost Centre CB of Price Schedule 'A')	STN (Cost Centre CS of Price Schedule 'A')	CV (Cost Centre CV of Price Schedule 'A')	CW (Price Schedule 'B')
Other Materials (POTH)	10%	10%	20%	10%	10%
Reinforcement* Steel *(PSR)	-	25%	20%	*17%*	*15%*
Structural Steel (PSS)	-	-	-	*18%*	*20%*
Total	100%	100%	100%	100%	100%

Tender No. HORC/HRIDC/C-5/2023

Attachment 2
to
Corrigendum No. 1

Part 1, Section IV. Tender Forms

Appendix B to Financial Part: Price Schedules

1. Clause 6: Schedule ‘B’/R1
2. Clause 7: Schedule ‘C’/R1
3. Clause 8: Schedule ‘D’/R1

1. Clause 6: Schedule ‘B’/R1

6. Schedule 'B': Retaining Wall, Bridges & other Civil works

Schedule 'B' is subdivided into fourteen (14) Sub-Schedules as given below:

SCHEDULE 'B': Bridges, Retaining Wall & other Civil works					
S. No.	**Sub Schedule**	**Description**	**Item Range**	**No. of Items**	**Estimated Amount (INR)**
1.	B1	Bridge Works-Steel Super Structure - Open Web Girder (USSOR Based item)	1	1	67,70,29,509.30
2.	B2	Reinforcement (USSOR Based items)	2	1	39,25,25,087.50
3.	B3	RCC Works (NS item)	3	1	17,62,43,627.52
4.	B4	Bridge Works-Pile foundation (NS items)	4	1	10,69,13,193.00
5.	B5	Bridge Works-Steel Super Structure-Composite Girder (USSOR Based item)	5	1	7,63,87,291.44
6.	B6	Backfill Material (USSOR Based item)	6	1	7,12,94,621.42
7.	B7	Bridge Works-Precast Concrete Blocks (NS item)	7	1	4,97,20,839.72
8.	B8	Cement (USSOR Based items)	8	1	4,09,37,764.39
9.	B9	Formation Works (USSOR Based & NS items)	9 to 12	4	6,02,08,512.50
10.	B10	Bridge Works-Steel Super Structure - Miscellaneous (USSOR Based items)	13 to 14	2	10,53,31,396.00
11.	B11	Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)	15 to 52	38	16,06,89,079.97
12.	B12	Road and Building Works (DSR Based & NS items)	53 to 109	57	16,60,31,563.15
13.	B13	Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)	110 to 124	15	9,20,01,357.06
14.	B14	P Way Works-Ballastless Track, Rails & Special Sleepers (NS items)	125 to 130	6	8,84,27,376.10
Total Estimated Amount of Schedule 'B' (INR)					***226,37,35,219.07***

6.1 Sub-Schedule 'B1': Bridge Works- Steel Super Structure -Open Web Girder (USSOR Based item)

SUB SCHEDULE-B1: Bridge Works-Steel Super Structure -Open Web Girder (USSOR Based item)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
1	041010	Supplying, fabrication, assembling of all types of steel girders of specified spans with structural steel conforming to Quality "B0" Grade Designation E250 conforming to IS:2062, erection / slewing / end launching of steel girders with cranes or any other approved launching methods as per site conditions (not requiring traffic block) on sub-structure including provision of trolley refuges etc., complete as per approved QAP and drawings conforming to IRS-B1-2001 and other relevant codes and specifications. Note: **1.** Detailed fabrication and erection drawings & launching methodology will be prepared by the contractor and got approved from Railway. **2.** The item includes fabrication of all types of battens, bracings, ties, stiffeners, packing, diaphragms, shop rivets / welding, T&F bolts, drifts, SAW, templates, jigs, fixtures, accessories, transporting various components from fabrication shop to site including loading & unloading, assembly of girders with drifts/bolts, field riveting /welding /HSFG Bolting, assembling of temporary support for side slewing, raising of girders to the bed block level, providing sliding arrangements and slewing the girder in position, lowering of girder on				

SUB SCHEDULE-B1: Bridge Works-Steel Super Structure -Open Web Girder (USSOR Based item)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		bearings and bed plates with all temporary arrangements or any other method of launching complete. **3.** The bearing sets to be provided with the girders will be paid separately as per relevant item of Sub schedule B13. **4.** Payment for addition in weight for rivets / welds shall be made as per clause 45 of IRS B-1-2001. **5.** In case of composite work (welding and HSFG bolts), addition in weight shall be 1% for welding and HSFG bolts shall be paid separately under relevant item of Sub schedule B10. **6.** Painting of girders will be paid separately under relevant item of this Sub schedule B10. **7. Payment Schedule:** (i) Receipt of material at plant/workshop against submission of Bank Guarantee: 40% (ii) Fabrication of girders: 20% (iii)Erection/Launching: 20% (iv)Completion in all respects: 20%				
1a	041012	Open Web Girder Upto 45.7 m Clear Span	2,091	MT	1,61,971.98	33,86,83,410.18
1b	041013	Open Web Girder Above 45.7 m Clear Span	1,959	MT	1,72,713.68	33,83,46,099.12
Estimated value of SUB SCHEDULE 'B1': Bridge Works-Steel Super Structure -Open Web Girder (USSOR Based item)						**67,70,29,509.30**

6.2 Sub-Schedule 'B2'- Reinforcement (USSOR Based items)

SUB SCHEDULE 'B2': Reinforcement (USSOR Based items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
2	025070	Steel reinforcement for R.C.C. work including straightening, cutting, bending, placing in position and binding all complete.				
2a	025072	Thermo-Mechanically Treated bars of grade Fe-500D or more.	49,49,875	Kg	79.30	39,25,25,087.50
Estimated value of SUB SCHEDULE 'B2': Reinforcement (USSOR Based items)						**39,25,25,087.50**

6.3 Sub-Schedule 'B3': RCC Works (NS Item)

SUB SCHEDULE-'B3' RCC Works (NS item)						
S. No.	**NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
3	NS-1	Supplying and laying in position M-35 RCC as per approved design mix with admixtures and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all lifts & leads, having continuous agitated mixer, pumping concrete from transit mixer to site of laying, compacting, finishing & curing, with all labour, material, tools, plants, machinery and equipment, taxes, cess etc., as a complete job ,but excluding supplying & fixing form work (centring & shuttering),in accordance with the specification and drawings. Note – (i) Cost of cement is included in the above item. (ii) Cost of Reinforcement steel is not included in the above item and will be paid separately under relevant item of Sub-Schedule B2. (iii) Cost of supplying & fixing form work (centring & shuttering) is not included in the above item (except pile cap & open foundation) and will be paid separately under relevant item of Sub-Schedule B11.				
3a	NS-1A	In Pile caps, open foundation & RCC Box/Sub way	13,304	Cum	7,732.00	10,28,66,528.00
3b	NS-1B	In Piers, abutments	1,941	Cum	7,995.23	1,55,18,741.43

SUB SCHEDULE-'B3' RCC Works (NS item)						
S. No.	**NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
3c	NS-1C	Abutment cap & Pier Cap, pedestals, deck slab, Inspection platform, Trolly refugee	1,781	Cum	8,259.09	1,47,09,439.29
3d	NS-1D	Retaining walls, wing walls, return walls, drop walls, curtain walls, Wearing Coat etc. of all heights	5,515	Cum	7,823.92	4,31,48,918.80
Estimated Value of SUB SCHEDULE 'B3': RCC Works (NS item)						**17,62,43,627.52**

6.4 Sub-Schedule 'B4': Bridge Works-Pile foundation (NS items)

SUB SCHEDULE-B4: Bridge Works-Pile foundation (NS items)						
S. No.	**NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
4	NS-2	Boring 1200 mm diameter piles using Hydraulic Rig in all kinds of strata including boulder studded soil, underground structure like channel, sewer manholes, old foundation or any other obstruction, irrespective of sub-soil water level in all conditions whether dry or under water, shoe and temporary casing pipe, if required, with contractor plant, machinery & equipment for pile boring, use of bentonite slurry including all operations, cleaning of bore holes, supplying and laying in-situ with tremie pipe M-35 RCC in piles as per approved design mix with admixtures and manufactured in fully automatic batching plant and transported to site of work in transit mixer for all lifts & leads, having continuous agitated mixer, pumping concrete from transit mixer to site of laying including supplying & fixing form work (centering & shuttering), compacting, finishing, curing, chipping off pile top to remove laitance concrete above cut off level, removal and disposal of surplus excavated earth/debris/muck outside ROW including all lead, lift, ascends, descends, loading, unloading handling, re-handling, crossing of stream, nallahs, railway track, level crossing etc. with all labour, material, tools, plants, machinery and equipment, taxes, cess etc. as a complete job in accordance with the Specification and the Drawings. Note – i.Cost of cement is included in the above item. ii.Cost of Reinforcement steel is not included in the above item	8,718	Rmt	12,263.50	10,69,13,193.00

SUB SCHEDULE-B4: Bridge Works-Pile foundation (NS items)						
S. No.	**NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		and will be paid separately under relevant item of Sub-schedule-B2 iii. Cost of temporary casing pipe is included in the above item. However, the cost of permanent casing pipe is not included in this item and shall be paid separately under relevant item of Sub-schedule-B13, if required and approved by the Engineer.				
Estimated Value of SUB SCHEDULE 'B4': Bridge Works-Pile foundation (NS items)						**10,69,13,193.00**

6.5 Sub-Schedule 'B5': Bridge Works-Steel Super Structure - Composite

SUB SCHEDULE 'B5': Bridge Works-Steel Super Structure- Composite Girder (USSOR Based item)						
S. No.	**USSOR Item No**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
5	041020	Supplying, fabrication, assembling of all types of steel Composite girders of specified spans with structural steel conforming to Quality "B0" Grade Designation E250 conforming to IS:2062, erection / slewing / end launching of steel girders with cranes or any other approved launching methods as per site conditions on sub-structure including provision of stud bolts / shear connectors, complete as per approved QAP and drawings conforming to IRS- B1-2001 and other relevant codes and specifications. Note: 1. Detailed fabrication and erection drawings & launching methodology will be prepared by the contractor and got approved from Railway. 2. Rate includes fabrication of all types of battens, bracings, ties, stiffeners, packing, diaphragms, shop rivets / welding, T&F bolts, drifts, SAW, templates, jigs, fixtures, accessories, transporting various components from fabrication shop to site including loading & unloading, assembly of girders with drifts/bolts, field riveting /welding /HSFG Bolting, assembling of temporary support for side slewing, raising of girders to the bed block level, providing sliding				

		arrangements and slewing the girder in position, lowering of girder on bearings and bed plates with all temporary arrangements or any other method of launching complete. 3. The bearing sets to be provided with the girders will be paid separately as per relevant item of Sub schedule B13. 4. Payment for addition in weight for rivets / welds shall be made as per clause 45 of IRS B-1-2001. 5. In case of composite work (welding and HSFG bolts), addition in weight shall be 1% for welding and HSFG bolts shall be paid separately under relevant item of Sub schedule B10. 6. Painting of girders will be paid separately under relevant item of Sub schedule B10. 7. Payment Schedule: (i) Receipt of material at plant/workshop against submission of Bank Guarantee: 40% (ii) Fabrication of girders: 20% (iii) Erection/Launching: 20% (iv) Completion in all respects: 20%				
5a	041021	Composite steel girder of span length up to 36.0m	564	MT	1,35,438.46	7,63,87,291.44
Estimated Value of SUB SCHEDULE 'B5': Bridge Works-Steel Super Structure- Composite Girder (USSOR Based item)						**7,63,87,291.44**

6.6 Sub-Schedule 'B6': Backfill Material (USSOR Based item)

SUB SCHEDULE 'B6' : Backfill Material (USSOR Based item)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
6	051170	Providing and laying of filter media consisting of granular materials of GW, GP, SW groups as per IS:1498 (latest) in required profile behind boulder filling of abutments, wing walls / return walls etc. above bed level with all labour and material complete job as per drawing and technical specification of RDSO Guidelines.	32,782	Cum	2,174.81	7,12,94,621.42
Estimated Value of SUB SCHEDULE 'B6': Backfill Material (USSOR Based item)						**7,12,94,621.42**

6.7 Sub-Schedule 'B7': Bridge Works-Precast Concrete Blocks (NS item)

SUB SCHEDULE 'B7': Bridge Works-Precast Concrete Blocks (NS item)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
7	NS-3	Casting, supplying and installation of Pre-cast cement concrete blocks of size 25X25 X20cm. or of required size as directed by the Engineer for protective works at bridges & banks like pitching, toe wall, flooring, drains etc. using M20 design concrete mix with 20mm aggregate size including Contractor's shuttering, leading to bridge site from casting depot, including dressing and levelling of surface, providing gravel backing, laying & jointing blocks with cement mortar 1:3 with Contractor's labour and as directed by Engineer-in-charge (All labour and materials including cement by Contractor). Note: i) Payment for gravel backing will be paid under relevant item of Sub schedule B11. ii) 60% Payment shall be made after casting of pre-cast concrete blocks and bringing at work site. The balance 40% will be made on completion of laying and finishing. iii) Measurement is based on quantity calculation of blocks used only (no of blocks x volume of one block).	8,102	Cum	6,136.86	4,97,20,839.72
Estimated Value of SUB SCHEDULE 'B7': Bridge Works-Precast Concrete Blocks (NS item)						**4,97,20,839.72**

6.8 Sub-Schedule 'B8': Bridge Works-Steel Super Structure -Miscellaneous (USSOR Based items)

SUB SCHEDULE 'B8': Cement (USSOR Based items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
8	025060	Supply and using Cement at Worksite				
8a	025062	Ordinary Portland Cement 53 grade	295	MT	8,741.08	25,78,618.60
8b	025063	Pozzolana Portland Cement	4,921	MT	7,794.99	3,83,59,145.79
Estimated Value of SUB SCHEDULE 'B8': Cement (USSOR Based items)						**4,09,37,764.39**

6.9 Sub-Schedule 'B9': Formation Works (USSOR Based & NS items)

SUB SCHEDULE 'B9' Formation Works (USSOR Based & NS items)						
S.NO.	**USSOR/NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
9	011010	Earthwork in cutting (classified) in formation, trolley refuges, side drains, level crossing approaches, platforms, catch water drains, diversion of nallah & finishing to required dimension and slopes to obtain a neat appearance to standard profile inclusive of all labour, machine & materials and removing & leading all cut spoils either to make spoil dumps beyond 10m from cutting edge or for filling in embankment with leads within 2 km on either side of cutting edge, lifts, ascent, descent, loading, unloading, all taxes / royalty, clearance of site and all incidental charges, bailing & pumping out water, if required, etc. complete as per directions of the Engineer in-Charge. The work is to be executed as per latest / updated edition of "Guidelines for Earthwork in Railway Projects" issued by RDSO, Lucknow. Cut trees shall be property of HRIDC and to be deposited in the Employers' godown unless specified otherwise in the Special Conditions of Contract. {Note - (i) All usable earth arising from cut spoils shall be led into bank formation and Unusable spoils shall be dumped / stacked (ii) All hard rock /and boulders not fit for filling will be stacked by the Contractor and will be property of HRIDC.}				
9a	011011	In all conditions and classifications of soil except rock	1,000	Cum	184.70	1,84,700.00

SUB SCHEDULE 'B9' Formation Works (USSOR Based & NS items)						
S.NO.	**USSOR/NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
10	013050	Turfing / planting, including all lead & lift and watering as required until properly rooted with. Note - Initially payment of only 40% will be made. Balance 60% will be paid only after 3 months of maintenance period, if the turfing is properly rooted.				
10a	013053	Planting Sarkanda / sarpat or any other suitable species approved by the Engineer	250	100 sqm	7,744.21	19,36,052.50
11	NS-4	Earthwork in embankment for 32.5t axle load and as per RDSO specification No. RDSO/2020/GE:004 September 2020 "Comprehensive Guidelines and Specification for Railway Formation" with contractor's own earth from borrow areas including all lead, lift, ascent, descent, royalty, taxes, cess, compensation, crossing of nallahs /stream and other obstructions including mechanical compaction in layers with watering, handling, re-handling, dressing of banks to the final profile with all labour, material, tools, plant, machinery and equipment, taxes, cess etc. as a complete job in accordance with the specification and drawings. **Note:** 10% of payment shall be withheld till the slopes are dressed to the required profile and compacted mechanically with vibratory rollers as per RDSO guidelines.	1,35,000	Cum	330.24	4,45,82,400.00

SUB SCHEDULE 'B9' Formation Works (USSOR Based & NS items)						
S.NO.	**USSOR/NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
12	NS-5	Supplying and laying blanketing material produced through mechanical means using crushers and pug mill for 32.5 T axle load as per RDSO specification No. RDSO/2020/GE:004 September 2020 "Comprehensive Guidelines and Specification for Railway Formation" over the top of subgrade including all lead, lift, ascent, descent, royalty, taxes, cess, crossing of nallahs /stream and other obstructions including mechanical compaction in layers not exceeding 200 mm thick with vibratory rollers, watering, handling, re-handling and dressing of formation to the final profile with all labour, material, tools, plants, machinery and equipment, taxes, cess, etc. as a complete job in accordance with the specification and drawings. Note: 10% of payment shall be withheld till the slopes are dressed to the required profile and compacted mechanically with vibratory rollers as per RDSO guidelines.	5,500	Cum	2,455.52	1,35,05,360.00
Total Estimated Value of SUB SCHEDULE 'B9': Formation Works (USSOR Based & NS items)						**6,02,08,512.50**

6.10 Sub-Schedule 'B10': Bridge Works-Precast Concrete Blocks (NS item)

SUB SCHEDULE 'B10' Bridge Works-Steel Super Structure -Miscellaneous (USSOR Based items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
13	041030	Supplying and fixing HSFG bolts of any dia. and any length with suitable nuts including DTI washers conforming to IRS-B1-2001 for bridges and steel structures with contractors labour, tools and plants and lead and lift etc., complete.	1,87,500	Kg	306.36	5,74,42,500.00
14	041050	Metalizing of steel work of girders with sprayed aluminium after surface preparation by Sand/grit blasting, followed by one coat of etch primer (IS:5666) & one coat of Zinc Chrome primer (IS:104)and two coats of aluminium paint (IS:2339) with all labour, T&P and material as a complete job duly conforming to all relevant specifications and process given under Clause 39 of IRS-B1-2001 Note: Nominal Thickness of Aluminium coating shall be 150 microns. DFT of Zinc chrome primer shall be 25-30 microns and DFT of each coat of Aluminium paint shall be 12-14 microns.	56,320	Sqm	850.30	4,78,88,896.00

Estimated Value of SUB SCHEDULE 'B10' Bridge Works-Steel Super Structure -Miscellaneous (USSOR Based items)	10,53,31,396.00

6.11 Sub-Schedule 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
15	013130	Shoring with 'Z' section MS sheet piles side by side in all kinds of soil mechanically or manually as per approved drawing with contractor's own arrangement complete in all respects and removal of sheet piles after completion of the work as directed by engineer in-charge. {Note - Payment will be made as per actual driven length of pile}	400	Sqm	917.12	3,66,848.00
16	014020	Supplying and laying of drainage composite for use behind abutments, wing walls, return walls and retaining walls geo composite drain (vertical) as per RDSO Specification No.-RDSO/2018/GE: IRS-0006 Latest version with all material, labour, equipment, tools and plants, lead, lift etc. complete in all respects as per the direction of engineer-in-charge.	1,407	Sqm	755.43	10,62,890.01

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
17	022010	Earthwork in excavation by mechanical means (Hydraulic Excavator)/Manual Means for foundations and floors of the bridges, retaining walls etc. including setting out, dressing of sides, ramming of bottom, getting out the excavated material, back filling in layers with approved material and consolidation of the layers by ramming and watering etc. including all lift, disposal of surplus soil up to a lead of 300m, all types of shoring and strutting with all labour and material complete as per drawing and technical specification as directed by Engineer. Note: This item will be used for excavation work in connection with other miscellaneous works also like side drains, foundation for OHE masts and other miscellaneous structures in connection with Gauge Conversion, Doubling, New lines.				
17a	022011	All kinds of soils	47,932	Cum	238.30	1,14,22,195.60

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
18	022040	Providing and laying in position machine batched, machine mixed and machine vibrated Design Mix Cement Concrete of specified grade **(M-20** Cast in-Situ) using 20mm graded crushed stone aggregate and coarse sand of approved quality in RCC raft foundation & Pile cap including finishing, using Admixtures in approved proportions (as per IS:9103), to modify workability & other properties without impairing strength and durability complete as per specifications and direction of the Engineer in charge. Payment for cement, reinforcement and shuttering shall be paid extra. **Note**-Cement concrete in drainage and other miscellaneous works shall be paid under this item.	8,804	Cum	3,383.45	2,97,87,893.80
19	022070	Providing and fixing Weep Holes in Abutments, RCC Box, Wing walls and Return walls etc, of new bridges with 110mm dia UPVC pipe (IS :13592) Type A ISI marked with all contractor's men, material, transportation, all taxes as per specifications and as directed by Engineer-in-Charge.	5,601	Meter	259.80	14,55,139.80

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
20	022120	Conducting load testing of a single pile upto following capacity in accordance with IS:2911 (Part IV) including installation of loading platform and preparation of pile head or construction of test cap and dismantling of test cap after test etc. with all labour, material, tool & plants, equipment, machinery, etc. complete as per drawing and specification, as directed by the Engineer.				
20a	022123	Initial load test above 100 ton capacity upto 250 ton capacity pile	6	Each	97,491.59	5,84,949.54
20b	022124	Extra for every increase of 50 ton in pile capacity or part thereof over 250 ton	50	Each	9,599.01	4,79,950.50
20c	022127	Routine Load Test above 100 ton capacity upto 250 ton capacity pile	26	Each	65,525.51	17,03,663.26
21	022130	Lateral load testing of single pile in accordance with "IS Code of practice IS:2911 (Part-IV) for determining safe allowable lateral load of pile" with all labour, material, tool & plants, equipment, machinery, etc complete as per drawing and specification as directed by the Engineer				
21a	022131	Piles with lateral load capacity of upto 50 ton	5	Each	24,363.19	1,21,815.95
22	022140	Pulse Echo Test (PET) for integrity testing of piles with contractor's men, materials and machines. The rate includes cost of Inspection of site, preparation of pile head and any other	356	Each	3,476.42	12,37,605.52

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		unforeseen cost required for the test, submission of reports in triplicate as per satisfaction of the Engineer in Charge at site.				
23	023010	Earth work in OPEN excavation in foundation of bridges, for placing of well curbs of all shapes and designs in all kinds of soil including taking out the excavated soil, levelling, ramming of bottom of excavation and trimming of sides, returning the soil in layers, consolidation, disposal of surplus soil within a lead of 300m, including all lift, dewatering, shoring and strutting complete as per technical specification and as directed by Engineer in charge. (compaction of surplus soil when led to the bank will be paid as per relevant item separately)	1,654	Cum	263.18	4,35,299.72
24	023040	Dry/Wet Sinking of Circular Wells (Other than pneumatic method) in all types of strata except hard rock requiring ballasting, including bailing and pumping out water, removal of excavated soil with all labour and material required for sinking as per drawing and direction of the Engineer in charge, disposal of surplus soil in the adjoining bank/embankment (compaction to be paid separately under the relevant item).				
24a	023041	From initial level of cutting edge & upto 3m depth	1,145	Cum	196.29	2,24,752.05

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
24b	023042	Above 3m to 10m depth	2,671	Cum	296.00	7,90,616.00
24c	023043	Above 10m to 15m depth	1,908	Cum	429.42	8,19,333.36
24d	023044	Above 15m to 20m depth	1,908	Cum	507.41	9,68,138.28
24e	023045	Above 20m to 25m depth	500	Cum	923.30	4,61,650.00
24f	023046	Above 25m to 30m depth	500	Cum	1,147.29	5,73,645.00
25	023090	Providing and laying in position machine batched, machine mixed and machine vibrated Design Mix Cement Concrete of specified grade (Cast in-Situ) using 20mm graded crushed stone aggregate and coarse sand of approved quality in the following elements of well including finishing, using Admixtures in approved proportions (as per IS:9103), to modify workability & other properties without impairing strength and durability complete as per drawings and technical specifications as directed by Engineer. Payment for cement, reinforcement and shuttering shall be made extra.				
25a	023091	In well Curb	360	Cum	3,555.81	12,80,091.60
25b	023092	In Steining of wells	3,179	Cum	3,555.81	1,13,03,919.99

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
25c	023093	In Bottom plug for wells including arrangements for placing concrete under water with tremie or bottom opening skips.	1,526	Cum	4,006.18	61,13,430.68
25d	023095	In Intermediate/Top plug with internal shuttering	351	Cum	4,296.35	15,08,018.85
25e	023096	In Well cap and corbel, if provided	668	Cum	4,296.35	28,69,961.80
26	023100	Supplying and filling ordinary sand in between bottom plug and top plug in wells including all lead lift handling, re-handling, as a complete job. Sand should be simultaneously filled with water for three days to achieve full compaction so that further chances of shrinkage due to voids are eliminated.				
26a	023102	Using sand from other than River bed (This item is to be operated if suitable sand is not available in River Bed for filling	2,543	Cum	1,909.88	48,56,824.84
27	025020	Providing and applying two coats of coal tar or bitumen confirming to IS:3117– latest version on the top and sides of RCC box/slabs @ 1.70 kg/sqm after cleaning the surface with all labour and materials complete job as directed by the Engineer	4,740	Sqm	184.49	8,74,482.60
28	025030	Centering and shuttering including strutting, propping etc. and removal of form for :				
28a	025032	All types of bridge super-structures, e.g. slabs, I-girders, T-girders, Box girders etc. upto 5m above ground level	2,360	Sqm	933.91	22,04,027.60

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
28b	025033	Extra for additional height over item no. 025032 wherever required with adequate bracing, propping etc. over initial height of 5 metres for every additional height of 1 metre or part thereof	9,030	Sqm	117.66	10,62,469.80
29	031020	Providing and laying in position machine batched, machine mixed and machine vibrated Design Mix Cement Concrete of specified grade using 20mm graded crushed stone aggregate and coarse sand of approved quality for the Precast Prestressed (Post tensioned) concrete girder/Box (spans upto 30.5m) in contactor's casting yard, including finishing, using Admixtures in approved proportions (as per IS:9103), to modify workability & other properties without impairing strength and durability, complete as per drawings, specifications and direction of the Engineer. Payment for Shuttering, Cement, reinforcement, HTS cables, anchorage cones, stressing of cables and grouting of the ducts will be done extra. Launching of girder/slab in position is not included in this item.	71	Cum	3,055.96	2,16,973.16
29a	031021	Deduct from 0310220 for casting of Slab in place of Girder/Box	71	Cum	-95.71	-6,795.73

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
30	031040	Providing, fabricating & fixing in position to exact design profiles, prestressing H.T.S. cables of all classification made from Low Relaxation strands conforming to IS:14268– latest version in Prestressed (Post tensioned) Concrete girders/slabs etc. including supplying, cutting, making into cables with necessary spacers, colour coding, protecting with water soluble oil at all time, anchoring of cables, supplying and placing spiral corrugated type galvanized metal steel ducts sheathing made up of Cold Rolled Cold Annealed (CRCA) mild steel conforming to IS:513 of required diameter/ thickness, vent pipe, placing, bending, routing, fixing, stressing & grouting of cable ducts with cement grout, Anchorage sets in required number with provision for future prestressing if any including all lead and lift with contractor's own materials, labour, equipments etc. complete as per drawings & specifications. Rate also includes covering anchorage pads with epoxy mortar of approved quality to avoid corrosion. Cement for grouting to be paid separately. Payment shall be made in terms of weight of HTS cables as per drawing.	4	MT	1,99,689.58	7,98,758.32
31	031060	Extra for Using HDPE Sheathing in place of CRCA Sheathing	367	Meter	159.26	58,448.42

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
32	*031110*	*Load testing of one or more spans of bridge as selected by the Engineer as per approved load test procedure following relevant IS/ IRC / Railway codes with contractor's labour, deflection measuring instruments, loading materials, recoding and analyzing the load testing results including all lead & lift, etc. complete as required. The rates are all inclusive and will be paid after load test is finished and girder is cleared of the kentledges/ loading material etc. The load shall be 1.25 times the stipulated design load.*				
32a	*031111*	*For Span design load up to 100 MT*	*5*	*Each*	*90,478.87*	*4,52,394.35*
32b	*031112*	*Extra for every increase 1 MT or part thereof in the span design load capacity up to 800 MT*	*1000*	*MT*	*893.37*	*8,93,370.00*
33	031140	Providing and fixing in position GI Drainage Spouts of required length with Grating in RCC slab and filling bitumen along kerb as shown in drawing with contractor's pipes, bitumen, tools, equipment, lead, lifts etc. complete as per specifications and as directed by Engineer in-charge				

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
33a	031142	100mm dia. Drainage Spouts	186	Meter	1,270.12	2,36,242.32
34	041240	Surface preparation for painting of bridge plate/composite girders and other steel structures where the finishing coat shows signs of deterioration; but primer coat of paint is sufficiently in good condition and there are no signs of rusting etc. Surface shall be cleaned free from oil grease, scaling and other foreign matters without disturbing the primer coat {Rate includes cost of labour, consumables, tools & plants, scaffolding, jhoola, ladder etc.}	3,250	Sqm	26.97	87,652.50
35	041260	Painting cleaned bridge plate/composite girders including all scaffolding, shuttering and strutting along with provision of Jhoola / hanging scaffolding ladders etc. where required				
35a	041261	With one coat ready mix Zinc Chromate conforming to IS:104 with DFT of 25-30 Microns followed by one coat of Zinc Chromate red oxide conforming to IS:2074 DFT of 25 Microns.	3,250	Sqm	101.72	3,30,590.00

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
36	041330	Launching & fixing in specified Bridge location all types of Steel Plate girders / PSC girders / Slabs including loading/unloading and transport to the site of launching with a lead of five kilometres & lifting to any height as per site requirement, provision of approaches for leading, cleaning of bed block and minor repairs to bed block with epoxy if required, as directed by Engineer in charge with all labour, tools and plant, equipment etc., complete.				
36a	041331	PSC girders / slabs	176	MT	5,643.58	9,93,270.08
37	051010	Providing and laying boulders apron on river bed for protection against scour with stone boulders weighing not less than 35 kg each with voids filled with spalls complete as per drawing and Technical Specification.	55	Cum	1,510.18	83,059.90
38	051120	Stenciling of Girders with black / blue lettering over yellow background with ready mix paint w.r.t. details of executed inspection, greasing and painting, other details as directed by Engineer in charge.	840	Each	43.40	36,456.00

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
39	052220	Painting the HFL mark and Danger level mark, year of HFL on bridge abutments and piers with ready mixed paint as per standard in two coats over one coat of primer with all materials, labour, tools, scaffolding, all lead and lift etc. including writing complete.	225	Each	299.88	67,473.00
40	052230	Providing cast in situ bridge number plaques as per Railway drawing in cement concrete 1:2:4 mix using 20mm hard stone aggregate embedded in 30mm notch in Bridge parapet coping duly engraving the letter and figures and an arrow indicating the direction of flow and finishing the top exposed surface with cement mortar 1:3, painting letters and figures with two coats of black enamel paint on two coats of white background with all labour, tools, cement, paint etc. with all leads and lifts.	14	Each	846.77	11,854.78
41	052240	Providing cast in-situ plaques for bridge foundations details of size 45cmx45cmx5cm in cement concrete 1:2:4 mix using 20mm hard stone aggregate embedded in 30mm deep notch over abutment & piers, engraving the letters & figures with CM 1:3 and finished smooth including painting letters and figures with 2 coats of black enamel and plaque with white enamel with all labour, tools, cement, paint, curing etc. as a complete job.	26	Each	1,108.92	28,831.92

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
42	052250	Providing & laying non pressure NP-4 Class RCC pipe with collars, jointing with 1:2 cement and ordinary sand mortar including testing of joints, but excluding earthwork with all labour and material as a complete job. Cement for mortar will be paid separately. (Pipes of 600mm dia and above will be laid using crane/hydra).				
42a	052252	450mm dia.	100	Meter	2,756.69	2,75,669.00
43	052260	Supplying, spreading and filling coarse sand (no cohesive materials to be used) of approved quality including watering and ramming in foundation, plinth, behind the abutment, wing wall, retaining wall in layers not exceeding 150mm thick including its compaction as per direction of Engineer-incharge. The rate includes all lead, lift, ascent, descent, crossing of Railway line etc. complete with contractor's labour, materials, tools and plant.	7,958	Cum	2,020.70	1,60,80,730.60

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
44	191310	Fabrication, supplying and fixing 600mm x 450mm Bridge Board made from 16 SWG MS Sheet duly welded or rivited to back support of two 600mm long horizontal angles of size 25mm x 25mm x 3mm & two 2.5 metre long vertical support of MS Angle of size 50mm x 50mm x 5mm, welded /rivited to board. Vertical supports shall have split ends for proper fixing in ground. Vertical supports of board shall be embedded in ground in M 20 Cement Concrete blocks of size 300mm x300mm x 300mm, complete job including painting & writing of subject matter on bridge board, as directed by Engineer – In charge. {Note : Excavation & concrete work will be paid separately under Sub Schedule-B12}	14	Each	2,715.86	38,022.04
45	195030	Centring and shuttering including strutting, propping etc. and removal of form for :				
45a	195032	Abutment, pier, wing walls and return walls	6,581	Sqm	376.01	24,74,521.81
45b	195033	Abutment cap, Pier Cap, Inspection Platform & Pedestal over Pier cap, Fender wall, Diaphragm wal etc.	2,110	Sqm	364.94	7,70,023.40
45c	195034	Approach slab at formation level, Dirt wall/ ballast wall at formation level	668	Sqm	237.17	1,58,429.56

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
45d	195038	In Bottom/top slab & side walls of RCC Box , toe wall and sumps haunch filling head walls, In well Kerb & Steining or any other component	23,550	Sqm	376.01	88,55,035.50
46	NS-6	Supplying and laying of 150mm thick well graded stones aggregate/gravel as base layer over the slopes of embankment with manual dressing with water compaction including the cost of supply of all material, labour, lead, lift, tools, plants, crossing of tracks etc. complete as per approved drawings and technical specifications.	6,188	Cum	1,096.18	67,83,161.84
47	NS-7	Providing Boulder Backing behind wing wall, return wall, retaining wall with hand packed boulders & cobbles not less than 15cm in any direction & not less than 15kg (except smaller boulders required for filling voids) including all lead, lift, labour & other incidental charges as complete work in all respect. Cost of boulder/cobbles is included in this item.	4,601	Cum	1,219.73	56,11,977.73
48	NS-8	Providing and fixing of 75mm dia PVC pipe for weep holes in abutments, Wing Wall, Return Wall, Face wall, retaining wall etc. at suitable intervals as directed by the Engineer-in-charge.	1,500	Meter	232.42	3,48,630.00

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
49	NS-9	Manufacturing, transportation (including loading & unloading) and installation in position (including joining and grouting) M-35 **or higher grade** precast reinforced cement concrete U-shaped drain/duct with cover as per the directions of the Engineer. Precast reinforced U-shaped drain shall be factory-made, and steam cured in a controlled environment with inserts for handling/transportation. Dimensional tolerances shall be as per IS: 6408 (part 2) for PC Class 6. Notes:- 1. This item includes cost of all the materials, labour, machinery, tools & plant etc. complete required for manufacture of precast segments except Steel Reinforcement which shall be paid separately under relevant item of Sub schedule B2. 2. Excavation of soil for foundation shall be paid separately under item relevant of Sub Schedule B11. 3. Before placing of wall segments, 20 mm thick stiff 1:3 cement mortar bedding layer shall be laid over a levelling course of 50 mm thick of M20 concrete. Payment for M20 concrete shall be made under relevant item of Sub Schedule	360	Cum	26,770.42	96,37,351.20

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		B11 and for mortar under relevant item of Sub-Schedule- B12. 4. 60% of the rate shall be paid on receipt of the precast retaining wall segments at site and balance 40% will be paid on fixing the same in position in satisfactory condition.				
50	NS-10	Designing, Providing and erection of specified grade precast RCC Facia Panel of thickness 180 mm made with M-35 Grade Concrete Batching plant, Transit Mixer, Concrete Pump and Vibrator for retaining earth with all element and accessories including reinforcing element complete as per approval drawing and Section 3100 of MORT&H specification including all material labour machinery etc. (Scope of work including designing, getting approval, casting in yad, curing, storing, Transporting, lifting, placing in position, erection with all necessaries fasteners etc complete). The cost of cement & steel are included in this item & no separate payment shall be paid whatsoever. The rate also include cost for excavation, foundation, reinforcing element, fasteners, drainage layer, drain pipe, coping beam and other accessories for which nothing extra shall be paid. Mode of Payment:	2640	Sqm	6,068.85	1,60,21,764.00

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		1- Casting of RE Panel: 60% 2- Erection & fixing: 35 % 3- Final Bill: 5%				
51	NS-11	Providing Placing & Compacting to desired density approved backfill material in layers as per approved methodology including testing of reinforced fill portion in approaches between reinforced soil (RS) wall panels as per approved drawing as per Section 3103 of MORT&H Specification. The soil should be predominantly coarse grained, Not more than 10 % of particles should pass 75 micron sieve. The item shall be measured and paid for the finished volume of backfill and subgrade placed in position excluding the volume of filter media at base and behind the RS RE Wall.	8316	Cum	373.31	31,04,445.96
52	NS-12	Providing & constructing of RCC Crash Barrier of M35 at the edge of road , approaches to bridge structures and medians, constructed with specified grade of concrete using batching plant , transit mixer, concrete pump and vibrator with 450 mm long at expansion joint filled with premolded asphlat filler board, keyed to the structure on which it is built and installed as per design and dimension in the approved drawing and at location directed by the engineer, all as specified as per Section 809 of MORT&H	238	Cum	6,996.32	16,65,124.16

SUB SCHEDULE 'B11': Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						
S. No.	**USSOR Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		Specification including all material labour, scaffolding etc.				
Estimated Value of SUB SCHEDULE 'B11' Well foundation, Concrete Superstructure, RE wall & Other miscellaneous Works (USSOR Based & NS items)						***16,06,83,079.97***

6.12 Sub-Schedule 'B12': Road and Building Works (DSR Based & NS items)

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
53	2.27	Supplying and filling in plinth with sand under floors, including watering, ramming, consolidating and dressing complete	96	Cum	2,212.30	2,12,380.80
54	3.8	1:3 (1 Cement : 3 coarse sand (zone-III)) cement sand levelling mortar. Item will be used as below precast item. Note:- cost of cement is included in the item.	33	Cum	5,142.94	1,69,717.02
55	4.17	Making plinth protection 50mm thick of cement concrete 1:3:6 (1 cement : 3 coarse sand (zone-III) derived from natural sources : 6 graded stone aggregate 20 mm nominal size derived from natural sources) over 75mm thick bed of dry brick ballast 40 mm nominal size, well rammed and consolidated and grouted with fine sand, including necessary excavation, levelling & dressing & finishing the top smooth.	120	Sqm	697.77	83,732.40
56	4.6	Providing and fixing at or near ground level precast cement concrete in kerbs, edgings etc. as per approved pattern and setting in position with cement mortar 1:3 (1 Cement : 3 coarse sand), including the cost of required centering, shuttering complete.				
56a	4.6.1	1:1½:3 (1 Cement: 1½ coarse sand(zone-III) derived from natural sources: 3 graded stone aggregate 20 mm nominal size derived from natural sources)	10	Cum	8,322.88	83,228.80

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
57	5.1	Providing and laying in position specified grade of reinforced cement concrete, excluding the cost of centering, shuttering, finishing and reinforcement - All work up to plinth level.				
57a	5.1.2	1:1.5:3 (1 cement : 1.5 coarse sand (zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size de rived from natural sources).	51	Cum	8,561.96	4,36,659.96
58	5.3	Reinforced cement concrete work in beams, suspended floors, roofs having slope up to 15° landings, balconies, shelves, chajjas, lintels, bands, plain window sills, staircases and spiral stair cases above plinth level up to floor five level, excluding the cost of centering, shuttering, finishing and reinforcement with 1:1.5:3 (1 cement : 1.5 coarse sand(zone-III) derived from natural sources : 3 graded stone aggregate 20 mm nominal size derived from natural sources).	48	Cum	10,972.74	5,26,691.52
59	5.9	Centering and shuttering including strutting, propping etc. and removal of form for				
59a	5.9.1	Foundations, footings, bases of columns, etc. for mass concrete	450	Sqm	315.23	1,41,853.50
59b	5.9.2	Walls (any thickness) including attached pilasters, butteresses, plinth and string courses etc.	300	Sqm	685.38	2,05,614.00
59c	5.9.3	Suspended floors, roofs, landings, balconies and access platform	1,200	Sqm	784.67	9,41,604.00
59d	5.9.5	Lintels, beams, plinth beams, girders, bressumers and cantilevers	690	Sqm	622.73	4,29,683.70
59e	5.9.6	Columns, Pillars, Piers, Abutments, Posts and Struts	540	Sqm	823.27	4,44,565.80

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
59f	5.9.19	Weather shade, Chajjas, corbels etc., including edges	240	Sqm	834.22	2,00,212.80
60	5.33	Providing and laying in position ready mixed or site batched design mix cement concrete for reinforced cement concrete work; using coarse aggregate and fine aggregate derived from natural sources, Portland Pozzolana / Ordinary Portland /Portland Slag cement, admixtures in recommended proportions as per IS: 9103 to accelerate / retard setting of concrete, to improve durability and workability without impairing strength; including pumping of concrete to site of laying, curing, carriage for all leads; but excluding the cost of centering, shuttering, finishing and reinforcement as per direction of the engineer-in-charge; for the following grades of concrete. Notes:- Extra cement up to 10% of the minimum specified cement content in design mix shall be payable separately. In case the cement content in design mix is more than 1.10 times of the specified minimum cement content, the contractor shall have discretion to either re-design the mix or bear the cost of extra cement				
60a	5.33.1	All works upto plinth level				
60aa	5.33.1.1	Concrete of M25 grade with minimum cement content of 330 kg /cum	90	Cum	8,889.11	8,00,019.90
60b	5.33.2	All works above plinth level upto floor V level				

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
60ba	5.33.2.1	Concrete of M25 grade with minimum cement content of 330 kg /cum	132	Cum	10,549.87	13,92,582.84
61	6.1	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in foundation and plinth in:				
61a	6.1.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	9	Cum	6,815.67	61,341.03
62	6.4	Brick work with common burnt clay F.P.S. (non modular) bricks of class designation 7.5 in superstructure above plinth level up to floor V level in all shapes and sizes in :				
62a	6.4.2	Cement mortar 1:6 (1 cement : 6 coarse sand)	201	Cum	8,484.36	17,05,356.36
63	8.31	Providing and fixing Ist quality ceramic glazed wall tiles conforming to IS: 15622 (thickness to be specified by the manufacturer), of approved make, in all colours, shades except burgundy, bottle green, black of any size as approved by Engineer-in-Charge, in skirting, risers of steps and dados, over 12 mm thick bed of cement mortar 1:3 (1 cement : 3 coarse sand) and jointing with grey cement slurry @ 3.3kg per sqm, including pointing in white cement mixed with pigment of matching shade complete.	15	Sqm	1,088.59	16,328.85
64	9.7.7	Providing and fixing panelling or panelling and glazing in panelled or panelled and glazed shutters for doors, windows and clerestory windows (Area of opening for panel inserts excluding portion inside grooves or rebates to be measured). Panelling for				

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		panelled or panelled and glazed shutters 25 mm to 40 mm thick: Float glass panes.				
64a	9.7.7.1	4 mm thick glass pane (weight not less than 10kg/sqm).	27	Sqm	1,941.95	52,432.65
65	9.21	Providing and fixing ISI marked flush door shutters conforming to IS : 2202 (Part I) non-decorative type, core of block board construction with frame of 1st class hard wood and well matched commercial 3 ply veneering with vertical grains or cross bands and face veneers on both faces of shutters.				
65a	9.21.1	35 mm thick including ISI marked Stainless Steel butt hinges with necessary screws	41	Sqm	2,063.41	84,599.81
66	9.48	Providing and fixing M.S. grills of required pattern in frames of windows etc. with M.S. flats, square or round bars etc. including priming coat with approved steel primer all complete.				
66a	9.48.1	Fixed to steel windows by welding	300	Kg	185.28	55,584.00
67	9.83	Providing and fixing aluminium die cast body tubular type universal hydraulic door closer (having brand logo with ISI, IS : 3564, embossed on the body, door weight upto 35 kg and door width upto 700 mm), with necessary accessories and screws etc. complete.	6	Each	1,049.90	6,299.40

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
68	9.96	Providing and fixing aluminium sliding door bolts, ISI marked anodised (anodic coating not less than grade AC 10 as per IS : 1868), transparent or dyed to required colour or shade, with nuts and screws etc. complete.				
68a	9.96.1	300x16 mm	18	Each	266.51	4,797.18
69	9.97	Providing and fixing aluminium tower bolts, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete				
69a	9.97.1	300x10 mm	18	Each	120.43	2,167.74
69b	9.97.4	150x10 mm	10	Each	77.34	773.40
70	9.100	Providing and fixing aluminium handles, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour or shade, with necessary screws etc. complete				
70a	9.100.1	125 mm	18	Each	61.47	1,106.46
71	9.101	Providing and fixing aluminium hanging floor door stopper, ISI marked, anodised (anodic coating not less than grade AC 10 as per IS : 1868) transparent or dyed to required colour and shade, with necessary screws etc. complete				
71a	9.101.2	Twin rubber stopper	6	Each	63.72	382.32

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
72	10.13	Providing and fixing T-iron frames for doors, windows and ventilators of mild steel Tee-sections, joints mitred and welded, including fixing of necessary butt hinges and screws and applying a priming coat of approved steel primer				
72a	10.13.1	Fixing with 15x3 mm lugs 10 cm long embedded in cement concrete block 15x10x10 cm of C.C. 1:3:6 (1 Cement : 3 coarse sand : 6 graded stone aggregate 20 mm nominal size)	600	Kg	117.36	70,416.00
73	10.14	Providing and fixing pressed steel door frames conforming to IS: 4351, manufactured from commercial mild steel sheet of 1.60 mm thickness, including hinges, jamb, lock jamb, bead and if required angle threshold of mild steel angle of section 50x25 mm, or base ties of 1.60 mm, pressed mild steel welded or rigidly fixed together by mechanical means, including M.S. pressed butt hinges 2.5 mm thick with mortar guards, lock strike-plate and shock absorbers as specified and applying a coat of approved steel primer after pre-treatment of the surface as directed by Engineer-in-charge:				
73a	10.14.1	Profile B				
73aa	10.14.1.1	Fixing with adjustable lugs with split end tail to each jamb	180	Meter	455.01	81,901.80
74	10.17	Providing and fixing M.S. fan clamp type I or II of 16 mm dia M.S. bar, bent to shape with hooked ends in R.C.C. slabs or beams during laying, including painting the exposed portion of loop, all as per standard design complete	24	Each	189.58	4,549.92

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
75	10.25	Steel work welded in built up sections/ framed work, including cutting, hoisting, fixing in position and applying a priming coat of approved steel primer using structural steel etc. as required				
75a	10.25.2	in gratings, frames, guard bar, ladder, railings, brackets, gates and similar works	6,913	Kg	145.66	10,06,947.58
76	10.26	Providing and fixing hand rail of approved size by welding etc. to steel ladder railing, balcony railing, staircase railing and similar works, including applying priming coat of approved steel primer				
76a	10.26.1	M.S. tube	102	Kg	160.87	16,408.74
76b	10.26.3	G.I. pipes	114	Kg	184.46	21,028.44
77	10.29	Providing & fixing fly proof wire gauze to windows, clerestory windows & doors with M.S. Flat 15x3 mm and nuts & bolts complete				
77a	10.29.1	Galvanised M.S. Wire gauze with 0.63 mm dia wire and 1.4 mm aperture on both sides	120	Sqm	749.51	89,941.20
78	11.20	Chequerred precast cement concrete tiles 22 mm thick in footpath & courtyard, jointed with neat cement slurry mixed with pigment to match the shade of tiles, including rubbing and cleaning etc. complete, on 20 mm thick bed of cement mortar 1:4 (1 cement: 4 coarse sand)				
78a	11.20.1	Light shade pigment using white cement	600	Sqm	1,262.20	7,57,320.00

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
79	11.21	Providing and fixing 10 mm thick acid and/or alkali resistant tiles of approved make and colour using acid and/or alkali resisting mortar bedding, and joints filled with acid and/or alkali resisting cement as per IS : 4457, complete as per the direction of Engineer-in- Charge				
79a	11.21.1	In flooring on a bed of 10 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand)				
79aa	11.21.1.1	Acid and alkali resistant tile	120	Sqm	1,551.28	1,86,153.60
79b	11.21.2	In dado/skirting on 12 mm thick mortar 1:4 (1 acid proof cement : 4 coarse sand)				
79ba	11.21.2.1	Acid and alkali resistant tile	90	Sqm	1,676.42	1,50,877.80
80	11.27	Kota stone slabs 20 mm thick in risers of steps, skirting, dado and pillars laid on 12 mm (average) thick cement mortar 1:3 (1 cement: 3 coarse sand) and jointed with grey cement slurry mixed with pigment to match the shade of the slabs, including rubbing and polishing complete.	600	Sqm	2,086.75	12,52,050.00
81	11.38	Providing and laying Ceramic glazed floor tiles of size 300x300 mm (thickness to be specified by the manufacturer), of 1st quality conforming to IS : 15622, of approved make, in all colours, shades, except White, Ivory, Grey, Fume Red Brown, laid on 20 mm thick bed of cement mortar 1:4 (1 Cement : 4 Coarse sand), jointing with grey cement slurry @ 3.3 kg/ sq.m including pointing the joints with white cement and matching pigments etc., complete	35	Sqm	1,133.22	39,662.70

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
82	11.41	Providing and laying vitrified floor tiles in different sizes (thickness to be specified by the manufacturer) with water absorption less than 0.08% and conforming to IS: 15622, of approved make, in all colours and shades, laid on 20mm thick cement mortar 1:4 (1 cement : 4 coarse sand), jointing with grey cement slurry @ 3.3 kg/ sqm including grouting the joints with white cement and matching pigments etc., complete				
82a	11.41.2	Size of Tile 600x600 mm	411	Sqm	1,450.14	5,96,007.54
83	11.55	Providing and laying flamed finish Granite stone flooring in required design and patterns, in linear as well as curvilinear portions of the building all complete as per the architectural drawings with 18 mm thick stone slab over 20 mm (average) thick base of cement mortar 1:4 (1 cement : 4 coarse sand) laid and jointed with cement slurry and pointing with white cement slurry admixed with pigment of matching shade including rubbing, curing and polishing etc. all complete as specified and as directed by the Engineer-in-Charge :				
83a	11.55.1	Flamed finish granite stone slab Jet Black, Cherry Red, Elite Brown, Cat Eye or equivalent.	100	Sqm	2,651.13	2,65,113.00
84	13.1	12 mm cement plaster of mix				
84a	13.1.2	1:6 (1 cement: 6 fine sand)	1,800	Sqm	288.67	5,19,606.00

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
85	13.2	15 mm cement plaster on the rough side of single or half brick wall of mix				
85a	13.2.2	1:6 (1 cement: 6 fine sand)	420	Sqm	331.97	1,39,427.40
86	13.16	6 mm cement plaster of mix				
86a	13.16.1	1:3 (1 cement : 3 fine sand)	360	Sqm	259.03	93,250.80
87	13.42	Distempering with 1st quality acrylic distemper (ready mixed) having VOC content less than 50 gms/litre, of approved manufacturer, of required shade and colour complete, as per manufacturer's specification.				
87a	13.42.1	Two or more coats on new work	780	Sqm	94.94	74,053.20
88	13.45	Finishing walls with textured exterior paint of required shade.				
88a	13.45.1	New work (Two or more coats applied @ 3.28 ltr/10 sqm) over and including priming coat of exterior primer applied @ 2.20kg/10 sqm.	420	Sqm	250.79	1,05,331.80
89	13.47	Finishing walls with Premium Acrylic Smooth exterior paint with Silicone additives of required shade.				
89a	13.47.1	New work (Two or more coats applied @ 1.43 ltr/10 sqm over and including priming coat of exterior primer applied @ 2.20 kg/10 sqm).	600	Sqm	166.19	99,714.00

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
90	13.48	Finishing with Deluxe Multi surface paint system for interiors and exteriors using Primer as per manufacturers specifications:				
90a	13.48.2	Painting wood work with Deluxe Multi Surface Paint of required shade. Two or more coat applied @ 0.90 ltr/10 sqm over an under coat of primer applied @0.75 ltr/10 sqm of approved brand and manufacture.	24	Sqm	148.33	3,559.92
90b	13.48.3	Painting Steel work with Deluxe Multi Surface Paint to give an even shade. Two or more coat applied @ 0.90 ltr/ 10 sqm over an under coat of primer applied @ 0.80 ltr/ 10 sqm of approved brand and manufacture.	30	Sqm	143.36	4,300.80
91	13.50	Applying priming coat:				
91a	13.50.1	With ready mixed pink or Grey primer of approved brand and manufacture on wood work (hard and soft wood).	54	Sqm	62.90	3,396.60
92	13.60	Wall painting with acrylic emulsion paint of approved brand and manufacture to give an even shade.				
92a	13.60.1	Two or more coats on new work	1,170	Sqm	141.11	1,65,098.70
93	13.61	Painting with synthetic enamel paint of approved brand and manufacture to give an even shade.				

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
93a	13.61.1	Two or more coats on new work.	111	Sqm	134.56	14,936.16
94	13.80	Providing and applying white cement based putty of average thickness 1 mm, of approved brand and manufacturer, over the plastered wall surface to prepare the surface even and smooth complete.	2,580	Sqm	126.78	3,27,092.40
95	16.54	Providing and laying Dense Graded Bituminous Macadam using crushed stone aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site by tippers, laying with paver finisher equipped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers as per specifications to achieve the desired compaction and density, complete as per specifications and directions of Engineer-in-Charge				
95a	16.54.1	50 to 100 mm average compacted thickness with bitumen of grade VG-30 @ 5% (percentage by weight of total mix) and lime filler @ 2% (percentage by weight of Aggregate) prepared in Batch Type Hot Mix Plant of 100-120 TPH capacity.	195	Cum	10,250.05	19,98,759.75
96	16.57	Providing and laying Bituminous concrete using crushed stone aggregates of specified grading, premixed with bituminous binder and filler, transporting the hot mix to work site by tippers, laying with paver finisher equipped with electronic sensor to the required grade, level and alignment and rolling with smooth wheeled, vibratory and tandem rollers to				

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		achieve the desired compaction and density as per specification, complete and as per directions of Engineer-in-Charge.				
96a	16.57.1	40/50 mm compacted thickness with bitumen of grade VG-30 @ 5.5% (percentage by weight of total mix) and lime filler @ 3% (percentage by weight of Aggregate) prepared in Batch Type Hot Mix Plant of 100-120 TPH capacity.	103	Cum	11,127.77	11,46,160.31
97	16.69	Providing and laying at or near ground level factory made kerb stone of M-25 grade cement concrete in position to the required line, level and curvature, jointed with cement mortar 1:3 (1 cement: 3 coarse sand), including making joints with or without grooves (thickness of joints except at sharp curve shall not to more than 5mm), including making drainage opening wherever required complete etc. as per direction of Engineer-in-charge (length of finished kerb edging shall be measured for payment). (Precast C.C. kerb stone shall be approved by Engineer-in-charge).	161	Cum	8,817.20	14,19,569.20
98	16.75	Providing and laying C.C. pavement of mix M-25 with ready mixed concrete from batching plant. The ready mixed concrete shall be laid and finished with screed board vibrator , vacuum dewatering process and finally finished by floating, brooming with wire brush etc. complete as per specifications and directions of Engineer-incharge. (The panel	5,848	Cum	8,473.26	4,95,51,624.48

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		shuttering work shall be paid for separately). (Note:- Cement content considered in this item is @ 330 kg/cum. Excess/less cement used as per design mix is payable/ recoverable separately).				
99	16.78	Construction of granular sub-base by providing close graded Material conforming to specifications, mixing in a mechanical mix plant at OMC, carriage of mixed material by tippers to work site, for all leads & lifts, spreading in uniform layers of specified thickness with motor grader on prepared surface and compacting with vibratory power roller to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge.				
99a	16.78.2	With material conforming to Grade-II (size range 53 mm to 0.075 mm) having CBR Value-25	6,279	Cum	2,841.28	1,78,40,397.12
100	16.79	Providing, laying, spreading and compacting graded stone aggregate (size range 53 mm to 0.075 mm) to wet mix macadam (WMM) specification including premixing the material with water at OMC in for all leads & lifts, laying in uniform layers with mechanical paver finisher in sub- base / base course on well prepared surface and compacting with vibratory roller of 8 to 10 tonne capacity to achieve the desired density, complete as per specifications and directions of Engineer-in-Charge.	4,868	Cum	2,869.94	1,39,70,867.92

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
101	16.80	Construction of dry lean cement concrete sub base over a prepared sub-grade with coarse and fine aggregate conforming to IS:383, the size of coarse aggregate not exceeding 25 mm, aggregate cement ratio not to exceed 15:1, aggregate gradation after blending to be as per specifications, cement content not to be less than 150 Kg/cum, optimum moisture content to be determined during trial length construction, concrete strength not to be less than 10 Mpa at 7 days, mixed in a batching plant, transported to site, for all leads & lifts, laid with a mechanical paver, compacting with 8-10 tonne vibratory roller, finishing and curing etc. complete as per direction of Engineer in- charge.	5,043	Cum	4,228.21	2,13,22,863.03
102	16.90	Providing and laying tactile tile (for vision impaired persons as per standards) of size 300x300x9.8mm having with water absorption less than 0.5% and conforming to IS:15622 of approved make in all colours and shades in for outdoor floors such as footpath, court yard, multi modals location etc., laid on 20mm thick base of cement mortar 1:4 (1 cement : 4 coarse sand) in all shapes & patterns including grouting the joints with white cement mixed with matching pigments etc. complete as per direction of Engineer-in-Charge.	1,000	Sqm	1,759.64	17,59,640.00

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
103	16.91	Providing and laying factory made chamfered edge Cement Concrete paver blocks in footpath, parks, lawns, drive ways or light traffic parking etc, of required strength, thickness & size/ shape, made by table vibratory method using PU mould, laid in required colour & pattern over 50mm thick compacted bed of sand, compacting and proper embedding/laying of inter locking paver blocks into the sand bedding layer through vibratory compaction by using plate vibrator, filling the joints with sand and cutting of paver blocks as per required size and pattern, finishing and sweeping extra sand. complete all as per direction of Engineer-in-Charge.				
103a	16.91.1	60mm thick cement concrete paver block of M-35 grade with approved colour, design & pattern.	100	Sqm	954.39	95,439.00
103b	16.91.2	80 mm thick C.C. paver block of M-30 grade with approved color design and pattern.	3,570	Sqm	1,035.11	36,95,342.70
104	19.1	Providing, laying and jointing glazed stoneware pipes class SP-1 with stiff mixture of cement mortar in the proportion of 1:1 (1 cement : 1 fine sand) including testing of joints etc. complete :				
104a	19.1.2	150 mm diameter	100	RMT	605.38	60,538.00
105	19.6	Providing and laying non-pressure NP2 class (light duty) R.C.C. pipes with collars jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete :				

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
105a	19.6.5	450 mm dia. R.C.C. pipe	100	RMT	1,516.58	1,51,658.00
105b	19.6.7	600 mm dia. R.C.C. pipe	100	RMT	2,147.71	2,14,771.00
106	19.36	Providing and laying Non Pressure NP-4 class (Heavy duty) R.C.C. pipes including collars/spigot jointed with stiff mixture of cement mortar in the proportion of 1:2 (1 cement : 2 fine sand) including testing of joints etc. complete.				
106a	19.36.5	1200 mm dia RCC pipes. (Laying by manual/mechanical means)	10	RMT	10,104.64	1,01,046.40
107	21.1	Providing and fixing aluminium work for doors, windows, ventilators and partitions with extruded built up standard tubular sections/ appropriate Z sections and other sections of approved make conforming to IS: 733 and IS: 1285, fixing with dash fasteners of required dia and size, including necessary filling up the gaps at junctions, i.e. at top, bottom and sides with required EPDM rubber/ neoprene gasket etc. Aluminium sections shall be smooth, rust free, straight, mitred and jointed mechanically wherever required including cleat angle, Aluminium snap beading for glazing / panelling, C.P. brass / stainless steel screws, all complete as per architectural drawings and the directions of Engineer-in-charge. (Glazing, panelling and dash fasteners to be paid for separately)				
107a	21.1.1	For fixed portion				

SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						
S. No.	**DSR-2021 Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
107aa	21.1.1.1	Anodised aluminium (anodised transparent or dyed to required shade according to IS: 1868, Minimum anodic coating of grade AC 15).	360	Kg	444.21	1,59,915.60
107b	21.1.2	For shutters of doors, windows & ventilators including providing and fixing hinges/ pivots and making provision for fixing of fittings wherever required including the cost of EPDM rubber / neoprene gasket required (Fittings shall be paid for separately).				
107ba	21.1.2.1	Anodised aluminium (anodised transparent or dyed to required shade according to IS: 1868, Minimum anodic coating of grade AC 15).	240	Kg	544.37	1,30,648.80
108		Items included in Delhi Schedule of Rate-(Horticulture & Landscaping) 2020.		LS		10,00,000.00
109	NS-13	Earthwork in filling with contractor's own earth of approved quality from borrow areas including all lead all lead, lift, ascent, descent, royalty, taxes, cess, compensation, crossing of nallahs /stream and other obstructions including mechanical compaction in layers with watering to 95% of MDD (as per IS 2720 part 8), handling, re-handling, dressing to the final profile with all labour, material, tools, plant, machinery and equipment, taxes, cess etc. as a complete job in accordance with the specification and drawings. Note:- This item will be used for earthwork in filling for other than railway embankment work.	1,43,601	Cum	259.50	3,72,64,459.50
Estimated value of SUB SCHEDULE 'B12': Road and Building Works (DSR Based & NS items)						**16,60,31,563.15**

6.13 **Sub-Schedule 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)**

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
110	022100	Providing, fabricating and installing permanent casing pipe for bored piles for all diameters with specified thickness of steel plate including all labour, materials, pumping and bailing out water wherever required, complete as per technical specifications as directed by Engineer in charge. This will include the weight of plate only and no cognizance will be given for the fittings, i.e. rivets and welding etc.	194	MT	93,323.45	1,81,04,749.30
111	023030	Supplying, Fabrication, assembly, erection & placing in position the cutting edge of well curb with structural steel including MS sheet/Plates of specified thickness for pier/abutment complete as per approved plans and as per direction of Engineering In charge including all operations like cutting, bending, straightening, drilling holes, bolting, riveting, welding, threading, jointing of steel sections including outer and inner places liners and skin plates, stiffeners, hooks, bottle nuts, bond rods etc. as per design including all ascent, descents, leads, lifts, handing, re-handling, all other obstructions whatsoever, diverting channels, pumping / bailing out of water wherever required including cost of steel such as flats, sheets, angles,	18	MT	1,01,005.73	18,18,103.14

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		steel bars etc. with all labour and material as a complete job.				
112	031090	Design, manufacturing, supplying and fixing in position elastomeric bearing true to line and level conforming to IS:3400, IS:226, BS-5400 under prestressed concrete girders/ Steel Girders, for Precast as well as cast-in-situ girders as per approved drawing. The rate shall include cost of load test of one no. bearing from Railway approved firms and all fixing materials, equipments, machineries, labour, taxes, loading, unloading, leading, lifting etc. complete. Rates include getting the drawing approved from Railway and cost of inspection during manufacturing from railway approved organization. Note : 1. The rate is for finished item complete and paid only after fixing in position below the girder.	4,42,368	Cu.Cm.	1.68	7,43,178.24

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
113	041060	Providing and fixing railing used in rows for footpath or anti-crash barrier railing with B class G.I. pipe 65/50 mm nominal dia including cost of M.S. angle and channels in vertical posts, welding / bolting, priming painting with one coat ready mix Zinc Chromate conforming to IS:104 with DFT of 25-30Microns, followed by one coat of Zinc Chrome red oxide conforming to IS:2074 with DFT of 25 Microns with all material, labour, T&P as a complete job.	9,933	Kg	107.58	10,68,592.14
114	041080	Providing and fixing various size HTS holding down bolts conforming to IS:1364 in concrete column or in other structures with proper nuts, bolts, washers/plates, grouting of holes with all material, labour, T&P as a complete job. Note: Cement used in grouting will be paid separately under relevant item.	2,000	Kg	165.20	3,30,400.00

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
115	041180	Design, supply and fixing 300MT capacity Spherical Bearing in position true to line and level consisting of set of concave and convex mating steel backing plate with a low friction sliding interface, flat sliding elements ,guides and restraining rings; with all components conforming to approved drawing and technical specifications & Bridge Code including grouting of holes for anchor bolts and underside of baseplate with approved non-shrink epoxy grout with all material, labour, T&P as a complete job. Note: Sliding surface with PTFE or UHMWPE low friction thermoplastic material and steel for backing plate of Mild steel in accordance to IS:2062 grade-B. Cast steel in accordance with IS 1030 Grade 280-520W. Stain less steel in accordance with AISI 304/316.Low friction thermo -plastic sliding PTFE material either pure polytetrafluroethalyne (PTFE) Or Ultra High Molecular weight Polythylene (UHMWPE). Austanitic steel is of stainless steel for the sliding interface shall be in accordance with AISI 316L or O2 Cr17 NI12 of IS-6911. The thickness of the stain less steel sheet shall be 3mm minimum. The stainless steel sheet shall be attached to its backing plate either by screwing/riveting or by continuous fillet weld. Hard chromium plated surface shall be entire curved surface of the convex steel plate mating with hard chromium plated				

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		concave sliding surface. The thickness of the hard chromium plating shall be at least 100 microns and the final surface roughness of the plated surface shall not exceed 3 microns. Bearing manufacturer shall give the guarantee for satisfactory performance of bearing for period specified.				
115a	041181	Spherical Fixed Bearing	26	Each	1,19,070.94	30,95,844.44
115b	041182	Spherical Free Float Bearing	26	Each	1,30,006.81	33,80,177.06
115c	041183	Spherical Slide Guide (L) Bearing	26	Each	1,30,488.44	33,92,699.44
115d	041184	Spherical Slide Guide (T) Bearing	26	Each	1,30,233.46	33,86,069.96

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
116	041390	Supplying fabricating and erecting welded and/or bolted and/or riveted steel work in built up sections, trusses and framed work, staging, racks etc. for Steel Structures other than bridge girders, using RSJ, tees, angles and channels/flats, plates, gussets, round or square bars, cleats, bolts etc., with contractors own steel including cutting, bending, straightening, drilling, riveting, hoisting, fixing, erecting, welding, bolting etc., with Providing stiffeners wherever required as per approved drawing including applying a priming coat of a approved steel primer with all contractor's materials, labour, tools & plants, lead & lift including crossing of tracks if required etc., complete as per specification and as directed by Engineer-in-charge.	85	MT	1,05,186.17	89,40,824.45
117	191260	Supplying & fixing MS chequered plates 6 to 8mm thick between guard rails on unballasted deck bridge for gang pathway, overlapping at regular intervals of 2m to 2.5m with rail screws or bolts duly drilling holes in chequered plate, as directed. [Note: Overlapping of chequered plates shall not fall in between sleepers]	5	MT	94,164.70	4,70,823.50
118	NS-14	Construction of Mild Steel pipe of 323.9 mm outer diameter in the embankment at approximately 500m interval (except in station yards) for crossing utilities in future as shown in drawings.	500	RMT	3,909.00	19,54,500.00

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
119	NS-15	Supplying, fabrication and fixing pathway on Open Web Girder bridges & Composite with hollow steel, rolled and chequred plate including welding / bolting, priming painting with one coat ready mix Zinc Chromate conforming to IS:104 with DFT of 25-30Microns, followed by one coat of Zinc Chrome red oxide conforming to IS:2074 with DFT of 25 Microns with all material, labour, T&P as a complete job as RDSO drawing No. CBS 0045 & CBS 0046.	293	MT	1,17,302.05	3,43,69,500.65
120	NS-16	Supplying and fixing M.S. Angles 100mmx 100mm x 10mm size conforming to IS:2062 in expansion joint of Composite girder bridges including provision of 10mm dia dowel bar & 12mm dia anchor bolts at 150 mm centre to centre and 250mm wide GI plate over the top of angles as per relevant RDSO standard drawing with all material, labour, T&P as a complete job.	88	Each	6,139.09	5,40,239.92

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
121	NS-17	Supplying, fabricating, transportation and fixing galvanized H-Beam sleepers as per RDSO drawing RDSO/B/1636/4/R & RDSO/B/1636/5 with latest alteration and specifications thereto complete with all fittings and fixtures including the cost of all steel sections, all fittings and fixtures ,elastomeric pad, galvanized bolts, nuts, washer, split pin, fish plates 1m and 0.6m long along with fish bolts and nuts for 60Kg running rail and 52Kg guard rail respectively, track fittings and fastenings (Zero Toe Load Fastening) for 60 kg running rail and 52 Kg guard rail as per RDSO drg -RDSO/T-8759 to RDSO/T8765. labour, lead, lift, plants and equipments including galvanized work of full steel components complete in all respects as per approved drawing and technical specifications & as per direction of Engineer on Open Web Girder (OWG) bridges. The rate is also inclusive of the cost of supply of approved quality of epoxy/adhesive and fixing of elastomeric pads with different components of steel sleepers & girder in accordance with approved drawings. The steel to be supplied by the contractor for fabrication of steel H-Beam sleepers shall conform to IS-2062-2006, Grade B0 only. The rate is also inclusive of inspection charges of components of sleepers including all fixtures & fastening, galvanization etc. from the reputed laboratory/organization. Elastomeric pad plate and other track fittings shall be procured from RDSO	135	Each	30,640.06	41,36,408.10

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		approved source. *The rate also includes supply of 10% of spare fittings as per Annexure F-8, Section VII-2:Employer's Requirements: Functional.* Note: Payment under this item shall be made in following manner; i. 75% of the rate shall be paid after fabrication, galvanization and transportation of H beam sleepers to the site and submission of material test certificate of manufacturer and inspection certificate of the agency nominated by Engineer. ii.15% of the rate shall be paid after supply of fittings to the site and submission of inspection certificate of the agency nominated by Engineer. iii. 10% of the rate will be paid after fixing H Beam sleepers to the girder in satisfactory manner. iv. In case fixing is not required, then balance payment will be released on handing over of the sleepers after making recovery @ Rs.850/- per sleeper.				

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
122	NS-18	Providing and fixing stainless steel (Grade 304) railing made of Hollow tubes, channels, plates etc., including welding, grinding, buffing, polishing and making curvature (wherever required) and fitting the same with necessary stainless steel nuts and bolts complete, i/c fixing the railing with necessary accessories & stainless steel dash fasteners , stainless steel bolts etc., of required size, on the top of the floor or the side of waist slab with suitable arrangement as per approval of Engineer-in-charge, (for payment purpose only weight of stainless steel members shall be considered excluding fixing accessories such as nuts, bolts, fasteners etc.).	4,144	Kg	651.22	26,98,655.68
123	NS-19	Supply, fabrication and erection of bed plate of approved sizes(as per relevant RDSO drawing No. RDSO/B-11751/4R2, B-11753/5R1, B-11754/3R2 with UpToDate corrections), in exact position over bed block on pier/abutments by giving full and even bearing, setting them on the layer of free flow non-shrinkable grouting compound, scrapping or chipping of bed block, if required, fabrication and fixing of HD bolts of suitable sizes along with nuts, washers etc., drilling holes of required size, grouting of holes by epoxy mortar after fixing HD bolts with all labour, material, T & P as a complete job.				
123a	NS-19A	More than 12.2m and upto 18.3m clear span	8,800	Kg	225.63	19,85,544.00

SUB SCHEDULE 'B13': Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						
S. No.	**USSOR/ NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
124	NS-20	Supply and fixing of Metallic Guided Bearing in position true to line and level as per RDSO drawing No. RDSO/B-11754/3R2 and IRC:83 pt. III-2018 including supply & grouting of anchor bolts with approved non-shrinking epoxy grout with all material, labour, T&P as a complete job.	32	Each	49,532.72	15,85,047.04
Estimated value of SUB SCHEDULE 'B13' Bridge Bearing & Miscellaneous Structural Steel Works (USSOR Based & NS items)						**9,20,01,357.06**

6.14 Sub-Schedule 'B14': P Way Works-Ballastless Track, Rails & Special Sleepers (NS items)

SUB SCHEDULE 'B14': P Way Works- Ballastless Track, Rails & Special Sleepers (NS items)						
S. No.	**NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
125	NS-21	Construction of ballast less track on straight, curved track on bridges including linking of track with 60 Kg rails in LWR including, supply and fixing of rail fittings/ fastening, Construction of derailment guard , as per design approved by the Engineer. The item include supply and leading of all material, labour and tools & plants as a complete job including welding of track in LWR, destressing, drainage arrangement as per the approved drawing complete in all respect. Nothing extra shall be paid. Note:- 1- 60 Kg, 350 R Rails shall be paid under item no NS-25 of this Sub-Schedule	1,072	Rmt	52,879.28	5,66,86,588.16
126	NS-22	Construction of Transition system of ballastless track to ballasted track on bridge approach including linking of track with 60 Kg rails in LWR including, supply and fixing of rail fittings/ fastening, Construction of derailment guard , as per design approved by the Engineer. The item include supply and leading of all material, labour and tools & plants as a complete job including welding of track in LWR, destressing, drainage arrangement as	8	Each	11,42,190.26	91,37,522.08

SUB SCHEDULE 'B14': P Way Works- Ballastless Track, Rails & Special Sleepers (NS items)						
S. No.	**NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
		per the approved drawing complete in all respect. Nothing extra shall be paid. Note:- 1- 60 Kg, 350 R Rails shall be paid under item no NS-25 of this Sub-Schedule				
127	NS-23	Linking of track on H- beam sleepers on Open Web Girder (OWG) bridges with 60 Kg running rail and 52 kg guard rail with track fittings/fastenings including leading of Running and guard rails from bridge approach and fixing of running rails & guard rails, bending of guard rails, notching, drilling of holes, cutting of rails etc., as directed and making track structure fit for sectional speed. Note- 1. 60Kg, 350R Rails for running rails and 52 Kg class 'IU' rails for guard rals shall be paid under item No. NS-25 & NS -26 respectively.	82	RTM	1,425.98	1,16,930.36
128	NS-24	Supplying at site of work including leading, loading, unloading and stacking of special PSC wider base sleepers for bridge approaches with provision of guard rails as per RDSO Drawing No. T-8673 to T-8680 for 60 Kg Rail.	2	Set	49,622.71	99,245.42

SUB SCHEDULE 'B14': P Way Works- Ballastless Track, Rails & Special Sleepers (NS items)						
S. No.	**NS Item No.**	**Description of Item**	**Quantity**	**Unit**	**Estimated Rate (INR)**	**Estimated Amount (INR)**
129	NS-25	Supplying, Transporting of Rail 60 kg Class 'A' ,R350 rail of 13/26 meter length as per IRS: T-12/2009 Specifications with latest amendments issued by RDSO.	2912	Rmt	7,396.29	2,15,37,996.48
130	NS-26	Supplying, Transporting of Rail 52 kg Class 'IU' as per IRS: T-12/2009 Specifications with latest amendments issued by RDSO.	164	Rmt	5,177.40	8,49,093.60
Estimated Value of SUB SCHEDULE 'B14' P Way Works- Ballastless Track, Rails & Special Sleepers (NS items)						**8,84,27,376.10**
					Total Estimated Amount of Schedule 'B'	**226,37,35,219.07**

Total Estimated Amount of Schedule 'B': INR: 226,37,35,219.07

7. Schedule 'C': General Electrical Services/R1

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
1	**CONDUITS, WIRING, PLUGS, FAN AND DISTRIBUTION BOARDS**				
1.1	Point Wiring By 3x2.5 sqmm Copper Cable (With Modular Switches & Socket) in Conduits.	Nos	636	448.27	2,85,099.22
1.2	Supply of Material and Erection of 3x2.5 Sqmm Copper Cable in Conduits.	m	4183	93.20	3,89,872.38
1.3	Supply of Material and Erection of 3x6 Sqmm Copper Cable in Conduits.	m	673	141.86	95,473.18
1.4	Supply and Installation of 6A Modular Switch Socket.	Nos	481	254.38	1,22,357.89
1.5	Supply and Installation of 16A Modular Power Switch Socket.	Nos	129	281.42	36,302.93
1.6	Supply and Installation of 02 Module Plate GI Box.	Nos	86	109.37	9,406.00
1.7	Supply and Installation of 04 Module Plate GI Box.	Nos	242	151.15	36,579.44
1.8	Supply and Installation of 08 Module Plate GI Box.	Nos	99	260.53	25,792.15
1.9	Supply and Installation of 12 Module Plate GI Box.	Nos	12	280.19	3,362.27

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
1.10	Supply, Installation, Testing and Commissioning (SITC) of 1200 mm Sweep Ceiling Fan with Fan Regulator.	Nos	181	2775.38	5,02,344.14
1.11	Supply, Installation, Testing and Commissioning (SITC) of 300 mm Sweep Exhaust Fan.	Nos	29	1606.70	46,594.44
1.12	Supply, Installation, Testing and Commissioning of Double Door, MCB TPN, 440V, 8 Module Distribution Boards (DB).	Nos	17	19614.74	3,33,450.61
1.13	Supply, Installation, Testing and Commissioning of Double Door, MCB SP, 12 Way Distribution Board (DB).	Nos	15	9319.16	1,39,787.33
1.14	Supply, Installation, Testing and Commissioning of 440V, 3-phase Change Over Distribution Board.	Nos	2	25884.66	51,769.31
1.15	Supply, Installation, Testing and Commissioning of MCCB 200A, 440V, 3-phase (4 Pole, 36 KA).	Nos	4	20784.60	83,138.42
1.16	Supply, Installation, Testing and Commissioning of Double Door, 63A, 240V, MCB SP 8 Way Distribution Board.	Nos	19	4659.58	88,531.97
1.17	Supply and Installation of Junction Box Size 390(H)x305(B)x170(D) mm.	Nos	10	3024.90	30,248.98

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
1.18	Supply, Installation, Testing and Commissioning of Control and Distribution Panel for Colour Light Signalling (CLS) for 10/ 25/ 50 kVA AT supply.	Nos	3	94442.82	2,83,328.45
1.19	Supply and Installation of Metal Clad Plug Socket 20A, 240V, Single Phase with 32A MCB.	Nos	40	1098.64	43,945.46
1.20	Supply and Installation of Metal Clad Plug Socket 16A, 240V, Single Phase with 20A MCB.	Nos	4	878.91	3,515.64
1.21	Supply, installation, testing and commissioning of 32 mm dia GI Conduit.	m	80	188.02	15,041.45
1.22	Supply, installation, testing and commissioning of 25 mm dia GI Conduit.	m	600	146.89	88,133.51
1.23	Design and Drawing of conduits, wiring, panels, distribution board, as built drawings, survey, calculation etc. for Item no. 1.1 to 1.22.	LS	LS		54,281.50
2	**LT & HT CABLES AND LAYING**				
2.1	Supply of 2 Core x 10 Sqmm Copper Cable.	m	11645	194.24	22,61,866.58
2.2	Supply of 2 Core x 16 Sqmm Copper Cable.	m	7250	310.78	22,53,126.00

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
2.3	Supply of 2 Core x 35 Sqmm Copper Cable.	m	2400	679.82	16,31,574.00
2.4	Supply of 2 Core x 70 Sqmm Copper Cable.	m	16000	1359.65	2,17,54,320.00
2.5	Supply of 2 Core x 95 Sqmm Copper Cable.	m	3200	1845.23	59,04,744.00
2.6	Supply of 4 Core x 120 Sqmm Copper Cable.	m	1800	3884.70	69,92,460.00
2.7	Supply of 4 Core x 240 Sqmm Copper Cable.	m	600	7769.40	46,61,640.00
2.8	Supply, Installation, Testing and Commissioning of LT Heat Shrinkable Straight Through Joint.	Nos	20	2581.41	51,628.20
2.9	Supply of 3 Core x 120 Sqmm 11 kV Copper Cable.	m	600	7320.32	43,92,194.40
2.10	Supply and Installation of End Termination Kit for 3 core, 70 Sqmm to 185 Sqmm, 11 kV Copper Cable.	Nos	24	14797.94	3,55,150.60
2.11	Laying of LT/ HT Cables (All Sizes) In Air/ Pipe/ Cable Tray/ Trench Etc.	m	20210	46.96	9,49,016.05
2.12	Excavation and Refilling of Trench of Size 500 mm Wide and depth up to 1200 mm (as per design) for cables.	m	20210	129.47	26,16,575.36

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
2.13	Excavation and Refilling of Trench of Size 500 mm Wide and depth up to 1200 mm with brick protection (as per design) for cables.	m	2100	329.67	6,92,305.61
2.14	Supply and Laying of HDPE Pipe (90 mm outside dia).	m	8400	143.90	12,08,740.14
2.15	Supply and Laying of HDPE Pipe (90 mm outside dia) at platform along with pit and cover.	m	2400	151.09	3,62,622.04
2.16	Supply and Laying of HDPE Pipe (125 mm outside dia).	m	3200	466.37	14,92,391.69
2.17	Supply and Laying of HDPE Pipe (160 mm outside dia).	m	600	596.96	3,58,174.01
2.18	Supply and Laying of GI Pipe (nominal bore 125 mm).	m	1800	1694.86	30,50,746.55
2.19	Supply and Installation of Cable Route Marker.	Nos	210	2119.38	4,45,069.22
2.20	Drilling of horizontal bore below Railway track or road by pushing method for laying of HDPE/ GI pipe.	m	1610	2754.27	44,34,374.85
2.21	Design and Drawing of cable layout, trench layout, route markers, cable and pipe schedule, as built drawings, survey, calculation etc. for Item no. 2.1 to 2.20.	LS	LS		13,17,374.39
3	**LIGHTING, STREET LIGHT POLE AND HIGH MAST**				

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
3.1	Provision of 22 Watt LED Tube Light with fitting.	Nos	476	733.38	3,49,089.17
3.2	Provision of 40 Watt LED Street Light with Fitting.	Nos	100	5080.26	5,08,026.27
3.3	Provision of 120 Watt LED Street Light with Fitting.	Nos	44	12700.66	5,58,828.90
3.4	Provision of Rechargeable Batten Type 240 Watt Emergency Light.	Nos	8	3179.16	25,433.31
3.5	Provision of Outdoor LED Type Flood Light Luminaries (200 Watt).	Nos	60	33066.46	19,83,987.75
3.6	Supply, installation, testing and commissioning of 11 meter high cast iron decorative street light pole.	Nos	210	30000.00	63,00,000.00
3.7	Supply, Installation, Testing and Commissioning of (OFF Delay) Modular Digital Timers.	Nos	15	6527.92	97,918.75
3.8	Supply, Installation, Testing and Commissioning of 20 Meter High Mast.	Nos	5	355937.16	17,79,685.78
3.9	Design and Drawing of high masts, platform/ street poles, digital timer, foundation, lighting lux calculations, earthing, calculation, survey, as built drawings etc. for Item no. 3.1 to 3.8.	LS	LS		2,32,059.40

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
4	**ELECTRICAL EQUIPMENTS (PUMPS, AIR-CONDITIONERS, UPS, WATER COOLER, ETC.)**				
4.1	Supply of Submersible Pump Set of 7.5 kW.	Nos	4	69291.53	2,77,166.11
4.2	Supply, Installation, Testing and Commissioning of Automatic Control Panel for 7.5 kW, 440V, 3- Phase Submersible Pump.	Nos	3	20031.07	60,093.21
4.3	Installation, Testing and Commissioning of Submersible Pump Set of 7.5 kW.	Nos	3	4505.15	13,515.44
4.4	Supply, installation, testing and commissioning of Mono-Block Pump 1.5 kW, 240V, Complete with All Accessories.	Nos	1	15953.58	15,953.58
4.5	Supply and Installation of G.I. Pipe 50 mm nominal dia Medium Class With Flanges and Sockets.	m	300	529.17	1,58,750.51
4.6	Supply and Installation of G.I. Pipe Fitting Bends, Sockets, Flanges, Delivery Valve, Non-Return Valve.	Set	3	4592.40	13,777.20
4.7	Supply, Installation, Testing, Commissioning of 3 Core, 10 Sqmm Copper Flat Cable.	m	1350	165.90	2,23,967.03
4.8	Supply of Mono Block Pump 3.75 kW.	Nos	3	41574.92	1,24,724.75
4.9	Supply, Installation, Testing and Commissioning of Automatic Control Panel with DOL Starter for 3.75 kW Pump.	Nos	2	12018.64	24,037.28

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
4.10	Installation, Testing and Commissioning of 3.75 kW Mono Block Pump Set.	Nos	2	2703.09	5,406.18
4.11	Supply, Installation, Testing and Commissioning of 32A, 240V, DP MCB.	Nos	12	2123.01	25,476.08
4.12	Supply, Installation, Testing and Commissioning of Heavy Duty 5 Star, 1.5 Ton Split Inverter Type Air Conditioner.	Nos	4	50385.48	2,01,541.91
4.13	Supply, Installation, Testing and Commissioning of Heavy Duty 5 Star, 2 Ton Split Inverter Type Air Conditioner.	Nos	40	67180.64	26,87,225.50
4.14	Supply, Installation, Testing and Commissioning of 2 KVA, 240 Volt, AC, Pure Sine Wave Online UPS cum Inverter.	Nos	4	53940.00	2,15,760.00
4.15	Supply, Installation, Testing and Commissioning of Water Cooler (150 Litre).	Nos	7	78612.49	5,50,287.41
4.16	Supply, Installation, Testing and Commissioning of 5 star rated storage geyser 25 litre capacity.	Nos	4	4763.22	19,052.87
4.17	Design and Drawing of pumps, control panels, AC, water coolers, geyser, UPS, survey, calculation, as built drawings etc. for Item no. 4.1 to 4.16.	LS	LS		92,334.70

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
5	**SUBSTATION 11kV/ 0.44 KV, HT PANEL, LT PANEL, APFC PANEL, DG SET AND EARTHING**				
5.1	Supply, Installation, Testing and Commissioning Of 11kV/0.44kV, 1x250 kVA, Compact Substation (CSS).	Nos	2	1086256.66	21,72,513.32
5.2	Supply, Installation, Testing and Commissioning of Automatic Power Factor Correction Panel (APFC panel) with 150 kVAR shunt capacitors complete in all respects.	Nos	2	226735.74	4,53,471.47
5.3	Supply, Installation, Testing and Commissioning of Indoor Type 400A LT Panel.	Nos	2	210318.23	4,20,636.45
5.4	Supply, Installation, Testing and Commissioning of Indoor Type 160A LT Panel.	Nos	1	126190.94	1,26,190.94
5.5	Supply, Installation, Testing and Commissioning of Indoor Type 160A Essential LT Panel.	Nos	1	132500.48	1,32,500.48
5.6	Supply and Installation of 3 mm Thick Rubber Mat.	Sqm	60	11743.53	7,04,611.50
5.7	Supply, Installation, Testing and Commissioning of 125 kVA Capacity, Radiator Cooled Silent DG Set.	Nos	1	1240029.30	12,40,029.30

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
5.8	Supply, Installation, Testing and Commissioning of Feeder Pillar.	Nos	6	114443.66	6,86,661.93
5.9	Supply, Installation, Testing and Commissioning of Earth Electrode Complete with RCC chamber etc.	Nos	39	3778.11	1,47,346.40
5.10	Supply, Installation, Testing and Commissioning of Earth Electrode buried in ground complete.	Nos	136	3589.21	4,88,132.17
5.11	Supply and Installation of 40x5 mm Copper Strip on Surface or in Recess or in GI Pipe.	m	100	1700.35	1,70,034.98
5.12	Supply and laying of 40x6 mm GI Flat.	m	1080	137.78	1,48,806.27
5.13	Supply and Installation of 5 mm Dia GI Wire.	m	4500	70.13	3,15,562.50
5.14	Supply, installation, testing and commissioning of CO2 Panel Flooding System for length above 6000 mm.	Nos	2	309812.99	6,19,625.99
5.15	Supply, installation, testing and commissioning of CO2 Panel Flooding System for length up to 6000 mm.	Nos	1	259765.55	2,59,765.55
5.16	Design and Drawing of Sub-station, LT panels, APFC panel, DG set, earthing, feeder pillar, fire trace system, as-built drawings, calculations, survey etc. for Item no. 5.1 to 5.15.	LS	LS		1,61,717.79

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
6	**FIRE FIGHTING EQUIPMENTS**				
6.1	Supply and Installation of Safety Items in the Substation.	Set	3	18559.30	55,677.90
6.2	Supply and installation of Set of 04 fire buckets (10 litre) capacity with one GI stand and GI cover.	Set	5	6709.54	33,547.72
6.3	Supply and installation of Portable fire extinguisher Dry Chemical Powder (5 kg).	Nos	33	1263.03	41,680.05
6.4	Supply and installation of Carbon dioxide fire extinguishers, capacity 4.5 kg.	Nos	33	6249.38	2,06,229.38
7	**VIADUCT LIGHTING**				
7.1	Provision of 22 Watt LED with Bulkhead Light Fitting on Viaduct.	Nos	420	3461.19	14,53,699.17
7.2	Laying of 2 Core x 70 Sqmm LT Cable in Viaduct/ Tunnel/ Air Etc.	m	16000	205.93	32,94,856.33
7.3	Laying of 2 Core x 10 Sqmm LT Cable in Viaduct/ Tunnel/ Air Etc.	m	8000	94.24	7,53,931.44
7.4	Supply and Installation of Junction Box Size 250(H)x200(B)x105(D) mm.	Nos	22	2817.98	61,995.61

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
7.5	Design and Drawing of Viaduct lighting, cabling, earthing, calculation, survey, as-built drawings etc. for Item no 7.1 to 7.4.	LS	LS		1,11,289.65
8	**MISCELLANEOUS**				
8.1	Supply, Installation, Testing and Commissioning of 25 Litre Fully Automatic with Auto Cut-Off RO water purification system.	Nos	5	17000.00	85,000.00
8.2	Supply, Installation, Testing and Commissioning of Single Sided LED Signage Board.	Sqm	300	7780.43	23,34,128.65
8.3	Supply, Installation, Testing and Commissioning of Double Sided LED Signage Board.	Sqm	360	9649.85	34,73,946.28
8.4	Dismantling of Rail Pole, Cable Pole, Overhead Line, Cable Tray complete.	Nos	12	693.72	8,324.59
8.5	Supply and Installation of GI Cable Duct 40x60 mm (wxh) Minimum 2 mm Thick.	m	250	105.78	26,445.39
8.6	Supply and Installation of Stainless Steel Wire Mesh 25mm x 25mm (of 5 mm dia wire) Welded on GI Angle.	Kg	500	66.93	33,463.73

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
8.7	Supply, Installation, Testing and Commissioning of GI Perforated Cable Tray of Size 150x50 mm with Thickness 1.6 mm.	m	400	636.63	2,54,650.00
8.8	**Spares**				
8.8.1	Digital Earth Testers	Nos	2	9991.00	19,982.00
8.8.2	Earth Leakage Detector 1000 V	Nos	2	24849.00	49,698.00
8.8.3	Digital Insulation Tester 2.5 kV	Nos	2	8559.00	17,118.00
8.8.4	Digital Insulation Tester 0 – 1000 V	Nos	2	2175.00	4,350.00
8.8.5	Digital Vernier Caliper	Nos	5	12872.00	64,360.00
8.8.6	Portable Diesel Generating set, 3 kVA, 240 V AC	Nos	1	110400.00	1,10,400.00
8.8.7	Digital micrometer	Nos	5	9957.00	49,785.00
8.8.8	Digital Multi-meter	Nos	5	1490.00	7,450.00
8.8.9	Safety Helmet	Nos	10	995.00	9,950.00
8.8.10	Tool Kit Box	Nos	3	6603.00	19,809.00
8.8.11	Portable Grinder Electrically Operated	Nos	2	8463.00	16,926.00

Schedule C: General Electrical Services/R1					
Item No.	**Item Description**	**Unit**	**Quantity**	**Unit Rate (INR)**	**Amount (INR)**
1	**2**	**3**	**4**	**5**	**6**
8.8.12	Portable Electrical Drill	Nos	2	14914.00	29,828.00
8.9	Operation and Maintenance Manuals	LS	LS	98784.70	98,784.70
8.10	Training to Staff	LS	LS	246961.76	2,46,961.76
Total estimated amount of Schedule 'C'					**10,77,20,424.79**

Total Estimated Amount of Schedule 'C': INR: 10,77,20,424.79

Schedule 'D': Signalling & Telecom (S&T) Works

Schedule 'D': Signalling & Telecom (S&T) Works					
S. No.	**Item Description**	**Unit**	**Estimated Rate (INR)**	**Quantity**	**Estimated Amount (INR)**
D1	**Supply of Signalling and Telecom equipment and associated material (S. No. 1 - 12)**				
1	Supply of Relay- AC immune plug in type QNA1, DC neutral line relay, 24 V DC 8F/8B contacts, metal to carbon with plug-in arrangement etc. conforming to BRS: 931A. The interlocking code for this unit shall be "ABDGH or latest.	Nos.	4,360	15	65,400
2	Supply of 16/0.2mm, size tinned flexible single core indoor wire as per IRS:S 76/89 (latest) specification, PVC coated in different colours as per requirement and to be supplied in coils of 100 meters.	Nos.	1,041	50	52,050
3	Supply Fabrication and fixing of cable termination board of size as per Drg. No.NR/S&T/Project/13/2015 duly fitted with Bakelite sheet of size 6 mm thick. This also includes fixing of ARA terminals & fuse bases with Location box inside/outside painting, writing, cable fixing, bunching, numbering as per Indian railway standard.	Nos.	54,930	1	54,930
4	Supply of Disconnect Terminal block for four conductors with screwing cage clamp type/sliding switch disconnect as per RDSO specification. No. RDSO/ SPN/189/2004 Ver. 1.2 (latest) for conductor size upto 2.5 sq. mm for M6 terminals.	Nos	140	200	28,000
5	Supply of ARA terminal block 25 mm centre spacing for small M-6 terminal as per RDSO specifications IRS-S75/2006 (latest).	Nos	98	200	19,600
6	Supply of PVC Insulated Armoured, Unscreened, Underground Railway Signalling cable copper conductor as per specification no. IRS-S-63/2014 (latest) Size 24 Core x 1.5 Sq. mm.	Km	4,98,267	2	9,96,534

Schedule 'D': Signalling & Telecom (S&T) Works					
S. No.	**Item Description**	**Unit**	**Estimated Rate (INR)**	**Quantity**	**Estimated Amount (INR)**
D1	**Supply of Signalling and Telecom equipment and associated material (S. No. 1 - 12)**				
7	Supply of PVC insulated armoured, unscreened, underground railway signalling cable copper conductor as per specification no. IRS: S-63/2014 (latest) size 12 Core x 1.5 sq. mm.	Km	2,22,628	8	17,81,024
8	Supply of PVC insulated armoured, unscreened, underground railway signalling cable copper conductor as per specification no. IRS: S-63/2014 (latest) size 6 Core x 1.5 sq. mm.	Km	1,43,385	2	2,86,770
9	Supply of Power cable as per BIS specification No. IS: 694/2010 (2 x 25 sq. mm, red & black colour).	Km	1,43,038	3	4,29,114
10	Supply of 6 Quad cable. 0.9 mm jelly filled underground, screened, armoured cable as per RDSO specification No IRS TC: 30/2005 (latest) amendment.	Km	2,95,313	11	32,48,443
11	Supply of Armoured Optical Fiber Cable (OFC) (24 Fiber) Mono Mode as per Spec. No. RDSO/SPN/TC/110/2020.	Km	1,01,792	11	11,19,712
12	Supply of permanently lubricated high density polyethylene (PLB-HDPE) duct of 40 mm/ 33 as per RDSO spec. No. RDSO/SPN/TC/45/2013 Rev.2.0, complete with all accessories caps, couplers, bends etc.	Km	77,794	10	7,77,940
				Sub Total of 'D1' (INR)	**88,59,517**

Schedule 'D': Signalling & Telecom (S&T) Works					
S. No.	**Item Description**	**Unit**	**Estimated Rate (INR)**	**Quantity**	**Estimated Amount (INR)**
D2	**Signalling Installation, Testing & Commissioning (S. No. 13 -34)**				
13	Final Location Survey of cable route, Preparation of cable route plan, Track crossing plan, Location Description plan, Cable insulation chart and other outdoor diagram for way side stations. Three sets of above drawings will be submitted for approval & for execution of work to engineer (job complete work).	Nos.	48,245	1	48,245
14	Supply of Location Box /Apparatus Case single as with 'E' type lock, key ward No. 42 and handle as per RDSO drg. No. RD- SO/S-11500 or latest.	Nos.	24,550	6	1,47,300
15	Supply of Location Box /Apparatus Case steel half with with 'E' type lock, key ward No. 42 and handle as per RDSO drg. No. RD- SO/S-11507 or latest.	Nos	19,254	6	1,15,524
16	casting, concreting and curing of foundation and Installation and Erection of single location box /apparatus cases as per RDSO drg. No. NR/S&T/CON/2.7/97. All installation material as cement, sand, aggregate and anchor bolt etc. shall be supplied by the contractor.	Nos.	13,045	6	78,270
17	casting, concreting and curing of foundation and Installation and Erection of half location box /apparatus cases as per RDSO drg. No. NR/S&T/CON/2.8/97. All installation material as cement, sand, aggregate and anchor bolt etc. shall be supplied by the contractor.	Nos.	8,764	6	52,584

Schedule 'D': Signalling & Telecom (S&T) Works					
S. No.	**Item Description**	**Unit**	**Estimated Rate (INR)**	**Quantity**	**Estimated Amount (INR)**
D2	**Signalling Installation, Testing & Commissioning (S. No. 13 -34)**				
18	Fabrication and fixing of phenolic laminated sheet of grade P3, minimum 10 mm thick, in location box /apparatus cases and providing all fixtures like M6/ ARA/Disconnect terminals, fuse blocks, relays etc. on square bars. This includes fixing of PVC coated string rods at the back side for cable support with contractor's own material like iron angle, nuts, bolts etc. The iron angle for fixing shall be minimum 3 mm thick. This includes providing teak wood shelf minimum 25 mm thick for holding track circuit equipments. The work shall be done as per instructions of engineer. (Location Box/Apparatus case single involving wiring of relays).	Nos.	5,961	6	35,766
19	Fabrication and fixing of phenolic laminated sheet of grade P3, minimum 10 mm thick, in location box / apparatus cases and providing all fixtures like M6/ ARA/Disconnect terminals, fuse blocks, relays etc. on square bars. This includes fixing of PVC coated string rods at the back side for cable support with contractor's own material like iron angle, nuts, bolts etc. The iron angle for fixing shall be minimum 3 mm thick. This includes providing teak wood shelf minimum 25 mm thick for holding track circuit equipments. The work shall be done as per instructions of engineer. (Location Box/Apparatus case half).	Nos	3,322	6	19,932
20	Termination of all type of cables at either end on terminal boards providing identification, ferrules, dressing, lacing with thread. This includes testing, meggering and submitting test reports etc. and defect rectification *(*per condutor).	Nos	16	852	13,632

Schedule 'D': Signalling & Telecom (S&T) Works					
S. No.	**Item Description**	**Unit**	**Estimated Rate (INR)**	**Quantity**	**Estimated Amount (INR)**
D2	**Signalling Installation, Testing & Commissioning (S. No. 13 -34)**				
21	Dismantling and Releasing of existing Location boxes/Apparatus cases/Jn boxes including releasing of terminal boards, release, terminals, fittings installed therein complete with fittings. All dismantled material to be transported and stacked in the store of the employer.	Nos	779	12	9,348
22	Excavating and refilling of trench, in Normal Soil to the level of ground with rammed earth as per drg. No. NR/S&T/CON/1.1/97-A so as not to form a drain, 0.3 Mtrs. Wide & 1.0 m. Deep alongside the track.	M	83	10,000	8,30,000
23	Excavating and refilling of trench 0.3 Mtr./ as required Wide & 1.0 m. Deep from bottom of rail flange across the track or 0.5 Mtr. from ground level whichever is more (NR/S&T/CON /1.2/97). Earth should be rammed so as not to form a drain. This includes removal and refilling of ballast & restoration of surface under normal traffic conditions. Lesser depth of the trench is to be paid proportionately.	M	95	200	19,000
24	Supply & installation of Double walled corrugated HDPE Pipe of outer dia 120 mm (other than black in colour) in 6 m straight length with one coupler for every 6 m length conforming to RDSO/SPN/204/2011 or equivalent IS specification wherever required as per approved cable route plan. This includes brick work and other arrangements required to secure the pipe for road crossing/Platform/track crossing and for bridges & culverts etc.	M	546	200	1,09,200

Schedule 'D': Signalling & Telecom (S&T) Works					
S. No.	**Item Description**	**Unit**	**Estimated Rate (INR)**	**Quantity**	**Estimated Amount (INR)**
D2	**Signalling Installation, Testing & Commissioning (S. No. 13 -34)**				
25	Supply and installation of Half split Double wall corrugated pipe of HDPE in 2 or 3 m. length produced out of full round DWC pipes as per RDSP specn. No. RDSO/SPN/204/2011 or equivalent IS specifications. The pipe should have necessary fixing and coupling arrangements. Size 200/ 175 mm inner dia).	M	389	5,000	19,45,000
26	Supply and laying of 2nd class bricks in the trench and laying as per drg. No. NR/S&T/CON/1.1/97-A as per instructions of the Engineer's.	M	8	1,000	8,000
27	Supply & installation of earth electrodes pipe of 3 metre length and 50 mm dia. pointed on lower end by tapering for a length of 150 mm as per drg. No. NR / S&T/ Proj /16.1 /2015 and connecting with signalling gears. This includes casting and plastering of cement concrete enclosures as per drg. No. NR / S&T/ Proj /16.2 /2015.	Nos	3,751	12	45,012
28	Fabrication, supply and fixing of cable marker of 1:3:6 concrete as per No.NR/S&T/CON/1.5/97A. The marker shall be fixed at various places of cable route as per instructions of the Engineer's representative.	Nos	387	100	38,700
29	Laying of signalling/Telecom/power/ other all type of cables etc. of different sizes as per drg. No. NR/S&T/CON/1.1/97-A and testing & meggering of cable before and after laying.	M	8	26,000	2,08,000
30	"Laying of HDPE duct in the trenches, HDD/Manual Boring, RCC ducts, Pipes etc. and supply & pulling of Nylon rope through it as required.	M	10	10,000	1,00,000

Schedule 'D': Signalling & Telecom (S&T) Works					
S. No.	**Item Description**	**Unit**	**Estimated Rate (INR)**	**Quantity**	**Estimated Amount (INR)**
D2	**Signalling Installation, Testing & Commissioning (S. No. 13 -34)**				
31	"Blowing/drawing of OFC cable in the HDPE duct laid in trenches & protective works".	M	14	10,000	1,40,000
32	Supply and installation of optical fiber cable joint enclosure as per RDSO/SPN/TC/68/2014 or equivalent TEC specifications (Make: Reychem or superior) and splicing of OFC cables. This includes fabrication & installation of RCC jointing pit (1 m inner dia x 1 m deep) for OFC joint closure.	Nos.	17,622	10	1,76,220
33	Supply & installation of thermos shrinkable straight through joint suitable for making straight through/deviation joint without transformer in underground 6 quad/jelly filled cables. RDSO specification No. RDSO/SPN/TC/77/2010 (latest amendment) with all accessories.	Nos.	6,421	10	64,210
34	Supply & Installation of 1120:470 Ohms VF isolation transformers rack mounting type as per RDSO Specification IRS/TC/22/76 with latest amendment applicable on the date of opening of the tender. (Select joint type).	Nos.	1,605	10	16,050
				Sub Total of 'D2' (INR)	**42,19,993**
				Total Estimated Amount of Schedule 'D' (D1+D2) INR	**1,30,79,510.00**

Total Estimated Amount of Schedule 'D'- INR 1,30,79,510.00

Tender No. HORC/HRIDC/C-5/2023

Attachment 3

to

Corrigendum No. 1

Part 2, Section VII 2: Employer's Requirements – Functional / R1

Section VII: Employer's Requirements

Section VII-2: Functional */R1*

EMPLOYER'S REQUIREMENTS – FUNCTIONAL

Objective

The objective of the Contract is the design, construction, testing and commissioning of the permanent works by the Contractor (including without limitation, the design, construction and removal of the Temporary Works) and the rectification of defects appearing in Permanent Works in the manner and to the standards and within the time obligations, liabilities and risks which may be involved, the Contractor shall undertake the execution of the Works.

1. GENERAL

1.1 The Works to be executed under Package C-5 is for design and construction of civil works and General Electrical Services work as per Employer's Requirements on 'Design Build' basis. All information available with the Employer has been furnished in Section VII-Tender Drawings and Documents, Part 2, Employer's Requirements. The Works are to be designed by the Contractor. Any other site data and information required for design *and execution* of the Works shall be collected (through tests or otherwise), arranged, produced by the Contractor at his own cost. No claim from the Contractor whatsoever shall be entertained on the ground of certain information not being furnished in the Contract. The design and performance of the Permanent Works shall comply with the specific core requirements contained in these Employer's Requirements – Functional.

1.2 The design of the Permanent Works shall be developed in accordance with these Employer's Requirements – Functional and other requirements of the Contract.

1.3 The Permanent Works shall be designed and constructed to the highest standards available using proven up-to-date good engineering practices. The Specifications shall in no case specify standards which, in the Engineer's opinion, are less than or inferior to those described in the Outline Design Specifications (ODS) - Civil & BLT and Outline Construction Specifications (OCS) -Civil & BLT. Construction shall be carried out employing the procedures established by the Contractor as per approved Quality Assurance and Quality Control plan and Environmental, Social, Health and Safety (ESHS) Plan.

1.4 The Contractor shall be responsible for obtaining all necessary approvals from the relevant Public/Government/Local/Statutory or any agencies in the design and construction of the Works at his own cost.

1.5 Employer's Requirements- Functional shall be read in conjunction with Employer's Requirements- Design, Construction, Outline Design Specifications (ODS)- Civil & BLT, Outline Construction Specifications (OCS) -Civil & BLT, General Electrical Services, S&T *Works* and other requirements of the Contract. The price quoted by the Contractor shall *include* cost of Works as per Part 2-Employer's Requirements (General, Functional, Design- Civil & BLT, Construction - Civil & BLT, Outline Design specifications (ODS) - Civil & BLT, Outline Construction Specifications (OCS) - Civil & BLT, General Electrical Services, *S&T Works*, Tender Drawings and Documents and Appendices).

1.6 Jurisdictional Sketch of Civil works under C-5 package is given in Section VII-8: Tender Drawings and Documents, Part 2, Employer's Requirements.

2. SCOPE OF WORK

2.1 Scope under Lump Sum Price Schedule 'A'

2.1.1 The Lumpsum Scope of Work in brief is given below but the scope also includes all other requirements stipulated in various parts/sections of the Contract Document including Appendices and Annexures. The through Chainages mentioned in the Scope of the Works/Tender drawings can undergo some minor corrections, without any impact on the overall length/Scope of the Works.

2.1.2 Design of the Works

i. Schedule 'A'

a) Design and drawings of all items of the Works under Schedule 'A' shall be carried out by the Contractor and the payment for the same is included in Cost Centre 'CD' of Schedule 'A'.

b) Design and drawings of all the temporary works, temporary road diversion shall also be carried out by the Contractor and the payment for the same is included in Cost Centre 'CD' of Schedule 'A'.

ii. Schedule 'B'

a) Design and drawings of all items of the Works under Schedule 'B' shall be carried out by the Contractor and the payment for the same is included in Cost Centre 'CD' of Schedule 'A'.

b) Design and drawings of all the temporary works, temporary road diversion shall also be carried out by the Contractor and the cost for the same is deemed to be included in the rates quoted for the relevant item of Schedule 'B' unless otherwise specified in the Contract.

iii. Payment matrix

Payment matrix for design of bridges, viaduct, temporary diversions, permanent diversions, widening of existing roads, restoration of existing roads *and diversion of canals / nallah* is given in **Annexure F-7.**

2.1.3 Design and construction of railway formation

2.1.3.1 The Contractor shall design and construct railway formation for 32.5 t axle load as per updated RDSO Specifications "Comprehensive Guidelines and Specifications for Railway Formation-Specification No. RDSO/2020/GE: IRS-0004, (Including ACS No-01 dated 16.12.2021)" from Chainage -855.0 m to Chainage 12000 m and from Chainage 18000 m to Chainage 20942.473 m for double tracks of Main line as per Employer's Requirements and shall include earthwork in cutting/filling, subgrade, prepared subgrade and blanketing including mechanical compaction. The Contractor shall arrange borrow areas for earthwork in embankment at his own cost.

2.1.3.2 Excavated earth (approximately 2.0 lakh cum) from C-4 Package (herein after called the Employer's earth) *which will be* available between Chainage 18,000 m to 20,000 m shall be

utilised *by the Contractor* for construction of formation in C-5 Package. *Measurement of the Employer's earth shall be taken by recording cross-section of the formation after compaction.* A deduction @ INR 225.0 per cum shall be made from the Cost Centre 'CE-Earthwork and Blanketing' for use of Employer's earth. *Royalty, if any, for use of Employer's earth will be reimbursed to the Contractor on submission of proof of royalty payment. However, all other taxes payable, if any, for use of Employer's earth shall be borne by the Contractor.*

2.1.3.3 Formation width in station yards (i.e. from platform end to a distance of 200m beyond outermost SRJs on both up and down sides at both ends of station) shall be increased by 1.0m XXX to lay cables and other utilities.

2.1.3.4 Formation at Chainage 7860 to 8036 (176m), Chainage 8036 to 8298 (262m) & Chainage 9650 to 9890 (240m) passes through pond/waterlogged stretches. In all such stretches, before undertaking earthwork in formation, minimum 500 mm thick layer of coarse sand (Zone I, II & III as per IS:383) shall be provided at bottom of embankment after dewatering by providing suitable arrangement like bunding etc. and removing slush/mud. Depression/ditch shall be filled with earth up to a distance beyond toe equal to H (height of embarkment) or ROW, whichever is less. A toe wall of boulder filled in crates shall be provided at the end of earth filling as shown in Tender drawings.

2.1.4 Design and construction of slope protection work

The slope of embankment/cuttings shall be protected by vegetative cover comprising perennial turf forming grass in accordance with Section VII- 6 Outline Construction Specifications (OCS)-Civil & BLT. On embankments higher than 4 m, vegetative cover shall be provided using coir netting as per IS:15869, IS:15872 and IRC: 56.

After Taking Over the Works, the Contractor shall maintain slopes of embankment/cutting and vegetative cover for a period of one (01) year and shall make good any loss/damage to formation and vegetative cover due to rain cuts, pedestrian movement or any other reason.

2.1.5 Design and construction of drainage system on embankments by providing precast RCC drains on berms, chute drains & sumps

The Contractor shall design and construct precast RCC longitudinal drains on berms of embankments to collect surface runoff from the slope. Precast RCC chute drains shall be provided at approximately every 50 m for collecting water from drains on berms and discharging it safely away from toe of embankments as shown in the Tender drawings. RCC collecting chambers shall be provided at the junction of longitudinal berm drains and chutes.

After Taking Over the Works, the Contractor shall maintain drainage system on embankments including sump, drain on berms, chutes etc. for a period of one (01) year and shall make good any damage to the drainage system due to rain cuts, pedestrian movement or any other reason.

2.1.6 Design and construction of Viaduct with Ballastless track

The Contractor shall design and construct viaduct *with Ballastless Track (BLT) with derailment guards and Long Welded Rails (LWR)* for *UP and DN line* from Chainage 20942.473 m to Chainage 24843.548 m, including *supply of rails, track fittings/fastenings system and welding complete in all respects. P*rotection works on viaduct approaches at A1 *shall be provided* as

per Employer's Requirements. *The* Contractor shall carry out RSI analysis *for providing LWR on viaduct.*

Superstructure of proposed viaduct shall consist of *composite girders of RDSO* standard span *length* of 24.4m*, 30.5m and 45.7m* with *minimum* 1.0 m wide pathway *on outside of UP & DN line tracks as shown in Tender drawings.*

Substructure of proposed viaduct shall *be provided with deep* foundation at locations shown in Tender drawings. Open foundation may be permitted, *only at locations* shown in Tender Drawings, subject to availability of sufficient bearing capacity as per GT investigations duly approved by the Engineer.

Design and construction of abutment A2 is not in the scope of C-5 Package. However, the Contractor shall make design data available to C-4 contractor for design and construction of abutment A2.

The work also includes supply of spare track fittings/fastenings and maintenance of Ballastless track for a period of three years after start of traffic as per Employer's Requirements - Outline Design Specifications (ODS) – Civil & BLT.

C-5 Contractor shall provide holding down bolts with washers, nuts, locknuts and template on viaduct piers, for each line, at the locations given by the SYS-1 Contractor. The design and specification of (a) holding down bolts i.e length, dia, thread part, material composition, washers, nuts, locknuts, galvanisation etc. and (b) template i.e length, breadth, thickness, hole location, material composition, galvanisation etc. shall be given by SYS-1 Contractor to C-5 Contractor. C-5 Contractor shall arrange the material and install the same on viaduct piers for OHE mast/portals in coordination with SYS-1 Contractor.

C-5 Contractor shall provide anchor bolts for OHE guy rod arrangement on the viaduct deck slab at the locations supplied by the SYS-1 Contractor. SYS-1 Contractor shall provide design details and material composition etc. of GI anchor bolts of guy rod arrangement to C-5 Contractor. C-5 Contractor shall arrange the anchor bolts of guy rod arrangement and install the same on viaduct deck slab for OHE in coordination with SYS-1 Contractor.

2.1.7 Design and Construction of *Transition from* Ballastless Track *to Ballasted Track* on *A-1 Approach of Viaduct*

The Contractor shall design and construct *transition from* ballastless track to *ballasted track on A-1 approach of* including *supply of rails, track fittings/fastenings system, welding into LWR* complete in all respect on abutment A1 side approach.

The Chainage of 20.842 Km for the design and construction of Ballastless track given in the Name of Work is only an indicative chainage. The actual chainage will be based on the design of transition from Ballastless Track to Ballasted Track on A-1 Approach of Viaduct.

2.1.8 Design and construction of minor bridges

The Contractor shall design and construct minor bridges (RUBs, canal and waterway bridges) including protection works on bridge approaches and height gauges at all RUBs as per

Employer's Requirements. List of minor bridges is given in **Annexure-F-1.** Approach road on both sides of RUBs shall be designed *by the Contractor. The Contractor shall construct RCC road* upto ROW of HORC for full clear width of RUB. *Construction of approach road work beyond ROW of HORC shall be paid under Schedule 'B'*. Design and construction of permanent diversion at RUBs shall be carried out by the Contractor, as shown in the Tender drawings or wherever required. In bridges over canals, RCC lining *of canal over soil* shall be designed & constructed by the Contractor upto ROW of HORC. Payment matrix for various items incidental to bridges is given in **Annexure F-7.** Drainage arrangement shall be designed and constructed at RUBs where road level in the RUB is below natural ground level.

2.1.9 Design and construction of major bridges

The Contractor shall design and construct major bridges (RUBs, canal and waterway bridges) including protection works on bridge approaches and height gauges at all RUBs as per Employer's Requirements. List of major bridges is given in **Annexure- F-2/1**. Approach road on both sides of RUBs shall be designed *by the Contractor.* In case of RUB major bridges with RCC box, t*he Contractor shall construct RCC road* upto ROW of HORC for full clear width of RUB. *Construction of approach road work beyond ROW of HORC shall be paid under Schedule 'B'*. Design and construction of permanent diversion at RUBs shall be carried out by the Contractor, as shown in the Tender drawings or wherever required. In bridges over canals, RCC lining *of canal over soil* shall be designed & constructed by the Contractor upto ROW of HORC. Payment matrix for various items incidental to bridges is given in **Annexure F-7.** Drainage arrangement shall be designed and constructed at RUBs where road level in the RUB is below natural ground level.

LWR shall be provided on major bridges. The Contractor shall carry out RSI analysis of major *b*ridges *wherever required* to cater to the effect of providing LWRs in design of bridges.

C-5 Contractor shall provide holding down bolts with washers, nuts, locknuts and template on piers of major bridge (having multiple spans with overall span length of more than 25m), for each line, at the locations given by the SYS-1 Contractor. The design and specification of (a) holding down bolts i.e length, dia, thread part, material composition, washers, nuts, locknuts, galvanisation etc. and (b) template i.e length, breadth, thickness, hole location, material composition, galvanisation etc. shall be given by SYS-1 Contractor to C-5 Contractor. C-5 Contractor shall arrange the material and install the same on major bridge piers for OHE mast/portals in coordination with SYS-1 Contractor. The above items shall also be provided on piers of major bridge (having multiple spans with overall span length of more than 25m) included in Schedule "B". Payment of these items is deemed to be included in Schedule 'A' under Cost Center 'CB.2'.

2.1.10 Design and construction of stations

The Contractor shall design and construct three new stations namely Prithla, Silani & IMT Sohna.

i. Prithla station

This is a crossing station with four tracks, two end platforms, a double storey station building, RCC portico etc as shown in Tender drawings.

ii. Silani Station

This is a halt station having only two tracks, two end platforms, *t*icket *b*ooking *o*ffice building, RCC portico etc as shown in Tender drawings.

iii. IMT Sohna

This is a crossing station with four tracks, two end platforms, a double storey station building, RCC portico, *S&T hut on both ends of station yard*, etc as shown in Tender drawings.

The items of works to be carried out at various stations are shown in **Annexure F-3.** Two subways shall be constructed at Prithla, Silani & IMT Sohna stations each as shown in Tender drawings. The list of subways is shown in **Annexure F-5.** The *W*orks at stations shall be carried out in accordance with Tender drawings, Outline Design specifications (ODS) – Civil & BLT, Outline Construction Specifications (OCS) - Civil & BLT and other requirements of the Contract.

2.1.11 ***Design of formation from chainage (-) 2296 m to (-) 855 m***

Design of formation from chainage (-) 2296 m to (-) 855 m as per Sub-Clause 2.1.3.1 of Section VII-2, Employers Requirement – Functional.

2.1.12 Design and application of water proofing system

Design and application of water proofing system in subway at three stations i.e, Prithla, Silani and IMT Sohna as per the Employer's Requirements.

2.1.13 Design and construction of MS pipe in embankment

Design and construction of Mild Steel pipe of *minimum* 323.9 mm outer diameter in the embankment at approximately 500m interval (except in station yards) for crossing utilities in future as shown in Tender drawings.

2.1.14 Design of Auto Location Hut (ALH):

Design of *4* Nos. Auto Location Huts along the alignment between km 0 to km 25.0 as per Tender drawings**.** Floor level of the Auto Location Hut shall be at least 300 mm above the formation level. Construction of Auto Location Huts shall be paid under Schedule 'B'.

2.1.15 Design of approach road *at stations*

Design of concrete *station* approach road at Prithla, Silani and IMT Sohna stations including retaining/RE wall, footpath, ramp drain etc as shown in Tender drawings. Construction of road, retaining/RE wall, footpath, ramp, drain etc shall be paid under schedule 'B'.

2.1.16 Design of prefabricated/precast cable duct

Design of prefabricated/precast cable duct of 300mm x 300mm internal size, with RCC cover, for laying of S&T cables in station yards buried under formation. The top of duct cover shall be minimum 690 mm below the formation level. The duct shall be designed with chamber of size 1200mmX1200mmX1500mm depth with a lid and locking arrangement at suitable interval, not more than 500m along the duct and at each track crossing location. Construction

of precast duct and chamber shall be paid under schedule 'B'. *Cable route plan for ducts shall be provided by SYS-2 Contractor.*

2.1.17 Design of precast/cast in situ RCC longitudinal drains

Design of precast/cast in situ RCC longitudinal drain of required capacity with suitable slope and outfall at *locations* where HORC embankment overlaps with DFC embankment to safely cater the surface runoff from the slopes of HORC embankment and DFC embankment. Construction of precast/cast in situ RCC drain shall be paid under Schedule 'B'. *The outfall of drains shall be at the nearest bridges on HORC alignment.*

2.1.18 Design of precast and cast in-situ retaining walls

Design of precast and cast in-situ retaining walls for retaining formation slope along the alignment *between New Prithla and Prithla stations* at locations given in **Annexure F-4**. Construction of these retaining walls shall be paid under Schedule 'B'.

2.1.19 Design of bridges *including* protection works included in Schedule ' B'

Design of bridges including protection works as mentioned in **Annexure F-6.** In major bridge Nos. 17, 28, 45 & 68 superstructure shall also be designed for *BLT with* LWR. In case, the Employer/Engineer decides to adopt *design of* standard RDSO span, the design of superstructure of above bridges shall not be done by the Contractor and shall be deleted from the scope of the work. Construction of these bridges shall be paid under Schedule 'B'.

2.1.20 Design of minor works at stations not included in Schedule 'A'

Design of minor works at stations like circulating area, land scaping etc. shall also be carried out by the Contractor. Construction of above-mentioned items shall be paid under Schedule 'B'.

2.1.21 Design of Staircase in Viaduct

Design *and drawing* of Staircase in viaduct at interval of 500 m in staggered manner on Up and Down tracks to evacuate the passengers in case of emergency. Construction of stair case shall be paid under Schedule 'B'.

2.1.22 Traffic management

Traffic management along the work site including construction works required in connection with traffic management like road works, footpaths, drains and other services etc. and repair and maintenance of these construction works during construction period. Any road widening / diversion along with associated drainage system required to facilitate the movement of traffic and their repair & maintenance shall also be carried out by the Contractor. It also includes reinstatement of land/structure/roads/services etc. to original condition wherever road diversion has been made outside original road including reconstruction of structure demolished for traffic management. Materials and other specification related to traffic control devices shall conform to IRC standards.

2.1.23 Barricading

The Contractor shall provide and maintain during progress of works barricading around the work area where vehicular or pedestrian traffic passes with all safety measures as shown in Tender drawings. The excavations near habitations/public movement areas and all works along the roads shall be provided with proper caution signs and marked with red lights, reflectors at night to avoid accidents near public places to ensure safety of public.

2.1.24 Reinstatement/Restoration of roads and services

Reinstatement/Restoration of roads and services *within and outside of ROW* with new material of similar specification as per codal requirement after completion of work for the area disturbed by the Contractor during construction activities. However, reinstatement of roads and its drainage system will be as per current standards being used by the roads/service owning agency for similar roads. Proper survey to be done before dismantling of any of the above services along with extensive photographs, videos & sample of these services by the Contractor & get it verified by the Engineer so as to ascertain the extent of these existing services and its specification.

2.1.25 There is possibility of some of the items not getting mentioned in the above list of works. Tenderers are requested to go through the Tender drawings also in details as the works listed in Clause 2.1 above as well as indicated in the Tender drawings would be considered inclusive in the scope of work under lump sum quoted price except the items mentioned in Sub-Clause 2.2, 2.3 and 2.4 below unless specified otherwise in the Contract. Engineer's decision shall be final in this regard in case of dispute.

2.1.26 The work content against the lump sum component of the work i.e. Schedule 'A' shall also include, but not be limited to, the following:

a) Site Clearance *as per Sub-Clause 10.14 of Appendix 10, Section VII-9: Appendices, Part 2-Employer's Requirements* or as directed by the Engineer;

b) True and proper setting out and layout of the Works, benchmarks and provision of all necessary labour, instruments and appliances in connection therewith as specified or as directed by the Engineer;

c) All aspects of quality assurance including testing of materials as per the approved Inspection and Test Plan and other components of the work as specified or as directed by the Engineer;

d) Day to day cleaning of worksite throughout the execution period;

e) Maintenance of the completed Works during the period as specified or as directed by the Engineer;

f) Submission of completion (i.e., 'As-Built') drawings 06 (Six) sets in A-1 size and all other related documents as specified including scanned (in .pdf) and AutoCAD copy with soft copies in both formats of all As-built drawings & documents.

g) Preparing Definitive Design, Construction Reference drawings, Good For Construction (GFC) drawings and working drawings for various components of the *W*orks and obtaining approval in respect thereof from the Engineer, inclusive of

incorporation of all modifications, alterations, changes, etc. that may be required to be carried out as directed by the Engineer;

h) Compliance of requirements of Environmental, Social, Health and Safety (ESHS) Manual as per Appendix 13 of Employer's Requirements, Section VII-9: Appendices.

i) Results of sub-surface investigations conducted at project site are enclosed with the Tender documents. This information about the soil and sub-soil water conditions is being made available to the Contractor in good faith and the Contractor shall have to obtain the details of sub-soil parameters independently. There are certain locations where weak sub-soil exist. Tentative location of weak subsoil stretches for formation has been given in ODS. Contractor shall be required to take necessary action for ground improvement. No claim whatsoever on account of any discrepancy/variation about the soil parameters and sub soil water conditions that may be actually encountered at the time of execution of the work and those given in these Tender Documents shall be *payable* to the Contractor under any circumstances.

2.1.27 Other Works under Lump Sum

The Interface Management Document as per Appendix- 5 of Employer's Requirements shall also be complied with**.**

2.1.28 Safety of adjoining structures of DFC

Alignment is passing adjacent to DFC Tracks. The Contractor shall ensure that the design and construction of the Works *shall* be carried out with adequate measures for the safety & protection of DFC or any other nearby structures. Construction activities shall be planned without affecting the operations of the existing system. It shall be ensured that no damage is caused to any element/person/ property of these systems. The Engineer/ Employer shall be indemnified against any damage caused to such structures at no extra cost.

2.1.29 Associated Works

Works to be performed shall also include all general works, preparatory works for the construction and works of any kind necessary for the design and satisfactory construction, completion and maintenance of the *W*orks to the intent and meaning of the drawings adopted and Outline Construction Specifications (OCS) - Civil & BLT , to best Engineering standards and orders that may be issued by the Engineer from time to time, compliance with all Conditions of Contract, supply of all materials, apparatus, plants, equipment, tools, fuel, water, strutting, timbering, transport, offices, stores, workshop, staff, labour and the provision of proper and sufficient protective works, diversion, temporary fencing, lighting and watching required for the safety of the public and protection of works on adjoining land; first-aid equipment, sanitary accommodation for the staff and workmen, effecting and maintenance of all insurances, the payment of all wages, salaries, fees, royalties, duties or the other charges arising out of the execution of works and the regular clearance of rubbish, clearing up, leaving the site perfect and tidy on completion.

2.1.30 Land for Contractor's Facilities & Site Office

For batching plants, field quality control laboratories, site offices and other activities (excluding labour camps), land total measuring approx. 20,000 Sq. m will be made available at multiple locations between km 0 to km 12.00 and km 18.00 to km 24.84 by the Employer on 'as is where is basis' free of cost. This land shall be made good for such offsite activities as needed by the Contractor at no extra cost to the Employer. Any land required beyond the above area will have to be arranged by the Contractor at his own cost. The land shall be cleared from debris, all structures made by the Contractor including RCC footings and rafts etc. and reinstated to the line, level and to the same conditions as existed before the work started before handing over back to the Employer within 91 days after Taking over Certificate. The final bill shall be released to the Contractor after all structures from the Contractor facility and site office are removed & *cleared* of site. The cost of setting up of all the above-mentioned facilities & the office and reinstatement of site is included in lump sum price in Schedule 'A'.

2.1.31 *Design of Permanent Diversion of Canal*

Design of permanent diversion of canal/drain/nallah *at bridges included in Annexure F-1, F-2 and F-6 as shown in Tender drawings. Construction of permanent diversion of canal shall be paid in Schedule 'B'.*

2.2 Scope under BOQ Schedule 'B'

Under this Schedule, the Contractor is required to carry out works which are not covered in Schedule 'A'. Broadly following works shall be carried out under this Schedule 'B':

a) Construction of railway formation from Chainage (-) 2296 m to Chainage (-) 855 m for connecting single track *between* Prithla Station and New Prithla Station (DFC)

b) Construction of cast in-situ retaining walls along the embankment at locations as given in **Annexure F-4** *as shown intender drawings. There shall be retaining wall at DFC New Prithla yard between HORC track and DFC Prithla SSP. The cross feeder gantry at SSP location shall be suitably modified by SYS-1 Contractor. There is space constraint at DFC Prithla SSP and retaining wall shall have to accommodate cross feeder gantry structure OHE foundation. C-5 Contractor shall coordinate with SYS-1 Contractor and shall provide the integrated retaining wall housing the cross feeder gantry structure OHE foundation as per the approved drawings given by the SYS-1 Contractor.*

c) Construction of bridges including slope protection on bridge approaches and height gauge *drawings* mentioned in **Annexure F-6** *as shown intender drawings*.

d) Construction of Ballastless *T*rack *(BLT)* on major bridges *(OWG)* Nos. 17, 28, 45 & *68* including supplying & fixing rails and fittings complete in all respect. *This shall also include* transition from ballastless track to ballasted track on approaches & derailment guard.

e) Construction of stairs in viaduct at interval of 500 m in staggered manner.

f) Construction of permanent diversion of canal/drain/nallah at bridges included in Annexure F-1, F-2 and F-6 as shown in Tender drawings

g) *Earthwork in excavation and c*onstruction of precast S&T cable ducts of 300mmX300mm internal dimensions with RCC cover and chambers in station yards *as shown in Tender drawings*. The top of duct cover shall be minimum 690 mm below the formation level. The Chamber shall be 1200 mmx 1200 mm x1500 mm (depth) size, with a lid & locking arrangement, shall be provided at suitable interval not more than 500m along the duct and at each track crossing location. The design of cable ducts is included in Schedule 'A'. *Cable route plan for ducts shall be provided by SYS-2 Contractor.*

h) Construction of *station* approach road including RE wall/Retaining wall, foot path, ramp, drain etc at Prithla, IMT Sohna and Silani Stations.

i) Construction of circulating area at Prithla, IMT Sohna and Silani Stations.

j) Construction of precast/cast in-situ RCC longitudinal drain of required capacity with outfall arrangement where HORC embankment overlaps with DFC/KMP embankment to safely cater the surface runoff from the slopes of HORC embankment and DFC/KMP embankment.

k) Earth filling in station area near the circulating area to improve drainage etc.

l) Construction of 4 Nos. Auto location Huts (ALH) at approximate chainage 4350 m, 7950 m, 10950 m & 24843 m.

m) Any other item as directed by the Engineer related to the work.

2.3 Scope under Schedule 'C' (General Electrical Services works)

Under this Schedule, the Contractor is required to carry out General Electrical Services works. Detailed Scope of Works is given in Section VII-7A: General Electrical Services, Part 2- Employer's Requirements.

2.4 Scope under Schedule 'D' (Signalling and Telecommunication works)

Under this Schedule, the Contractor is required to carry out Signalling & Telecommunication (S&T) works. Detailed Scope of the Works is given in Section VII-7B: Signalling & Telecommunication (S&T) Works, Part 2- Employer's Requirements.

2.5 REFERENCE TO THE STANDARD CODES OF PRACTICE

2.5.1 All Standards, Outline Construction Specifications (OCS) - Civil & BLT, Technical Specifications and Codes of Practice referred to shall be latest editions including all applicable official amendments and revisions. The Contractor shall make available at site all relevant Standard Codes of practice, *viz* IRS, IS, IRC, UIC, *etc* as applicable.

2.5.2 Wherever Indian Standards do not cover some particular aspects of design/ construction, relevant International Standards will be referred to. The Contractor shall make available at site such standard codes of practice.

2.5.3 In case of discrepancy among Standard codes of practice and Section VII-6: Outline Construction Specifications (OCS) -Civil & BLT, the order of precedence shall be as given below:

a. Outline Design Specifications (ODS) - Civil & BLT

b. Outline Construction Specifications (OCS) - Civil & BLT.

c. Standard Codes of Practice. In case of discrepancy among Standard Codes of Practice, the order of precedence will be

   i. IRS,

   ii. IS,

   iii. IRC,

   iv. other International codes

d. Indian Railway Unified Standard Specifications,

e. CPWD specifications,

f. NBC 2016,

g. MORTH Specification for Road & Bridges

2.6 DIMENSIONS

As regards errors, omissions and discrepancies in Specifications and *Tender d*rawings, relevant clause of Particular Specification will apply. The levels, measurements and other information concerning the existing *S*ite as shown on the conceptual / layout drawings are believed to be correct, but the Contractor shall verify them for himself and examine the nature of the ground as no claim or allowance whatsoever shall be entertained on account of any errors or omissions in the levels or strata turning out different from what is shown on *Tender* drawings.

2.7 INSPECTION

The Employer may appoint an independent agency to ensure the quality checking of design, supply, fabrication, erection and construction of all works under scope of work. Payment to the independent agency shall be made by the Employer separately. The Contractor shall ensure complete co-operation with the agency to perform their work satisfactorily. In addition, the Employer also reserves right to undertake quality check and inspection directly by itself.

2.8 ALIGNMENT OF TRACKS

2.8.1 The alignment *of tracks* shall be as shown in the Tender drawings. The alignment has been developed by the Employer to meet operational and technical criteria. The Contractor is not required to evaluate the alignment for compliance with these criteria but shall review it with respect to his own design and construction proposals and shall satisfy himself that it suites to the available land width and there is no conflict with the clearances at proposed structures.

2.8.2 The Contractor is permitted to propose minor deviations in alignment to suit his construction proposals, but he must demonstrate that any such deviations shall comply with good design

practice and the alignment requirement of the *d*esign *c*riteria. Such deviations shall require prior approval of the Employer subject to following conditions:

i. There is no extra cost to the *E*mployer.

ii. Changes proposed are essentially required to suit the *C*ontractor's specific design.

iii. There is no change at the *C*ontract boundaries or if there is any, the same is agreed by the Contractor of the adjoining section without any extra cost to the *E*mployer**.**

2.8.3 The ground levels shown in Conceptual Alignment Plan & L-Section Tender drawings are based on preliminary survey. Detailed survey *shall* be carried out by the Contractor for confirming and preparation of final Alignment Plan & L-Section. *No claim by the Contractor* shall be *entertained on account of* any variation in the ground levels with respect to ground levels shown in conceptual Alignment Plan & L-Section *T*ender drawings.

2.9 DURABILITY AND MAINTENANCE

The *p*ermanent Works shall be designed and constructed such that, if maintained reasonably, they shall endure in a serviceable condition throughout their minimum *life* as described in Section VII-5: Outline Design Specifications (ODS) – Civil & BLT. The *p*ermanent Works shall be designed and constructed so as to minimise the cost of maintenance whilst not compromising the performance characteristics and ride quality of the railway.

2.10 OPERATIONAL REQUIREMENTS

a) The vertical and horizontal alignments for the main and connectivity line shall comply with the conditions laid in para 2.8 above.

b) During construction the Contractor shall be responsible for providing and maintaining adequate flood protection to ensure protection of the *W*orks.

2.11 ENVIRONMENTAL CONSIDERATIONS

All provisions and conditions contained in the Environmental, Social, Health and Safety (ESHS) Manual as per Appendix 13 shall be strictly complied with *by the Contractor*.

2.12 TRAFFIC MANAGEMENT

The Contractor shall carry out the Works so as to minimise disruption to road and pedestrian traffic. The Contractor shall prepare his traffic management plan based on his proposed construction methodology in co-ordination with the Engineer and in conjunction with the concerned road authority as per Appendix 10. He shall comply strictly with the approved plan during construction of his works.

2.13 CRS INSPECTION

The Contractor shall note that the Commissioner for Railway Safety (CRS) will inspect the Works from time to time for the purpose of determining whether the HORC Project complies with the terms of operational and infrastructural safety in accordance with the Laws of India. The Contractor shall note that CRS approval is mandatory for commissioning the system. Notwithstanding other provisions of the Contract, the Contractor shall ensure that the Works comply with the requirements of CRS in terms of construction to the drawings and shall make all necessary arrangements and assist the representatives of the Employer and CRS in carrying out their inspection duties and also comply with their instructions regarding rectifying any defects and making good any deficiencies. *The* Contractor shall prepare and make available all drawings, documents, sketches, photographs etc. as required for submission of application for inspection of CRS as instructed by the Engineer.

2.14 STANDARDS

Equipment, materials and systems shall be designed, manufactured and tested in accordance with the latest issue of National and/or International codes and standards. The Contractor shall submit hard copies in original to the Engineer of all codes and standards used for the work.

Reference to standards or to materials and equipment of a particular manufacturer shall be regarded as followed by the words "or equivalent". The Contractor may propose alternative standard materials, or equipment that shall be equal to or better than those specified. If the Contractor for any reason proposes alternatives to or deviations from the specified standards, or desires to use materials or equipment not covered by the specified standards, the Contractor shall apply for the consent of the Engineer. The Contractor shall state the exact nature of the change, the reason for making the change and relevant specifications of the materials and equipment in English language. The decision of the Engineer in the matter of quality *shall* be final.

ANNEXURE-F-1

(Ref. Sub-Clause 2.1.8)

LIST OF MINOR BRIDGES**

S. No.	Br. No.	*Chainage (m)	Type of Crossing	Type of Bridge	SPAN	No. of Tracks
					No. x L (in m) x H (in m)	
1.	6	-574.471	Balancing Culvert	RCC Box	1x2.0x2.0	2
2.	7	-252.537	RUB	RCC Box	1x4.6x5.65	4
3.	9	139.953	RUB	RCC Box	1X4.6X4.15	4
4.	10	371.033	Canal + RUB	RCC Box	1X5.2X5.0+ 1X4.7X5.0	4
5.	11	958.395	RUB	RCC Box	1X4.6X4.15	2
6.	13	2034.964	RUB	RCC Box	1X4.6X4.15	2
7.	14	2493.015	RUB+ Drain	RCC Box	2X5.2X4.15	2
8.	15	3153.203	Balancing Culvert	RCC Box	1X2.0X2.0	2
9.	18	4373.615	RUB	RCC Box	1X9.75X6.7	2
10.	19	4858.791	RUB	RCC Box	1X4.6X4.15	2
11.	20	4891.994	Balancing Culvert	RCC Box	1X2.0X2.0	2
12.	21	5340.100	RUB	RCC Box	1X4.6X4.15	2
13.	22	5807.675	RUB	RCC BOX	1X4.6X4.15	2
14.	23	6409.986	Balancing Culvert	RCC BOX	1X3.0X3.0	2
15.	24	6881.539	RUB	RCC Box	1X4.6X4.15	2
16.	25	7548.546	RUB	RCC BOX	1X4.6X4.5	2

S. No.	Br. No.	*Chainage (m)	Type of Crossing	Type of Bridge	SPAN	No. of Tracks
					No. x L (in m) x H (in m)	
17.	27	7941.374	Balancing Culvert	RCC BOX	1X2.0X2.0	2
18.	29	8141.419	Balancing Culvert	RCC BOX	1X2.0X2.0	2
19.	31	8593.734	Balancing Culvert	RCC BOX	1X4.0X3.0	2
20.	32	8891.591	Balancing Culvert	RCC BOX	1X4.0X3.7	2
21.	33	9293.620	RUB	RCC BOX	1X7.0X4.15	2
22.	35	9591.677	Balancing Culvert	RCC BOX	1X2.0X2.0	2
23.	38	10090.792	Balancing Culvert	RCC BOX	1X3.0X3.0	2
24.	40	10410.702	RUB	RCC BOX	1X8.4X5.15	2
25.	42	10907.894	Balancing Culvert	RCC BOX	1X2.0X2.0	2
26.	43	11203.249	RUB	RCC BOX	1X4.6X5.65	2
27.	44	11403.443	Balancing Culvert	RCC BOX	1X2.0X2.0	2
28.	64	18558.000	RUB	RCC Box	2X6.0X4.0	2
29.	65	18735.000	Balancing Culvert	RCC Box	1X2.0X2.0	4
30.	67	19435.000	Canal	RCC Box	2x7.5x7.5	4

Notes:

1. *Chainages start from Prithla station of HORC.
2. **Payment of bridges in Annexure F-1 will be made in Cost Centre 'CB'-Bridges under lumpsum Schedule 'A'.
3. There can be minor change in span arrangement to suit site conditions. Nothing extra shall be payable to the Contractor on this account.
4. Deep foundation shall be provided at *bridge Nos. 38, 40, 44, 64 & 67* as shown in *T*ender drawings. Type of foundation at other locations shall be decided as per design requirements.

ANNEXURE-F-2
(Ref. Sub-Clause 2.1.8)

ANNEXURE-F-2/1

LIST OF MAJOR BRIDGES**

A. Bridges other than Viaduct

S. No.	Bridge No.	*Chainage (m)	Type of Crossing	Type of Bridge Super structure	Span Arrangement	No. of Tracks
1.	5	-592.612	ROAD	RCC Box	1x12x6.10	2
2.	12	1696.624	RUB	PSC U SLAB	1x12.2	2
3.	16	3472.548	RUB	RCC Box	1x12.0x6.10	2
4.	26	7753.296	RUB	RCC Box	1x12.0x6.10	2
5.	34	9536.901	IOCL Pipeline	Composite Girder	1X24.4	2
6.	41	10709.675	RUB	RCC BOX	1X12.0X5.65	2
7.	69	20400.000	Sub-station	Composite Girder + PSC U slab	1x12.2+2x18.3+1x12.2	2

Note:

1. *Chainages start from centre line of Prithla station of HORC.
2. **Payment of bridges in Annexure F-2/1 will be made in Cost Centre 'CB'-Bridges under lumpsum Schedule 'A'.
3. There can be minor change in span arrangement to suit site conditions. Nothing extra shall be payable to the Contractor on this account.
4. Deep foundation shall be provided at locations shown in Tender drawings. Type of foundation at other locations shall be decided as per design requirements.

ANNEXURE-F-2/2

(Ref. Sub-Clause 2.1.6)

B. Viaduct**

S. No.	Bridge No	*Chainage (m)	Type of Crossing	Type of Bridge Superstructure	Span Arrangement	No. of Tracks
1.	70	20942.473 to 24843.548	Viaduct	Composite Girder	107x24.4+1x30.5+41x24.4+1x29.5+1x12.2 (UP Line) & 107x24.4+1x30.5+41x24.4+1x46.1+1x12.2 (DN Line)	2

Note:

1. *Chainages start from centre line of Prithla station of HORC.
2. **Payment of Viaduct in Annexure F-2/2 will be made in Cost Centre 'CV- Viaduct under lumpsum Schedule 'A'.
3. There can be minor change in span arrangement to suit site conditions. Nothing extra shall be payable to the Contractor on this account.
4. Deep foundation shall be provided at locations shown in Tender drawings. Type of foundation at other locations shall be decided as per design requirements.

ANNEXURE-F-3

(Ref. Sub-Clause 2.1.10)

List of items of works to be carried out at stations under Schedule 'A'

S. No	Item	Prithla	Silani	IMT Sohna
1	**Station Building**			
	a) Station Building.	1 No.	Ticket Booking Office	1 No.
	b) S & T huts.	-.	-	*2 Nos.*
2	***High Level* Platforms -**			
	a) Earthwork in filling above formation level,	2 Nos. *each* 600m *long* *(as shown in Tender drawings)*	02 No. *each* 425m *long* *(as shown in Tender drawings)*	2 Nos. *each* 600m *long* *(as shown in Tender drawings)*
	b) *C*ast in-situ RCC platform face wall.	*2 Nos. each 600m long* *(as shown in Tender drawings)*	*02 No. each 425m long* *(as shown in Tender drawings)*	*2 Nos. each 600m long* *(as shown in Tender drawings)*
	c) Surfacing of platform with VDC, RCC precast coping, tactile tiles, precast fencing at end platforms.	For entire area of platform.	For entire area of platform.	For entire area of platform.
	d) PF Shelters	2 x 20m on each PF	2 x 20m on each PF	2 x 20m on each PF
	e) Mini PF Shelters	4 Nos. on each PF	4 Nos. on each PF	4 Nos. on each PF
	f) Passenger amenities-			
	i) Toilet blocks.	01 No. on each PF	01 No. on each PF	01 No. on each PF
	ii) Drinking water booths at platforms.	5 Nos. on each PF	5 Nos. on each PF	5 Nos. on each PF

S. No	Item	Prithla	Silani	IMT Sohna
	iii) Seating arrangement (Stainless steel).	48 Nos. seats on each PF	24 Nos. seats on each PF	48 Nos. seats on each PF
	g) Two HDPE pipes on platforms for laying Electrical and S&T cables.	*All Stations*		
3	a) Subway for inter-platform transfer *including* covered stairs & ramps to platforms *covered with self supported roof,* flooring, dado, wall cladding, water proofing, drainage, complete in all respects.	2 Nos.	2 Nos.	2 Nos.
	b) Lift Well & space for escalator	-	-	2 Nos.
4	**Water supply system-**			
	a) *Tube well with minimum 15000 litres/hr yield*, pump house and *overhead gantry*.	Yes	Yes	Yes
	b) Underground RCC water storage tank. (litres)	50,000	50,000	50,000
	c) Overhead RCC water storage tank. (litres)	20,000	20,000	20,000

S. No	Item	Prithla	Silani	IMT Sohna
	d) Water supply distribution system complete from borewell to *station* building and platforms.	Yes	Yes	Yes
5	**Drainage & Sewerage system-**			
	i) Platform drainage.	Yes	Yes	Yes
	ii) Station Yard drainage *as shown in Tender drawings.*	Yes	Yes	Yes
	iii) Sewerage system.	1 No. septic tank for 50 users at each PF; 1 No. septic tank for 100 users for station building.	1 No. septic tank for 50 users at each PF.	1 No. septic tank for 50 users at each PF; 1 No. septic tank for 100 users for station building.
6	**Miscellaneous Work –**			
	a) Station name board at station building and at platform ends.	Yes	Yes	Yes
	b) Platform number boards at each platform.	Yes	Yes	Yes
	c) RCC portico at entrance to subway	Yes	Yes	Yes

Note: The above requirements must be read in conjunction with Employer's Requirement mentioned in Section VII-5: Outline Design Specifications (ODS) Civil & BLT and Section VII-6: Outline Construction Specifications (OCS) Civil & BLT .

Annexure-F-4

[Ref. Sub-Clause 2.2 b)

Approximate Details of Retaining Wall Along Formation *Between New Prithla (DFC) and Prithla Station* Under Schedule 'B'

Connectivity Line (LHS) along the formation				
S. No.	Chainage (m)		Length (m)	Approx. Height (m) Above ground level
	From	To		
1.	-1900	-1840	60	2.50
2.	-1840	-1720	120	6.00
3.	-1720	-1600	120	1.50
4.	-1600	-1480	120	2.00

ANNEXURE-F-5

(Ref. Sub-Clause 2.1.10)

LIST OF SUBWAYS** AT STATIONS

S. No.	Bridge No.	*Chainage (m)	Type of Crossing/Station	Type of Bridge	SPAN	No. of Tracks
					No. x L (in m) x H (in m)	
1	8	-145.0	Pedestrian Subway/ Prithla	RCC Box	1x6x3.15	4
2	8A	55.0	Pedestrian Subway/ Prithla	RCC Box	1x6x3.15	4
3	39	10240.0	Pedestrian Subway/ Silani	RCC Box	1x6x3.15	2
4	39A	10440.0	Pedestrian Subway/ Silani	RCC Box	1x6x3.15	2
5	66	18985.0	Pedestrian Subway/ IMT Sohna	RCC Box	1x10x3.15	4
6	66A	19185.0	Pedestrian Subway/ IMT Sohna	RCC Box	1x10x3.15	4

Note:-

1. *Chainages start from Prithla station of HORC
2. * *Payment of above subways *shall* be made in Cost Centre 'CS'-Stations under lumpsum Schedule 'A'.

ANNEXURE-F-6
(Ref. Sub-Clause 2.2 c)

LIST OF BRIDGES UNDER SCHEDULE 'B'

ANNEXURE-F-6/1

1) LIST OF MINOR BRIDGES

S. No.	Br. No.	*Chainage (m)	Type of Crossing	Type of Bridge	SPAN No. x L (in m) x H (in m)	No. of Tracks
1	1	-1950.000	Drain	RCC pipe	1x1.2	1
2	2	-1832.759	Road + Balancing Culvert	RCC Box	(1x2.50x5.05) + (1x3.6x5.05)	1
3	3	-1312.056	Road	RCC Box	1x4.6x5.65	1
4	36	9882.453	Balancing Culvert	RCC BOX	1X2.0X2.0	2
5	37	9894.460	RUB	RCC BOX	1X5.7X4.15	2

***Note**:*

1. **Chainages start from centre line of Prithla station of HORC.*
2. *Payment for design of bridges in Annexure F-6/1 will be made under Lumpsum Schedule 'A'.*
3. *Payment for construction of bridges in Annexure F-6/1 will be made under BOQ Schedule 'B'.*
4. *There can be modifications in span arrangement to suit site conditions. Payment shall be made as per actual quantities executed.*

ANNEXURE-F-6/2

2) LIST OF MAJOR BRIDGES

S. No.	Bridge No.	*Chainage (m)	Type of Crossing	Type of Bridge	Span Arrangement	No. of Tracks
1.	4	-795.733	Canal + Road	CG + RCC Box	(1x 8 x 7.5) + (1x24.4) + (1x8x7.5)	2
2.	17	4256.298	RUB	OWG	4X30.5	2
3.	28	8036.354	Canal	OWG+CG	1x18.3+2x30.5 +1x18.3	2
4.	30	8298.110	RUB+ Drain	Composite Girder	1X30.5	2
5.	45	11543.518	NH71B RUB	OWG	2X76.2	2
6.	63	18310.000	Drain	PSC U Slab+ RCC Box	1x5x4.9+1x12. 2+1x5x4.9	2
7.	68	20184.000	RUB + Canal	OWG	2 x 61.0	2
8.	53#	14472.112	Stream	CG	2 x 24.4	2

Note:

1. *Chainages start from centre line of Prithla station of HORC.
2. *Payment for design of bridges in Annexure F-6/2 will be made under Lumpsum Schedule 'A'.*
3. Payment for construction of bridges in Annexure F-6/2 will be made under BOQ Schedule 'B'.
4. #*F*abrication, erection *& launching* of composite steel superstructure including bearings of *Br. No. 53 is included in the scope of Contract Package C-5*. Construction of substructure is included in the scope of *C-4 Contract*.
5. There can be *some modifications* in span arrangement to suit site conditions/ *stakeholders requirement*. Payment shall be made as per actual quantities executed.
6. Deep foundation shall be provided at locations shown in Tender drawings. Type of foundation at other locations shall be decided as per design requirements.
7. *Span arrangement of Br. No. 45 is tentative and may change.*

Annexure F-7

[Ref. Sub-Clause 2.1.2, Sub-Clause 2.1.31, Sub-Clause 2.2 (f), Annexures F-1, F-2 and F-6]

Payment matrix for Design of Bridges, Viaduct, Temporary diversions, Permanent diversions, widening of existing roads and Restoration of existing roads for C5 package.

Sr No	Activity	Minor bridges in Annexure F-1 included in Schedule 'A'	Major bridges in Annexure F-2 included in Schedule 'A'	Subways at stations in Annexure F-5 included in Schedule 'A'	Bridges in Annexure F-6 included in Schedule 'B'
	Number of bridges covered	30	8	06	13
i.	a. Submission *and approval* of design of permanent works, permanent diversion and regrading of roads and submission of As Built drawings and documents	Included in Cost Centre 'CD' of Price Schedule A	Included in Cost Centre 'CD' of Price Schedule A	Included in Cost Centre 'CD' of Price Schedule A	Included in Cost Centre 'CD' of Price Schedule A
	b. Design of Temporary works and temporary diversion/widening of roads	Included in Cost Centre 'CD' of Price Schedule A	Included in Cost Centre 'CD' of Price Schedule A	NA	Included in quoted rates of relevant items under Schedule-B
ii.	*Construction of all permanent works as shown in Tender drawings*	*Included in Cost Centre 'CB' of Price Schedule A*	*Included in Cost Centre 'CB' of Price Schedule A*	*Included in Cost Centre 'CS' of Price Schedule A*	*Included in quoted rates of relevant items under Schedule-B*
iii.	Construction of temporary diversions, if any, including additional land (if any required beyond ROW) for constructing the same	Included in quoted lumpsum cost of works under Schedule A	Included in quoted lumpsum cost of works under Schedule A	NA	Included in quoted rates of relevant items under Schedule-B

Sr No	Activity	Minor bridges in Annexure F-1 included in Schedule 'A'	Major bridges in Annexure F-2 included in Schedule 'A'	Subways at stations in Annexure F-5 included in Schedule 'A'	Bridges in Annexure F-6 included in Schedule 'B'
	Number of bridges covered	30	8	06	13
iv.	Construction of permanent diversions and re-grading *of roads*, if any required	Included in quoted lumpsum cost of works under Schedule A	Included in quoted lumpsum cost of works under Schedule A.	NA	Will be paid separately under Schedule -B
v.	Widening of existing roads (within HORC ROW)	Included in quoted lumpsum cost of works under Schedule A	Included in quoted lumpsum cost of works under Schedule A	NA	Included in quoted rates of relevant items under Schedule-B
vi.	Restoration of existing roads damaged during construction activities	Included in quoted lumpsum cost of works under Schedule A	Included in quoted lumpsum cost of works under Schedule A	NA	Included in the rates quoted under Schedule-B
vii.	*Design of permanent diversion of Canal/Drain/ Nallah*	*Included in Cost Centre 'CD' of Price Schedule A*	*Included in Cost Centre 'CD' of Price Schedule A*	*NA*	*Included in Cost Centre 'CD' of Price Schedule A*
viii.	*Construction of permanent diversion of Canal/Drain/ Nallah*	*Will be paid separately under Schedule-B*	*Will be paid separately under Schedule-B*	*NA*	*Will be paid separately under Schedule-B*

ANNEXURE F-8

(***Ref. Sub-Clause 7.3.17 of Section VII-6: OCS (Civil & BLT)***)

LIST OF TRACK FITTINGS

LIST OF MATERIALS FOR 1 SET OF H- BEAM SLEEPER.

S. No.	DESCRIPTION OF PARTS	DRAWING NO.	SPECIFICATION	Nos.
1	H-BEAM (ISHB 200X200) 2655 mm LENGTH	BASED ON R.D.S.O./B-1636/4/R	BS :45, IS :4759	1
2	M.S BASE PLATE	R.D.S.O./T-8760	IS.2062-2011	2
3	RAIL PAD WITH EMBEDDED STEEL PLATE	R.D.S.O./T-8761	IRS. SPECIFICATION FOR 10mm. THICK G.R. PAD (PROVISIONAL-1989) & STEEL AS PER PROVISIONAL-2019	2
4	SPL.CAST LINER (INNER)FOR 60KG RAIL	R.D.S.O./T-8762	IRS. SPECIFICATION PROVISIONAL -2019	2
5	SPL.CAST LINER (OUTER)FOR 60KG RAIL	R.D.S.O./T-8763	IRS. SPECIFICATION PROVISIONAL -2019	2
6	ELASTIC RAIL CLIP MK III	RDSO/T-3701	IRS T-31-2018	4
7	TAPPER WASHER (FOR GUARD RAIL)	R.D.S.O./T-5161	IS.226-1962	4
8	TAPPER WASHER (FOR GUARD RAIL)	R.D.S.O./T-5162	IS.226-1962	4
9	SINGLE COIL SPRING WASHER	R.D.S.O./T-10773	IRS T-42-1988	4
10	6mm GROOVED RUBBER PAD (FOR GUARD RAIL)	R.D.S.O./T-5163	IRS. SPECIFICATION FOR 6mm. THICK G.R. PAD (PROVISIONAL-1989)	4
11	305X300X25/30mm ELASTOMERIC PAD	R.D.S.O./B-1636/5	REV.-02 Dt-26/11/2012	2
12	TAPERED SPLIT PIN	CE's NO.22994/8	IS.226-1962	8
13	Φ28 HOOK BOLT347mm Length and 2 Nos NUT & 3 Nos. Washer	BASED ON R.D.S.O./B-1636/5	IS.226-1962	4
14	PACKING PLATE FOR GUARD RAIL 150mmX22mmX75mm		IS.226-1962	4
15	BOLT & NUT FOR GUARD RAIL	R.D.S.O./T-5164	IRS T-10-1968	2

Note: The above list excluding Sr No.1, 2 & 14 will be considered equal to 1 set of spare fittings. The Contractor shall supply spare set of fittings for 10% quantity of H Beam sleepers under NS Item No. 17 of Schedule 'B'.

Tender No. HORC/HRIDC/C-5/2023

Attachment 4

to

Corrigendum No. 1

Part 2, Section VII-7A: Employer's Requirements - Particular Specifications (PS)-General Electrical Services

1. Revised Sub-Clause 1.2 - Scope of Work
2. Revised Sub-Clause 3.1 - Explanatory Notes for BOQ Items

CHAPTER-1 – INTRODUCTION AND OBJECTIVE

1.2 SCOPE OF WORK

The broad scope of work, relating to works are given below and shall be for the purpose of general guidance only and is not exhaustive. For complete appreciation of the scope, the specification, drawings and other relevant document, mentioned in the Tender documents shall be referred to. The indicative items of work are as under:

(1) Electrification of Prithla, Silani and IMT Sohna Station, Yard areas and S&T buildings with allied facilities and complete power supply arrangement as per Standard Railway Practice and guidelines issued by Railway Board/ RDSO/ CPWD specification etc.

(2) Supply, Installation, testing and commissioning of 11 kV/0.44 kV, 1x250 kVA Compact Substation (CSS) with Dry type transformer (250 kVA) with earthing and all safety equipment with complete power supply arrangement at Prithla and IMT Sohna stations.

(3) Supply, Installation, testing and commissioning of silent type DG Set of 1x125 kVA capacity (emission CPCB 4-plus norm) including AMF Panel & LT Panel including earthing system and all safety equipment with complete power supply arrangement at IMT Sohna station.

(4) Supply, Installation, testing and commissioning of Automatic Power Factor Correction (APFC) Panel of 150kVAR including earthing system and all safety equipment with complete power supply arrangement at Prithla and IMT Sohna station. APFC panel shall be connected to main LT Panel.

(5) Supply, Installation, Testing and Commissioning of High Mast Towers (20 meter) with luminaires, with complete cabling arrangement to meet standard lux level at Prithla, Silani and IMT Sohna stations as per specifications and guidelines issued be RDSO/ Railway Board. At Prithla and IMT Sohna, 2 nos. high mast towers shall be provided and one no. at Silani station.

(6) Supply, Installation, Testing and Commissioning of 11 meter high decorative poles with luminaires, with complete cabling arrangement Prithla, Silani and IMT Sohna stations to meet standard lux level as per specifications and guideline issued by RDSO/ Railway Board.

(7) Supply, Installation, Testing and Commissioning of Colour Light Signalling (CLS) Panel with cabling arrangement of suitable size and rating at all 3 stations *(if required)* as per RDSO specifications.

(8) Supply, installation, Testing and Commissioning of Single sided and Double-sided LED signage board with pictogram/ symbol at all 3 stations as per specification.

(9) The space for (13 Passenger, 1000 Kg) lift and Escalators at IMT Sohna station shall be kept. If needed, the lifts and escalators can be provided in future.

(10) Supply, installation, Testing and Commissioning of LT panel for distribution of LT supply for lighting (indoor and outdoor), fans, air conditioners, yard lighting, FOB/ Sub Way Lighting, Signalling and Telecom Load, SCADA RTU load, submersible pump load, Power supply for operation of OHE motorised isolator/ Interrupter etc. Twenty percent (20%) spare capacity shall be kept in LT panel for future loads.

(11) Supply and laying of Conduits Fire Resistant PVC or GI and all conduits shall be concealed. No surface conduit shall be allowed and if surface conduit is essential then it shall be with GI pipe only and with the approval of Engineer.

(12) Provision of conduits, wiring, lights (indoor and outdoor) , fans and power sockets etc. in all stations, S&T installations at station, pump houses and other service buildings. The wiring shall be with copper wires and cables.

(13) Provision of conduits, wiring, lights, fans, air-conditioners and power sockets etc. at S&T huts at both ends of IMT Sohna station. Air-conditioners shall also be provided in S&T rooms of the Prithla and IMT Sohna stations.

(14) Provision of conduits, wiring, lights, fans, air-conditioners and power sockets etc. in S&T Auto Signalling System buildings (Auto Location Hut: ALH) - *4* Nos.

(15) Provision of lights, fans, exhaust fans in all buildings and provision of lights in subways, platforms, passenger shelters etc.

(16) Earthing of all equipment's and systems.

(17) Lightning protection of all buildings.

(18) Supply, installation, testing and commissioning of LT copper cables. The cable shall be laid under ground, under platform, under floor, below tracks etc and cable route markers shall be provided as per specifications and drawings. These cables shall feed 20 m high mast flood light towers, 11 m high decorative poles, platform lighting, street lighting, pump sets, S&T loads at both ends of platform etc. The maximum voltage drop in cables from source to load point shall not exceed 5%.

(19) Supply, installation, testing and commissioning of HT cables with all safety norms.

(20) Supply, installation, testing and commissioning of submersible and mono-block pumpsets.

(21) Supply, installation, testing and commissioning of UPS.

(22) All Nuts, bolts, Studs, washers, Pins etc. shall be of GI or stainless steel. All earthing strips shall be of GI except Copper strips for copper earthing.

(23) Provision of water cooler, Geyser, RO system etc. at stations.

(24) Both sides of the viaduct shall be provided illumination and lux level shall be 10 (minimum). The 240 V AC, power supply for LED lights shall be taken from substation at IMT Sohna and substation at shaft of the tunnel. The feeding zone of each substation shall be approximately equal.

(25) Miscellaneous items e.g. shock treatment charts, schematic layouts, safety rubber mats, equipment number plates, first aid boxes, indication boards and danger notice plates, fire buckets, etc.

(26) All equipment testing (type test, routine tests and factory acceptance tests etc), system acceptance tests, integrated testing and commissioning of all equipments.

(27) Interface with other Contractors to ensure timely completion of the Works.

(28) Training to staff.

(29) Supply of spares.

(30) Provision of all the construction drawings, documents, and as-built drawings required to supply, install, testing and commissioning of the above works and all other installations, as required. Operation & Maintenance Manuals, training manual and other related Documentation.

(31) Provide maintenance supervision support during Defect Notification Period.

(32) The above works can be executed anywhere in the section from Prithla to New Harsana Kalan, as per directions of the Engineer.

(33) The arrangement of 11kV, 3-phase or 440 volt, 3-phase AC supply, from Power Supply Authority (PSA) substation to HORC point at H-Pole in HORC premises shall be arranged by Employer and all coordination with PSA including necessary payments to PSA shall be made by Employer.

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CHAPTER 3–EXPLANATARY NOTES FOR INDICATIVE BOOK OF QUANTITIES (BOQ) ITEMS

3.1 EXPLANATORY NOTES FOR BOQ ITEMS:

The explanatory notes to the BOQ are as under and shall be read in conjunction with tender drawings, specifications and Employer's Requirements.

S.No.	Description for BOQ Items
1 CONDUITS, WIRING, PLUGS, FAN AND DISTRIBUTION BOARDS	
1.1	**Point Wiring By 3x2.5 sqmm Copper Cable (With Modular Switches & Socket) in Conduits:** Supply of material and wiring of Light point/ Fan point/ Exhaust-Fan point. Wiring shall be done by 3x2.5 sqmm multi stranded copper flexible FRLS PVC insulated ISI marked 1100 volts grade cable, confirming to IS: 694-1990. Concealed conduit shall be laid with FRLS PVC pipe or GI pipe minimum 25 mm dia (as required). Surface conduits shall not be laid and if required, shall be done with GI pipe only with the help of GI clamps/ rawal plugs etc. as required as per site requirement. Wherever required, the flexible metallic conduits shall be provided to complete the circuit. The zinc coating on GI conduits shall be as per IS-4736. One-way piano type modular switch 6A shall be provided on phase cable. Plugs and Sockets shall conform to IS-1293 and switches to IS-3854. The entire GI box shall have modular plate for switches and 6A modular plugs with required modular design groove cutting for installation of switches/ sockets etc. The wiring shall be done in such a way that minimum conduit pipes run inside the room as far as possible. The size of copper cable used for earthing purpose shall not be less than the size of cable used for wiring and cable shall be ISI marked confirming to relevant IS code, specifications. The Contractor shall be responsible for proper plastering and distempering/ fixing of tiles to restore the original finish of wall such that it matches with original surface and colour of wall on which conduit pipe has been laid. There should be no loose connections in the wiring circuit. Joints in cables are not allowed. Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the Contractor, at his own cost. All metallic parts, fittings etc. shall be connected to the earth cable. Contractor shall make necessary interface with Civil Contractor during laying of conduits and shall handover conduiting drawing to Civil Contractor in advance.
1.2	**Supply of Material and erection of 3x2.5 Sqmm Copper Cable in Conduits**: Supply of material and wiring of single core insulated, multi-stranded 2x2.5 sqmm FRLS PVC copper cable in FRLS PVC/ GI conduit ISI mark & 2.5 sqmm FRLS PVC insulated copper cable multi-stranded for earthing. Concealed conduit shall be laid with FRLS PVC pipe or GI pipe minimum

	25 mm dia (as required). Surface conduits shall not be laid and if required, shall be done with GI pipe only with the help of GI clamps/ rawal plugs etc. as required as per site requirement. Wherever required, the flexible metallic conduits shall be provided to complete the circuit. Cable shall be ISI marked confirming to IS: 694-1990 specifications and make of reference list. The sub wiring shall be done in such a way that minimum conduit pipes run inside the room as far as possible. The size of copper cable used for earthing purpose shall not be less than the size of cable used for phase wiring. The Contractor shall be responsible for proper plastering and distempering/ fixing of tiles to restore the original finish of wall such that it matches with original surface and colour of wall on which conduit pipe has been laid. There should be no loose connections in the wiring circuit. Joints in cables are not allowed. Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the Contractor, at his own cost. All metallic parts, fittings etc. shall be connected to the earth cable.
1.3	**Supply of Material and erection of 3x6 Sqmm Copper Cable in Conduits**: Supply of material and wiring of single core insulated, multi-stranded 2x6 sqmm FRLS PVC copper cable in FRLS PVC/ GI conduit ISI mark & 6 sqmm FRLS PVC insulated copper cable multi-stranded for earthing. Concealed conduit shall be laid with FRLS PVC pipe or GI pipe minimum 25 mm dia (as required). Surface conduits shall not be laid and if required, shall be done with GI pipe only with the help of GI clamps, plugs etc. as required as per site requirement. Wherever required, the flexible metallic conduits shall be provided to complete the circuit. Cable shall be ISI marked confirming to IS: 694-1990 specifications and make of reference list. The sub wiring shall be done in such a way that minimum conduit pipes run inside the room as far as possible. The size of copper cable used for earthing purpose shall not be less than the size of cable used for phase wiring. The Contractor shall be responsible for proper plastering and distempering/ fixing of tiles to restore the original finish of wall such that it matches with original surface and colour of wall on which conduit pipe has been laid. There should be no loose connections in the wiring circuit. Joints in cables are not allowed. Any discrepancy occurred in engineering work during the wiring should be restored in the original condition by the Contractor, at his own cost. All metallic parts, fittings etc. shall be connected to the earth cable.
1.4	**Supply and Installation of 6A Modular Switch Socket:** Supply and installation of 6A plug, 5-pin 240V modular type switch socket of standard size on existing board and connection with 2.5 sqmm FRLS PVC copper cable. A switch for controlling power supply of plug shall be connected in phase cable and earth cable size shall be same size of wiring to

	flow maximum fault current.
1.5	**Supply and Installation of 16A Modular Power Switch Socket**: Supply and installation of modular type 16A plug, 6-pin power socket 240V and switch modular type with GI or powder coated metal box concealed in wall and connection with 6sqmm FRLS PVC copper cable. A switch for controlling power supply of plug shall be connect in phase cable and earth cable size shall be same size of wiring to flow maximum fault current.
1.6	**Supply and Installation of 02 Module Plate GI Box**: Supply and installation of 2 module modular plates powder coated for installation of switches and sheet metal box of thickness 2 mm (minimum), good quality concealed fixing of GI box confirming to IS 14772 (2000). GI box should be of standard size.
1.7	**Supply and Installation of 04 Module Plate GI Box**: Supply and installation of 4 module modular plates powder coated for installation of switches and sheet metal box of thickness 2 mm (minimum), good quality concealed fixing of GI box confirming to IS 14772 (2000). GI box should be of standard size.
1.8	**Supply and Installation of 08 Module Plate GI Box**: Supply and installation of 8 module modular plates powder coated for installation of switches and sheet metal box of thickness 2 mm (minimum), good quality concealed fixing of GI box confirming to IS 14772 (2000). GI box should be of standard size.
1.9	**Supply and Installation of 12 Module Plate GI Box**: Supply and installation of 12 module modular plates powder coated for installation of switches and sheet metal box of thickness 2 mm (minimum), good quality concealed fixing of GI box confirming to IS 14772 (2000). GI box should be of standard size.
1.10	**Supply, Installation, Testing and Commissioning (SITC) of 1200 mm Sweep Ceiling Fan with Fan Regulator:** Supply, installation, testing and commissioning of all materials of 240V A.C. 1200 mm sweep ceiling fan having 3 blades, double ball bearing, copper wound motor, suitably sized down rod, canopies and capacitor etc. complete with all accessories including fixing phenolic laminated sheet cover on the fan box, FR PVC insulated multi-stranded three core copper conductor cabling and connecting with earthing system etc. Fan should have ISI mark and as per IS-374 and 5-star energy rating issued by BEE. The modular type electronic fan regulator shall be 5 step type on existing board and connection as per requirement.
1.11	**Supply, Installation, Testing and Commissioning (SITC) Of 300 mm Sweep Exhaust Fan:** Supply, installation, testing and commissioning of exhaust fan 300 mm sweep (having reinforced insulation and metal blade) with louver shutter heavy duty (ISI marked, as per IS-2312), 5-star energy rating issued by BEE and making hole in wall including repairing the same properly with cement-

	sand (1:4) or M-25 grade concrete and connection complete in all respect, installation of suitable fire-resistant framing etc. The price also covers supply and installation of suitable clamps/ brackets & cost of all materials including cost of FR PVC insulated multi stranded single core copper conductor wiring, earthing connection etc. for fixing above.
1.12	**Supply, Installation, Testing and Commissioning of Double Door, MCB TPN 440V, 8 Module Distribution Boards (DB)**: Supply, installation, testing and commissioning of minimum 1.6 mm thick CRCA power coated (7 tank process) Double Door with MCB TPN 440V, 8 modules 4 row Distribution Board, with neutral and earth link and minimum IP42 ingress protection. The DB shall be with one no. four pole MCB 40A, one no. four pole RCCB 40A 30 mA and twenty four nos. SP MCB 40/32/25/16/10/6 A 'C' series conforming to IS-2675. All MCB should be of 'C 'series with breaking capacity not less than 10 kA. MCB, RCCB and DB should be of same make. The distribution board shall be fixed in such a fashion that its door flushed with the wall on which it is fixed. Circuit breakers shall be conforming to IS/IEC-60898-1.
1.13	**Supply, Installation, Testing and Commissioning of Double Door, MCB SP, 12 Way Distribution Board (DB):** Supply, installation, testing and commissioning of minimum 1.6 mm thick CRCA power coated (7 tank process) Double Door MCB SP 12 way DB, neutral and earth link and minimum IP42 ingress protection, with one no. DP MCB 40A, one no. DP RCCB 40A, 30 mA and eight nos. SP MCB 32/25/16/10/6 A 'C' series. All MCB should be of 'C' series with breaking capacity not less than 10 kA. MCB, RCCB and DB shall be of same make. The distribution board shall be fixed in such a fashion that its door flushed with the wall on which it is fixed.
1.14	**Supply, Installation, Testing and Commissioning of 440V, 3-phase Change Over Distribution Board:** Supply, installation, testing and commissioning of minimum1.6 mm thick CRCA power coated (7 tank process) box of size 610 x 450 x 190 mm approximate change over distribution board with minimum IP42 ingress protection. The distribution board shall be indoor type dust vermin proof knock out/ glands plates as applicable shall be provided in the box for incoming and outgoing cables. Earth terminals shall be provided. Danger notice shall be provided at appropriate place. The complete internal wiring for each phase selector is to be done with copper cable of size 10 sqmm. It shall comprise of following items: - • 01 no. 440V, 3-phase, 100 A TPN MCCB as incomer • 01 no. 63 A SPN MCCB as outgoing. • 04 nos. integrated LED pilot lamp (3 incoming+1 outgoing) 01 no. 63A selector switch (phase selector switch) without OFF Three pole three ways (Three phase incoming & only one phase outgoing).
1.15	**Supply, Installation, Testing and Commissioning of MCCB 200A, 440V, 3-phase, (4 Pole, 36 kA):** Supply, installation, testing and commissioning of four Pole Moulded case circuit breaker (MCCB) of 200A, 440V, 3-phase, 36 kA with adjustable

	thermal, fix magnetic release complete. MCCB is to be provided in minimum 1.6 mm thick CRCA power coated enclosure at location as per the site requirement.
1.16	**Supply, Installation, Testing and Commissioning of Double Door, 63A, 240V, MCB SP 8 Way Distribution Board:** Supply, installation, testing and commissioning of minimum 1.6 mm thick CRCA power coated Double Door MCB SP 8 way DB, neutral and earth link and minimum IP42 ingress protection, with one no. DP MCB 63A, 240V, one no. DP RCCB 63A, 30 mA and eight nos. SP MCB 32 A 'C' series (for feed from ACO Panel). All MCB should be of 'C' series with breaking capacity not less than 10 kA. MCB, RCCB and DB shall be of same make. The distribution board shall be fixed in such a fashion that its door flushed with the wall on which it is fixed.
1.17	**Supply and Installation of Junction Box Size 390(H)x305(B)x170(D) mm:** Supply and installation of junction box size 390(H)x305(B)x170(D) mm comprising stainless steel material with 1.6 mm thick sheet having power coating with 7 tank processes with rubber gasket, padlock arrangement, zinc passivated earth bolt, etc. with terminals suitable for 440V/240V supply requirement. All busbars and terminals in the junction box shall be of copper material with 4 nos. copper bus bar capacity 200A, 250mm long suitable for 440V supply requirement. The box shall be fixed robustly with clamps at pole/ wall as per requirement. All the material should be of good quality.
1.18	**Supply, Installation, Testing and Commissioning of Control and Distribution Panel for Colour Light Signalling (CLS) for 10/ 25/ 50 kVA AT supply:** Supply, installation, testing and commissioning of automatic changeover panel complete for 25kV/240V, AC auxiliary transformer supply, as per RDSO specification No. TI/SPC/PSI/CLS/0020 (12/02) with A&C slips No. 1 to 4 or latest, connections as required. The Make of panel shall be on the approved list of manufacturers issued by RDSO/ Lucknow.
1.19	**Supply and Installation of Metal Clad Plug Socket 20A, 240V, Single Phase with 32A MCB:** Supply and installation of metal clad plug socket 20A, 240V, single phase with 32A MCB SP 10kA, C series including installation and sheet metal enclosure box with one 20A plug top (Ray roll type) to be supplied with board.
1.20	**Supply and Installation of Metal Clad Plug Socket 16A, 240V, Single Phase with 20A MCB:** Supply and installation of metal clad plug socket 16A, 240V, single phase with 20A MCB SP 10kA, C series including installation and sheet metal enclosure box with one 16A plug top (Ray roll type) to be supplied with board.
1.21	**Supply, installation, testing and commissioning of 32 mm dia GI Conduit:** Supply, installation, testing and commissioning of 32 mm dia GI Conduit concealed/surface including all junction boxes (2 way, 3

	way, 4 way as required), bends etc. conforming to IS-9537.
1.22	**Supply, installation, testing and commissioning of 25 mm dia GI Conduit:** Supply, installation, testing and commissioning of 25 mm dia GI Conduit concealed/ surface including all junction boxes (2 way, 3 way, 4 way as required), bends etc. conforming to IS-9537.
1.23	Design and Drawing of conduits, wiring, panels, distribution board, as built drawings, survey, calculation etc. for item no. 1.1 to 1.22.
2 LT & HT CABLES AND LAYING	
2.1	**Supply of 2 Core x 10 sqmm Copper Cable:** Supply of 1.1 KV grade 2 Core x 10 Sqmm LT XLPE insulated, FRLS, armoured copper conductor cable, end terminations with suitable crimping sockets/ lugs, gland, testing and meggering etc. as per required technical specifications & confirming to IS: 7098, IS: 8130 and IEC-60502-1 standards with latest amendment.
2.2	**Supply of 2 Core x 16 sqmm Copper Cable:** Supply of 1.1 KV grade 2 Core x 16 Sqmm LT XLPE insulated, FRLS, armoured copper conductor cable, end terminations with suitable crimping sockets/ lugs, gland, testing and meggering etc. as per required technical specifications & confirming to IS: 7098, IS: 8130 and IEC-60502-1 standards with latest amendment.
2.3	**Supply of 2 Core x 35 sqmm Copper Cable:** Supply of 1.1 KV grade 2 Core x 35 Sqmm LT XLPE insulated, FRLS, armoured copper conductor cable, end terminations with suitable crimping sockets/ lugs, glands, testing and meggering etc. as per required technical specifications & confirming to IS: 7098, IS: 8130 and IEC-60502-1 standards with latest amendment.
2.4	**Supply of 2 Core x 70 sqmm Copper Cable:** Supply of 1.1 KV grade, 2 Core x 70 Sqmm LT XLPE insulated, FRLS, armored copper conductor cable, end terminations with suitable crimping sockets/ lugs, glands, testing and meggering etc. as per required technical specifications & confirming to IS: 7098, IS: 8130 and IEC-60502-1 standards with latest amendment.
2.5	**Supply of 2 Core x 95 sqmm Copper Cable:** Supply of 1.1 KV grade, 2 Core x 95 Sqmm LT XLPE insulated, FRLS, armored copper conductor cable, end terminations with suitable crimping sockets/ lugs, glands, testing and meggering etc. as per required technical specifications & confirming to IS: 7098, IS: 8130 and IEC-60502-1 standards with latest amendment.
2.6	**Supply of 4 Core x 120 sqmm Copper Cable:** Supply of 1.1 KV grade 4 Core x 120 Sqmm LT XLPE insulated, FRLS, armoured copper conductor cable, end terminations with suitable crimping sockets/ lugs, glands, testing and meggering etc. as per required technical specifications & confirming to IS: 7098, IS: 8130 and IEC-60502-1 standards with latest amendment.

2.7	**Supply of 4 Core x 240 sqmm Copper Cable:** Supply of 1.1 KV grade 4 Core x 240 Sqmm LT XLPE insulated, FRLS, armoured copper conductor cable, end terminations with suitable crimping sockets/ lugs, glands, testing and meggering etc. as per required technical specifications & confirming to IS: 7098, IS: 8130 and IEC-60502-1 standards with latest amendment.
2.8	**Supply, Installation, Testing and Commissioning of LT Heat Shrinkable Straight Through Joint:** Supply, installation, testing and commissioning of LT heat shrinkable straight through joint (conforming to IS-1255) with required accessories complete in all respect suitable for XLPE 1.1 kV and above rating cables as per site requirement.
2.9	**Supply of 3 Core x 120 sqmm 11 kV Copper Cable:** Supply of 3 Core x 120 Sqmm 11 kV XLPE insulated, armoured, Copper conductor Cable conforming to IS: 7098 (Part 2)/ 2011 or latest.
2.10	**Supply and Installation of End Termination Kit for 3 core, 70 sqmm to 185 Sqmm, 11 kV Copper Cable:** Supply and installation of outdoor type, heat shrinkable, end termination kit suitable for 3 core 11 kV 70 to 185 Sqmm XLPE insulated, armoured Copper conductor cable and making termination connections with overhead conductor, testing and commissioning etc. The material shall conform to IS-1255.
2.11	**Laying of LT/ HT Cables (All Sizes) In Air/ Pipe/ Cable Tray/ Trench etc.:** Laying and commissioning of LT/ HT XLPE insulated armoured sheathed copper cable underground/ under the road/ under the track along with pole/ wall/ trench/ air in already laid pipe. Before and after laying cable, the IR value should be checked. While laying the cable, care should be taken that no tree roots/ water logging area come on the way of cable, as it may damage the outside insulation of cable. Armoring at both ends of the cable should be earthed. At termination point of cable suitable lugs and brass glands of suitable size and good quality shall be provided. The Contractor shall restore the original condition of the Roads/ platform/ concrete flooring after laying of cable. Bending radius of the cable shall not be less than 16 times of dia. of the cable. Wherever the cable emerges out of the ground at least two loops of sufficient radius should be laid. Installation of cable along with wall/ pole/ roof top/ underneath sheds wherever required shall be done with support of G.I. Saddles/ clamp of proper size and GI Pipe as required. Breaking of floor/ wall/ road and other civil structures and repairing up to original condition, shall be done by the Contractor, and no extra cost shall be paid for it. Permission for crossing any road/ track if required shall be arranged by the Contractor in coordination with Engineer, and all the expenditures shall be borne by the Contractor. All the instruments required for insulation testing, high voltage testing shall be arranged by the Contractor at his own cost. The cable shall be transported by the Contractor through his own means from major electrical depot to required site of work. Before transportation of the cable it shall be tested at site to ascertain the serviceability of the cable by the Contractor. The work

	shall conform to IS-1255.
2.12	**Excavation and Refilling of Trench of Size 500 mm Wide and depth up to 1200 mm (as per design) for cables:** Excavation and refilling of Trench of size 500 mm wide and depth up to 1200 mm (as per design with the approval of the Engineer) in all kinds of soil for laying of HDPE/ GI pipe for underground cables crossing. Contractor shall clear all metallic parts & stones etc. in trench. After laying of pipe, the trench should be refilled with same soil, ramming (compaction not less than 95%) and restore to original position. After cable/ pipe laying Contractor shall clear all site debris. The excess earth and debris etc. shall be disposed off upto a distance of 2km at suitable place by the Contractor.
2.13	**Excavation and Refilling of Trench of Size 500 mm Wide and depth up to 1200 mm with brick protection (as per design) for cables.** Excavation and refilling of Trench of size 500 mm wide and depth up to 1200 mm with brick protection (as per design with the approval of the Engineer) for laying of LT/HT cables in all kinds of soils. The trench shall have sand cushioning, protective covering with bricks of compressive strength class designation 10 (minimum). Two rows of bricks shall be laid breadthwise (i.e brick length shall be 90 degree to the laid cable). Contractor shall clear all metallic parts & stones etc. in trench. After laying of cables and bricks, the trench should be refilled with same soil, ramming (compaction not less than 95%) and restore to original position. After cable laying Contractor shall clear all site debris. The excess earth and debris etc. shall be disposed off upto a distance of 2km at suitable place by the Contractor.
2.14	**Supply and Laying of HDPE Pipe (90 mm outside dia)**: Supply and laying of HDPE pipe in already excavated trench under floor, platform, road, ground, air etc. as per site requirement size 90 mm outside dia wall thickness 4.3 mm to 5.0 mm, PN-4 conforming to IS 4984:1995 or latest as per site requirement (including laying of 63 mm outside dia HDPE pipe for making connection to 90 mm outside dia HDPE pipe and reducer wherever required). Pipe should be laid in trench such that it shall be possible to withdraw the cables for repair or replacement without disturbing the work. The pipes shall be laid with a gradient to facilitate drainage of water. Accessories related with laying of HDPE pipe like fitting, bends joints/ coupler junction, flange end cap etc. as per site requirement shall be provided by Contractor and the payment of 90 mm outside dia HDPE pipe shall include all these items as required.
2.15	**Supply and Laying of HDPE Pipe (90 mm outside dia) at platform along with pit and cover**: Supply and laying of HDPE Pipe (90 mm outside dia) at platform along with pit and cover at every 40m-50m as per design in already excavated trench at platform as per site requirement. The HDPE pipe size shall be 90 mm outside dia, wall thickness 4.3 mm to 5.0 mm, PN-4 conforming to IS 4984:1995 or latest. Pipe should be laid in trench such that it shall be

	possible to withdraw the cables for repair or replacement without disturbing the work. The pipes shall be laid with a gradient to facilitate drainage of water. Accessories related with laying of HDPE pipe like fitting, bends joints/ coupler junction, flange end cap etc. as per site requirement shall be provided by Contractor and the payment of 90 mm outside dia HDPE pipe shall include all these items as required. The pit shall be with bricks having inside dimensions 400x400 mm with 400 mm depth and M-25 RCC cover thickness shall be 75mm and pit cover shall cover the entire brick work. The top layer of cover shall flush with platform level as per design.
2.16	**Supply and Laying of HDPE Pipe (125 mm outside dia)**: Supply and laying of HDPE pipe in already excavated trench underfloor, platform, road, ground, air etc. as per site requirement, size 125 mm outside dia wall thickness 6 mm to 6.8 mm, PN-4 conforming to IS 4984:1995 or latest. Pipe shall be laid in trench such that It shall be possible to withdraw the cables for repair or replacement without disturbing the work. The pipes shall be laid with a gradient to facilitate drainage of water. Accessories related with laying of HDPE pipe like fitting, bends joints/ coupler junction, flange end cap etc. as per site requirement shall be provided by Contractor and payment of HDPE pipe shall include all these items as required.
2.17	**Supply and Laying of HDPE Pipe (160 mm outside dia):** Supply and laying of HDPE pipe in already excavated trench under floor, platform, road, ground, air etc. with technical specification of 160 mm dia (OD), wall thickness between 7.7 mm to 8.6 mm, PN-4 with confirming to IS: 4984/1995 of latest. Pipe shall be laid in trench such that possible to withdraw the cable for repair or replacement. The pipes shall be laid with a gradient to facilitate drainage of water. Accessories related with laying of HDPE pipe like fitting, bends joints/ coupler junction, reducer, flange end cap etc. as per site requirement shall be provided by Contractor and payment of HDPE pipe shall include all these items as required.
2.18	**Supply and Laying of GI Pipe (nominal bore 125 mm):** Supply and laying of 125 mm dia GI Pipe medium class as per IS 1239 under road/ Railway track. The GI pipe shall be fixed with pole/ wall/ structure etc. by GI flat/clamps of suitable size & GI nut-bolt-washer etc. In the case of GI pipe is laid in road/ permanent floor/ other civil structures etc, and require any dismantling then repairing up to original condition shall be done by the Contractor. The pipes shall be laid with a gradient to facilitate drainage of water and shall be laid right angle to the track. Accessories related with laying of HDPE pipe like fitting, bends joints/ coupler junction, reducer, flange end cap etc. as per site requirement shall be provided by Contractor and payment of GI pipe shall include all these items as required.
2.19	**Supply and Installation of Cable Route Marker:** Supply and installation of Cable Route marker along straight runs of the cables at locations approved by the Engineer and generally at intervals not exceeding 100 meters. Wherever, the cable route is changing or it is entering a fixed installation, route marker shall be provided. Route marker shall also be provided at joints of cable. The item price includes labour & cost of all materials including cost of cable route markers. The route marker

	shall be 150mm dia, 6mm thick GI plate welded with GI angle of size 40x25x5mm and lower part of angle shall be embedded (end slightly bent) in 150x150x150mm M-15 cube which shall be buried 200 mm below the ground as per drawing. The plate shall be painted in yellow paint and on one face of plate HRIDC shall be painted in black paint and on other side voltage level (240V/440V/11000V) as applicable shall be marked. Drawing of cable route marker shall get approved from Engineer before installation.
2.20	**Drilling of horizontal bore below Railway track or road by pushing method for laying of HDPE/GI pipe:** Drilling of horizontal bore by pushing method (trenchless technology) in all types of soil/ rock for laying of HDPE/GI pipe dia up to 250mm by pushing method. Horizontal boring shall be done at minimum 1.5 metre below or as per site requirement from ground level at Road/ canal/ bridges/ Railway track portion but in case, where bank is high then boring should be such that outer side and under track HDPE/ GI pipes are in same alignment. All work shall be done without disturbing the Road/ canal/ bridges/ Railway track taking all necessary safety precautions related to Road/ canal/ bridges/ track and movement of Road transport and trains.
2.21	Design and Drawing of cable layout, trench layout, route markers, cable and pipe schedule, as built drawings, survey, calculation etc. for item no. 2.1 to 2.20.
3 LIGHTING, STREET LIGHT POLE AND HIGH MAST	
3.1	**Provision of 22 Watt LED Tube Light with fitting:** Supply, installation, testing & commissioning of surface mounted Energy efficient LED tubular lamp with fitting and its driver and Luminaries (22 watt), of CRCA steel sheet enclosure, IP-20 for indoor application, operating voltage (140-270) V, minimum 2000 lumens, complete with all accessories of approved make etc. The item price also includes labour & cost of all materials including cost of FRLS PVC insulated multi stranded single core copper conductor cable, earthing connection etc. The price also covers supply and installation of suitable clamps/ brackets etc. to fix light fittings under FOB/ Poles/ roofs/ walls/ sheds etc. The material shall conform to IS-2418, IS-3528, IS-5077, IS-10322, IS-16101, IS-16102, IS-16103, IS-16106, IS-16107 and other specifications as applicable.
3.2	**Provision of 40 Watt LED Street Light with Fitting:** Supply, installation, testing & commissioning of Energy efficient 40 Watt LED with street light fitting with pressure die cast aluminium housing with driver & suitable fixing arrangement, IP-65 for outdoor application, operating voltage (140-270) V, System efficacy more than 100 lumen/W, complete with all accessories of approved make etc. The item price also includes labour & cost of all materials including cost of FRLS PVC insulated multi-stranded single core copper conductor cable, earthing connection etc.
3.3	**Provision of 120 Watt LED Street Light with Fitting:** Supply, installation, testing & commissioning of Energy efficient 120 Watt LED with street light fitting with pressure die cast aluminium housing with driver & suitable fixing arrangement, IP-65 for outdoor application,

	operating voltage (140-270) V, System efficacy more than 100 lumen/W, complete with all accessories of approved make etc. The item price also includes labour & cost of all materials including cost of FRLS PVC insulated multi-stranded single core copper conductor cable, earthing connection etc.
3.4	**Provision of Rechargeable Batten Type 240 Watt Emergency Light:** Supply, installation, testing & commissioning of rechargeable batten type Emergency light, 240 watt (60 LEDs 4 watts) with Two-hour minimum backup. The battery life shall be minimum 4 years. The luminaire shall provided rated lumen within 5 second after switching on. The material shall conform to IS-9583.
3.5	**Provision of Outdoor LED Type Flood Light Luminaries (200 Watt):** Supply, installation, testing & commissioning of 200 watt pre wired LED Flood light fitting with 200 watt LED Type Flood Light Luminaries complete conforming to BAJAJ Cat. No. BARFEG-200W LED or equivalent with IP- 65 protection with LEDs and driver and all accessories. The Contractor shall make necessary fixing/ suspension arrangement for LED fitting. **Specification of LED fitting:** The LED lamps, driver & luminaries shall be suitable for outdoor lighting/ facade lighting and other installations. **Technical requirements of LED Flood light fitting:** (i) LED efficacy shall be 120 lumen/ watt for luminaire system wattage. (ii) LED used should be of Surface Mounted Diode (SMD) type only. (iii) L70 Reported Life span of LEDs used in the luminaries shall be greater than 50,000 hrs. at the soldering point temperature of 85°C. (iv) Color temperature of the proposed white color LED shall be 5700 K (minimum). (v) Color Rendering Index (CRI): Greater than 65. **Technical requirements of Driver:** (i) Efficiency of driver: power output rating > 100 W = 90% (ii) Power factor of complete fitting: 0.90. (iii) Input Operating Voltage: 140V to 270 V. (iv) Short circuit protection: Compliant (v) Open load protection: Compliant (vi) Driver Surge Protection standard: (a) 3 kV Min (b) 10 kV for lighting prone location (External to driver circuit). (vii) Total Harmonic Distortion (THD): Less than 20% at full load. (viii) Tc (Maximum Driver case temperature) must be declared on the data sheet. (ix) Isolated driver should be used. **Technical requirements of Luminaire:** (i) Shall submit the LM-79 and/or IS: 16106 test report. The

	manufacturer shall submit accreditation that the luminaire submitted for LM-79 testing was equipped with the LED Driver now being offered by the Contractor. (ii) Cover type: Toughened glass or UV stabilized polycarbonate cover. The material shall conform to IS-3528, IS-10322, IS-16101, IS-16106, IS-16107 and other specifications as applicable.
3.6	**Supply, installation, testing and commissioning of 11 meter high cast iron decorative street light pole**: Supply, installation, testing and commissioning of 11 meter high cast iron decorative platform/street light pole with single/double arm model (straight arm or curved hanging type arm) with all accessories i.e. GI pipe, clamps, nuts, bolts etc. along with outdoor type junction box with 5A MCB complete as required with anti corrosive treatment and suitable for 50m/s wind speed. Galvanized base plate of 220 x 220x 12 mm (as per IS 2062) and GI bolt size M20 X 600mm X 4 nos. (as minimum) in position including excavation of pit and filling the same with M-25 grade concrete with two curved 63mm dia HDPE pipe embedded in foundation for cable loop-in-loop-out including supply of material as required or recommended by pole manufacturer. The allied accessories such as cross arms bakelite sheet with SP MCB (6A, C series) and stud terminals, clamping, etc. are included. Single arm (and double arm as per requirement) of 500 to 1500 mm length are to be provided as per the site requirement with the approval of Engineer. The bakelite sheet with MCB & stud terminals shall be provided in the base compartment of the poles. All the connecting terminals shall be properly tightened and crimped in order to avoid any loose connection. Earthing of pole shall be done in proper manner under the designated item of earthing. Prior approval of foundation and pole/arm drawing shall be obtained from Engineer. The item shall also include LED light fitting accessories i.e. GI pipe, clamps, nuts, bolts etc. The outdoor type junction box (IP65 protection) shall have loop-in loop-out arrangement for feeding cable and with 5A MCB to control pole light fittings. The cable connections shall be with proper thimbling arrangement. GI pipe shall be medium class conforming to IS 1239 and size of GI pipe shall be as per LED fitting. The Contractor shall design the spacing between two poles based on lux level calculations. The platform lights shall be controlled by Assistant Station Master (ASM) and suitable control shall be provided by the Contractor. This is in addition to the Modular Digital Timers for control of platform lights (the cost of Timer shall be paid under relevant Timer material item). Contractor shall prepare complete drawing of decorative street/platform light pole, single/double arm, its foundation, accessories, control from ASM chamber etc. as required and obtain approval of the Engineer.
3.7	**Supply, Installation, Testing and Commissioning of (OFF Delay)**

	Modular Digital Timers: Supply, installation, testing and commissioning of modular digital timer for automatic operation of platform, circulating area, street light etc. complete with required power contactor, digital timer, wiring, MCB etc. suitable for outdoor as required in minimum 1.6 mm CRCA powder coated enclosure of suitable size. The timer shall be programmable to any time (ON/OFF) in 24 hours. The timer shall switch ON lights at preset time and shall switch OFF also at preset time. The life of timer shall not be less than 10 years. The manufacturer's certificate regarding life shall be submitted. Contractor shall submit drawing and obtain approval of Engineer.
3.8	**Supply, Installation, Testing and Commissioning of 20 Meter High Mast:** **Structure:** The 20 meter high mast, shall be of continuously tapered, polygonal cross section minimum 20 sided, presenting a good and pleasing appearance (as per manufacture design) and shall be based on proven in-tension design conforming to relevant standards to give an assured performance and reliable service. The mast shall be designed as per IS-875 (Part 3) and Technical Report 7 (TR 7) of the Institution of Lighting Engineers. **Construction:** The Mast shall be fabricated from special steel plates, to BSEN-10025 cut and folded to form polygonal section and shall be telescopically jointed and fillet welded. The welding shall be in accordance with BS: 5135. The mast section shall have one longitudinal seam weld and no circumferential weld as per section. The Mast shall be delivered in minimum sections as per design without any circumferential welding at site, which shall be joined together by slip-stressed-fit method. The jointing shall be with stressing equipment, thus forming the sleeve joint. No site welding or bolted joint shall be accepted. The overlap distance shall have full penetration of longitudinal welds. The overlap distance shall be 1.5 times the diameter at penetration. The base plate of the mast shall be at least 25mm thick. A door opening of minimum 950mm x 225mm shall be provided at the base of each Mast. For metal protection of the Mast, the entire fabricated Mast shall be hot dip galvanized internally and externally, having minimum average thickness of 75 microns suitable for wind velocity of 50m/s as per IS 875 Part-3. The mast sections shall be galvanized by single dipping method. Sections galvanized by double/ multiple dipping methods shall not be accepted. The Contractor may propose heavier sections also. **Foundation: -** The Contractor shall see the site closely and minutely with regard to the nature of the soil, average depth of decomposed garbage and debris at proposed site, mast location and the other site conditions before working out the type of foundation and specification for the proposed High Mast. The Contractor shall be responsible for the design of the foundation and safe installation of the High Mast in mechanically and structurally safe working condition for the design life of the Mast. The load bearing (safe) capacity of the soil shall be carried out by the Contractor to decide the

type of foundation. The holding down GI bolts shall be 16 Nos. of high tensile strength (EN – 19 grades) and shall be supplied complete with GI anchor plate of 6 mm thick for casting into the foundation. The precision made steel template with tube holes shall be provided to ensure correct vertically and horizontally of bolt alignment. The casting shall be with M-25 grade RCC concrete with safe soil bearing cap at site as 10 T/m^2 at 3 meter depth. Foundation shall bear the wind pressure minimum 200 kg/m^2 and earthquake of Haryana region. Prior approval of foundation drawing shall be obtained from the Engineer.

Door Opening: -

An adequate door opening shall be provided at the base of the mast and the opening shall be such that it permits clear access to equipment's like winches, cables, plugs and sockets etc. and also facilitate easy removal of the winch. The door opening shall be complete with a close fitting, vandal resistant, weatherproof door, provided with a heavy-duty double internal lock with special paddle key.

The door opening shall be carefully designed and reinforced with welded steel section; so that the mast section at the base shall be unaffected and undue buckling of the cut portion is prevented. Size of door opening shall be minimum 950 x 225 mm to avoid buckling of the mast section under heavy wind condition.

Dynamic Loading For Mast: -

The Mast structure shall be designed for an assumed maximum reaction arising from the maximum wind speed (50m/s) likely to be exceeded only once in 50 years (180 km per hour) and is measured at height of 10M above ground level. The design life of the Mast shall be 30 years. Wind excited oscillations shall be damped by the method of construction and adequate allowance is made for the related stresses. The offered High Mast shall be a tested design.

Fabrication: -

A fabricated lantern carriage shall be provided for installation and holding the flood light fittings and control gearboxes. The lantern carriage shall be of special design and shall be of steel tube construction, the tubes acting as conduits for wires, with holes fully protected by grommets. The lantern carriage shall be so designed and fabricated to hold the required number of flood light fittings and the control gearboxes also have a perfect self-balance. The lantern carriage shall be fabricated in two halves and joined by bolted flanges with stainless steel bolts and nylon type stainless steel nuts to enable easy installation or removal from the erected mast. The inner lining of the carriage shall be provided with protective PVC arrangement, so that no damage is caused to the surface of the mast during the raising and lowering operation of the carriage. The entire lantern carriage shall be hot dip galvanized after fabrication.

Raising And Lowering Mechanism: -

For the installation and maintenance of the luminaries and lamps, it shall be necessary to lower and raise the lantern carriage assembly. To enable this, a suitable winch arrangement shall be provided, with the winch fixed at the base of the mast and the specially designed head frame assembly at the top.

Winch: -

The winch shall be of completely self-sustaining type, without the need for brake shoe, springs or clutches. Each driving spindle of the winch shall be positively locked when not in use, by gravity activated pawls. Individual drum also should be operated for fine adjustment of lantern carriage. The capacity, operating speed, safe working load, recommended lubrication and serial number of the winch shall be clearly marked on each winch.

The gear ratio of the winch shall be 53:1. However, the minimum working load shall be not less than 750 kg. The winch shall be self-lubricating type by means of an oil bath and the oil shall be readily available grades of reputed producers. The winch drums shall be grooved to ensure perfect seat for stable and tidy rope lay, with no chances of rope slippage. The rope termination in the winch shall be such that distortion or twisting is eliminated and at least 5 to 6 turns of rope remains on the drum even when the lantern carriage is fully lowered and rested on the rest pads.

It should be possible to operate the winch manually by a suitable handle and/or by an integral power tool. Operation of the winch with manual handle shall be independent of the power tool. Winches with manually operation through the power tools shaft shall not be accepted. Individual drum operation of the winch shall be possible. A Double drum winch shall have 2 drums and two worm gears independent in operation for increased safety. It shall be possible to remove the double drum after dismantling, through the door opening provided at the base of the mast. Also, a winch gearbox for simultaneous and reversible operation of the double drum winch shall be provided as part of the Contract.

The winch shall be type tested in presence of a reputed institution and the test certificates shall be furnished before supply of materials. A test certificates shall be furnished by the Contractor from the original equipment manufacturer, for each winch in support of the maximum load operated by the winch.

Head Frame: -

The head frame which is to be designed as a capping unit of the mast, shall be of welded steel construction, galvanized both internally and externally after assembly. The top pulley shall be of appropriate diameter, large enough to accommodate the stainless steel wire ropes and the multi-core electrical cable. The pulley block shall be made of non-corrodible material, and shall be of die-cast Aluminium Alloy (LM-6). Pulley made of synthetic materials such as plastic or PVC is not acceptable. Self-lubricating bearings and stainless steel shaft shall be provided to facilitate smooth and maintenance free operation for a long period.

The pulley assembly shall be fully protected by a canopy galvanized internally and externally. Close fitting guides and sleeves shall be provided to ensure that the ropes and cables do not dislodged from their respective positions in the grooves. The head frame shall be provided with guides and stops with PVC buffer for docking the lantern carriage.

Stainless Steel Wire Ropes: -

	The suspension system shall essentially be without any intermediate joint and shall consist of only non-corrodible stainless steel of minimum AISI 316 grade. The stainless steel wire ropes shall be of 7/19 (7 strands including 19 wires each), the central core of stainless steel material. The overall diameter of the rope shall not be less than 8mm. The breaking load of each rope shall not be less than 2350 kg giving a factor of safety of not less than 5 for the system at full load as per the TR-7. The end constructions of rope to the winch drum shall be fitted with talurit. The thimbles shall be secured on ropes by compression splices. Three continuous lengths of stainless steel wire ropes shall be used in the system and no intermediate joints are acceptable in view of the required safety. No intermediate joints/ terminations, either bolted or else, shall be provided on the wire ropes between winch and lantern carriage. **Power Tool For The Winch: -** A suitable high powered, electrically driven, internally mounted power tool, with manual override shall be supplied for the raising and lowering of the lantern carriage for maintenance purposes. The speed for the power tool shall be to suit the system. The power tool shall be single speed. Provided with motor of the required rating. The power tool shall be supplied complete with a suitable control switch so that the operation of the mast can be done at a safe distance. The capacity and speed of the electric motor used in the power tool shall be suitable for the lifting of the design load installed on the lantern carriage. The power tool mounting shall be so designed that it shall be not only self-supporting but also aligns the power tool perfectly with respect to the winch spindle during the operations. Also, a handle for the manual operation of the winches in case of problems with the electrically operated tool, shall be provided and shall incorporate a torque limiting device. There shall be a separate torque-limiting device to protect the wire ropes from over stretching. It shall be mechanical with suitable load adjusting device. The torque limiter shall trip the load when it exceeds the adjusted limits. There shall be suitable provision for warning the operator once the load is tripped off. The torque limiter is a requirement as per the relevant standards in view of the overall safety of the system. Each mast shall have its own power tool motor. **Electrical System, Cable and Cable Connections: -** A suitable terminal box shall be provided as part of the contract at the base compartment of the high mast for terminating the incoming cable. The electrical connections from the bottom to the top shall be made by special trailing cable. The cable shall be EPR (Ethylene Propylene Rubber) insulated and PCP (Polychloroprene) sheathed to get flexibility and endurance. Size of the copper cable shall be minimum 5 core 2.5 Sqmm of reputed make. At the top there shall be weatherproof (GI or 7 tank powder coated) junction box to terminate the trailing cable. Connections from the top junction box to the individual luminaries shall be made by using 3 core 1.5 Sqmm flexible PVC copper cables of reputed make. The system shall have in-built facilities for testing the luminaries while in lowered position. Also, suitable provision shall be made at the base compartment of the mast to facilitate the operation of internally mounted, electrically operated power tool for raising and lowering of the lantern carriage assembly. The trailing cables of the lantern carriage rings shall be terminated by means of

specially designed, metal clad, multi-pin plug and socket provided in the base compartment to enable easy disconnection when required.

Incoming Power Cable:

4x2.5 Sqmm copper conductor armored cable for motor supply shall be provided from High mast control panel to the base compartment of the high mast. Cable shall be taken to the base compartment of the high mast through the provision made with 63mm dia HDPE pipe embedded in foundation. Power cable of suitable size up to the feeder pillar from supply point shall be laid by the Contractor. All copper cables required are included in the cost of the tender.

Lightning Arrestor:

One number heavy duty hot dip galvanized lighting spike rod shall be provided for each mast. The lightning spike rod shall be minimum 1.2 meter in length and shall be provided at the centre of the head frame. It shall be bolted solidly to the head frame to get a direct conducting path to the earth through the mast.

Aviation Obstruction Lights:

Aviation lighting arrangement shall be made on the top of high mast system and two nos. light fittings shall be fitted on each high mast complete with wiring. The fittings shall be of Bajaj reference BJAOL-I or similar Philips/ Crompton make.

Earthing Terminals:

Suitable earth terminal using 12 mm diameter stainless steel bolts shall be provided at a convenient location on the base of the mast for lightening and electrical earthing of the mast.

High Mast Control Panel:

Each mast shall be provided with a control panel fabricated out of 14 SWG CRCA sheet (GI or 7 tank powder coated). It is to be mounted on a raised plate from above ground level. Construction endures suitability for outdoor use.

Basic components inside the control panel shall consist of the following: -

- 1X63 A TPN MCB for incoming supply
- 3X32 A SPN MCB for outgoing (50% lighting, 100% lighting, motor)
- Automatic Astronomical Timer with contactor of suitable capacity for control of lighting.
- 1 no. multi plug socket 16A for Auxiliary power supply.
- 2 nos. of contactors for forward and reverse operation of winch motor.

Control Panel shall be connected with the help of a cable to the remote control switch for raising and lowering of the lantern carriage. The power feed cable should be flexible, sheathed copper type and shall be connected between the control panel and the junction box on the lantern carriage. The control panel shall be suitable for outside use weatherproof.

Technical Data for High Mast and Components:

A. High Mast Structures:

i) Height of Mast : 20 Meter
ii) Material of construction: High tensile steel as per BSEN 10025

iii) Thickness (in mm)

Section	Thickness (20 Meter)
Top	3 mm
Middle	4 mm
Bottom	5 mm

iv) Cross section of mast : In polygon minimum 20 sides or as per design
v) No. of section of Masts : 3

vi) Base and top diameters : 150mm (minimum) at Top 560mm (minimum) as per design of manufacture for 20m

vii) Type of joints : Telescopic stress fit (slip over joint system) with no circumferential weld

viii) Thickness of galvanization : Minimum 75 Microns as per BSEN ISO 1461

ix) Size of opening of door at base : Not less than 950mm x 225mm

x) Length of overlap minimum : 1.5 times the diameter at penetration

B. Dynamic Loading:

i) Max. Wind speed : 50m/s
ii) Height forms the ground level : 10 Meter for measurement of wind Velocity
iii) Factor of safety for wind loads : More than 1.25
iv) Factor of safety for material : More than 1.15 (as per TR No.7)
v) Factor of safety of Tower : More than 1.5

C. Lantern Carriage:

i) Material of construction : G.I (Hot dip galvanized)
ii) Buffer arrangement between Carriage & mast. : PVC sleeves

D. Winch:

i) No. of winch per mast : One (Double drum)

	E. Method Of Operation: : MANUAL/ ELECTRICAL i) Lubrication : Self-lubricating permanent oil bath ii) Safe Working Load (SWL) of the winch : 750 Kg iii) Breaking system : In built iv) Gear ratio : 53:1 **F. Power Tool:** i) Power supply : 240 Volts, 50 C/S, AC supply ii) Speed of power tool : 1.2 meter/ min iii) Number of speeds : Single speed iv) Reversible/ non-reversible : Reversible v) Remote control switch a) Type : Push Button. b) Length of control cable : 5 Meter copper. **G. Foundation:** i) Type of foundation : Open raft shallow M-25 grade RCC type ii) Size of foundation : As per site conditions considered and as per design iii) Considered wind speed/ pressure : 200 Kg/ SqM iv) Design safety factor considered : 2.5 (minimum) **H. Stainless Steel Wire Rope:** i) Grade : AISI 316 or better Grade ii) Nos. of ropes : Not less than 2 continuous ropes iii) Construction : 7/19 iv) Center core material : Stainless steel wire. v) Breaking load capacity : 2350 Kg vi) Factor of safety : not less than 5 per rope as per TR-7 **I. Torque Limitor:** a) Lifting capacity : Up to 700 Kg b) Adjustable/ Non- Adjustable : Adjustable **J. High Mast Enclosure:** Each mast shall be completely enclosed from all sides with GI panels of dimensions 1200mmx1200mm (with GI Wire Mesh 25mmx25mmx5mm) with 50x6 mm GI stiffners and wire mesh shall be enclosed in GI angles 50x50x6mm. The enclosure shall have proper entrance supported with 75x75x8 mm GI angles and 50x6 mm GI flats as required with locking arrangement etc. This enclosure shall be embedded in M-25 grade concrete work as per site requirement and approved by the Engineer.
3.9	Design and Drawing of high masts, platform/street poles, digital timer, foundation, lighting lux calculations, earthing, calculation, survey, as built drawings etc. for item no. 3.1 to 3.8.
4 ELECTRICAL EQUIPMENTS (PUMPS, AIR-CONDITIONERS, UPS, WATER COOLER ETC.)	
4.1	**Supply of Submersible Pump Set of 7.5 kW:** Supply of submersible energy efficient pump set of 7.5 kW (3 star & above rated), 20 Stages, Head Range: 15 Metre or above, 15000 LPH or above, 440 V, 3-phase, AC complete with all accessories as per site requirement. The material shall conform to

	IS-8034, IS-9283 or as applicable.
4.2	**Supply, Installation, Testing and Commissioning of Automatic Control Panel For 7.5 kW, 440V, 3-Phase Submersible Pump:** Supply, installation, testing and commissioning of automatic control panel with star-delta starter for 7.5 kW three-phase submersible pump voltage 380 – 440 volt, 3-phase, AC, 50Hz, IP protection IP-52. The panel box shall be stainless steel or CRCA powder coated. The cables shall be copper including connections and providing cable from main board to control panel and connection for Water Level Controller (WLC) in bore well. Necessary switchgear including protection, meters, selector switch, pushbuttons etc. as required for successful operation of submersible pump shall be provided. The approval of Engineer shall be obtained.
4.3	**Installation, Testing and Commissioning of Submersible Pump Set of 7.5 kW:** Installation, testing and commissioning of submersible pump set of 7.5 kW with G.I. pipe, nuts, bolts, washer & rubber packing and copper flat cable. Interface shall be made with Civil agencies who shall be making the bore hole.
4.4	**Supply, installation, testing and commissioning of Mono-Block Pump 1.5 kW, 240V, Complete with All Accessories:** Supply, installation, testing and commissioning of single stage Mono-block open well submersible pump set with control panel rating 1.5 kW, Head range-26 meter and above, suction and delivery size shall be 50X40mm, Discharge (LPM):180 or above at 26-meter head, IP-55 protection, suitable for 240V, single phase, 50Hz, AC supply.
4.5	**Supply and Installation of G.I. Pipe 50 mm nominal dia Medium Class With Flanges and Sockets**: Supply and installation of delivery GI pipe B class 50mm dia as per IS-1239: Part-1 or latest for bore well/ open well with flanges/ sockets/ bends etc. as per IS-1239:Part-2 as required as per site conditions in 6 meter lengths or as per requirement.
4.6	**Supply and Installation of G.I. Pipe Fitting Bends, Sockets, Flanges, Delivery Valve, Non-Return Valve:** Supply and installation G.I. pipe fittings, bends, sockets, flanges, delivery valve and non-return valve and supporting clamps in set; all complete. The material shall conform to IS-1239:Part-2, IS-5312, IS-6392, IS-5290, IS-13095, IS-14846 etc. as applicable
4.7	**Supply, Installation, Testing, Commissioning Of 3 Core, 10 Sqmm Copper Flat Cable:** Supply, Installation, Testing, Commissioning of flat submersible cable copper, 3C x 10 sqmm for pump set ISI mark as per IS 694 Part-I latest.
4.8	**Supply of Mono Block Pump 3.75 kW:** Supply, installation and connecting of monoblock Horizontal/ sump pump, 3.75 kW, 20-25 meters Head, discharge 15000 LPH complete with all accessories. IP-55 protection, suitable for 440V, 3-phase, 50Hz, AC supply.

4.9	**Supply, Installation, Testing and Commissioning of Automatic Control Panel with DOL Starter for 3.75 kW Pump:** Supply, installation, testing and commissioning of automatic control panel with with DOL starter for 3.75 kW pump, voltage 440V, 3-phase, AC, 50Hz, IP protection IP-52. The panel box shall be stainless steel or CRCA powder coated. The cables shall be copper including connections and providing cable from main board to control panel. Necessary switchgear including protection, meters, selector switch, pushbuttons etc. as required for successful operation of pump shall be provided. The approval of Engineer shall be obtained.
4.10	**Installation, Testing and Commissioning of 3.75 kW Mono Block Pump Set:** Installation, testing and commissioning of horizontal type 3.75 kW, 440V, 3-phase, mono block pump complete with DOL starter and provide with all required accessories i.e. nut-bolts, clamps, valve etc. All supports shall be correctly aligned before connecting and masonry work if required shall be done by the Contractor. Piping work from sump to overhead tank with all required accessories like GI pipe, bend, copper cable, coupling etc. shall be done by Contractor. Interface shall be made with Civil agencies who shall be making the tank. The drawing of the system with piping etc shall be approved by the Engineer.
4.11	**Supply, Installation, Testing and Commissioning of 32A, 240V, DP MCB:** Supply, installation, testing and commissioning of Double Pole MCB of 32A, 240V, 10 kA C series shall be provided in the metal enclosure powder coated as per the site requirement and at locations as per the instruction of the site Engineer. The material shall conform to IS-2147, IS-8623, IS/IEC-60898 Part-1 etc as applicable.
4.12	**Supply, Installation, Testing and Commissioning of Heavy Duty 5 Star, 1.5 Ton Split Inverter Type Air Conditioner:** Supply, installation, testing and commissioning of 1.5 Ton heavy duty, 5-star inverter type Split air conditioner, with remote controlled, suitable for 240V, single-phase, 50Hz, AC supply along with 4kVA voltage stabilizer (range 190V to 280V) IC controlled with initial time delay. Suitable size GI nuts, bolts, fasteners, copper pipe with insulation, drain pipe & petty hardware shall be provided to complete the work in all respect along with the required refrigerant & maintain the pressure with Eco-friendly refrigerant. Necessary hole in wall, concrete etc as required shall be made for pipe laying and the surface shall be restored to original finish. All fixtures etc for installation of indoor unit and outdoor unit shall be provided. The outdoor unit shall rest on floor or wall or roof as per site requirement and heavy duty support fixtures shall be provided as required. The 3 core copper cable of suitable size from power point to indoor and outdoor unit shall be provided by the Contractor. The material shall conform to IS-694, IS-996, IS-10617, IS-10773, IS-11338 etc as applicable.
4.13	**Supply, Installation, Testing and Commissioning of Heavy Duty 5 Star, 2 Ton Split Inverter Type Air Conditioner:** Supply, installation, testing and commissioning of 2 Ton heavy duty, 5-star inverter type Split air conditioner, with remote control, suitable for 240V, single-phase, 50Hz, AC supply along with 5kVA voltage stabilizer (range

	190V to 280V) IC controlled with initial time delay. Suitable size GI nuts, bolts, fasteners, copper pipe with insulation, drain pipe & petty hardware shall be provided to complete the work in all respect along with the required refrigerant & maintain the pressure with Eco-friendly refrigerant. Necessary hole in wall, concrete etc as required shall be made for pipe laying and the surface shall be restored to original finish. All fixtures etc for installation of indoor unit and outdoor unit shall be provided. The outdoor unit shall rest on floor or wall or roof as per site requirement and heavy duty support fixtures shall be provided as required. The 3 core copper cable of suitable size from power point to indoor and outdoor unit shall be provided by the Contractor. The material shall conform to IS-694, IS-996, IS-10617, IS-10773, IS-11338 etc as applicable. In the ALH, 4 nos. air-conditioners shall be provided, 2 nos. each in signal equipment room and telecom equipment room. The air-conditioners of signal equipment room and telecom equipment room shall be provided with automatic switchover switches/contactor/timers etc so that each air-conditioner in the room work for 12 hours each or as programmed by the Engineer. In case of failure on one Air-conditioner of the room, the healthy air-conditioner shall work for 24 hours of the day.
4.14	**Supply, Installation, Testing and Commissioning of 2 KVA, 240 Volt, AC, Pure Sine Wave Online UPS cum Inverter:** Supply, installation, testing and commissioning of 2 kVA pure sine wave, online UPS cum inverter. The input supply shall be 240 Volt (range 170 volt to 265 volt), AC, and inverter full load output voltage shall be 230(+/-10%) volt. The unit shall consist of intelligent battery charging mechanism with adaptive battery charging with 150 AH tubular battery of voltage 12 volt (2 Nos.) suitable for heavy duty application with minimum two hours capacity. All features i.e meters, switches, overload and underload indications, input/output indications, charging current, battery voltage etc. shall be provided. The material shall conform to relevant IS specifications.
4.15	**Supply, Installation, Testing and Commissioning of Water Cooler (150 Litre):** Supply, installation, testing and commissioning of self-contained drinking water cooler 150 litre capacity (cooling capacity 150 litres per hour) [conforming to IS-1475 (part-1)], ISI marked, minimum 3-star rated, suitable for operation on 240 volt (+/- 10%), 50Hz, AC supply system. The unit shall be complete with all connected standard fittings, accessories etc. and 5 KVA, wall mounted, I.C. controlled electronic auto-voltage corrector conforming to relevant IS (latest version), suitable for operation on single phase 180 to 280 volts, 50Hz incoming AC supply and output 200 to 240 volts A.C. supply. All the indicating instruments, switches etc complete with time delay relay, voltmeter, instant start provision with push button switch etc. shall be provided. Necessary arrangement for provision of earthing of the unit shall be provided. Necessary platform of M-25 grade concrete or GI angle frame of 75x75x6mm size shall be provided as decided by the Engineer.
4.16	**Supply, Installation, Testing and Commissioning of 5 star rated storage geyser 25 litre capacity:** Supply, installation, testing and commissioning of 5-star rated storage geyser 25 litre capacity suitable for 240V, single-phase AC supply. All the

	required GI nuts, bolts, fasteners, petty hardware, connecting pipe assemblies, supply ON, Supply OFF indications etc shall be provided. Geyser shall be ISI/ BIS marked with 5-star rating. All safety provisions against bursting, overload trip etc shall be provided. Necessary hole in wall, concrete etc as required shall be made for installation of geyser and its accessories and the surface shall be restored to original finish after installation.
4.17	Design and Drawing of pumps, control panels, AC, water coolers, geyser, UPS, survey, calculation, as built drawings etc. for item no. 4.1 to 4.16.
5. SUBSTATION 11kV/ 0.44 KV, HT PANEL, LT PANEL, APFC PANEL, DG SET AND EARTHING	
5.1	**Supply, Installation, Testing and Commissioning Of 11kV/0.44kV, 1x250 kVA, Compact Substation (CSS):** Supply, installation, testing and commissioning of Compact Sub-Station (CSS) (11/0.440 kV) consisting of 11 kV, 630A Load break switch, 11kV Compact VCB panel (1 isolator + 1 outgoing ACB with air insulated BUS PT metering module) with DRY type Transformer (250 kVA) Capacity and LT Switchgear with all HT & LT inter-connections, accessories, fittings & auxiliary equipment inside GI enclosure. CSS shall include (1) 11 kV, 630 Amp load break switch; (2) 11 KV Compact VCB , 11 kV, 630 Amp; (3) 11 kV, 630 Amp off load break switch; (4) LT panel; (5) CT/ PT for Metering system; (6) all HT and LT cable with proper termination arrangement of suitable size and length; (7) suitable connection to H-pole arrangement with GO/DO (gang operated/drop out) switch (as required). Provision of earthing as per requirement and supply & installation of all safety items required for 11/0.44 kV substation as per rules. Payment of earthing shall be made under the designated item of earthing. Schematic Diagram of substation and Transformer Data, computer printed and suitably laminated, shall be provided. The material shall conform to detailed specification and drawings mentioned in the tender document. Necessary cable trench wherever required for the CSS, HT/LT Panels, APFC Panel, DG set, HT/LT metering system etc. for HT/LT cables shall be provided. Chequered plates of GI 8mm thick, with hook arrangement for lifting, with installation support arrangement of channel, angles etc. as required shall be provided.
5.2	**Supply, Installation, Testing and Commissioning of Automatic Power Factor Correction Panel (APFC panel) with 150 kVAR shunt capacitors complete in all respects:** Supply, Installation, Testing and Commissioning of Automatic Power Factor Correction Panel (APFC panel) with 150 kVAR, 440 V (+/- 10%), 3-phase, 50 Hz shunt capacitors complete in all respects. The APFC panel shall be fabricated out of 2 mm thick CRCA sheets modular 7 tank process powder coated, compartmentalized, free standing, floor mounting, front hinged doors for indoor use, removable bottom gland plates for incoming cables, dust and vermin proof (IP:42 protection) with 3-phase copper busbars, complete with busbar connection, internal wiring, name plates, painting (shade grey RAL 7032) etc. The APFC panel shall consist of 4x25 kVAR + 1x50 kVAR configuration of capacitors with 5 stage microprocessor based APFC relay. Capacitor shall be rated for 500 V, AC, incoming supply controlled by MCCB with fuses for backup protection. APFC shall have over voltage and over current protection. Automatic power factor control shall be intelligent microprocessor based of L&T/ ABB/ Schneider/ Siemens

	make. Capacitors shall be heavy duty type suitable for continuous operation of make L&T/ Neptune/ ABB/ Schneider. APFC panel shall have ventilation exhaust fan of suitable size. All nuts, bolts, washers and mounting channel shall be stainless steel or GI. Necessary arrangement of earthing shall be made (earthing payment shall be made under the designated item of earthing). APFC panel shall be connected with main LT panel and shall become operative when power factor goes below 0.98 lagging and shall not operate on leading power factor. The capacitors shall conform to IS:13340, IS:13341, IS:13925 (Part -1 & Part – 2) , and other applicable standards.
5.3	**Supply, Installation, Testing and Commissioning of Indoor Type 400A LT Panel:** Supply, installation, testing and commissioning of minimum 1.6 mm CRCA sheet steel fabricated, cubicle, powder coated as per standard 7 tank process having outdoor type LT panel distribution board, having suitable IP54 protection, floor mounted front operated, mounted on GI base channel of suitable size, with top/ bottom removable cable gland plate as required, earth bus, hinged and lockable doors, dust and vermin proof, complete with all inter connections, small wiring by minimum 2.5 sq. mm copper FRLS cables. The panel shall consist of (1) 2 nos. incoming 400A, 4 pole, MCCBs with microprocessor release having integral overload, short circuit, earth fault and neutral protection and breaking capacity 60 KA (Ices=100%Icu). (2) outgoing 2x250A, 4x125A, 4x100A and 6x63A, 4 poles, MCCBs with adjustable overload and adjustable short trip unit and breaking capacity 36KA (Ics=100%Icu). The panel shall be provided with over voltage protection with suitable relay. The copper bus bars shall be insulated by heat shrinkable sleeves. The copper earth bus shall also be provided for suitable length and capacity for earthing purpose. The instrument shall be of flush type ammeter, voltmeter, and selector switches with CTs, feeder name and danger board. APFC panel shall be connected to this LT panel. General arrangement and wiring diagram along with panel dimensions shall be supplied by the Contractor for approval of Engineer before fabrication of panel. Special tools shall be supplied with the panel. Danger notice plate shall be placed on the front. All metal structures shall be 7 tank process powder coated. The final finishing shall be smooth and attractive. Caution boards of anodised aluminium or stainless steel plate in English/ Hindi shall be provided. Schematic Diagram of LT Panel, computer printed and suitably laminated shall be provided. The foundation of panel and trenching (with M-25 concrete) with GI/ CC/ Stone cover work shall be provided. Circuit identification by means of engraved on poly propylene sheet as per design approved by Engineer shall be provided. The panel shall be fixed on GI Channel of 100x50x6mm size with lifting hooks also. The earthing arrangement terminals (2 nos.) shall be made in the panel. The material shall conform to IS/IEC-60947 part-2 ; IS/IEC-60898 Part-1 and other relevant specifications.
5.4	**Supply, Installation, Testing and Commissioning of Indoor Type 160A LT Panel:** Supply, installation, testing and commissioning of minimum 1.6 mm CRCA sheet steel fabricated, cubicle, powder coated as per standard 7 tank process having outdoor type LT panel distribution board, having suitable IP54 protection, floor mounted front operated, mounted on GI base channel of

	suitable size, with top/ bottom removable cable gland plate as required, earth bus, hinged and lockable doors, dust and vermin proof, complete with all inter connections, small wiring by minimum 2.5 sq. mm copper FRLS cables. The panel shall consist of (1) 2 nos. incoming 160A, 4 pole, MCCBs with microprocessor release having integral overload, short circuit, earth fault and neutral protection and breaking capacity 60 KA (Ices=100%Icu). (2) outgoing 2x125A, 2x100A and 3x63A with 4 poles, MCCBs with adjustable overload and adjustable short trip unit and breaking capacity 36KA (Ics=100%Icu). The panel shall be provided with over voltage protection with suitable relay. The copper bus bar shall be insulated by heat shrinkable sleeves. The copper earth bus shall also be provided for suitable length and capacity for earthing purpose. The instrument shall be of flush type ammeter, voltmeter, and selector switches with CTs, feeder name and danger board. Schematic Diagram of LT Panel, computer printed and suitably laminated shall be provided. General arrangement and wiring diagram along with panel dimensions shall be supplied by the Contractor for approval of Engineer before fabrication of panel. Special tools shall be supplied with the panel. Danger notice plate shall be placed on the front. All metal structures shall be 7 tank process powder coated. The final finishing shall be smooth and attractive. Caution board of anodised aluminium or stainless steel plate in English/ Hindi shall be provided. The foundation of panel and trenching (with M-25 concrete) with GI/ CC/ Stone cover work shall be provided. Circuit identification by means of engraved on poly propylene sheet as per design approved by Engineer shall be provided. The panel shall be fixed on GI Channel of 100x50x6mm size with lifting hooks also. The earthing arrangement terminals (2 nos.) shall be made in the panel. The material shall conform to IS/IEC-60947 part-2 ; IS/IEC-60898 Part-1 and other relevant specifications.
5.5	**Supply, Installation, Testing and Commissioning of Indoor Type 160A Essential LT Panel:** Supply, installation, testing and commissioning of minimum 1.6 mm CRCA sheet steel fabricated, cubicle, powder coated as per standard 7 tank process having outdoor type essential LT panel distribution board, having suitable IP54 protection, floor mounted front operated, mounted on GI base channel of suitable size, with top/ bottom removable cable gland plate as required, earth bus, hinged and lockable doors, dust and vermin proof, complete with all inter connections, small wiring by minimum 2.5 sq. mm copper FRLS cables. This panel shall receive LT supply from AMF panel (of DG set) and shall feed to (a) ACO panel for CLS load and (b) emergency station loads. The panel shall consist of (1) 2nos. incoming 160A with 4 pole, MCCBs with changeover provision (if required) with microprocessor release having integral overload, short circuit, earth fault and neutral protection and breaking capacity 60 KA (Ices=100%Icu). (2) outgoing 2x125A, 3x100A

	and 4x63A with 4 poles, MCCBs with adjustable overload and adjustable short trip unit and breaking capacity 36KA (Ics=100%Icu). The panel shall be provided with over voltage protection with suitable relay. The copper bus bars shall be insulated by heat shrinkable sleeves. The copper earth bus shall also be provided for suitable length and capacity for earthing purpose. The instrument shall be of flush type ammeter, voltmeter, and selector switches with CTs, feeder name and danger board. Schematic Diagram of LT Panel, computer printed and suitably laminated shall be provided. General arrangement and wiring diagram along with panel dimensions shall be supplied by the Contractor for approval of Engineer before fabrication of panel. Special tools shall be supplied with the panel. Danger notice plate shall be placed on the front. All metal structures shall be 7 tank process powder coated. The final finishing shall be smooth and attractive. Caution board of anodised aluminium or stainless steel plate in English/ Hindi shall be provided. The foundation of panel and trenching (with M-25 concrete) with GI/ CC/ Stone cover work shall be provided. Circuit identification by means of engraved on poly propylene sheet as per design approved by Engineer shall be provided. The panel shall be fixed on GI Channel of 100x50x6mm size with lifting hooks also. The earthing arrangement terminals (2 nos.) shall be made in the panel. The material shall conform to IS/IEC-60947 part-2 ; IS/IEC-60898 Part-1 and other relevant specifications.
5.6	**Supply and Installation of 3 mm Thick Rubber Mat:** Supply and Installation of (ISI marked) Rubber mat with thickness 3 mm as per IS: 15652 (2006).
5.7	**Supply, Installation, Testing and Commissioning of 125 kVA Capacity, Radiator Cooled Silent DG Set:** Supply, installation, testing and commissioning of 1x125 kVA DG set (440 volt, 3-phase, AC, 50 Hz, at unity power factor) suitable emergency operation at full load with acoustic enclosure, AMF panel and all other accessories, construction of plinth with materials as per OEM recommendations and approved drawing, first filling of lubricating oil, supply of High Speed Diesel oil required for testing, commissioning at site etc. The Diesel Engine at 75% rating shall produce alternator output of 125kVA at unity power factor. DG set shall be complete with radiator cooled heat exchanger, turbo charged, battery starting, 1500 rpm, diesel engine, 110% engine over speed set etc. conforming to BS-5514, ISO-3046, SAE J1349, IS-10000 and as applicable. Copper wound alternator (insulation H class) with suitable rating as per manufacturer, salient pole, synchronous, 440V, 3-phase, 50 Hz, short circuit ratio not less than 0.5, brushless exciter, air cooled, star connection with isolated neutral terminals, fast acting solid state voltage regulator, anti-condensation heater etc. conforming to IS-1271, IS-2253, IS-4722, IS-4728, IS-4889, IS-6362, IS-7132, IS-7306, IS-7816, IS-12065, IS-12075, IS-12802, IS-13364, IS-13118, IEC-60034 and as applicable. DG set shall include battery set, anti-vibration pads, fuel tank (400 litre capacity) and all other accessories/ equipment's/ protective devices, copper fuel pipe etc. The battery of 12V DC with 180AH capacity along with suitable battery charger and 2 core, 70 sqmm copper XLPE insulated cable between battery and starter shall be provided. AMF

	control panel fabricated with CRCA, 1.6 mm sheet, 7 tank process powder coated and comprising of incoming 4 pole, 400 Amps ACB (MDO) for DG Set, copper bus-bars, 4 pole, heavy duty contactors, multifunction panel meter for display of current and voltage on phases and lines, power factor, frequency, KWH, MD etc., LED indications lights including connections with single core 1.1 kV grade LT XLPE insulated copper conductor control cable between LT panel, AMF panel and alternator for auto and manual operation etc. DG set shall be provided with minimum protection of over-current relay, under voltage protection, under frequency protection, reverse power protection, field failure relay, single element over voltage relay with timer, PT fuse failure relay, over speed protection and any other protection required for proper functioning of DG set. Noise level shall be less than 75-dBA averages or as per latest CPCB norms whichever is less. The emission pollution level shall be as CPCB 4-Plus norm. Suitable exhaust with insulation and supports shall be provided. Foundation shall be with RCC M-25 grade (minimum). The material shall conform to CPWD specification Part-VII: DG sets (2013) and all the relevant and applicable IS/ IEC standards. All documents and design shall be submitted to Engineer for approval.
5.8	**Supply, Installation, Testing and Commissioning of Feeder Pillar:** Supply, installation, testing and commissioning of feeder pillar minimum size 900x600x300 mm fabricated from 1.6 mm thick CRCA sheet powder coated with 7 tank process suitable for outdoor installation with IP-54 protection , powder coated complete enclosed type dust and vermin proof, with gland plate in bottom as required. The connecting incoming & outgoing cables with copper lugs and brass glands, with (i) incoming 440V, 3-phase 63 amp, 4 pole MCCB, 35 kA and (ii) outgoing 4 nos. (three phase), 440V, 40A, 4 pole, 25 kA MCCB, (iii) outgoing 6 nos, 240V, 40A, 10 kA double pole MCB (iv) copper bus-bar 200 A in bus bar Chamber (v) indication lights, complete with locking arrangement with GI angle stand 600 mm height angle size 50x50x6 mm Grouted in M-25 grade concrete. Schematic Diagram of feeder pillar supplies and cabling shall be submitted to Engineer for approval.
5.9	**Supply, Installation, Testing and Commissioning of Earth Electrode Complete with RCC chamber etc.:** Supply, installation, testing and commissioning of the earthing system and earthing shall be done with 4 meter long, 19 mm dia, copper cladded steel electrode with minimum 250 micron copper cladding. RCC chamber with cover (M-25 grade concrete) along with 50 kg earth enhancing compound as per drawing shall be provided as per Employer's Requirements. Each earth electrode shall be connected with 40x6 mm GI flat with GI nuts, bolts, spring washer etc. The earth resistance shall be mentioned as per specification. The cost of 40x6mm GI flat shall be paid under the designated item.
5.10	**Supply, Installation, Testing and Commissioning of Earth Electrode buried in ground complete:** Supply, installation, testing and commissioning of earth system with 4 metre long, 19 mm dia copper cladded earth electrode with minimum 250 micron copper cladding, buried 500 mm below the earth with connections complete as required. The connections shall be made with 40x6 mm GI flat with GI nuts, bolts, spring washer etc. The earth resistance shall be

	mentioned as per specification or as approved by the Engineer. The earth system buried in earth shall be provided anti corrosion treatment. The cost of 40x6mm GI flat shall be paid under the designated item.
5.11	**Supply and Installation of 40x5 mm Copper Strip on Surface or in Recess or in GI Pipe**: Supply and installation of all materials including cost of copper strip of size 40x5 mm on surface or recess or digging in ground/ making chase in wall/ floor or in GI pipe and making good the damages, connections including soldering/ riveting etc. as required.
5.12	**Supply and laying of 40x6mm GI Flat:** Supply and laying 40mm x 6mm G.I strip for earth connection on the ground, below the ground, on wall or recess etc as applicable as per site including bending, cutting, welding, drilling holes, nuts, bolts, washers etc. The GI strip shall be in compliance to IS-1730 for mild steel strips /flats and IS 4826 for hot-dip galvanization coating on steel strip/flat. The price also include air terminal conductor provision for building lightning protection.
5.13	**Supply and Installation of 5 mm Dia GI Wire:** Supply and installation 5 mm dia GI Wire on surface or in recess for earthing as required. The GI wire shall be in compliance to IS 280 for mild steel wire and IS 4826 for hot-dip galvanization coating on round steel wire.
5.14	**Supply, installation, testing and commissioning of CO2 Panel Flooding System for length above 6000mm** - Fire Trace Tube system for Panel with size: Panel length above 6000 mm.
5.15	**Supply, installation, testing and commissioning of CO2 Panel Flooding System for length upto 6000mm** - Fire Trace Tube system for Panel with size: Panel length up to 6000 mm.
5.16	Design and Drawing of Sub-station, LT panels, APFC Panel, DG set, earthing, feeder pillar, fire trace system, as-built drawings, calculations, survey etc. for item no. 5.1 to 5.15.
6 FIRE FIGHTING EQUIPMENTS	
6.1	**Supply and Installation of Safety Items in the Substation:** Supply and installation of First Aid Box with medicine (ISI mark) and associated materials, Shock Treatment Chart on Aluminium frame, (a) First Aid Box (ISI mark) complete with medicines – 2 set (b) Electric Shock Treatment Chart (large size) with Aluminium frame and laminated as approved – 5 nos.
6.2	**Supply and installation of Set of 04 fire buckets (10 litre) capacity with one GI stand and GI cover:** Supply and installation of set of 04 stainless steel fire buckets (10 litre) capacity; with one GI stand and GI cover of thickness minimum 2mm supported with suitable GI angles at suitable location as approved by Engineer.
6.3	**Supply and installation of Portable fire extinguisher Dry Chemical Powder** as per IS 2171, ISI marked (5 kg). Necessary installation shall be done and fixing arrangement drawing shall be approved by the Engineer.
6.4	**Supply and installation Carbon dioxide fire extinguishers, capacity 4.5 kg:** complete as required (CCOE Nagpur approved cylinders) capacity 4.5 kg ISI marked IS: 2878. Necessary installation shall be done and fixing arrangement drawing shall be approved by

	the Engineer.
7 VIADUCT LIGHTING	
7.1	**Provision of 22 Watt LED with bulkhead Light Fitting on viaduct:** Supply, installation, testing & commissioning of Energy efficient 22 Watt LED with bulkhead light fitting on viaduct with pressure die cast aluminium housing with driver & suitable fixing arrangement, IP-67 for outdoor application, operating voltage (140-270) V AC, system efficacy more than 100 lumen/W, wattage of each LED shall be greater than 1 W and less than 3 W, complete with all accessories of approved make etc. The life of LED lamp shall be minimum 50000 hours. The light fitting shall be provided on side railings of both sides of viaduct. The item price includes labour and cost of all materials including cost of FRLS PVC insulated multi-stranded single core copper conductor cable used for connection to light fitting from the terminal or junction box etc, earthing connection etc. The bulkhead light fittings shall be provided every 15 m to 20m distance. The illumination between the mid point area of two lights shall not be less than 10 lux. The uniform lux ratio (minimum to maximum lumens) shall not be less than $1/10^{th}$ across the installations on the viaduct. The Contractor shall submit dialux calculations and design for approval of the Engineer. The luminaire shall conform to IEC 60598. Provision of modular digital timer for automatic operation of viaduct LED light shall be made as per details given in Section C-3 (Item No. 6) and payment will be made in that section.
7.2	**Laying of 2 Core x 70 sqmm LT Cable In Viaduct/ Tunnel/ Air etc.:** Laying and commissioning of 2 Core x 70 Sqmm LT, XLPE insulated armoured sheathed copper cable between (a) IMT Sohna station to a point on viaduct and (b) viaduct point to substation on tunnel shaft. The point on viaduct shall be such that cable length on both sides i.e. to IMT Sohna station and tunnel shaft substation shall be equal. The cable shall be laid in viaduct/ tunnel/ air/tunnel shaft, as required. Clamping with G.I. Saddles/ clamp of proper size suitable for 2 Core x 70 Sqmm LT cable with all accessories shall be provided for the laying of cable. The fixing arrangement shall not become loose due to train vibrations. Before and after laying of cable, the IR value shall be checked. While laying the cable, care shall be taken to avoid any damage to outside insulation of cable. Armouring at both ends of the cables shall be earthed. At termination point of cable suitable lugs and brass glands of suitable size and good quality shall be provided. The Contractor shall restore the original condition of the concrete flooring/ viaduct/ tunnel after laying of cable. Bending radius of the cable shall not be less than 16 times of dia. of the cable. Wherever, the cable emerges out of the ground at least two loops of sufficient radius should be laid. Installation of cable along with wall/ pole/ viaduct/ tunnel, wherever required, shall be done with support of G.I. saddles/ clamp of proper size and GI Pipe as required. Breaking of floor/ wall/ viaduct/ tunnel and other civil structures and repairing up to original condition, shall be done by the Contractor, and no extra cost shall be paid for it. Track crossing, if required, shall be arranged by the Contractor in coordination with Engineer. All the instruments required for insulation testing, high voltage testing shall be arranged by the Contractor at his own cost. The cable shall be transported by the Contractor through his own means from major electrical depot to required site of work. Before

	transportation of the cable, it shall be tested at site to ascertain the serviceability of the cable by the Contractor. The work shall conform to IS-1255. All stainless steel/ GI Saddle Clamp of proper size shall be provided at every one metre, for support of 2 core x 70 sqmm copper cable including stainless steel screw, washer-nut-bolt, drilling etc. all complete. The clamps shall not come out or become loose due to vibrations. GI earth wire of 10 mm dia shall run from IMT Sohna station to Tunnel shaft substation along with each cable properly clamped. The earthing of cable armour shall be done at each end of the cable with proper clamps. Each junction box shall be earthed with this earth wire by suitable T-clamps as required. The viaduct railing (if railing length is more than 20m) shall be earthed with 10mm dia GI wire with suitable connectors. Necessary interface by the Contractor shall be made with the concerned civil Contractor. The price include 10 mm dia GI wire supply, laying and connection wherever required. The GI wire shall be in compliance to IS 280 for mild steel wire and IS 4826 for hot-dip galvanization coating on round steel wire. The approval of Engineer of method statement of cable laying, earthing and drawing shall be obtained before start of work.
7.3	**Laying of 2 Core x 10 Sqmm LT Cable In Viaduct/ Tunnel/ Air etc.:** Laying and commissioning of 2 Core x 10 Sqmm LT, XLPE insulated armoured sheathed copper cable between junction boxes having double pole (DP) MCB to the light fittings. The cabling arrangement shall be such that each DP MCB shall cater to supply power to 10-15 nos. of LED lights on the viaduct. The 2 Core x 10 Sqmm copper cable shall be laid in viaduct as required. Clamping with G.I. Saddles/ clamp of proper size suitable for 2 Core x 10 Sqmm LT cable with all accessories shall be provided for the laying of cable. The cable shall have loop-in loop-out in suitable size junction box (stainless steel or 7 tank process powder coating) with necessary termination at every LED light fitting. Before and after laying cable, the IR value shall be checked. While laying the cable, care shall be taken to avoid any damage to outside insulation of cable. Armouring at both ends of the cable should be earthed. At termination point of cable suitable lugs and brass glands of suitable size and good quality shall be provided. The Contractor shall restore the original condition of the concrete flooring/ viaduct after laying of cable. Bending radius of the cable shall not be less than 16 times of dia. of the cable. Installation of cable along with wall/ viaduct wherever required shall be done with support of G.I. Saddles/ clamp of proper size and GI Pipe as required. Breaking of floor/ wall/ viaduct and other civil structures and repairing up to original condition, shall be done by the Contractor, and no extra cost shall be paid for it. All the instruments required for insulation testing, high voltage testing shall be arranged by the Contractor at his own cost. The cable shall be transported by the Contractor through his own means from major electrical depot to required site of work. Before transportation of the cable, it shall be tested at site to ascertain the serviceability of the cable by the Contractor. The work shall conform to IS-1255.

	For earthing of LED light fittings, single core PVC insulated multi-stranded copper cable 6 sqmm size shall run from each junction box to all LED fitting with each 2Cx10 sqmm cable properly clamped. The earthing of each LED bulkhead light fitting shall be done and this earth cable shall terminate at junction box and shall be properly earthed with junction box. The price include PVC insulated multi-stranded 6 sqmm copper cable supply, laying and connection wherever required. The approval of Engineer of method statement of cable laying and drawing shall be obtained before start of work.
7.4	**Supply and Installation of Junction Box Size 250(H)x200(B)x105(D) mm:** Supply and installation of junction box size 250(H)x200(B)x105(D) mm comprising stainless steel material with 1.6 mm thick sheet having power coating with 7 tank processes with rubber gasket, padlock arrangement, zinc passivated earth bolt, etc. with terminals suitable for 240V supply requirement. All busbars and terminals in the junction box shall be of copper material. The junction box shall be IP 65 outdoor type for cable entry with terminals for connection of viaduct lighting. The box shall be fixed robustly with clamps at pole/ wall/ handrail as per requirement. The junction box shall be installed at every 400m on viaduct. The junction box shall enable loop-in loop-out of 2 core x 70 sqmm copper cable and shall have 2 nos. 6A, double pole MCB for supply of power to LED lights on both sides of junction box.
7.5	Design and Drawing of Viaduct lighting, cabling, earthing, calculation, survey, as-built drawings etc for item no. 7.1 to 7.4.
8 MISCELLANEOUS	
8.1	**Supply, Installation, Testing and Commissioning of 25 Litre Fully Automatic with Auto Cut-Off RO water purification system:** Wall mounted potable water purification system (Reverse Osmosis), 240V, AC with inbuilt storage tank (stainless steel type), minimum inlet pressure 1 kg/cm^2, Maximum inlet pressure 3.5 kg/cm^2, High pressure pump, Micron filter and also confirming to ISO 9001:2015, ISO 14001:2004, IS 10500 or latest. All the accessories required for installation of this system on wall/ structure shall be provided and after installation the wall shall be restored to the original finish by the Contractor.
8.2 & 8.3	**Supply, Installation, Testing and Commissioning of Single Sided and Double Sided LED Signage Board:** Supply, installation, testing and commissioning of LED back lit single & double sided signage boards with IP-65 CRCA housing, vinyl print on acrylic sheet which is back lit with high grade, high brightness LED modules inbuilt Switch Mode Power Supply (SMPS) driver, without battery backup. Operating voltage 80-270V AC. LED with L70 life of minimum 50,000 hours, LPM technology, including fabrication and supply of clamping arrangements. The Engineer Authorities shall decide the size, colour & content to be printed on the signage Board. Signage Board shall be prewired with flexible copper cable and terminated in a connector from where 3-core flexible cable shall be brought out for connecting the board to ceiling rose, as per site requirement. The body of Glow sign board to be connected with earth. The pictogram and letter of desired colour and size made by translucent vinyl sheet cut through computerized machine shall be

pasted on acrylic sheet. Acrylic sheet with pictogram shall be fixed on CRCA/ GI sheet powder coated box with suitable arrangement. Subject matter and pictogram can be seen in the standard book of signage available in office. The installation shall be done with GI or stainless steel nuts/ bolts/ washers etc.

LED Signage Board:- Depth of box shall be approximately 100 mm (for single sided) 140mm (for double sided) and made by 0.8 mm thick CRCA/ GI sheet with powder coated having louvers for ventilation on two sides having suitable gaskets for protection against water and vermin ingress. Louvers should be covered with wire mesh to avoid entry of insects/ lizards of suitable size as per requirement. LED light shall be provided inside the box in such way that intensity of light on both side of box (no dark spot) remains same. Individual Switch Mode Power Supply (SMPS) operated from AC source ranging from 80V to 270 Volts, 50 Hz AC, single phase shall be supplied in each board and fitted in such way that no impression is appeared outside the board. The box is to be fitted in shed with approx. size 40x40x5 mm slotted angle nut bolt etc. at a minimum clear height.

Script slogan shall be advised to the Contractor by the Site Engineer.

LED:- Clear cool white colour 5 mm LEDs of uniform intensity and luminosity shall be used for excellent Visibility. The intensity of the illumination is such that it shall be possible to read the information clearly from a distance of minimum 20 meters. NICHIA/ PHILIPS/ LUMILIDE/ AVAGO/ Seol semiconductor/ OSRAM make LED with L70 life of minimum 50,000 hours and with specified parameters as per latest data sheet of Original Equipment Manufacturer shall be used.

SMPS:- All power supply units supplied are Switch Mode Power Supply type (SMPS) operated from AC source ranging from 80V to 270 Volts, 50 Hz AC, and single phase. All the power units are tested at 50% load of maximum working capacity. Protection against transient coming in the power supply source or generated by some other source is provided. Protection against voltage fluctuations of short durations is also provided.

Signage board has following specifications:

Acrylic sheet thickness	3 mm
Dimension of LED module	295 mm x 295 mm or 600 mm x 295 mm approx.
Protection	IP-65
LED System Wattage	6 W max per square feet
LED Wattage	0.06 W per LED
Luminosity	700 mcd
LED Color	Cool White
Viewing Angle	70 Degree
Solid Angle	70 Degree
Distance between LEDs	1.5" Diagonally
No. of LEDs in each module	72 (for 295 mm x 295 mm)
Lux level inside the surface	≥3400 Lux @ 2" +/- 10%
Color Temperature	5500K/ 6500K

8.4	**Dismantling of Rail Pole, Cable Pole, Overhead Line, Cable Tray Complete:** The Contractor shall cut the rail/ pole 300 mm below the ground and released material shall be handed over to store of owner (IR/ DFC etc.) or any other site as per instruction of the Engineer with own cost and transport. The site shall be properly finished. The dismantling of overhead line /cable tray of length upto 100 m each shall be considered as one number and material shall be handed over to IR/DFC. Material deposit certificate in this regard shall be handed over to the Engineer.
8.5	**Supply and Installation of GI Cable Duct 40x60 mm (wxh) Minimum 2 mm Thick:** Supply and installation of GI cable duct 40 x 60 mm (w x h) minimum 2 mm thick and fixing as per site requirement. All drilling work, hole in wall, suspenders, anchors bolts, angle supports, nuts, bolts etc shall be provided. The wall/floor may involve dismantling and the same shall be restored to the original finish.
8.6	**Supply and Installation of Stainless Steel Wire Mesh 25mm X 25mm (of 5 mm dia wire) Welded on GI Angle:** Supply and installation of Stainless Steel Wire Mesh 25mm x 25mm (of 5 mm dia steel wire) welded on GI angle frame 30x30x3 mm which is fixed on base GI angle frame of 50x50x6 mm and 40x6 mm GI flat in center to support the mesh. Necessary GI nuts, bolts, washers etc shall be provided. The grouting of GI angle 50x50x6 mm or as required shall be done in M-25 grade concrete.
8.7	**Supply, Installation, Testing and Commissioning of GI Perforated Cable Tray of Size 150x50 mm with Thickness 1.6 mm:** Supply, installation, testing and commissioning of the hot dip galvanized perforated cable trays of Size 150x50 mm with thickness 1.6 mm and their fittings shall conform to the Indian Standards or their latest amended editions or equivalent International Standard. All drilling work, holes in wall, suspenders, anchors bolts, angle supports, nuts, bolts etc shall be provided. The wall/floor may involve dismantling and the same shall be restored to the original finish.
8.8	**Spares:** Supply and Testing of maintenance spares. (1) Digital earth testers: Mains operation & rechargeable battery operation, 0-20-200-2000 Ohms, Short circuit current 6 mA, noise rejection 8 mA, Guard out parallel leakage resistance with a max error of 2%, IP65 rated & CAT IV rating, Safety - IEC1010-1, EMC-IEC61326-1. (2) Earth Leakage Detector 1000 V: Range: 0-30 mA/300 mA/30 A/300 A, 0.01 mA resolution for measuring earth leakage currents, Jaw Opening 40 mm, Analogue Bar graph Display for trending, 300 V phase to earth and 500 V phase to phase CAT III or 600 V CAT II double insulated, Safety - IEC1010-1, EMC-IEC61326-1. (3) Digital Insulation Tester 2.5 kV: 2.5 kV Insulation Tester measurement consisting of selectable measurement voltage in the 100…2500 V range with 100 V step,

	continuous indication of 2.5 kV insulation resistance or leakage current, automatic discharge of capacitance of tested object after the insulation resistance measurement, acoustic signalling of five-second periods to facilitate obtaining time characteristics, indication of actual test voltage during the measurement, protection against measuring live objects, two and three-lead measurement method, Continuity measurement of protective and equipotential conductors according to EN 61557-4 with the >200 mA current, Leakage current measurement, Measurement of alternating and direct voltages, Built-in rechargeable battery pack. The instruments meet the requirements of the EN 61557 standard. (4) Digital Insulation Tester 0 – 1000 V: Measures Insulation Resistance, Continuity and AC Voltage, Three rated test voltages of 250V, 500V and 1000V, IR measurement upto 2000MΩ, Robust Design: Protection class IP54, 200mA current for continuity measurement, Auto discharge of test voltage, Meets international safety standards EN 61010-1 CAT III 600V. (5) Digital Vernier Caliper: Top quality material, 150mm measuring range, Precision reading, laser reticle, Measuring Range: 0-150 millimeter, Resolution: 0.01 millimeter, Repeatability: 0.01 millimeter, Maximum measurement speed: 1m/s, Power: 1 x 1.5V LR44 cell (included), Size: 237 x 76 x 11 millimeter for caliper 40 x 15 millimeter for LCD screen. (6) Portable Diesel Generating set 3 kVA 240 V A.C.: Portable Diesel Air Cooled Generator Set, 3KVA Application, 3KVA Generator generally used for generating electricity purpose (exp: lighting, power supply-purpose and for heavy power services) in offices, Institutes etc. because of their constant voltage property. Max AC Output: 3KVA, Rated AC Output: 3kW, Rated Voltage: 240 V, AC Frequency: 50Hz, Engine Output: 3.8kW, Fuel Type: Diesel, Fuel Consumption: 750ml/hr, Starting System: Recoil and Self Start Both, Engine Type: 4-Stroke, Air Cooled, Cylinder: Single. (7) Digital Micro Meter: Range: 325-350 mm, Digital step: 0.001 mm, maximum permissible error: +/- 6 µm, accuracy: +/- 6 µm, flatness: 0.6 µm, display: LCD, character height 7.5mm, power supply: 2 batteries SR-44, measuring spindle: with spindle lock, 8mm dia, spindle pitch 0.5mm etc. (8) Digital Multi-meter: 1000V AC/DC; 10A AC/DC (with test leads and current jacks); resistance to 50 MΩ; capacitance to 10,000 µF, frequency to 100 kHz; temperature from -10 ℃ to 60 ℃, Robust, fast and accurate with manual and automatic ranging, Display Hold, Auto Hold, and Min/Max-Average recording, Backlit digital display. (9) Safety Helmet: Straps should be fitted such that minimum clearance be at least 30 mm and maximum clearance more than 80 mm. Chin strap should have minimum width of 19 mm and directly attached to shell. Nape strip should have minimum depth of 115 mm. The mass of helmet without attachments should be 400 g. (10) Tool Kit box having impact drill, 1-piece case, masonry drill bits, wood drill bits, allen keys, 10-pieces hex bits, sockets, screws, wall plugs, 7-pieces wrenches (size 8/9,10/11,12/13,14/15,16/17,18/19,21/22), 1-piece magnetic bit holder, 1-piece cutter, 1-piece hammer, 1-piece plier, 1-piece long nose plier, 1-piece 1/4-inch adapter and 1-piece socket etc. (11) Portable grinder Electrically operated: An electric angle grinder is a hand-operated tool that is powered by electricity and is used with several attachments for grinding, cutting and polishing. Power consumption: 660W, disc diameter: 100mm, no load speed: 12000 rpm, voltage: 220 V, weight: 1.5 kg, with power supply cord etc. (12) Portable Electric drill: Max. Drilling Diameter: 16mm, Size: 6.5-16.0mm, No-Load Speed : 330-2700 RPM, Rated Voltage : 220V, Frequency : 50 Hz, Rated Input Power : 305-1600W.

8.9	**Operation and Maintenance Manuals:** Preparation of Operations and Maintenance Manuals and supply of requisite hard bound copies and in soft copies (pdf and word format) as per Employer's requirement.
8.10	**Training to Staff:** Imparting Training to Employers/ Engineer Staff in Classroom and at Site. Preparation of Training manuals for supply to each Trainee in hard bound copy. Supply of requisite hard bound copies and in soft copies (pdf and word format) as per Employer's requirement.

Notes:

1. The make of material shall be as per Reference list.
2. The plastering shall be done with 1:4 (cement : sand ratio) and concrete grade shall be minimum M-25. The brick class designation shall be minimum 10. The painting and distempering etc shall match the original finish.
3. The specifications, wherever mentioned, shall be latest or with latest amendment. Contractor to provide specifications, if not included in the tender document, as applicable. The indicative list of Standards is given in the tender document for reference purpose for all items of BOQ.
4. Prices of all items mentioned in each price schedule are included in the respective price schedule of BOQ.

Danger notice boards, danger signs and warning boards, indication boards etc. shall be provided at all 440V and above voltage rated equipments and prices of these shall be considered inbuilt in the respective prices.

Tender No. HORC/HRIDC/C-5/2023

Attachment 5

to

Corrigendum No. 1

Part 2, Section VII-8: Employer's Requirements-Tender Drawings and Documents

1. Section VII: 8A: List of Tender Drawings/R1
2. Section VII: 8A: Revised and New Drawings
3. Section VII: 8B: List of Documents/R1
4. Section VII: 8B: List of Charted Utilities/R1
5. Section VII: 8B: Additional Geotechnical Investigation Reports

1. Section VII: 8A: List of Tender Drawings/R1

Section VII-8A
Tender Drawings

List of Revised and New Additional Tender Drawings are enclosed hereunder.

List of Tender Drawings / *R1*

	- **Black colour shows Tender drawings which have not been revised**
	- **Blue colour shows Tender drawings which have been revised**
	- **Red colour shows New additional Tender drawings**

I. Civil Drawings

S. No	TITLE	DRAWING NO.
1. ALIGNMENT PLAN & L-SECTION		
1.	Conceptual Plan & longitudinal section (-2.296KM to -0.6KM)	GC-HRIDC-ALL-DRW-ALN-P&P-(-2.296) - (-0.6) KM_A0
2.	Conceptual Plan & longitudinal section (-0.6 KM TO 0.0 KM)	GC-HRIDC-ALL-DRW-ALN-P&P-(-0.6) - (0.0) KM_A0
3.	Conceptual Plan & longitudinal section (0.0 KM TO 5.0 KM)	GC-HRIDC-ALL-DRW-ALN-P&P-0-5KM_A1
4.	Conceptual Plan & longitudinal section (5.0 KM TO 10.0 KM)	GC-HRIDC-ALL-DRW-ALN-P&P-5-10KM_A0
5.	Conceptual Plan and longitudinal section (10.0KM to 15.0KM)	GC-HRIDC-ALL-DRW-ALN-P&P-10-15KM_A2
6.	Conceptual Plan and longitudinal section (15.0KM to 20.0KM)	GC-HRIDC-ALL-DRW-ALN-P&P-15-20KM_A2
7.	Conceptual Plan & longitudinal section (20.0 KM TO 25.0 KM)	GC-HRIDC-ALL-DRW-ALN-P&P-20-25KM_A1
2. ESP/YARD PLAN		
1.	Detailed Design Yard Layout Plan for New Prithala Junction Station.	14YLPLT4103 Rev 2 dated 22.09.2023
2.	Conceptual Engineering Scale Plan Prithla Junction Yard Ch:00m F/Prithla	GC-HRIDC-C5-DRW-STN-ESP-PRI01_A0
3.	Conceptual Engineering Scale Plan Silani Station Yard CH:10341.882m F/Prithla	GC-HRIDC-C5-DRW-STN-ESP-SIL01_A0
4.	Conceptual Engineering Scale Plan IMT Sohna	GC-HRIDC-C5-DRW-STN-ESP-SOH01_A1
3. STATION BUILDING AND SUBWAY		
1.	Conceptual Plan of Prithla Station & Subway No. 8 & 8A	GC-HRIDC-C5-DRW-STN-SAD-PRI01_A0 (Sheet 1 of 3)
	Conceptual Architectural Drawing Prithla Station Building	GC-HRIDC-C5-DRW-STN-SAD-PRI01_A1 (Sheet 2 of 3)
	Conceptual Architectural Drawing Prithla Building	GC-HRIDC-C5-DRW-STN-SAD-PRI01_A1 (Sheet 3 of 3)

S. No	TITLE	DRAWING NO.
2.	Conceptual Plan of SILANI Station and Subway No. 39 & 39A	GC-HRIDC-C5-DRW-STN-SAD-SIL01_A0 (Sheet 1 of 1)
3.	Conceptual Plan of Sohna Station and Subway No. 66 & 66A	GC-HRIDC-C5-DRW-STN-SAD-SOH01_A0 (Sheet 1 of 3)
	Conceptual Architectural Drawing IMT Sohna Station Building	GC-HRIDC-C5-DRW-STN-SAD-SOH01_A1 (Sheet 2 of 3)
		GC-HRIDC-C5-DRW-STN-SAD-SOH01_A1 (Sheet 3 of 3)
4. BRIDGES		
4.1 MINOR BRIDGES		
4.1.1 MAIN LINE		
1.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No.6 1x 2x 2m RCC Box at Ch.-574.471	GC-HRIDC-C5-DRW-BRD-GAD_01006_A0
2.	Conceptual General Arrangement Drawing For Road Under Bridge No. 07, Span 1.0x4.6x5.65 RCC Box at Ch:-252.537	GC-HRIDC-C5-DRW-BRD-GAD_01007_A0
3.	Conceptual General Arrangement Drawing For Road Under Bridge No. 09 Span 1.0x4.6x4.15 RCC Box at Ch:139.953	GC-HRIDC-C5-DRW-BRD-GAD_01009_A0
4.	Conceptual General Arrangement Drawing For Balancing Culvert + RUB Bridge No. 10 Span 1x5.2x5.0 + 1x4.7x5 RCC Box at Ch: 371.033 (CANAL CROSSING DHATIR DISTRIBUTORY RD 25000)	GC-HRIDC-C5-DRW-BRD-GAD_010010_A1
5.	Conceptual General Arrangement Drawing For Road Under Bridge No 11 Span 1x4.6x4.15 RCC Box at Ch: 958.395	GC-HRIDC-C5-DRW-BRD-GAD_01011_A0
6.	Conceptual General Arrangement Drawing For Road Under Bridge No 13 Span 1x4.60x4.15, RCC box at Ch: 2034.968	GC-HRIDC-C5-DRW-BRD-GAD-01013_A0
7.	Conceptual General Arrangement Drawing For RUB + Balancing Culvert Bridge No. 14 Span 2x5.2x4.15 RCC Box at Ch: 2493.015 (CANAL CROSSING CHANDPUR MINOR RD 6500)	GC-HRIDC-C5-DRW-BRD-GAD_01014_A1
8.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 15 Span 1x2x2 RCC Box at Ch: 3153.203	GC-HRIDC-C5-DRW-BRD-GAD_01015_A0
9.	Conceptual General Arrangement Drawing For Road Under Bridge No. 18 1x9.75mx6.70m RCC Box at Ch.4373.615m	GC-HRIDC-C5-DRW-BRD-GAD_01018_A0
10.	Conceptual General Arrangement Drawing For Road Under Bridge No 19 Span 1.0x4.6x4.15 RCC Box at Ch: 4858.791	GC-HRIDC-C5-DRW-BRD-GAD-01019_A1

S. No	TITLE	DRAWING NO.
11.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No 20 Span 1x2.0x2.0 RCC Box at Ch.4891.994	GC-HRIDC-C5-DRW-BRD-GAD-01020_A1
12.	Conceptual General Arrangement Drawing For Road Under Bridge No. 21 1 x 4.6 x 4.15m RCC Box at Ch.5340.10m	GC-HRIDC-C5-DRW-BRD-GAD_01021_A0
13.	Conceptual General Arrangement Drawing For Road Under Bridge No. 22 1x 4.6 x 4.15m RCC Box at Ch.5807.675m	GC-HRIDC-C5-DRW-BRD-GAD_01022_A0
14.	Conceptual General Arrangement Drawing For Balancing Culvert No. 23 1x 3 x 3m RCC Box at Ch.6409.986m	GC-HRIDC-C5-DRW-BRD-GAD_0023_A0
15.	Conceptual General Arrangement Drawing For Road Under Bridge No. 24 1x 4.6 x 4.150 m RCC Box at Ch.6881.539m	GC-HRIDC-C5-DRW-BRD-GAD_01024_A0
16.	Conceptual General Arrangement Drawing For Road Under Bridge No 25 Span 1.0x4.60x4.50 RCC Box at Ch: 7548.737	GC-HRIDC-C5-DRW-BRD-GAD-01025_A0
17.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 27 Span 1x2x2 RCC Box at Ch: 7941.374	GC-HRIDC-C5-DRW-BRD-GAD_01027_A0
18.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 29 Span 1x2x2 RCC Box at Ch: 8141.419	GC-HRIDC-C5-DRW-BRD-GAD_01029_A0
19.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 31, 1 x 4 x 3.0m RCC Box at Ch.8593.734m	GC-HRIDC-C5-DRW-BRD-GAD_01031_A1
20.	Conceptual General Arrangement Drawing For Balancing Culvert No. 32 1x4.0x3.7m RCC Box at Ch: 8891.591m	GC-HRIDC-C5-DRW-BRD-GAD_01032_A0
21.	Conceptual General Arrangement Drawing For Road Under Bridge No. 33 1 x 7.00 x 4.15m RCC Box at Ch.9293.620m	GC-HRIDC-C5-DRW-BRD-GAD_01033_A0
22.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 35 Span 1x2x2 RCC Box at Ch: 9591.677	GC-HRIDC-C5-DRW-BRD-GAD_01035_A0
23.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 36 Span 1x2x2 RCC Box at Ch: 9882.453	GC-HRIDC-C5-DRW-BRD-GAD_01036_A0
24.	Conceptual General Arrangement Drawing For Road Under Bridge No. 37 1 x 5.70 x 4.15m RCC Box at Ch.9894.460m	GC-HRIDC-C5-DRW-BRD-GAD_01037_A0
25.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 38 Span 1x3x3 RCC Box at Ch: 10090.792	GC-HRIDC-C5-DRW-BRD-GAD_01038_A1
26.	Conceptual General Arrangement Drawing For Road Under Bridge No. 40	GC-HRIDC-C5-DRW-BRD-GAD_01040_A1

S. No	TITLE	DRAWING NO.
	Span 1x8.40x5.15 RCC Box at Ch: 10410.702	
27.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 42 Span 1x2x2 RCC Box at Ch: 10907.894	GC-HRIDC-C5-DRW-BRD-GAD_01042_A0
28.	Conceptual General Arrangement Drawing For Road Under Bridge No. 43 Span 1.0x4.70x5.65 RCC Box at Ch: 11203.249	GC-HRIDC-C5-DRW-BRD-GAD_01043_A0
29.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 44 Span 1x2.0x2.0 RCC Box at Ch: 11403.443	GC-HRIDC-C5-DRW-BRD-GAD_01044_A1
30.	Conceptual General Arrangement Drawing For Road Under Bridge No. 64 Span 2x6.0x4.0 RCC Box at Ch: 18558.00	GC-HRIDC-C5-DRW-BRD-GAD_01064_A1
31.	Conceptual General Arrangement Drawing For Balancing Culvert Bridge No. 65 Span 1x2x2 RCC Box at Ch: 18735.000	GC-HRIDC-C5-DRW-BRD-GAD_01065_A0
32.	Conceptual General Arrangement Drawing For Road + Balancing Culvert No. 67 Span 2.0x7.5x7.5 RCC Box at Ch: 19435.000 (CANAL CROSSING REWASAN DRAIN RD 10350)	GC-HRIDC-C5-DRW-BRD-GAD-01067_A1
4.1.2 CONNECTING LINE		
A. PRITHLA TO NEW PRITHLA		
1.	Conceptual General Arrangement Drawing For Pipe Culvert Bridge No. 1 1x1.2m Dia ,at Ch:-1950.000	GC-HRIDC-C5-DRW-BRD-GAD_01001_A0
2.	Conceptual General Arrangement Drawing For Balancing Culvert + RUB Bridge No. 02 Span 1x2.5x5.05+1x3.6x5.05, RCC Box, at Ch: -1832.759	GC-HRIDC-C5-DRW-BRD-GAD_01002_A1
3.	Conceptual General Arrangement Drawing For Road Under Bridge No. 03, Span 1.0x4.60x5.65 RCC Box at Ch: -1312.056	GC-HRIDC-C5-DRW-BRD-GAD_01003_A0
4.2 MAJOR BRIDGES		
4.2.1 MAIN LINE		
1.	Conceptual General Arrangement Drawing for Prop Canal Crossing Bridge No. 4, 1x8x7.5+1x24.4+1x8x7.5m (CG+ RCC Box) at Ch. -795.733	GC-HRIDC-C5-DRW-BRD-GAD_01004_A0
2.	Conceptual General Arrangement Drawing for Road No. 5, 1x 12 x 6.10m RCC Box at Ch. -592.612m	GC-HRIDC-C5-DRW-BRD-GAD_01005_A0

S. No	TITLE	DRAWING NO.
3.	Conceptual General Arrangement Drawing Proposed RUB Bridge No.12 1x12.2 PSC U Slab Ch:1696.624	GC-HRIDC-C5-DRW-BRD-GAD_01012_A0
4.	Conceptual General Arrangement Drawing Proposed Major Bridge No. 16 1x12x6.10 m, RCC box Ch: 3472.548m	GC-HRIDC-C5-DRW-BRD-GAD_01016_A0
5.	Conceptual General Arrangement Drawing for Proposed Major RUB No.17 4x30.5 Open web Girder at Ch:4256.298m (NH-148A DND-2)	GC-HRIDC-C5-DRG-BRD-GAD_01017_A0 (Sheet 1 of 2)
		GC-HRIDC-C5-DRG-BRD-GAD_01017_A0 (Sheet 2 of 2)
6.	Conceptual General Arrangement Drawing Proposed RUB Bridge No. 26 1x12x6.10 m, RCC Box Ch: 7753.296m	GC-HRIDC-C5-DRW-BRD-GAD_01026_A0
7.	Conceptual General Arrangement Drawing For Prop. Major Bridge No. 28 18.3X30.5+18.3(OWG+CG) AT CH: 8036.354m (CANAL CROSSING GURGAON CANAL RD 79150)	GC-HRIDC-C5-DRG-BRD-GAD_01028_A0
8.	Conceptual General Arrangement Drawing For Prop. Drain Crossing Bridge No.30, 1X30.5 (Composite Girder) AT CH: 8298.110m (CANAL CROSSING NUH DRAIN RD 87645)	GC-HRIDC-C5-DRG-BRD-GAD_01030_A0
9.	Conceptual General Arrangement Drawing Proposed IOCL Crossing Bridge No. 34 1 x24.4m (CG) AT CH.9536.901m	GC-HRIDC-C5-DRW-BRD-GAD_01034_A0
10.	Conceptual General Arrangement Drawing for Road Under Bridge no. 41 Span 1x12x5.650 RCC Box at Ch: 10709.675	GC-HRIDC-C5-DRW-BRD-GAD_01041_A0
11.	Conceptual General Arrangement Drawing for Prop. Major Bridge No.045, at Ch: 11543.518m 2X76.2 (Open Web Girder) (NH 919 PALWAL SOHNA ROAD)	GC-HRIDC-C5-DRW-BRD-GAD_01045_A0
12.	Conceptual General Arrangement Drawing For Stream Bridge No.53 2x24.4 m CG at Ch:14472.112	GC-HRIDC-C4-DRW-BRD-GAD_01053_A2
13.	Conceptual General Arrangement Drawing for Prop. Drain Crossing bridge no.63 1x5x4.9+1x12.2m+1x5x4.9 (PSC U Slab +RCC Box) at CH: 18310 (CANAL CROSSING INDRI DISTRIBUTARY RD 11260)	GC-HRIDC-C5-DRW-BRD-GAD_01063_A0

S. No	TITLE	DRAWING NO.
14.	Conceptual General Arrangement Drawing for Prop. Major RUB No.68 2x61(OWG) at Ch: 20184 (CANAL CROSSING REWASAN DRAIN RD 6670) NH-248A	GC-HRIDC-C5-DRG-BRD-GAD_01068_A0
15.	Conceptual General Arrangement Drawing for Prop. Major Bridge no.69 12.2+2X18.3+12.2 (CG+PSC U Slab) at Ch: 20400m	GC-HRIDC-C5-DRG-BRD-GAD_01069_A0
16.	Conceptual General Arrangement Drawing for Viaduct Br. No.70, Span: 105X24.4+1X30.5+41x24.4 +1x30+1x11.10 (Composite Girder) from Ch: 20942.473m to 24843.543m	GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 1 of 15 to 15 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 2 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 3 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 4 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 5 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 6 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 7 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 8 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 9 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 10 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 11 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 12 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 13 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 14 of 15)
		GC-HRIDC-C5-DRG-BRD-GAD_01070_A0 (Sheet 15 of 15)

S. No	TITLE	DRAWING NO.
5. MISCELLANEOUS DRAWINGS (CONCEPTUAL PLANS)		
1.	Conceptual Plan Typical Embankment/Cutting Profile	GC-HRIDC-SK-GEN-001_A1
2.	Conceptual Plan R.C. Pre-Cast Fencing for End Platform	GC-HRIDC-SK-GEN-004

S. No	TITLE	DRAWING NO.
3.	Conceptual Plan Station Name Board	GC-HRIDC-SK-GEN-005
4.	Conceptual Plan Proposed Toilet Block on End Platforms	GC-HRIDC-SK-GEN-007_A1
5.	Conceptual Plan Drains for Embankment	GC-HRIDC-SK-GEN-008_A1
6.	Conceptual Plan Steel Barricade	GC-HRIDC-SK-GEN-009
7.	Conceptual Plan Water Booth with One Side Taps Arrangement (End Platform)	GC-HRIDC-SK-GEN-010_A1
8.	Conceptual Plan Water Booth with Both Side Taps Arrangement (Island Platform)	GC-HRIDC-SK-GEN-011_A1
9.	Conceptual Plan of Auto Location Hut (S&T)	GC-HRIDC-SK-GEN-012_A1
10.	Conceptual Plan Ticket Counter	GC-HRIDC-SK-GEN-013
11.	Conceptual Plan CC Toe Wall	GC-HRIDC-SK-GEN-014_A1
12.	Conceptual Plan Typical Details of Protection Work of Bridge Approaches	GC-HRIDC-SK-GEN-015_A1
13.	Conceptual Plan Barbed Wire Fencing	GC-HRIDC-SK-GEN-016_A1
14.	Conceptual Plan RCC Duct of Signalling Cable	GC-HRIDC-SK-GEN-017
15.	Conceptual Plan for Transition System of Bridge Approaches	GC-HRIDC-SK-GEN-019
16.	Conceptual Plan for Self-Supporting Roof Covering Shed	GC-HRIDC-SK-GEN-020
17.	Conceptual Plan for Formation Details Below of Subway and Lift Well	GC-HRIDC-SK-GEN-021
18.	Conceptual Plan for Trolley Refuge in Embankment	GC-HRIDC-SK-GEN-022
19.	Conceptual Plan for Trolley Refuge in Cutting	GC-HRIDC-SK-GEN-023
20.	Conceptual Sketch for RCC Platform Wall	GC-HRIDC-SK-GEN-024
21.	Conceptual Plan for Single and Double Lane Road	GC-HRIDC-SK-GEN-025
22.	Conceptual Sketch for Reinforced Earth Wall with Geogrid Reinforcement	GC-HRIDC-SK-GEN-026
23.	Conceptual Plan OHE Portal for OWG Girder	GC-HRIDC-SK-GEN-035
24.	Conceptual Plan for Mild Steel Pipe 323.9mm Outer Dia for Future Utilities	GC-HRIDC-SK-GEN-030
25.	Jurisdictional Sketch Of C-5 Package	GC-HRIDC-C5-SK-CIVIL-001_A1
26.	Conceptual Plan Drainage Arrangement (Prithla)	GC-HRIDC-C5-SK-CIVIL-002_A1
27.	Conceptual Plan Drainage Arrangement (Silani)	GC-HRIDC-C5-SK-CIVIL-003_A1

S. No	TITLE	DRAWING NO.
28.	Conceptual Plan Drainage Arrangement (IMT Sohna)	GC-HRIDC-C5-SK-CIVIL-004_A1
29.	Conceptual Plan Bank/Cutting Benching at Interface Locations	GC-HRIDC-C5-SK-CIVIL-009_A1
30.	Type Plan Powder Toilet for Divyangs	N.R.H.Q.E PLAN NO. HQ/20/11-2021
31.	Conceptual Plan OWG With Concrete Deck for BLT	GC-HRIDC-SK-GEN-036
32.	Conceptual Plan Ground Improvement for Embankment at Pond/Water Logged Area.	GC-HRIDC-SK-GEN-037
33.	Conceptual Plan for OHE Earthing & OHE Bolt Fixing Arrangement on Bridges	GC-HRIDC- C5-SK-GEN-038
34.	Conceptual Plan Location of Signal Post for Composite Girder Bridges	GC-HRIDC-SK-GEN-034
35.	Conceptual Plan Location of OHE Mast In Viaduct	GC-HRIDC-SK-GEN-032
36.	Conceptual Plan Location of OHE Mast for Composite Girder Bridges	GC-HRIDC- SK-GEN-031
37.	Indicative OHE Guy Rod Arrangement on Viaduct	GC-HRIDC-SYS1-DRW-ELE-007_A0
38.	Conceptual Plan Typical Embankment/Cutting Profile	GC-HRIDC-SK-GEN-001_A1
39.	Conceptual Cross- sectional sketch of ALH	GC-HRIDC- SK-GEN-039_A0
40.	Conceptual Plan drains between HORC embankment & DFC	GC-HRIDC- SK-GEN-041_A0
41.	Conceptual Plan S&T hut	GC-HRIDC- SK-GEN-002_A0
42.	Typical Conceptual Cross-sectional sketch of Platform	GC-HRIDC- SK-GEN-042_A0
43.	Typical Cross section of Road in RUB (Minor bridge)	GC-HRIDC- SK-GEN-043_A0

II. General Electrical Services Drawings

S. No	TITLE	DRAWING NO.
1.	Indicative LT Supply System with Local, DG and Auxiliary Transformer Supply	GC-HRIDC-C5-DRW-ELE-001-A1
2.	Indicative LT Supply Distribution Diagram	GC-HRIDC-C5-DRW-ELE-002-A0
3.	Indicative Arrangement of Decorative Street Light Pole at Station and Platform	GC-HRIDC-C5-DRW-ELE-03-A1
4.	Indicative Cable Route Plan for Track Crossing of Power Cable and Route Marker	GC-HRIDC-C5-DRW-ELE-04-A0
5.	Indicative Earthing Arrangement of Electrical System by Copper Cladded Electrode	GC-HRIDC-C5-DRW-ELE-05-A0
6.	Indicative Schematic Drawing Of 11 KV Power Supply Arrangement	GC-HRIDC-C5-DRW-ELE-06-A0

7.	Indicative LT Supply System With Local & Auxilary Transformer Supply	GC-HRIDC-C5-DRW-ELE-007-A1
8.	Indicative Compact Substation (CSS) Single Line Diagram	GC-HRIDC-C5-DRW-ELE-08-A0
9.	Indicative Viaduct Lighting and Railing Earthing Arrangement	GC-HRIDC-C5-DRW-ELE-09-A0

III. Signalling & Telecommunication Drawings

S. No	TITLE	DRAWING NO.
1.	Typical Main Cable Distribution Plan for Double Line (4 Lines) P.I. Station	SDO/CABLE LAYING/001
2.	Position of Trenches for Cable Laying	SDO/CABLE LAYING/002
3.	Cable Trench	SDO/CABLE LAYING/003
4.	Laying Of Signalling Cable & Telecom/ Power Cable in Same Trench	SDO/CABLE LAYING/004
5.	Laying Of Cables in Rocky Area	NR/SIG/CABLE/004
6.	Track Crossings	NR/SIG/CABLE/005
7.	Road Crossings	NR/SIG/CABLE/006
8.	Cable Laying on Culverts with Low Flood Level	SDO/CABLE LAYING/011
9.	Cable Laying on Culverts with High Flood Level	NR/SIG/CABLE/007
10.	Cable Laying on Metallic Bridges	SDO/CABLE LAYING/013
11.	Cable Trough for Metallic Bridges	SDO/CABLE LAYING/014
12.	Cable Laying on Arch Bridges	NR/SIG/CABLE/008
13.	Brick Masonry Channel for Arch Bridge	SDO/CABLE LAYING/016
14.	Arrangement of Jumper cable	SDO/CABLE LAYING/017
15.	CI Cable Marker & Concreting	SDO/CABLE LAYING/018
16.	CI Cable Marker	SDO/CABLE LAYING/019
17.	Concrete Cable Marker	SDO/CABLE LAYING/020
18.	Method of Unrolling Cable	SDO/CABLE LAYING/021
19.	Rule Made of Pipe for Measuring Trench Depth	SDO/CABLE LAYING/022

2. Section VII: 8A: Revised and New Additional Drawings

(i) Alignment Plan & L-Section (Revised Drawings)
(ii) Revised ESP/Yard Plan (Revised Drawings)
(iii) Station Building and Subway (Revised Drawings)
(iv) Bridges (Revised and New Additional Drawings)
(v) Miscellaneous Drawings (Conceptual Plans) (Revised and New Additional)
(vi) General Electrical Services Drawings (Revised)

Alignment Plan & L-Section (Revised Drawings)

LEGEND:

EXISTING RAILWAY TRACK	
PROPOSED UP & DN LINE	
DFCC WORKS	
DISMANTLING WORKS	
PROPOSED DIVERSIONS	
EXISTING ROAD	
PRO.HORC BOUNDARY	PROW
DFCC BOUNDARY	PROW
HT LINE	
ELECTRICAL LINE(LT)	
STREAM / CANAL / DRAIN	
WELL	
POND	
PRO.TOE LINE	TOE TOE

NOTE:-

1. ALL DIMENSIONS ARE IN METRE UNLESS OTHERWISE STATED
2. ALL THE LEVELS ARE WITH RESPECT TO MEAN SEA LEVEL.
3. TRACK CETRE BETWEEN MAIN LINES OF HORC HAS BEEN KEPT AS MIN 5.30m
4. PUBLIC UTILITIES HT/LT LINES OFC CABLES WATER /SEWER LINES ETC INTERFERING WITH DFC TRACKS SHALL BE RELOCATED.
5. ARRANGEMENT & SIZE OF THE BRIDGE SHOWN IN THE DRAWING IS TENTATIVE AND MAY CHANGE AS PER THE APPROVED GAD.
6. VERTICAL CLEARANCE FROM LOWEST CONDUCTOR OF HT POWER LINE TO PROPOSED RAIL LEVEL ARE SHOWN

PROPOSED TRACK STRUCTURE (TO SUIT FOR 25T AXLE LOAD)

I. FOR RAIL CORRIDOR: 160KMPH Speed
- * TRACK = 60KG RAILS
- * SLEEPER DENSITY : PSC SLEEPERS = 1660 No.S PER KM
- * BALLAST CUSHION : 350mm
- * ALL TURNOUTS ARE 1 in 12 UNLESS OTHERWISE SPECIFIED.

ABBREVIATIONS:-

1. BVC - BEGIN OF VERTICAL CURVE
2. PVI - POINT OF VERTICAL INTERSECTION
2. EVC - END OF VERTICAL CURVE

LEGEND FOR PROFILE :

- PROPOSED RAIL PROFILE
- PROPOSED FORMATION PROFILE
- GROUND PROFILE

GC/HORC

NAME / DESIGNATION	SIGN
CHAHATEY RAM PD	[signature]
SUDHIR AGRAWAL DPD/CIVIL	[signature]
KRISHAN CHAND SAINSI CRE/CIVIL	[signature]

HRIDC

NAME / DESIGNATION	SIGN
NEERAJ BHANDARI CPM/HRIDC	[signature]
RAJU SOLANKI DGM/CIVIL	[signature]

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

GENERAL CONSULTANT:
GENERAL CONSULTANT FOR
HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

RITES THE INFRASTRUCTURE PEOPLE | SMEC

TITLE : CONCEPTUAL PLAN & LONGITUDINAL SECTION (0.0 KM TO 5.0 KM)

GC DRG.NO. GC-HRIDC-ALL-DRW-ALN-P&P-0-5KM_A1

ISSUE Dt: 22.06.2023 | REVISED Dt: 11.12.2023

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Tel: 91-40-23737633; Fax: 91-40-23736277
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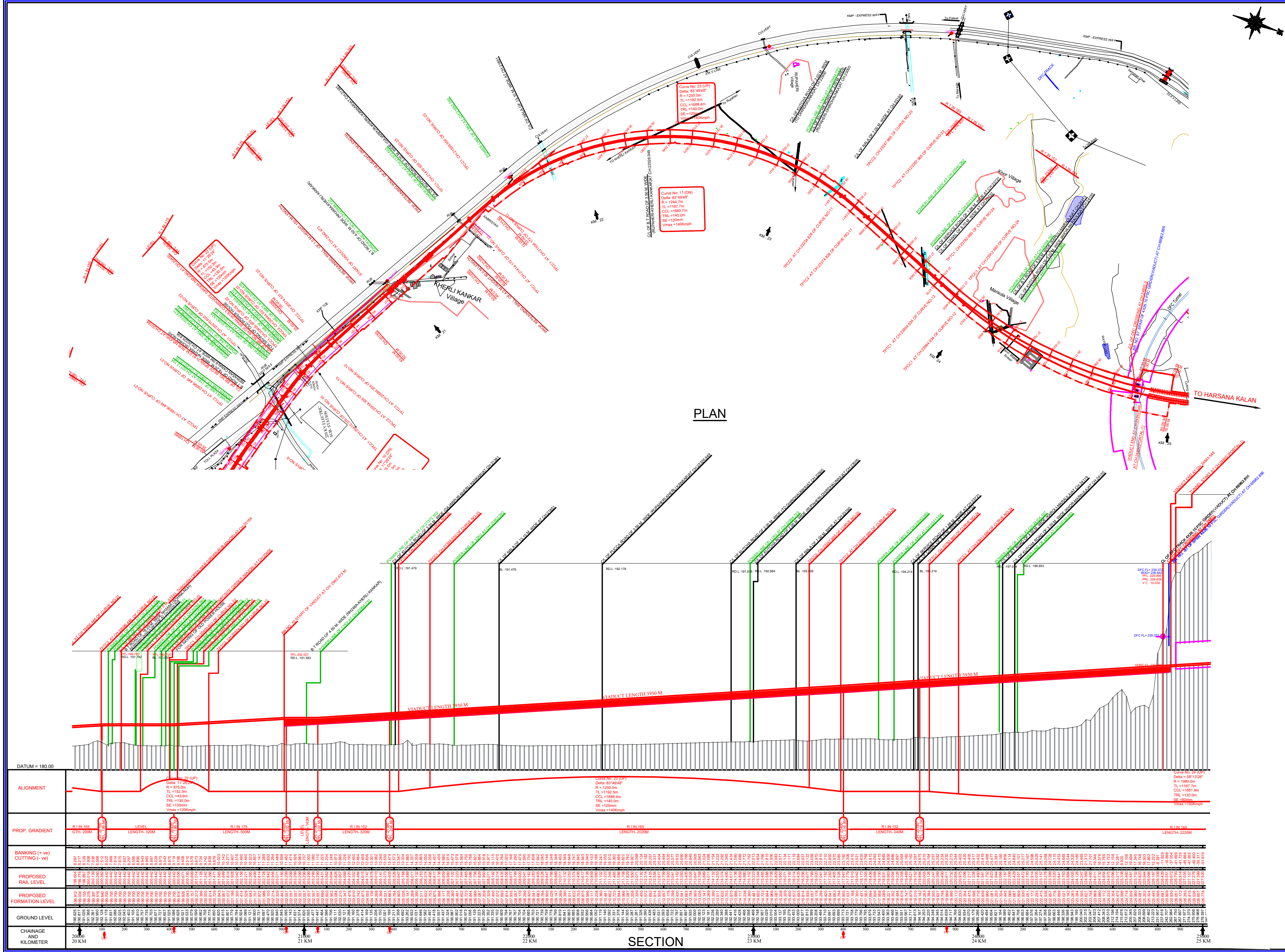
AARVEE ASSOCIATES

TANMAY (AM CAD) DRAWN	G.PRASAD (M) CHECKED	N.J. RAO (VP) APPROVED

DRG.NO.AA/2245/AL/DR/P&P/R3 | SHEET No. 3 OF 24
SCALE : H = 1:5000 V = 1:500 | ISSUED Dt: 26.11.2019 | REV Dt: 06-08-2022



LEGEND:

EXISTING RAILWAY TRACK	
PROPOSED UP & DN LINE	
DFCC WORKS	
DISMANTLING WORKS	
PROPOSED DIVERSIONS	
EXISTING ROAD	
PRO.HORC BOUNDARY	
EXPRESSWAY BOUNDARY	
HT LINE	
ELECTRICAL LINE(LT)	
STREAM / CANAL / DRAIN	
WELL	
POND	
PRO.TOE LINE	

NOTE:-

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3. TRACK CETRE BETWEEN MAIN LINES OF HORC HAS BEEN KEPT AS MIN 5.30m
4. PUBLIC UTILITIES HT/LT LINES OFC CABLES WATER /SEWER LINES ETC INTERFERING WITH DFC TRACKS SHALL BE RELOCATED.
5. ARRANGEMENT & SIZE OF THE BRIDGE SHOWN IN THE DRAWING IS TENTATIVE AND MAY CHANGE AS PER THE APPROVED GAD.
6. VERTICAL CLEARANCE FROM LOWEST CONDUCTOR OF HT POWER LINE TO PROPOSED RAIL LEVEL ARE SHOWN

PROPOSED TRACK STRUCTURE (TO SUIT FOR 25T AXLE LOAD)

I. FOR RAIL CORRIDOR: 160KMPH Speed
* TRACK = 60KG RAILS
* SLEEPER DENSITY : PSC SLEEPERS = 1660 No.S PER KM
* BALLAST CUSHION : 350mm
* ALL TURNOUTS ARE 1 in 12 UNLESS OTHERWISE SPECIFIED.

ABBREVIATIONS:-

1. BVC - BEGIN OF VERTICAL CURVE
2. PVI - POINT OF VERTICAL INTERSECTION
2. EVC - END OF VERTICAL CURVE

LEGEND FOR PROFILE :

PROPOSED RAIL PROFILE
PROPOSED FORMATION PROFILE
GROUND PROFILE

LIST OF TBM

TBM No.	Easting	Northing	Elevation
SM-1	705588.878	3121113.675	194.387
SM-2	704954.348	3119500.444	193.724
SM-3	703625.564	3118824.368	193.601

GC/HORC

NAME / DESIGNATION	SIGN
CHAHATEY RAM PD	Chahatey Ram
SUDHIR AGRAWAL DPD/CIVIL	
KRISHAN CHAND SAINSI CRE/CIVIL	

HRIDC

NAME / DESIGNATION	SIGN
NEERAJ BHANDARI CPM/HRIDC	
RAJU SOLANKI DGM/CIVIL	

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

GENERAL CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

TITLE : CONCEPTUAL PLAN & LONGITUDINAL SECTION 20 KM TO 25 KM

GC DRG.NO. GC-HRIDC-ALL-DRW-ALN-P&P-20-25KM_A1

ISSUE Dt: 22.06.2023 REVISED Dt: 11.12.2023

SCALE HORIZONTAL 1:5000 VERTICAL 1:500

SMC DRG. NO:- SMC/HRIDC/TUNNEL/LS- (R-4)

CONSULTANT: S.M. CONSULTANTS An ISO 9001 Company
Bhubaneswar / Balasore / Secunderabad / South Andaman / New Delhi
Web : www.smcindia.com , E-Mail : support@smcindia.com

DRAWN BY:- L.MOHANTY CHECKED BY:- SIVRAM J

A. A. SAMANT PROJECT INCHARGE

RELEASED FOR: ☐ PRELIMINARY FOR APPROVAL ☑ TENDER ☐ CONSTRUCTION

ESP/Yard Plan (Revised Drawing)

X-OVER DETAILS							
SL. NO	CHAINAGE START	CHAINAGE END	LENGTH OF X-OVER	OUTSIDE CURVE	INSIDE CURVE	TRACK CENTRE	THEORETICAL LENGTH
1	700.600	569.082	131.518	1 IN 12	1 IN 16	6.7	131.518
2	556.082	410.808	145.274	1 IN 12	1 IN 16	7.7	145.274
3	609.911	488.021	121.89	1 IN 12	1 IN 16	6	121.890
4	261.979	383.869	121.89	1 IN 12	1 IN 16	6	121.890
5	396.869	551.772	154.903	1 IN 12	1 IN 16	8.4	154.903
6	564.772	719.675	154.903	1 IN 12	1 IN 16	8.4	154.903
7	498.772	339.192	159.58	1 IN 12	1 IN 16	8.74	159.580

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		SHIV OM DWIVEDI CPM/ HRIDC	
SUDHIR AGRAWAL DPD/CIVIL		VIKRAM YADAV GM/ IE / HRIDC	
RAJENDRA KR. BHAUGUNA DPD/EST		RAJU SOLANKI DGM/CIVIL	
KRISHAN CHAND SAINSI CRE/CIVIL		JYOTI SANGWAN DGM/ELEC.	
A.S. JANGHU CRE/ELECT.		AM/S&T	

NORTHERN RAILWAY

DELHI DIVISION

PROJECT:

HARYANA ORBITAL RAIL CORRIDOR

CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

GENERAL CONSULTANT:

GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR

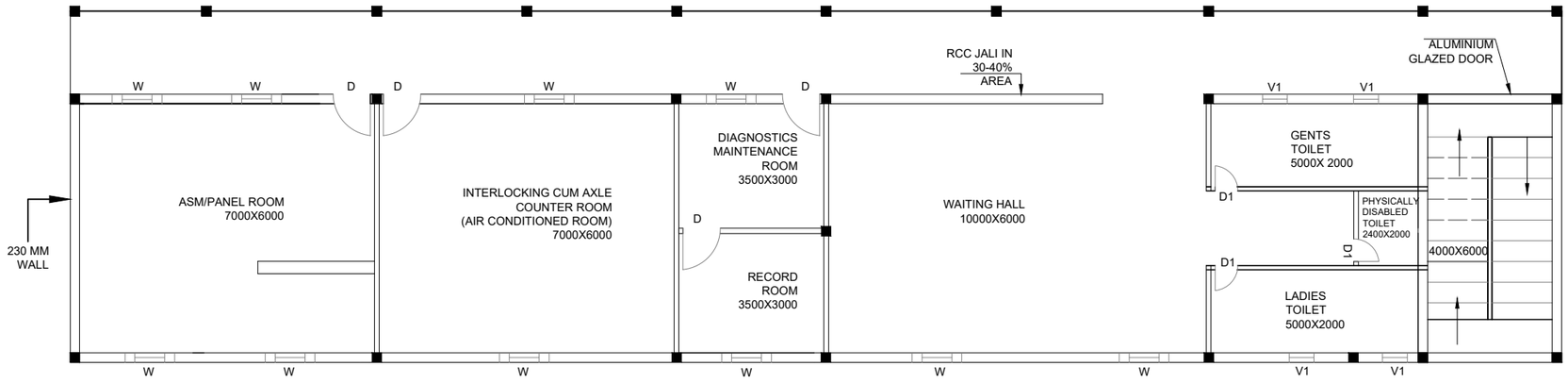
RITES Limited in consortium with SMEC International SRJy. Ltd.

THE INFRASTRUCTURE PEOPLE

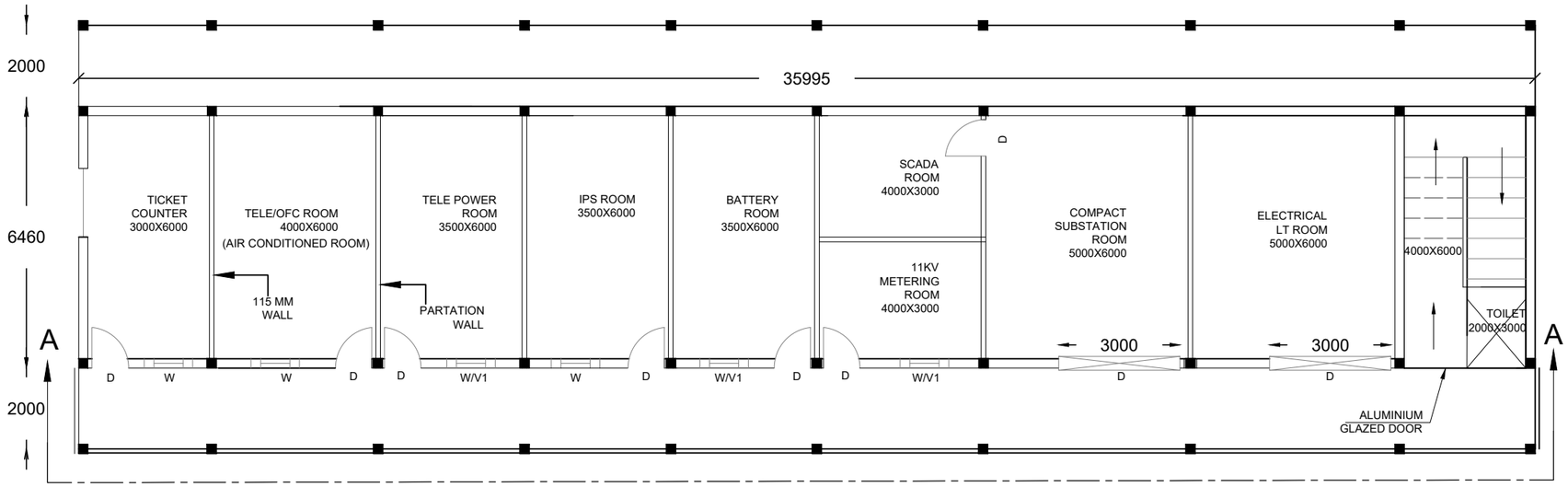
DRAWING NAME	CONCEPTUAL ENGINEERING SCALE PLAN IMT SOHNA
GC/HORC DRG. NO:-	GC-HRIDC-C5-DRW-STN-ESP-SOH01-A1
ISSUE DATE:	05.08.2023 — REVISED DATE: 01.12.2023
SCALE	1:1000 1MM:1METRE
SMC DRG. NO:-	HRIDC/PS/LP-1
CONSULTANT:	S.M. CONSULTANTS An ISO 9001 Company Bhubaneswar / Balasore / Secunderabad / South Andaman / New Delhi Web : www.smcindia.com , E-Mail : support@smcindia.com
DRAWN BY:-	R.DAS — CHECKED BY:- A. A SAMANT
RELEASED FOR	PRELIMINARY FOR APPROVAL ☐ / TENDER ☑ / CONSTRUCTION ☐

A. A. SAMANT
PROJECT INCHARGE

Station Building and Subway (Revised Drawings)



STATION BUILDING
FIRST FLOOR PLAN



STATION BUILDING
GROUND FLOOR PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. ALL OUTERS WALLS ARE OF 230MM THICK & PARTITION WALLS ARE OF 115MM.
3. THE FLOOR LEVEL OF PANEL ROOM SHALL BE ABOUT 300 MM ABOVE PLATFORM LEVEL.
4. FOR ANY FURTHER DETAIL OF S&T SERVICE BUILDING REFER NR TYPE PLAN NO. O-99/2021 SHEET NO. 1 TO 5.
5. FOR PHYSICALLY HANDICAPPED TOILET REFER DRAWING NO. O-104/2021 SHEET 1 OF 1.
6. SUITABLE ARRANGEMENT FOR SEPTIC TANK & SOAK PIT TO BE PROVIDED.
7. DETAILING OF TICKET COUNTER SHALL BE AS PER SKETCH NO. GC-HRIDC-SK-GEN0-013.
8. STAINLESS STEEL HANDRAIL SHALL BE FIXED WITH WALLS IN STAIRCASE PORTION.
9. FOR DETAILING OF LADIES AND GENTS TOILETS REFER DRAWING NO. GC-HRIDC-SK-GEN-007.
10. HEAVY DUTY TWO RCC SHELF IN BATTERY ROOM ON TWO SIDES 1000MM WIDE FOR BATTERIES, 100MM PLINTH SHALL BE MADE BELOW SHELF. FIRST SHELF AT 1000MM & SECOND SHELF AT 1600MM FROM GROUND LEVEL.
11. POWER CABLE ENTRY 300mm(L)x300mm(H)x600mm DEEP IN POWER ROOM.
12. TELECOM/OFC CABLE ENTRY IN POWER ROOM 300mm(L)X300mm(H)X600mm DEEP.
13. HEAVY DUTY EXHAUST FAN IN IPS & BATTERY ROOM FRONT WALL WITH SELF CLOSING FLAP.

TYPE	OPENING SIZE		DESCRIPTION
D	1000	2100	Panelled Door
D1	750	2100	PVC Framed Door
W	1500	1200	Glazed with MS Grill
V1	600	500	Glazed Louvered Ventilator

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/CIVIL	
RAJENDRA KR. BHAUGUNA DPD/EST		DGM/S&T	
A.S JANGHU CRE/ELECT		DGM/Elect.	
REETU PATIAL CDE/CIVIL			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

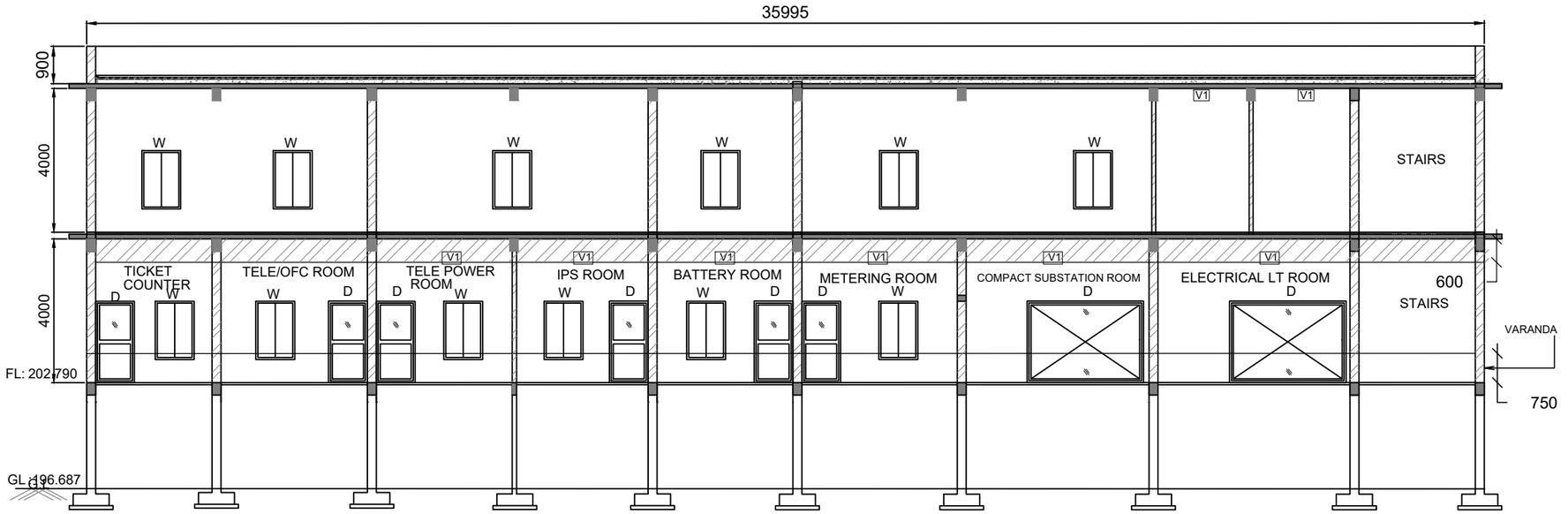
CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

TITLE:- CONCEPTUAL ARCHITECTURAL DRAWING PRITHLA STATION BUILDING

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-STN-SAD-PRI01_A1	2 OF 3

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	07.08.2023	12.12.2023



GROUND FLOOR & FIRST FLOOR ELEVATION PLAN

NOTES:

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9. FOR DETAILING OF LADIES AND GENTS TOILETS REFER DRAWING NO. GC-HRIDC-SK-GEN-007.
10. SELF IN BATTERY ROOM ON 3 SIDES 1M WIDE @800MM.

TYPE	OPENING SIZE		DESCRIPTION
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RAJENDRA KR. BHAUGUNA DPD/EST		DGM/S&T	
A.S JANGHU CRE/ELECT		DGM/Elect.	
REETU PATIAL CDE/CIVIL			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
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CONSULTANT:
GENERAL CONSULTANT FOR
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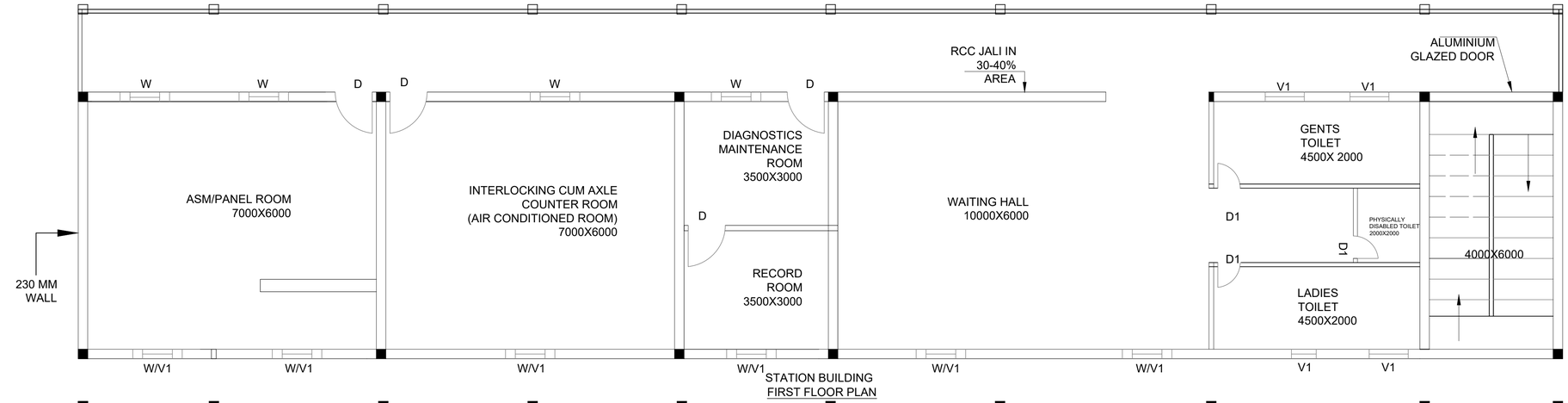
RITES Limited in consortium with SMEC International Pty. Ltd.

RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

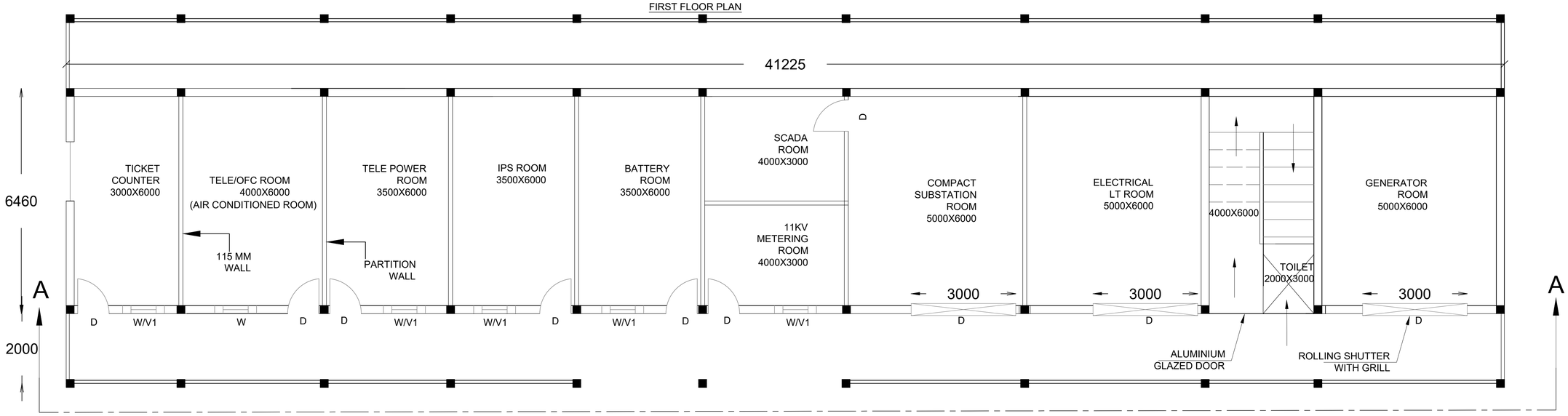
TITLE:-
CONCEPTUAL ARCHITECTURAL DRAWING
PRITHLA BUILDING

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-STN-SAD-PRI01_A1	3 OF 3

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	07.08.2023	12.12.2023



STATION BUILDING
FIRST FLOOR PLAN



STATION BUILDING
GROUND FLOOR PLAN

NOTES:

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PROJECT:
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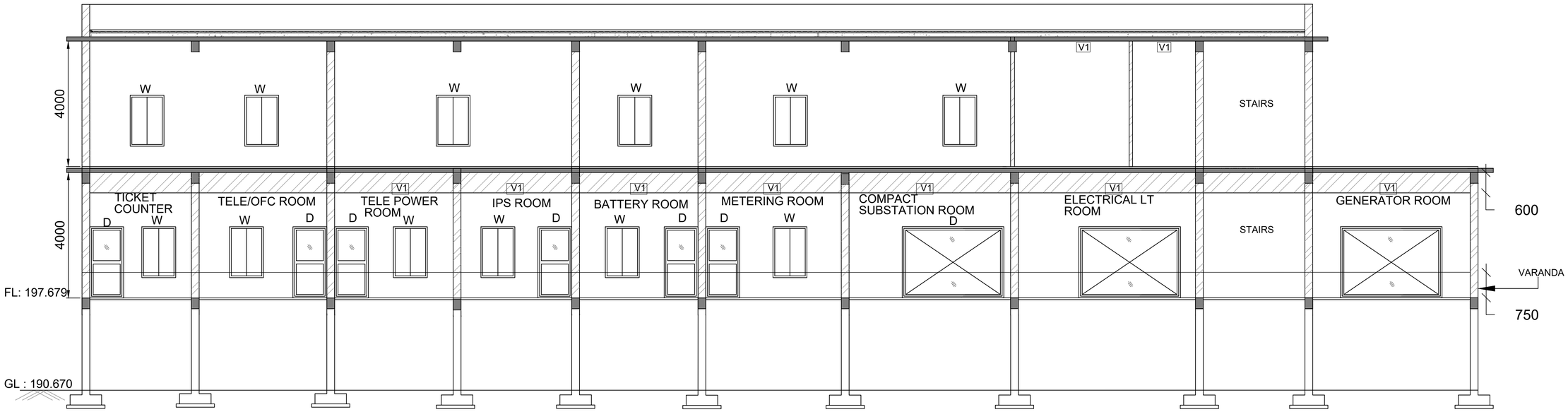
CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

TITLE:-
CONCEPTUAL ARCHITECTURAL DRAWING
IMT SOHNA STATION BUILDING

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-STN-SAD-SOH01_A1	2 OF 3

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	24.08.2023	12-12-2023



SECTIONAL ELEVATION -A

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SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/CIVIL	
RAJENDRA KR. BHAUGUNA DPD/EST		DGM/S&T	
A.S JANGHU CRE/ELECT		DGM/Elect.	
REETU PATIAL CDE/CIVIL	Reetu		

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
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CLIENT:
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RITES Limited in consortium with SMEC International Pty. Ltd.

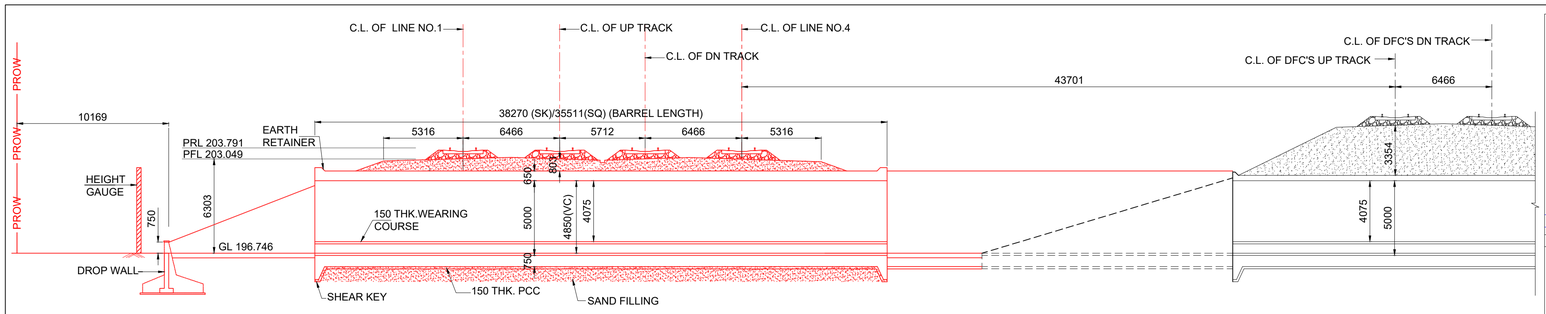
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

TITLE:-
CONCEPTUAL ARCHITECTURAL DRAWING
IMT SOHNA STATION BUILDING

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-STN-SAD-SOH01_A1	3 OF 3

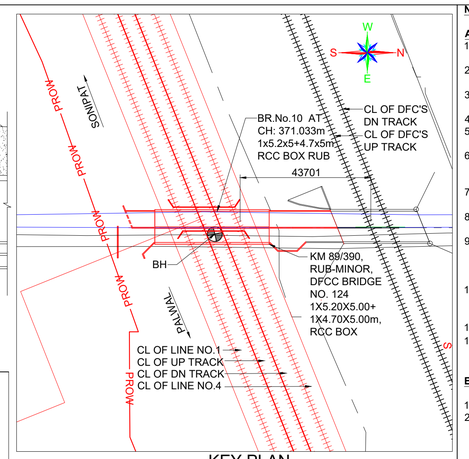
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	24.08.2023	12.12.2023

Bridges (Revised and New Additional Drawings)



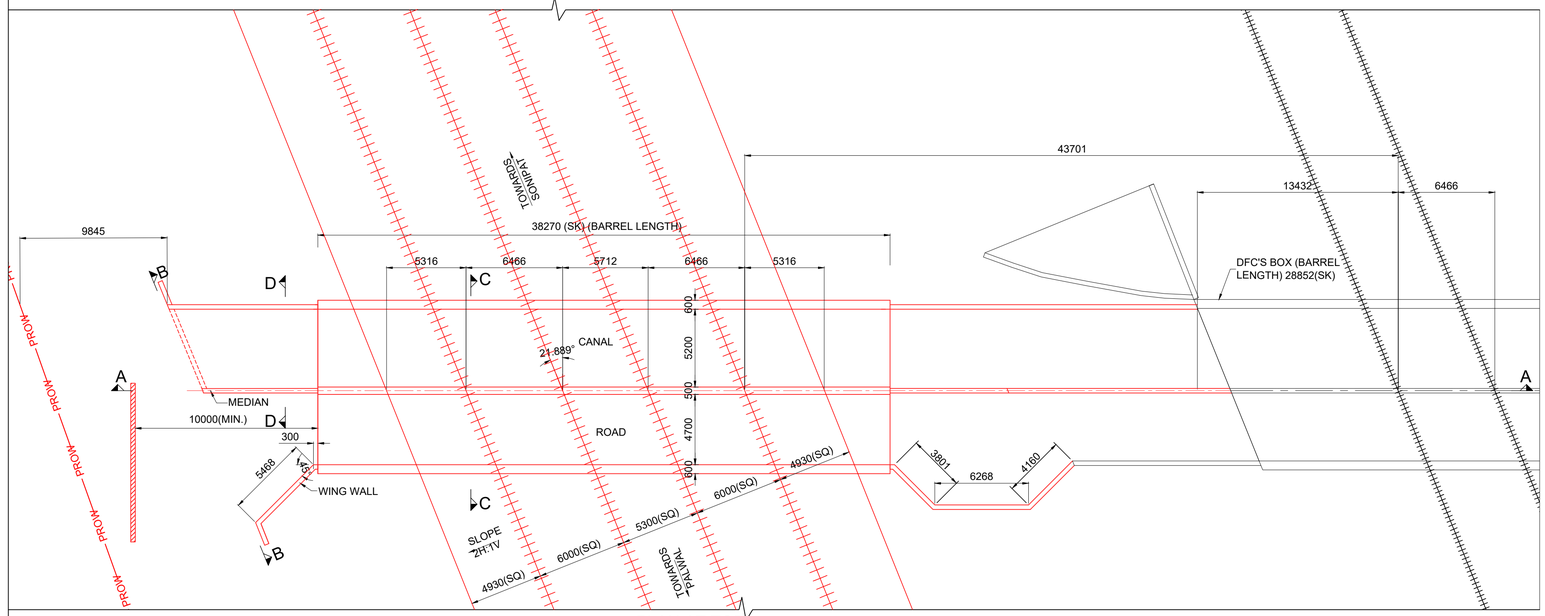
SECTIONAL ELEVATION AT A-A

SCALE 1:200



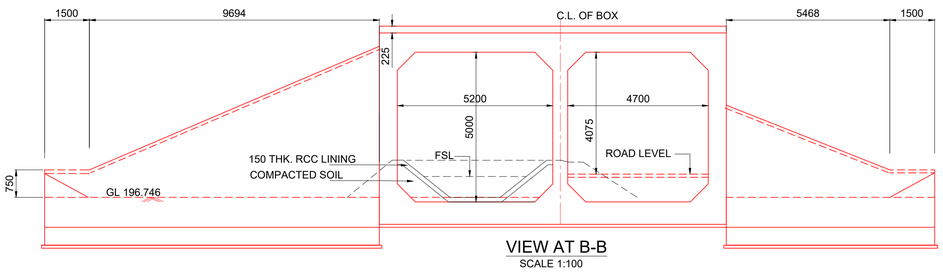
KEY PLAN

SCALE NTS



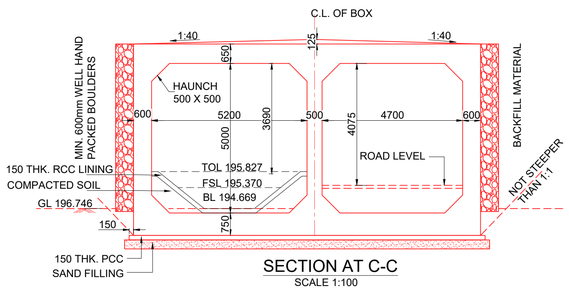
PLAN AT TOP

SCALE 1:200



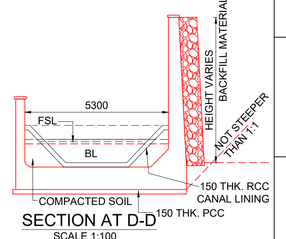
VIEW AT B-B

SCALE 1:100



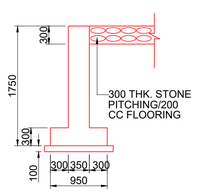
SECTION AT C-C

SCALE 1:100



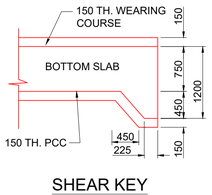
SECTION AT D-D

SCALE 1:100



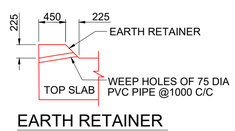
DROP/CURTAIN WALL DETAILS

SCALE 1:50



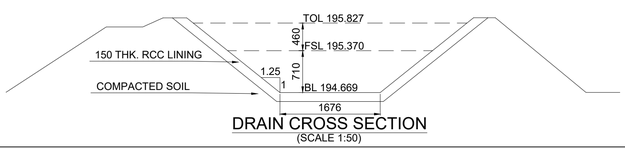
SHEAR KEY

SCALE 1:50



EARTH RETAINER

SCALE 1:50

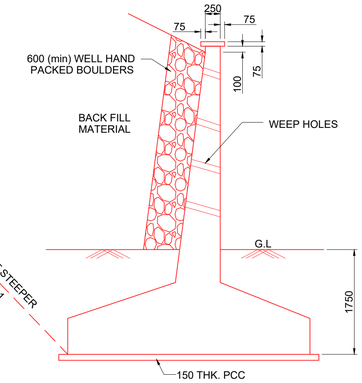


DRAIN CROSS SECTION

(SCALE 1:50)

HYDRAULIC DATA OF DRAIN

1	NAME OF CANAL	DHATRI DISTY
2	RD	25000/371
3	BED LEVEL (BL)	194.670
4	FULL SUPPLY LEVEL(FSL)	195.370
5	TOP OF LINING(TOL)	195.830
6	DISCHARGE	35cs
7	FREE BOARD	195.830



TYPICAL DETAIL OF RETURN WALL / WING WALL

SCALE 1:50

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
VC	VERTICAL CLEARANCE
PROW	PROPOSED HORC'S ROW

NOTES :

A) GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
3. THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
4. FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
5. THE EXISTING DETAILS ARE AS PER PRELIMINARY SITE SURVEY AND SHALL BE VERIFIED BY THE CONCTRACTOR BEFORE EXECUTION.
6. ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL , BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
7. SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
8. ENGINEER IN CHARGE SHALL ENSURE THE SAFETY OF DFC TRACK AND STRUCTURE DURING EXECUTION OF WORK.
9. ENGINEER IN CHARGE SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK. CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/Sig.NR,DFCCIL ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
10. DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
11. THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
12. DETAILED DESIGN DRAWING WILL BE PREPARED BASED ON THIS CONCEPTUAL APPROVED GAD,

B) TECHNICAL NOTES :

1. BOX BRIDGE IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
2. DESIGN CRITERIA SHALL BE BASED ON FOLLOWING IRS CODES
   (i) IRS BRIDGE RULE
   (ii) IRS CONCRETE BRIDGE CODE
   (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
3. SEISMIC ZONE- IV
4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE. GRADE OF CONCRETE :
   (i) ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
   (ii) LEVELING COURSE/PCC : M:20/DETAILED DESIGN DRG.
6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
7. PROTECTION WORK ON SLOPES OF BANK UP TO 15M,BOTH SIDES ON APPROACHES OF BRIDGE SHALL BE DONE AS PER SKETCH NO. GC-HRIDC-SK-GEN-015
8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BOX AFTER PROTECTION WORK.
9. FOR PROPER DRAINAGE OF WATER,SUITABLE SLOPE TO BE PROVIDED ON TOP OF BOX SLAB.
10. ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH THERMOCOL. .
11. ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM. CONFIRMING TO IS: 3117.
12. PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE, DRAINAGE &NATURAL GROUND PROFILE.
13. THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB- STRUCTURE AND FOUNDATION CODE. ANGLE OF INTERNAL FRICTION OF BACKFILL SHALL NOT BE LESS THAN 33 °.
14. 75mm DIA WEEP HOLES TO BE PROVIDED @1000 C/C HORIZONTAL AND 1000 MM C/C VERTICALLY IN RETURN WALL & ABUTMENT THROUGHOUT.
15. BEARING CAPACITY OF SOIL SHALL BE ENSURED AS PER DETAILED DESIGN REQUIREMENT. IF REQUIRED GROUND IMPROVEMENT MAY BE CARRIED OUT AND CONFIRMED THROUGH FIELD TESTING.
16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. HEIGHT GAUGE SHALL BE PROVIDE AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
2. SPEED BREAKER SHOULD BE PROVIDED ON EITHER APPROACH OF RUB AT A DISTANCE OF 20M FROM THE BRIDGE COVERING FULL WIDTH OF THE ROAD INCLUDE BERMS.
3. ADEQUATE SLOPE IN BOTTOM SLAB OF RCC BOX TOWARDS DIRECTION OF FLOW SHALL BE PROVIDED.
4. RCC LINING SHALL BE CONSTRUCTED FOR CANAL FROM ROW TO ROW OF HORC INCLUDING IN RCC BOX & U-TROUGH.
5. RCC LINING SHALL BE OF MIN 150 MM THICK AND HAVING AT LEAST MIN TEMP REINFORCEMENT.

IMPORTANT NOTE:

TOP OF BOTTOM SLAB OF RCC BOX SHALL NOT BE KEPT ABOVE THE NATURAL GROUND LEVEL.HOWEVER, ROAD LEVEL AND VERTICAL CLEARANCE ABOVE ROAD LEVEL SHALL BE MAINTAINED AS SHOWN IN THE DRAWING.OVERALL HEIGHT OF THE BOX MAY NEED MODIFICATION ACCORDINGLY.THE HEIGHT OF RCC BOX SHALL BE PROVIDED KEEPING ABOVE PROVISION IN VIEW.

PROJECT:

HARYANA ORBITAL RAIL CORRIDOR

CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

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CONSULTANT:

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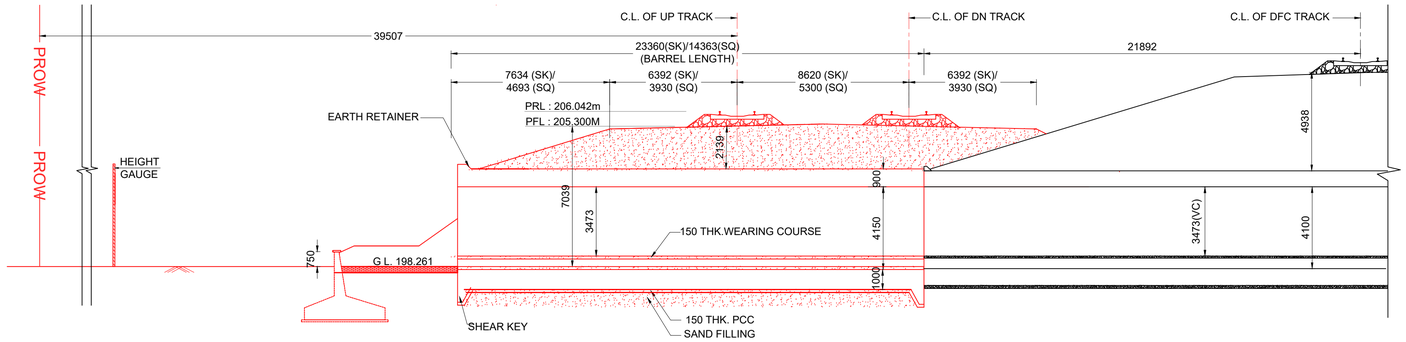
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL			

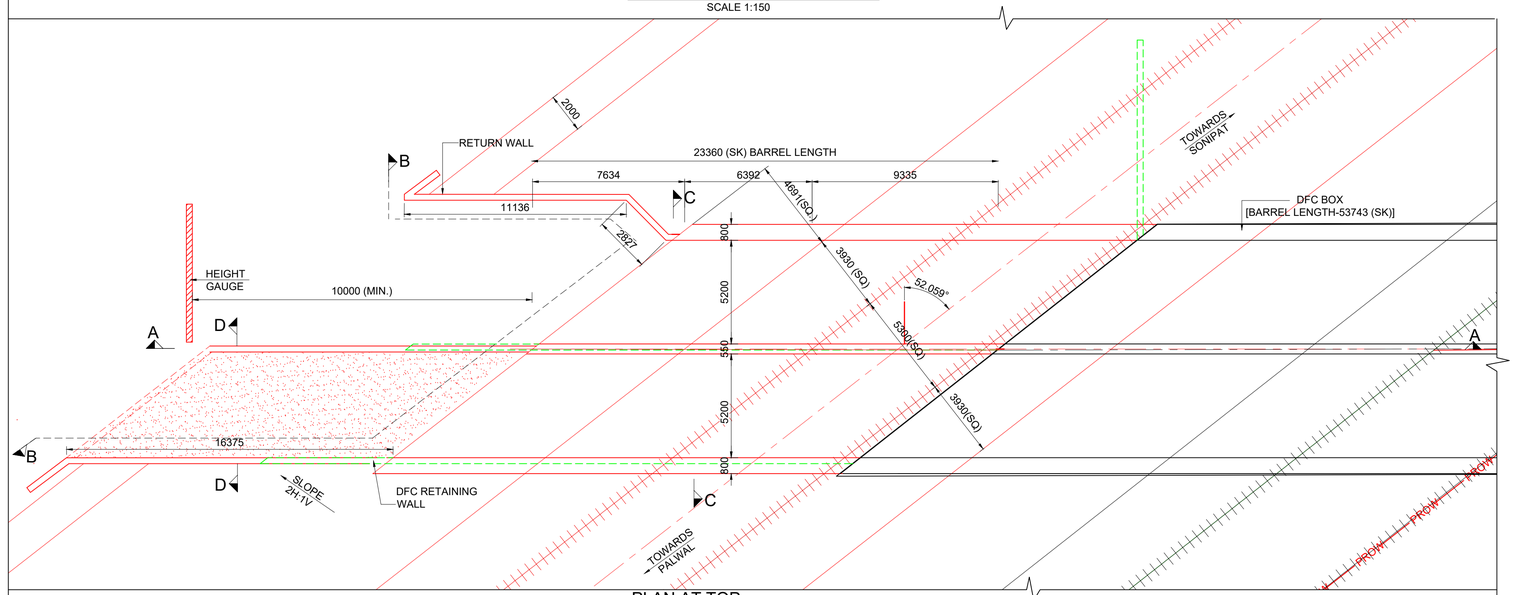
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR BALANCING CULVERT + RUB BRIDGE NO. 10 SPAN 1X5.2X5+1x4.7x5 RCC BOX AT CH: 371.033 (CANAL CROSSING DHATIR DISTRIBUTORY RD 25000)

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_010010_A1	

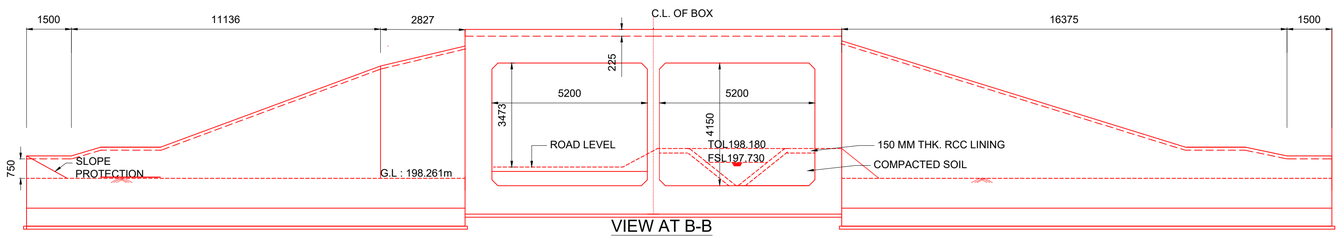
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	



SECTIONAL ELEVATION AT A-A
SCALE 1:150

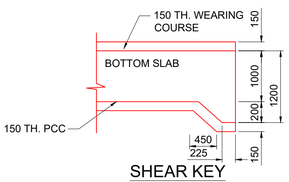


PLAN AT TOP
SCALE 1:150

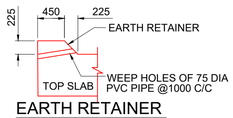


VIEW AT B-B
SCALE 1:50

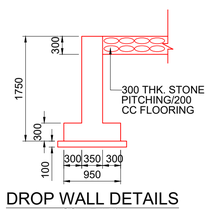
SECTION AT D-D
SCALE 1:50



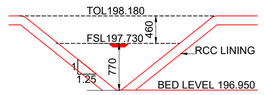
SHEAR KEY
SCALE 1:50



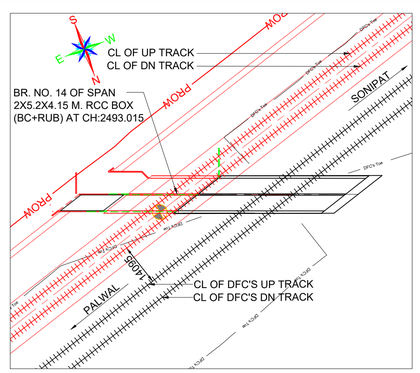
EARTH RETAINER
SCALE 1:50



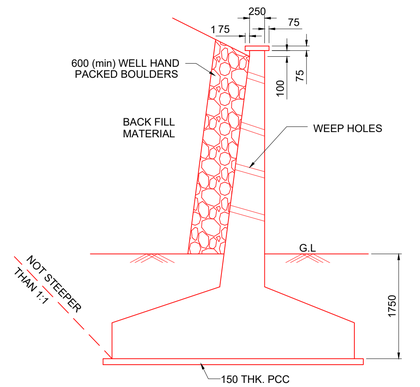
DROP WALL DETAILS
SCALE 1:50



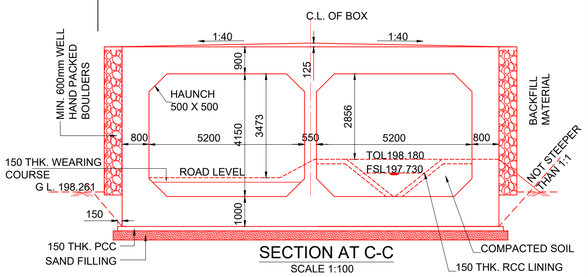
DRAIN CROSS SECTION
(SCALE 1:50)



KEY PLAN
SCALE NTS



TYPICAL DETAIL OF RETURN WALL / WING WALL
SCALE 1:50



SECTION AT C-C
SCALE 1:100

HYDRAULIC DATA OF DRAIN		
1	NAME OF CANAL	CHANDPUR MINOR CANAL
2	RD	6500/2493.016
3	BED LEVEL(BL)	196.950
4	FULL SUPPLY LEVEL(FSL)	197.730
5	DISCHARGE	16.50CS
6	FREE BOARD	198.180
7	TOP OF LINING (T.O.L.)	198.180

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
VC	VERTICAL CLEARANCE
PROW	PROPOSED HORC'S ROW

NOTES :

A) GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
3. THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
4. FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
5. THE EXISTING DETAILS ARE AS PER PRELIMINARY SITE SURVEY AND SHALL BE VERIFIED BY THE CONGTRACTOR BEFORE EXECUTION.
6. ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL , BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
7. SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
8. ENGINEER IN CHARGE SHALL ENSURE THE SAFETY OF DFC TRACK AND STRUCTURE DURING EXECUTION OF WORK.
9. ENGINEER IN CHARGE SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK. CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/Sig.NR,DFCCIL ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
10. DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
11. THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
12. DETAILED DESIGN DRAWING WILL BE PREPARED BASED ON THIS CONCEPTUAL APPROVED GAD.

B) TECHNICAL NOTES :

1. BOX BRIDGE IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
2. DESIGN CRITERIA SHALL BE BASED ON FOLLOWING IRS CODES
   (i) IRS BRIDGE RULE
   (ii) IRS CONCRETE BRIDGE CODE
   (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
3. SEISMIC ZONE- IV
4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
   GRADE OF CONCRETE :
   (i) ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
   (ii) LEVELING COURSE/PCC : M:20/DETAILED DESIGN DRG.
6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
7. PROTECTION WORK ON SLOPES OF BANK UP TO 15M,BOTH SIDES ON APPROACHES OF BRIDGE SHALL BE DONE AS PER SKETCH NO. GC-HRIDC-SK-GEN-015
8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BOX AFTER PROTECTION WORK.
9. FOR PROPER DRAINAGE OF WATER,SUITABLE SLOPE TO BE PROVIDED ON TOP OF BOX SLAB.
10. ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH THERMOCOL. .
11. ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM. CONFIRMING TO IS: 3117.
12. PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE, DRAINAGE &NATURAL GROUND PROFILE.
13. THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB- STRUCTURE AND FOUNDATION CODE. ANGLE OF INTERNAL FRICTION OF BACKFILL SHALL NOT BE LESS THAN 33 °.
14. 75mm DIA WEEP HOLES TO BE PROVIDED @1000 C/C HORIZONTAL AND 1000 MM C/C VERTICALLY IN RETURN WALL & ABUTMENT THROUGHOUT.
15. BEARING CAPACITY OF SOIL SHALL BE ENSURED AS PER DETAILED DESIGN REQUIREMENT. IF REQUIRED GROUND IMPROVEMENT MAY BE CARRIED OUT AND CONFIRMED THROUGH FIELD TESTING.
16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. HEIGHT GAUGE SHALL BE PROVIDE AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
2. SPEED BREAKER SHOULD BE PROVIDED ON EITHER APPROACH OF RUB AT A DISTANCE OF 20M FROM THE BRIDGE COVERING FULL WIDTH OF THE ROAD INCLUDE BERMS.
3. ADEQUATE SLOPE IN BOTTOM SLAB OF RCC BOX TOWARDS DIRECTION OF FLOW SHALL BE PROVIDED.
4. RCC LINING SHALL BE CONSTRUCTED FOR CANAL FROM ROW TO ROW OF HORC INCLUDING IN RCC BOX & U-TROUGH.
5. RCC LINING SHALL BE OF MIN 150 MM THICK AND HAVING AT LEAST MIN TEMP REINFORCEMENT.

IMPORTANT NOTE:

TOP OF BOTTOM SLAB OF RCC BOX SHALL NOT BE KEPT ABOVE THE NATURAL GROUND LEVEL HOWEVER, ROAD LEVEL AND VERTICAL CLEARANCE ABOVE ROAD LEVEL SHALL BE MAINTAINED AS SHOWN IN THE DRAWING.OVERALL HEIGHT OF THE BOX MAY NEED MODIFICATION ACCORDINGLY.THE HEIGHT OF RCC BOX SHALL BE PROVIDED KEEPING ABOVE PROVISION IN VIEW.

PROJECT:

HARYANA ORBITAL RAIL CORRIDOR

CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:

GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR

RITES Limited in consortium with SMEC International Pty. Ltd.

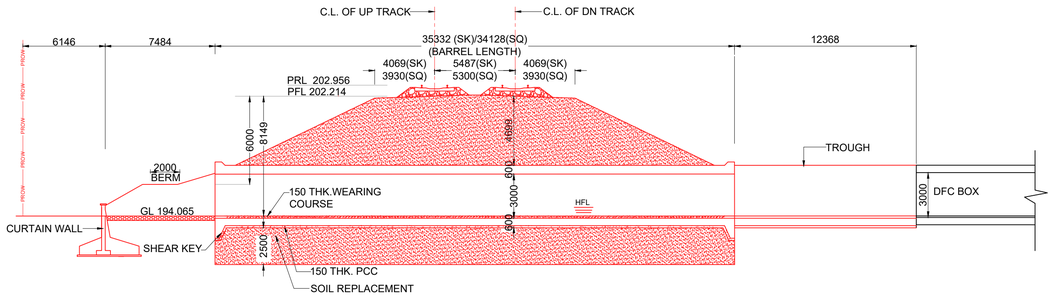
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD	Chahatey Ram	NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL			

TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR RUB + BALANCING CULVERT BRIDGE NO. 14 SPAN 2X5.2X4.15 RCC BOX AT CH: 2493.015 (CANAL CROSSING CHANDPUR MINOR RD 6500)

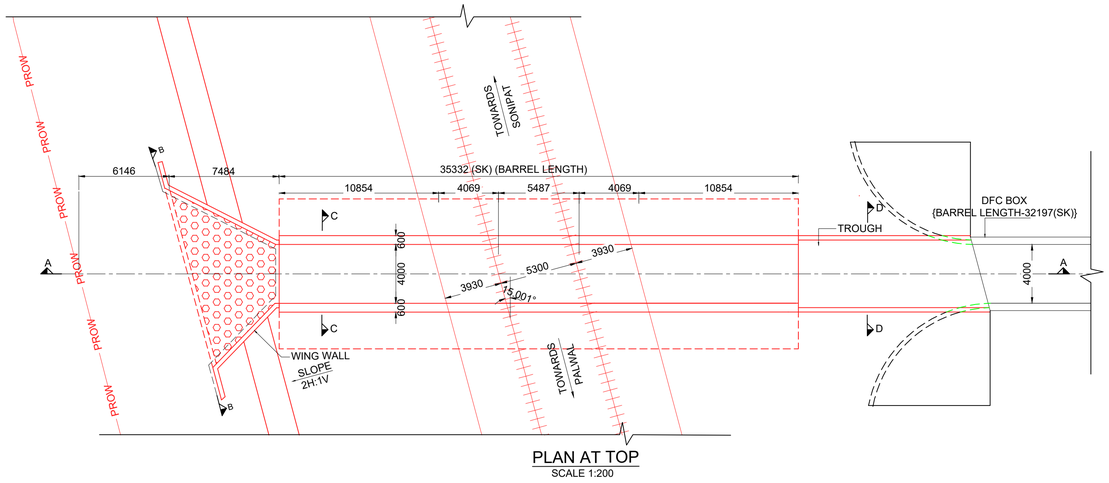
DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_01014_A1	

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	06-12-2023



SECTIONAL ELEVATION AT A-A

SCALE 1:200

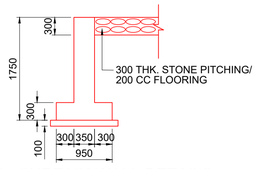


PLAN AT TOP

SCALE 1:200

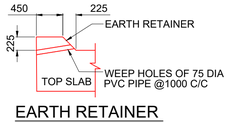
VIEW B-B

SCALE 1:100



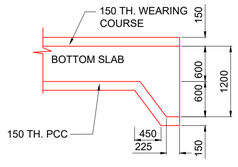
DROP / CURTAIN WALL DETAILS

SCALE 1:50



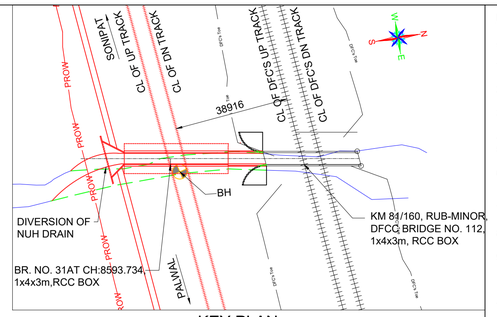
EARTH RETAINER

SCALE 1:50



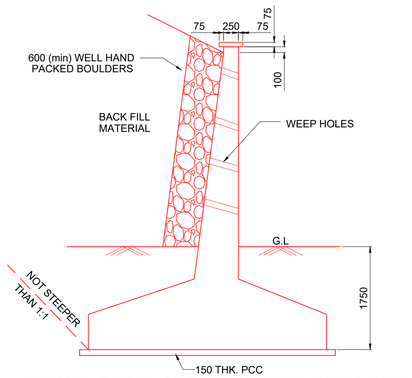
SHEAR KEY

SCALE 1:50



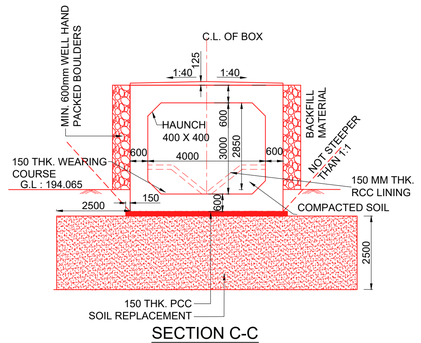
KEY PLAN

SCALE NTS



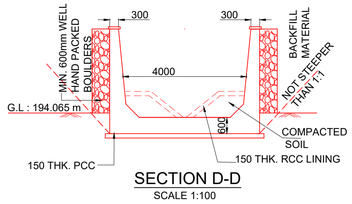
TYPICAL DETAIL OF RETURN WALL / WING WALL

SCALE 1:50



SECTION C-C

SCALE 1:100



SECTION D-D

SCALE 1:100

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
VC	VERTICAL CLEARANCE
GL	GROUND LEVEL
PROW	PROPOSED HORC'S ROW

NOTES :

A) GENERAL NOTES

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11. THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
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   (ii) IRS CONCRETE BRIDGE CODE
   (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
3. SEISMIC ZONE- IV
4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
   GRADE OF CONCRETE :
   (i) ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
   (ii) LEVELING COURSE/PCC : M:20/DETAILED DESIGN DRG.
6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
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8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BOX AFTER PROTECTION WORK.
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16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. ADEQUATE SLOPE IN BOTTOM SLAB OF RCC BOX TOWARDS DIRECTION OF FLOW SHALL BE PROVIDED.
2. WEARING COURSE PROFILE IN HORC BOX SHALL BE MAINTAINED WITH THAT OF DFC BOX. FOUNDING LEVEL OF BOX SHALL BE ADJUSTED ACCORDINGLY.
3. GROUND IMPROVEMENT DEPTH SHALL BE AS PER DETAILED GT INVESTIGATION AND DESIGN REQUIREMENTS.
4. CANAL IN HORC PORTION SHALL BE LINED FROM ROW TO ROW OF HORC INCLUDING IN RCC BOX & U-TROUGH.
5. RCC LINING SHALL BE OF MIN 150 MM THICK AND HAVING AT LEAST MIN TEMP REINFORCEMENT.

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD	Chahatey Ram	NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL	P.K. Singh		

PROJECT:

HARYANA ORBITAL RAIL CORRIDOR

CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:

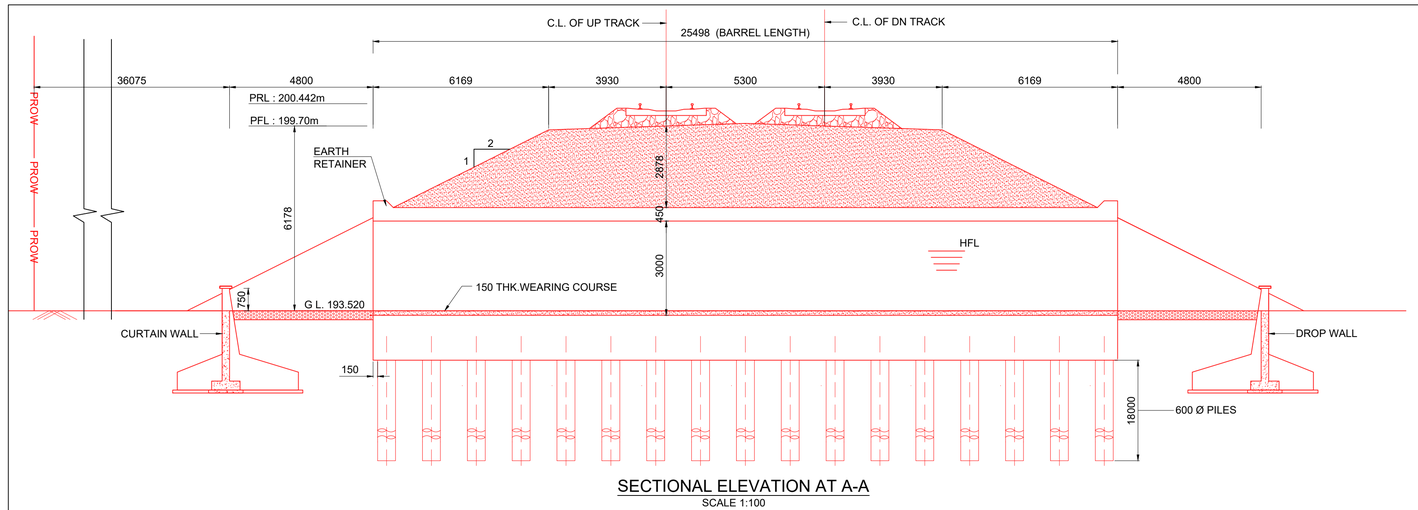
GENERAL CONSULTANT FOR
HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

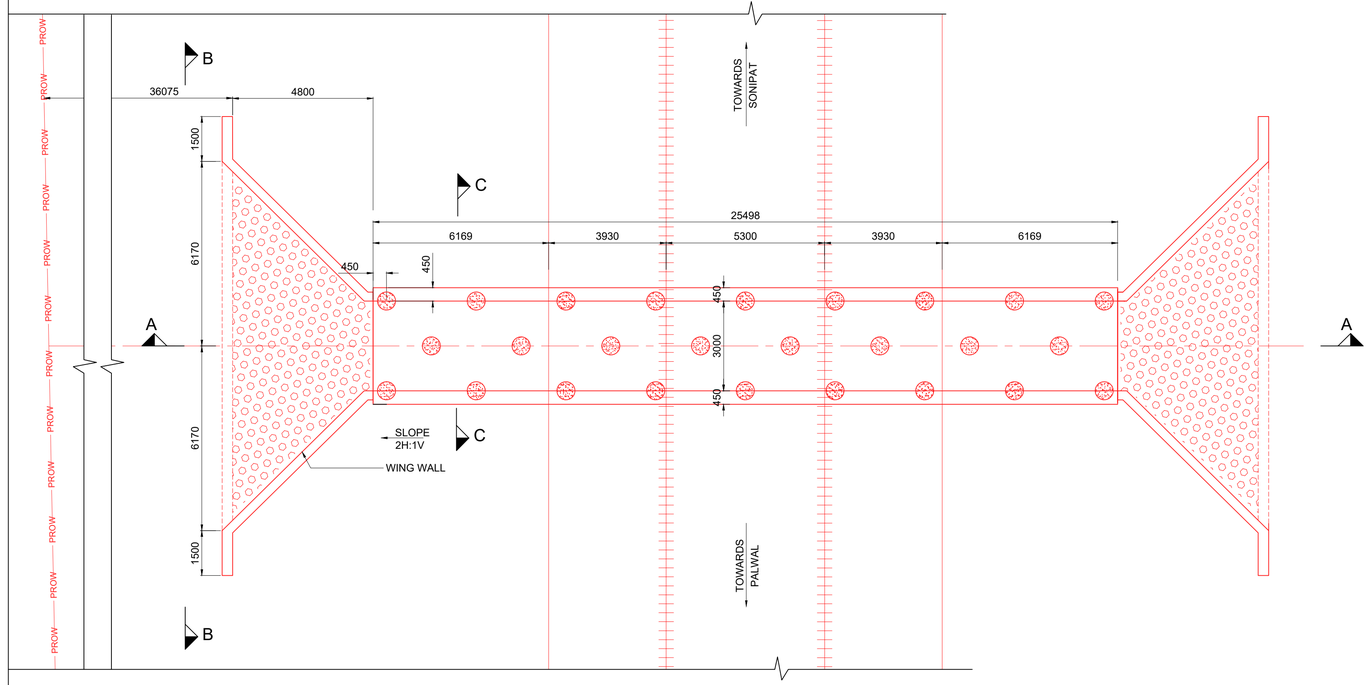
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR BALANCING CULVERT BRIDGE NO. 31
1 x 4 x 3.0m RCC BOX AT CH.8593.734m

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_01031_A1	1 OF 1

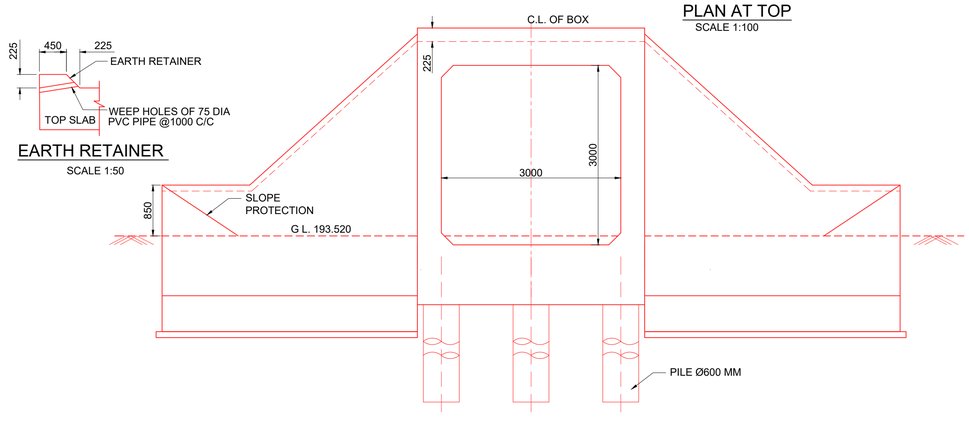
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	06-12-2023



SECTIONAL ELEVATION AT A-A
SCALE 1:100

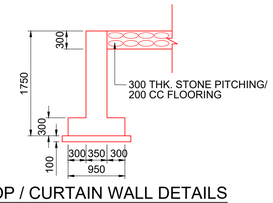


PLAN AT TOP
SCALE 1:100

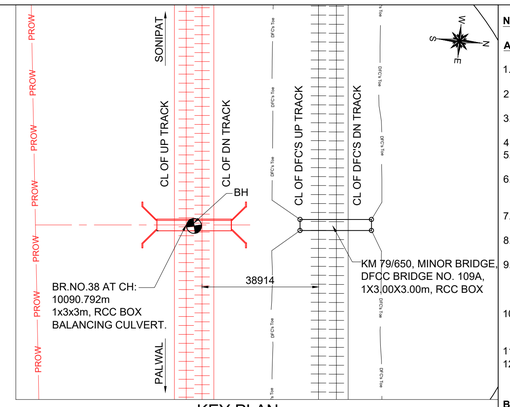


VIEW AT B-B
SCALE 1:50

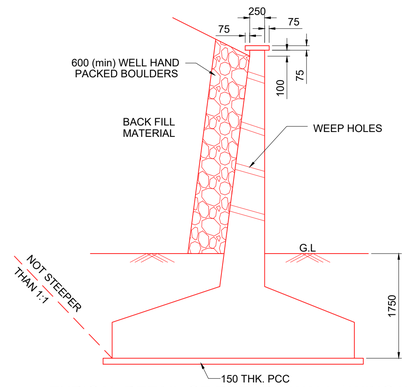
EARTH RETAINER
SCALE 1:50



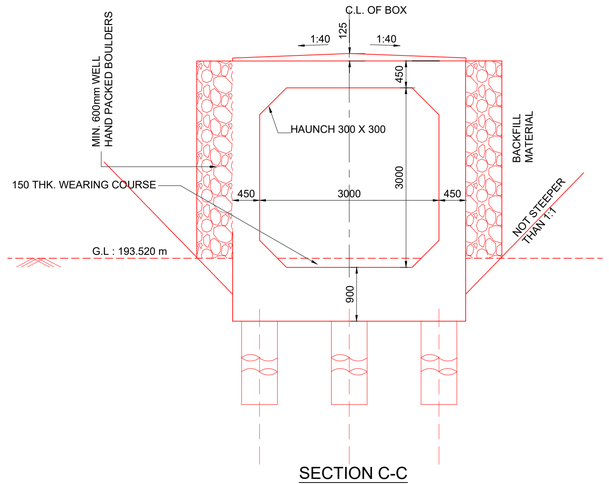
DROP / CURTAIN WALL DETAILS
SCALE 1:50



KEY PLAN
SCALE : NTS



TYPICAL DETAIL OF RETURN WALL / WING WALL
SCALE 1:50



SECTION C-C
SCALE 1:100

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PROW	PROPOSED HORC'S ROW

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3. THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
4. FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
5. THE EXISTING DETAILS ARE AS PER PRELIMINARY SITE SURVEY AND SHALL BE VERIFIED BY THE CONCTRACTOR BEFORE EXECUTION.
6. ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL , BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
7. SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
8. ENGINEER IN CHARGE SHALL ENSURE THE SAFETY OF DFC TRACK AND STRUCTURE DURING EXECUTION OF WORK.
9. ENGINEER IN CHARGE SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK. CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/(Sig)NR,DFCCIL ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
10. DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
11. THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
12. DETAILED DESIGN DRAWING WILL BE PREPARED BASED ON THIS CONCEPTUAL APPROVED GAD.

B) TECHNICAL NOTES :

1. BOX BRIDGE IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
2. DESIGN CRITERIA SHALL BE BASED ON FOLLOWING IRS CODES
   (i) IRS BRIDGE RULE
   (ii) IRS CONCRETE BRIDGE CODE
   (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
3. SEISMIC ZONE- IV
4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
   GRADE OF CONCRETE :
   (i) ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
   (ii) LEVELING COURSE/PCC : M:20/DETAILED DESIGN DRG.
6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
7. PROTECTION WORK ON SLOPES OF BANK UP TO 15M,BOTH SIDES ON APPROACHES OF BRIDGE SHALL BE DONE AS PER SKETCH NO. GC-HRIDC-SK-GEN-015
8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BOX AFTER PROTECTION WORK.
9. FOR PROPER DRAINAGE OF WATER,SUITABLE SLOPE TO BE PROVIDED ON TOP OF BOX SLAB.
10. ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH THERMOCOL. .
11. ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM. CONFIRMING TO IS: 3117.
12. PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE, DRAINAGE &NATURAL GROUND PROFILE.
13. THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB- STRUCTURE AND FOUNDATION CODE. ANGLE OF INTERNAL FRICTION OF BACKFILL SHALL NOT BE LESS THAN 33 °.
14. 75mm DIA WEEP HOLES TO BE PROVIDED @1000 C/C HORIZONTAL AND 1000 MM C/C VERTICALLY IN RETURN WALL & ABUTMENT THROUGHOUT.
15. BEARING CAPACITY OF SOIL SHALL BE ENSURED AS PER DETAILED DESIGN REQUIREMENT. IF REQUIRED GROUND IMPROVEMENT MAY BE CARRIED OUT AND CONFIRMED THROUGH FIELD TESTING.
16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. ADEQUATE SLOPE IN BOTTOM SLAB OF RCC BOX TOWARDS DIRECTION OF FLOW SHALL BE PROVIDED.

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

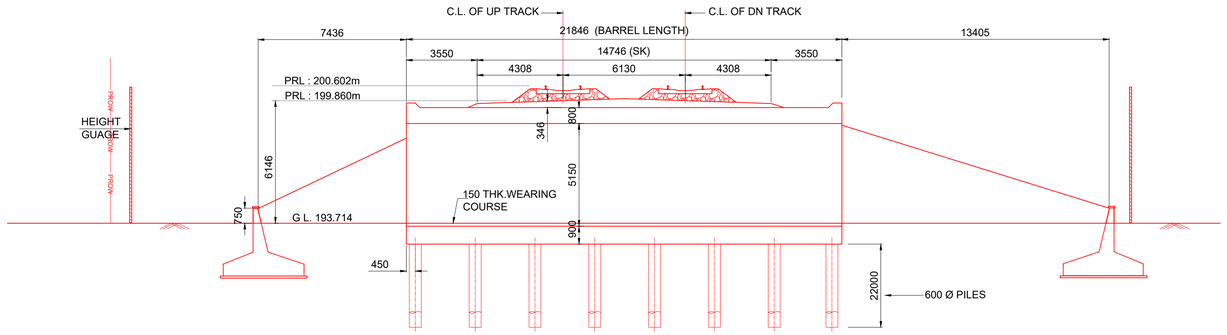
CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

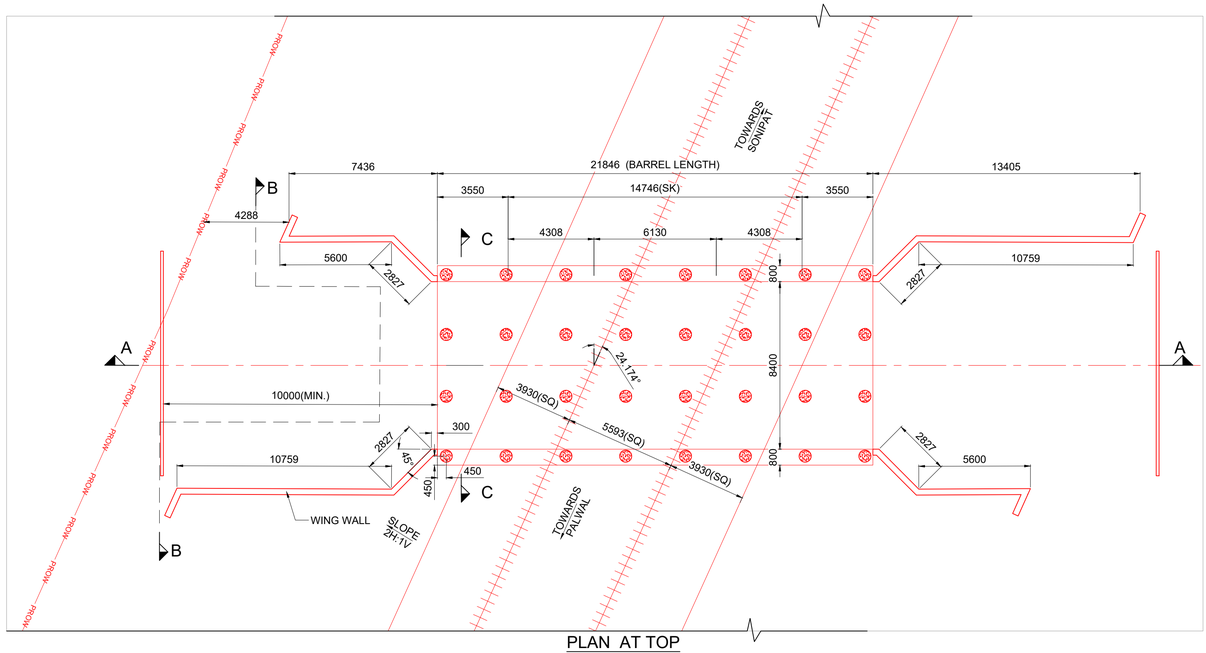
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR BALANCING CULVERT BRIDGE NO. 38 SPAN 1X3X3 RCC BOX AT CH: 10090.792

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_01038_A1	1 OF 1

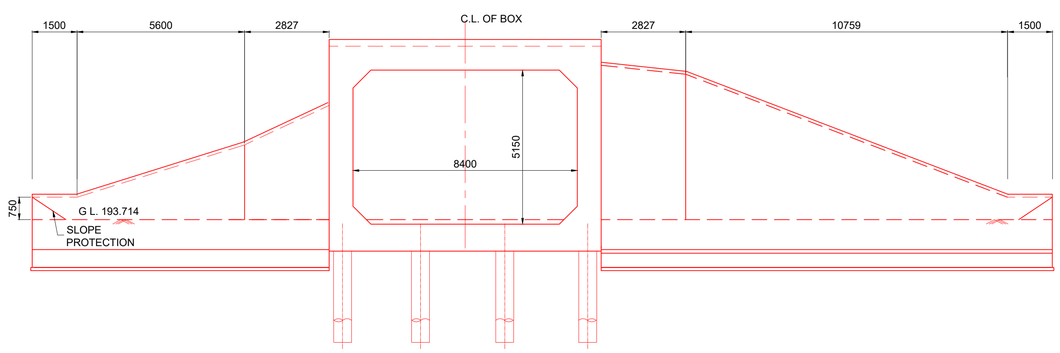
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	19-12-2023



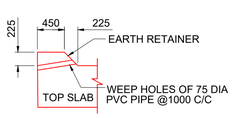
SECTIONAL ELEVATION AT A-A
SCALE 1:150



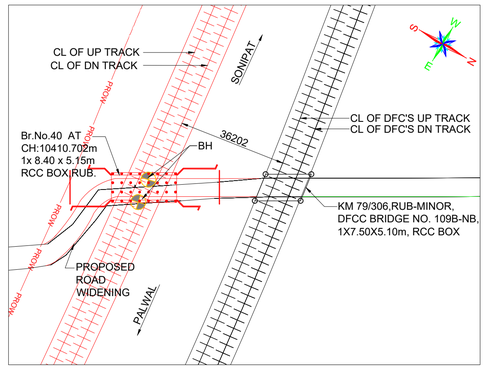
PLAN AT TOP
SCALE 1:150



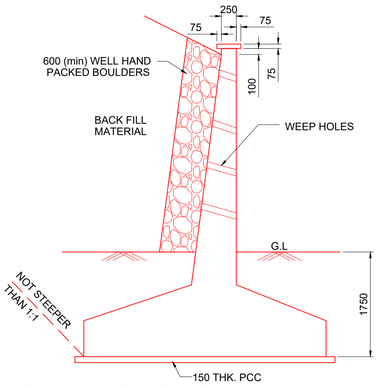
VIEW AT B-B
SCALE 1:100



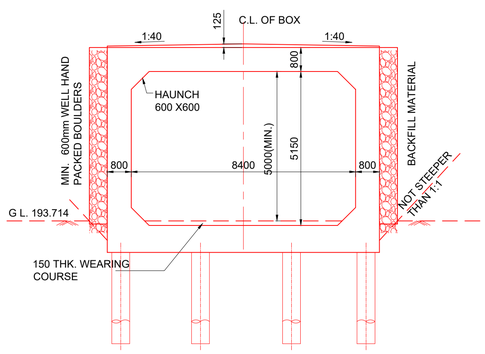
EARTH RETAINER
SCALE 1:50



KEY PLAN
SCALE NTS



TYPICAL DETAIL OF RETURN WALL / WING WALL
SCALE 1:50



SECTION AT C-C
SCALE 1:100

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PROW	PROPOSED HORC'S ROW

NOTES :

A) GENERAL NOTES

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C) OTHER NOTES :

1. HEIGHT GAUGE SHALL BE PROVIDE AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
2. SPEED BREAKER SHOULD BE PROVIDED ON EITHER APPROACH OF RUB AT A DISTANCE OF 20M FROM THE BRIDGE COVERING FULL WIDTH OF THE ROAD INCLUDE BERMS.

IMPORTANT NOTE:
TOP OF BOTTOM SLAB OF RCC BOX SHALL NOT BE KEPT ABOVE THE NATURAL GROUND LEVEL.HOWEVER, ROAD LEVEL AND VERTICAL CLEARANCE ABOVE ROAD LEVEL SHALL BE MAINTAINED AS SHOWN IN THE DRAWING.OVERALL HEIGHT OF THE BOX MAY NEED MODIFICATION ACCORDINGLY.THE HEIGHT OF RCC BOX SHALL BE PROVIDED KEEPING ABOVE PROVISION IN VIEW.

PROJECT:
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GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
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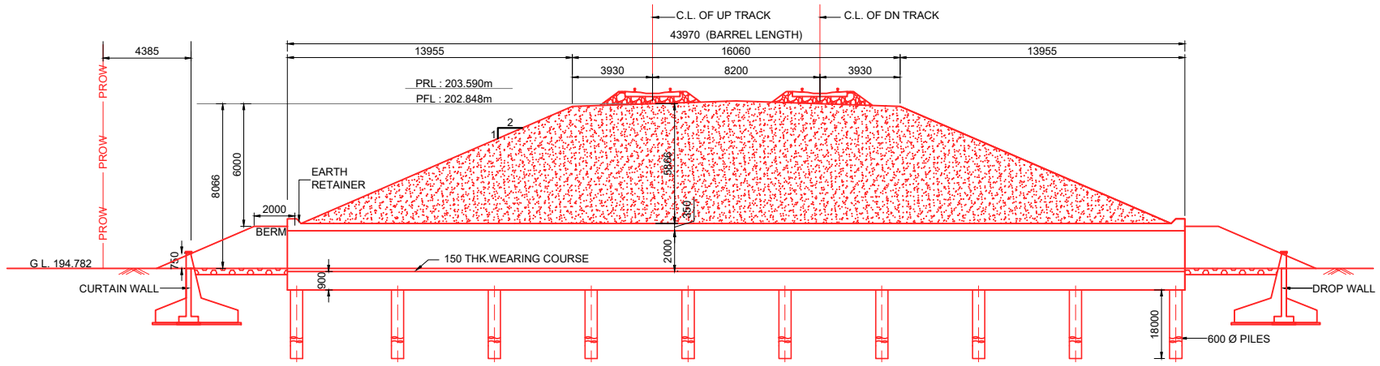
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL	P.K. Singh		

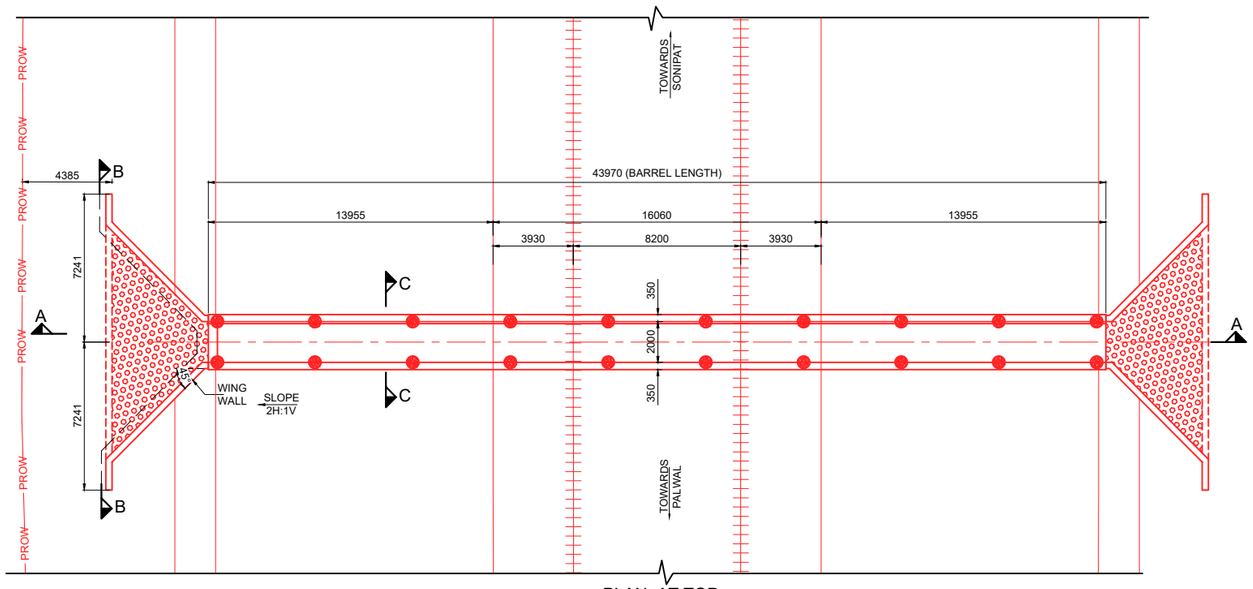
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR ROAD UNDER BRIDGE NO. 40 SPAN 1X8.40X5.15 RCC BOX AT CH: 10410.702

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_01040_A1	1 OF 1

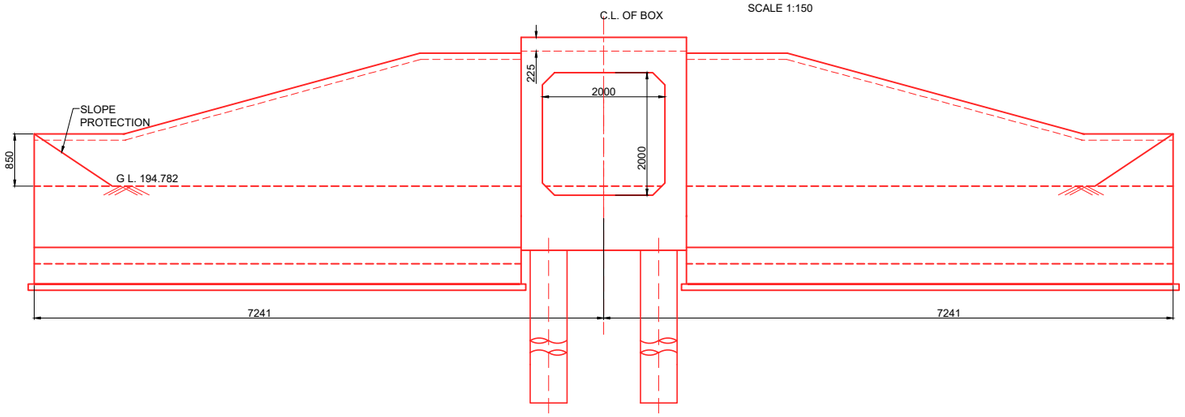
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	19-12-2023



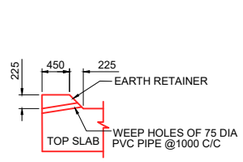
SECTIONAL ELEVATION AT A-A
SCALE 1:150



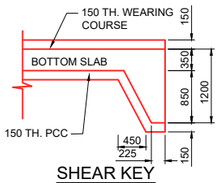
PLAN AT TOP
SCALE 1:150



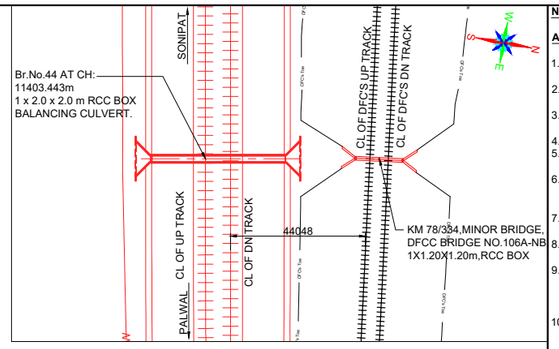
VIEW AT B-B
SCALE 1:50



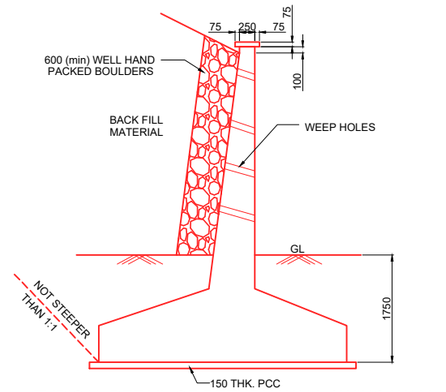
EARTH RETAINER
SCALE 1:50



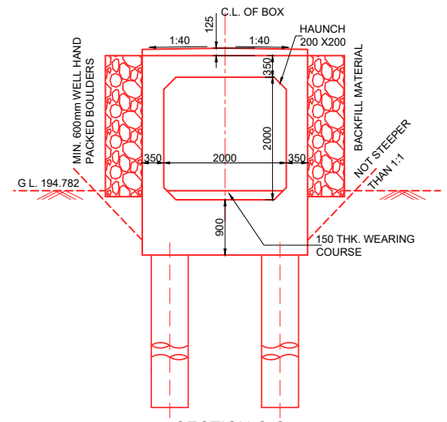
SHEAR KEY
SCALE 1:50



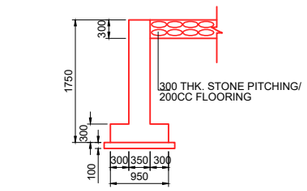
KEY PLAN
SCALE NTS



TYPICAL DETAIL OF RETURN WALL / WING WALL
SCALE 1:50



SECTION C-C
SCALE 1:50



DROP / CURTAIN WALL DETAILS
SCALE 1:50

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PROW	PROPOSED HORC'S ROW

NOTES :

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CONSULTANT:
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GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
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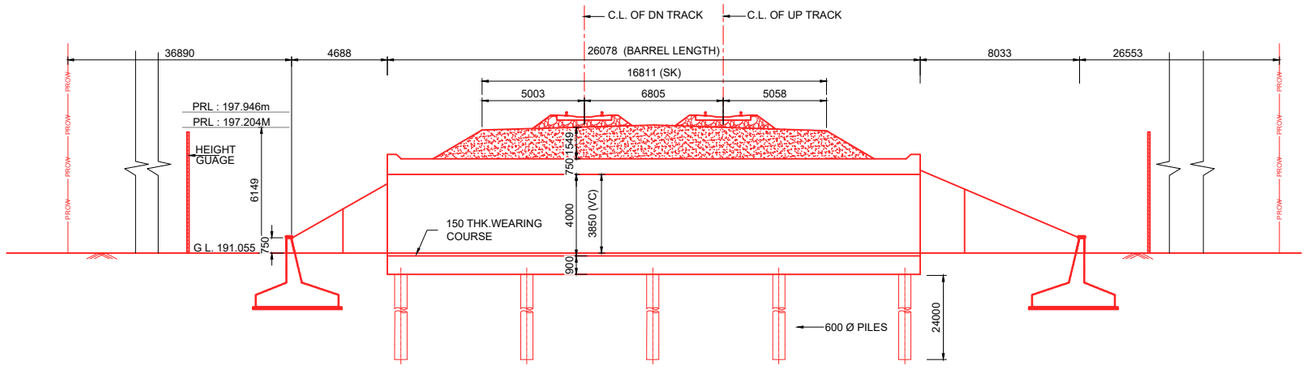
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL	P.K. Singh		

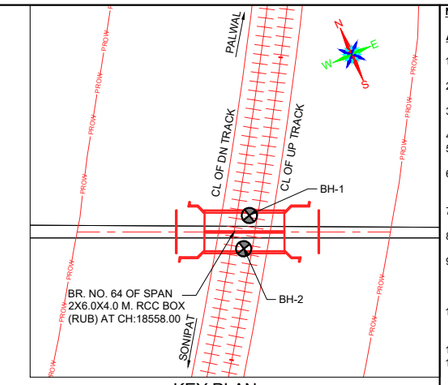
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR BALANCING CULVERT BRIDGE NO. 44
SPAN 1X2.0X2.0 RCC BOX AT CH: 11403.443

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_01044_A1	1 OF 1

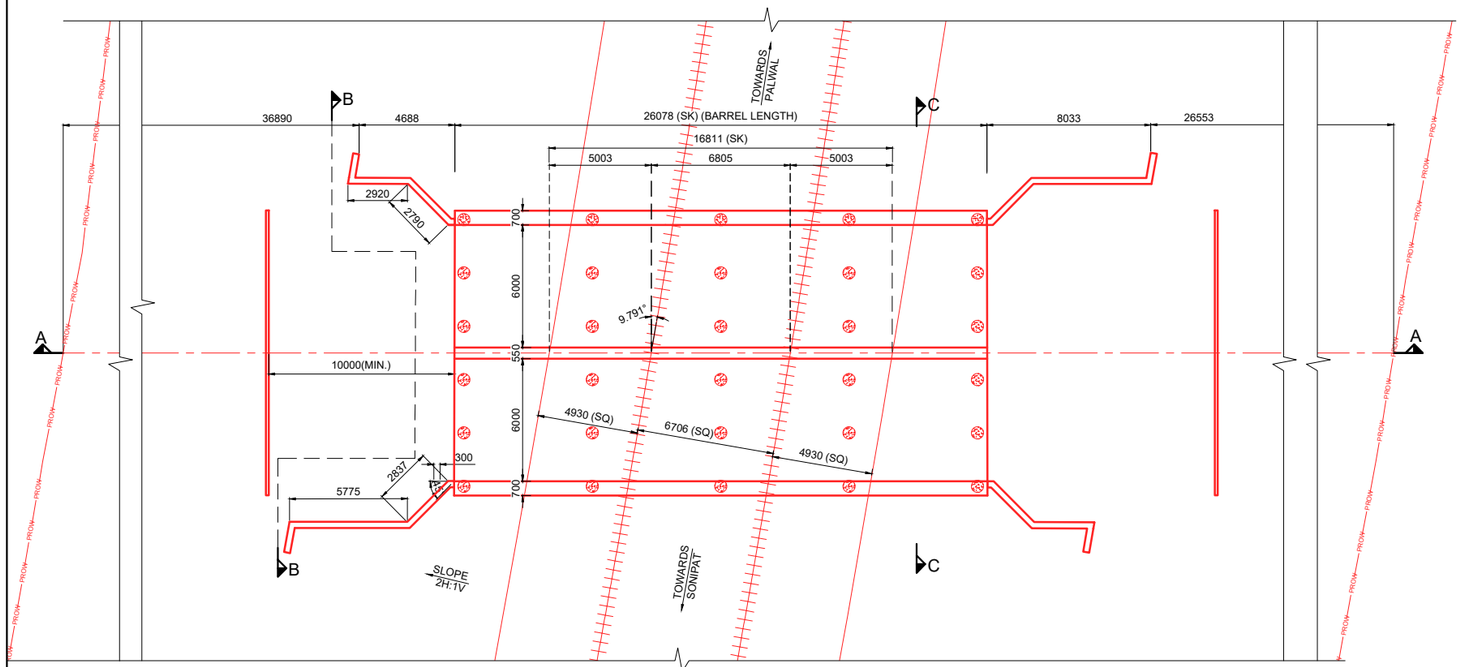
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	23-08-2023	19-12-2023



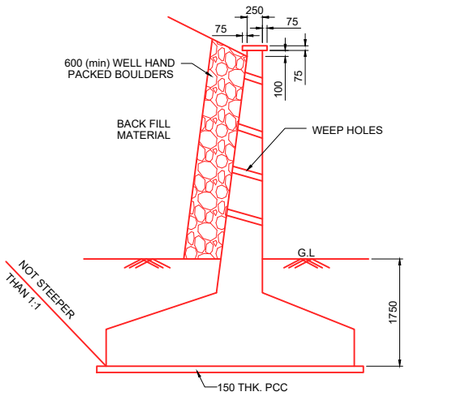
SECTIONAL ELEVATION AT A-A
SCALE 1:150



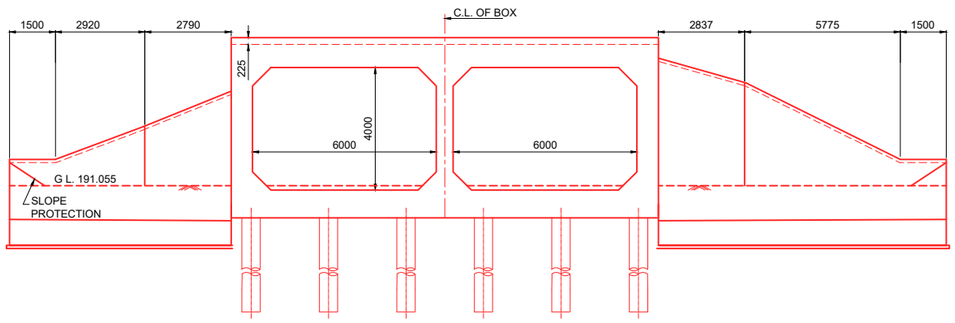
KEY PLAN
SCALE NTS



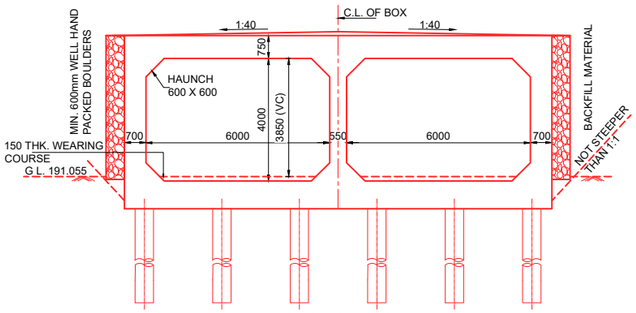
PLAN AT TOP
SCALE 1:100



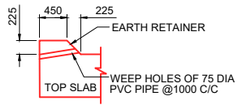
TYPICAL DETAIL OF RETURN WALL / WING WALL
SCALE 1:50



VIEW B-B
SCALE 1:100



SECTION C-C
SCALE 1:100



EARTH RETAINER
SCALE 1:50

NOTES :

A) GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
3. THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
4. FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
5. THE EXISTING DETAILS ARE AS PER PRELIMINARY SITE SURVEY AND SHALL BE VERIFIED BY THE CONCTRACTOR BEFORE EXECUTION.
6. ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
7. SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
8. ENGINEER IN CHARGE SHALL ENSURE THE SAFETY OF DFC TRACK AND STRUCTURE DURING EXECUTION OF WORK.
9. ENGINEER IN CHARGE SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK. CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/(Sig)NR,DFCCIL ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
10. DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
11. THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
12. DETAILED DESIGN DRAWING WILL BE PREPARED BASED ON THIS CONCEPTUAL APPROVED GAD.

B) TECHNICAL NOTES :

1. BOX BRIDGE IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
2. DESIGN CRITERIA SHALL BE BASED ON FOLLOWING IRS CODES
   (i) IRS BRIDGE RULE
   (ii) IRS CONCRETE BRIDGE CODE
   (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
3. SEISMIC ZONE- IV
4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
   GRADE OF CONCRETE :
   (i) ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
   (ii) LEVELING COURSE/PCC : M:20/DETAILED DESIGN DRG.
6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
7. PROTECTION WORK ON SLOPES OF BANK UP TO 15M,BOTH SIDES ON APPROACHES OF BRIDGE SHALL BE DONE AS PER SKETCH NO. GC-HRIDC-SK-GEN-015
8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BOX AFTER PROTECTION WORK.
9. FOR PROPER DRAINAGE OF WATER,SUITABLE SLOPE TO BE PROVIDED ON TOP OF BOX SLAB.
10. ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH THERMOCOL. .
11. ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM. CONFIRMING TO IS: 3117.
12. PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE, DRAINAGE &NATURAL GROUND PROFILE.
13. THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB- STRUCTURE AND FOUNDATION CODE. ANGLE OF INTERNAL FRICTION OF BACKFILL SHALL NOT BE LESS THAN 33 °.
14. 75mm DIA WEEP HOLES TO BE PROVIDED @1000 C/C HORIZONTAL AND 1000 MM C/C VERTICALLY IN RETURN WALL & ABUTMENT THROUGHOUT.
15. BEARING CAPACITY OF SOIL SHALL BE ENSURED AS PER DETAILED DESIGN REQUIREMENT. IF REQUIRED GROUND IMPROVEMENT MAY BE CARRIED OUT AND CONFIRMED THROUGH FIELD TESTING.
16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. HEIGHT GAUGE SHALL BE PROVIDE AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
2. SPEED BREAKER SHOULD BE PROVIDED ON EITHER APPROACH OF RUB AT A DISTANCE OF 20M FROM THE BRIDGE COVERING FULL WIDTH OF THE ROAD INCLUDE BERMS.

IMPORTANT NOTE:
TOP OF BOTTOM SLAB OF RCC BOX SHALL NOT BE KEPT ABOVE THE NATURAL GROUND LEVEL.HOWEVER, ROAD LEVEL AND VERTICAL CLEARANCE ABOVE ROAD LEVEL SHALL BE MAINTAINED AS SHOWN IN THE DRAWING.OVERALL HEIGHT OF THE BOX MAY NEED MODIFICATION ACCORDINGLY.THE HEIGHT OF RCC BOX SHALL BE PROVIDED KEEPING ABOVE PROVISION IN VIEW.

LEGEND

	PROPOSED
	EXISTING

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
VC	VERTICAL CLEARANCE
PROW	PROPOSED HORC'S ROW

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANK DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

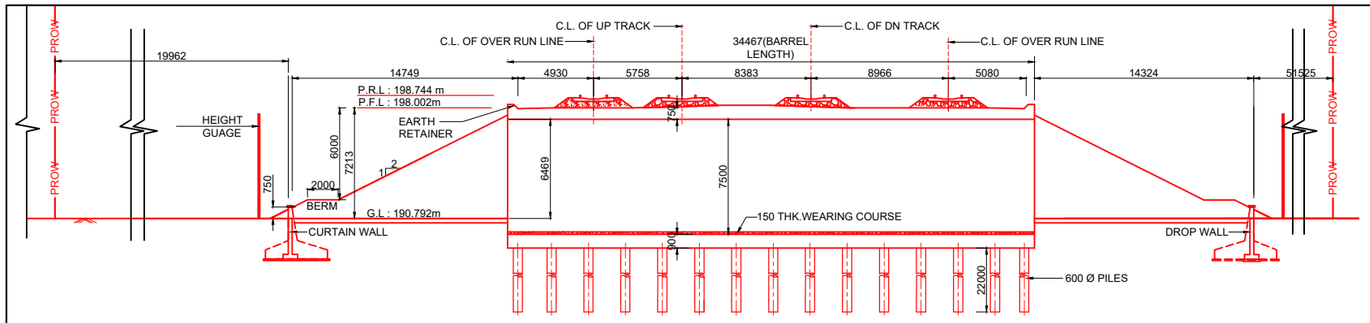
CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE
SMEC Member of the Surbana Jurong Group

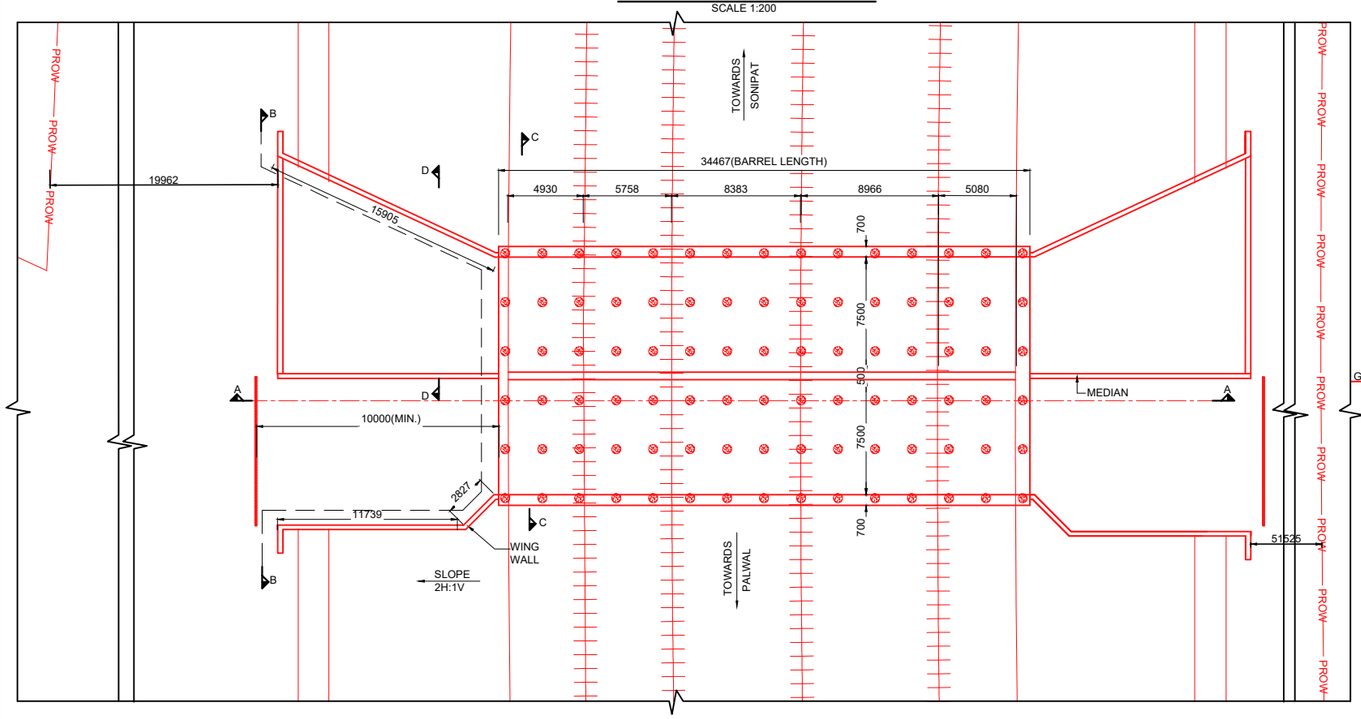
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR ROAD UNDER BRIDGE NO. 64 SPAN 2X6.0X4.0 RCC BOX AT CH: 18558.00

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_01064_A1	1 OF 1

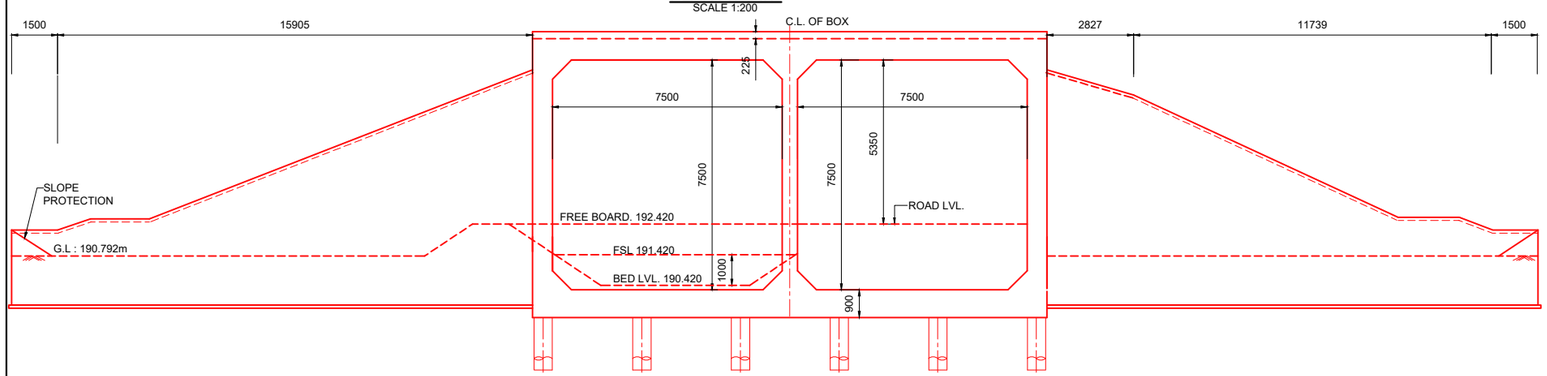
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	23-08-2023	19-12-2023



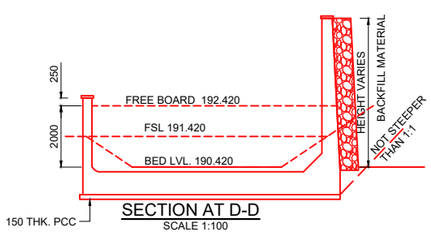
SECTIONAL ELEVATION AT A-A
SCALE 1:200



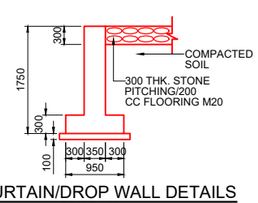
PLAN AT TOP
SCALE 1:200



VIEW AT B-B
SCALE 1:50

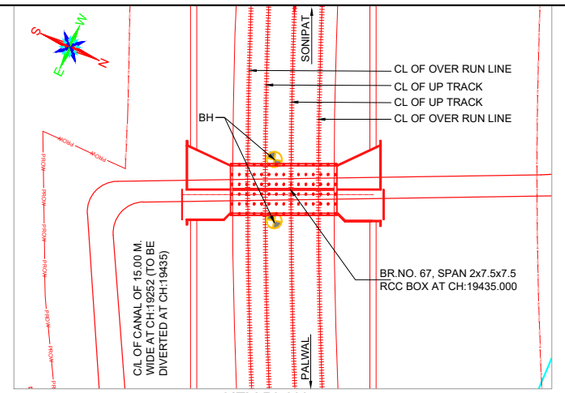


SECTION AT D-D
SCALE 1:100

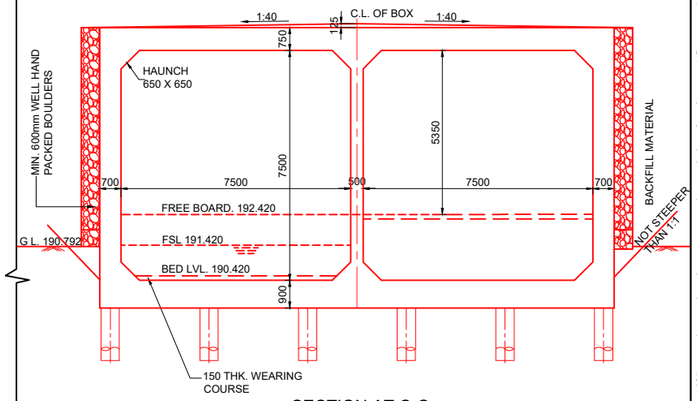


CURTAIN/DROP WALL DETAILS
SCALE 1:50

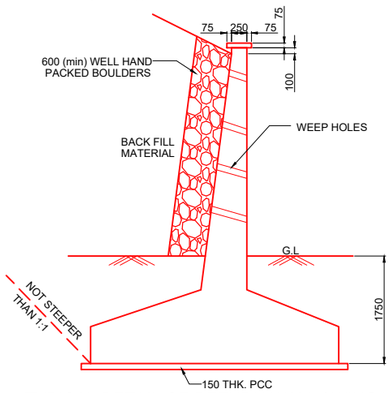
HYDRAULIC DATA OF DRAIN		
1	NAME OF CANAL	REWASAN DRAIN
2	RD	19435/10350
3	BED LEVEL	190.420
4	FULL SUPPLY LEVEL	191.42
5	FREE BOARD	192.420
6	DISCHARGE	90 cusec
7	BED WIDTH	4.87
8	FSD	1.00
9	SIDE SLOPE	1.5:1
10	W S SLOPE	0.15%
11	VELOCITY	1.5ft/sec
12	ROW	49.5



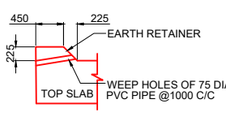
KEY PLAN
SCALE : NTS



SECTION AT C-C
SCALE 1:100



TYPICAL DETAIL OF RETURN WALL / WING WALL
SCALE 1:50



EARTH RETAINER
SCALE 1:50

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PROW	PROPOSED HORC'S ROW

NOTES :

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7. SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
8. ENGINEER IN CHARGE SHALL ENSURE THE SAFETY OF DFC TRACK AND STRUCTURE DURING EXECUTION OF WORK.
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5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
   GRADE OF CONCRETE :
   (i) ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
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6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
7. PROTECTION WORK ON SLOPES OF BANK UP TO 15M,BOTH SIDES ON APPROACHES OF BRIDGE SHALL BE DONE AS PER SKETCH NO. GC-HRIDC-SK-GEN-015
8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BOX AFTER PROTECTION WORK.
9. FOR PROPER DRAINAGE OF WATER,SUITABLE SLOPE TO BE PROVIDED ON TOP OF BOX SLAB.
10. ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH THERMOCOL. .
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16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. ADEQUATE SLOPE IN BOTTOM SLAB OF RCC BOX TOWARDS DIRECTION OF FLOW SHALL BE PROVIDED.
2. HEIGHT GAUGE SHALL BE PROVIDE AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
3. SPEED BREAKER SHOULD BE PROVIDED ON EITHER APPROACH OF RUB AT A DISTANCE OF 20M FROM THE BRIDGE COVERING FULL WIDTH OF THE ROAD INCLUDE BERMS.
4. RCC LINING SHALL BE CONSTRUCTED FOR CANAL UPTO ROW OF HORC.

IMPORTANT NOTE:
TOP OF BOTTOM SLAB OF RCC BOX SHALL NOT BE KEPT ABOVE THE NATURAL GROUND LEVEL.HOWEVER, ROAD LEVEL AND VERTICAL CLEARANCE ABOVE ROAD LEVEL SHALL BE MAINTAINED AS SHOWN IN THE DRAWING.OVERALL HEIGHT OF THE BOX MAY NEED MODIFICATION ACCORDINGLY.THE HEIGHT OF RCC BOX SHALL BE PROVIDED KEEPING ABOVE PROVISION IN VIEW.

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

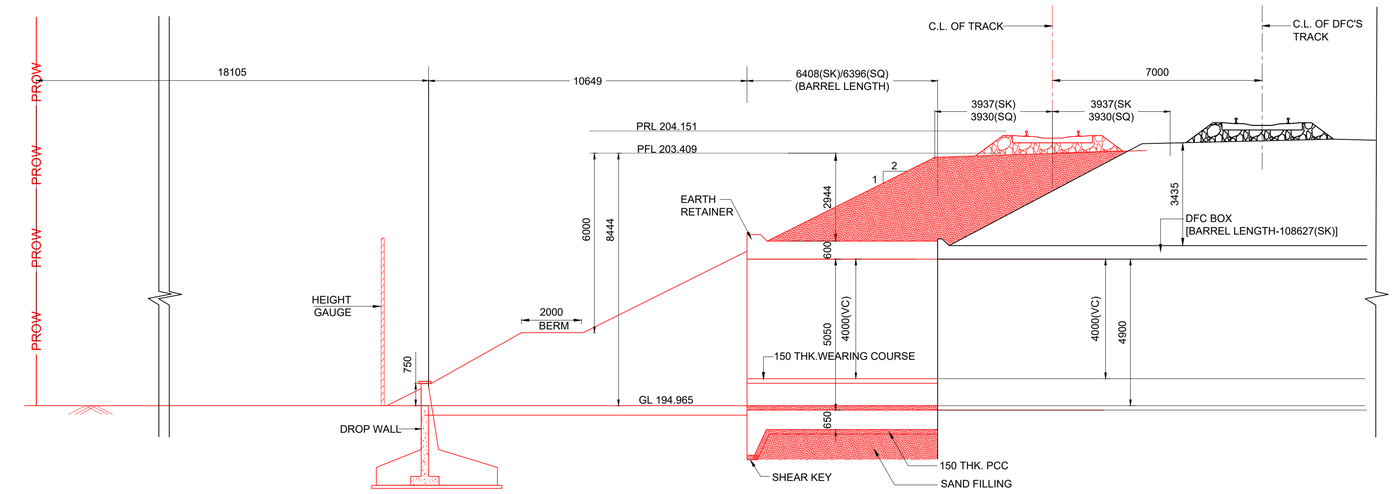
CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE
SMEC Member of the Surbana Jurong Group

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANK DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL			

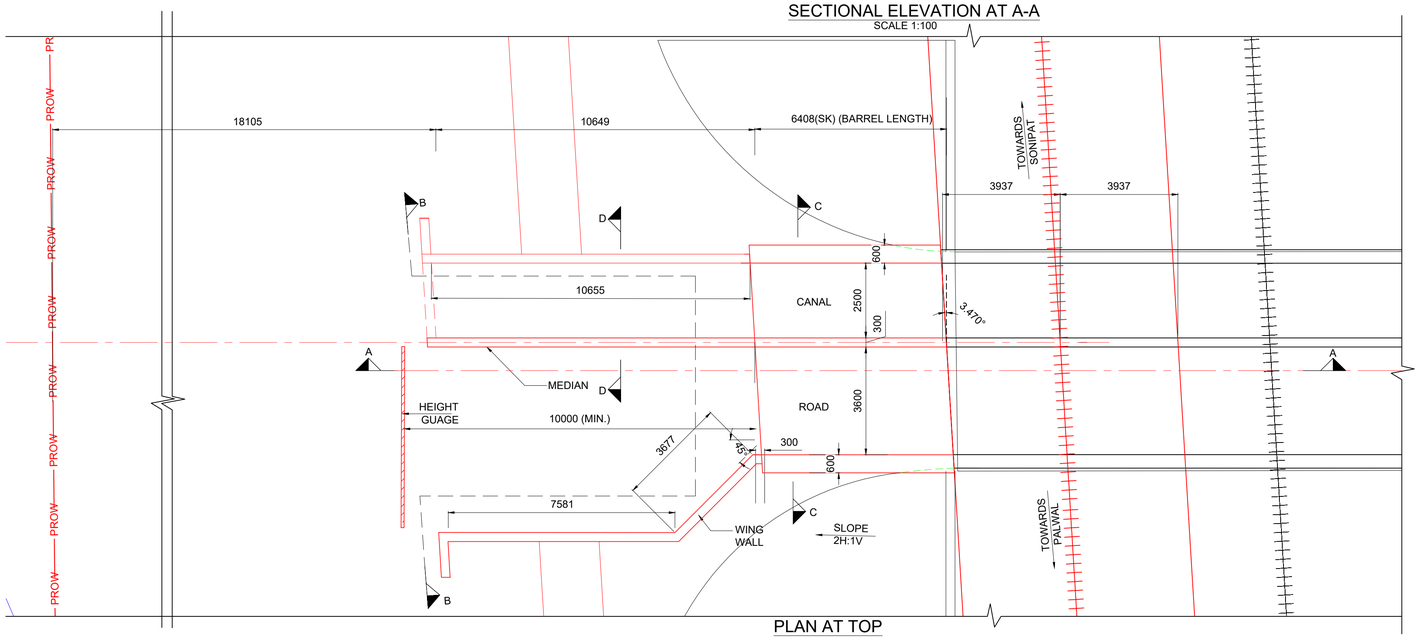
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR ROAD + BALANCING CULVERT BRIDGE NO. 67 SPAN 2.0X7.5X7.5 RCC BOX AT CH: 19435.000 (CANAL CROSSING REWASAN DRAIN RD 10350)

DRG. NO. GC-HRIDC-C5-DRW-BRD-GAD-01067_A1 | SHEET NO.

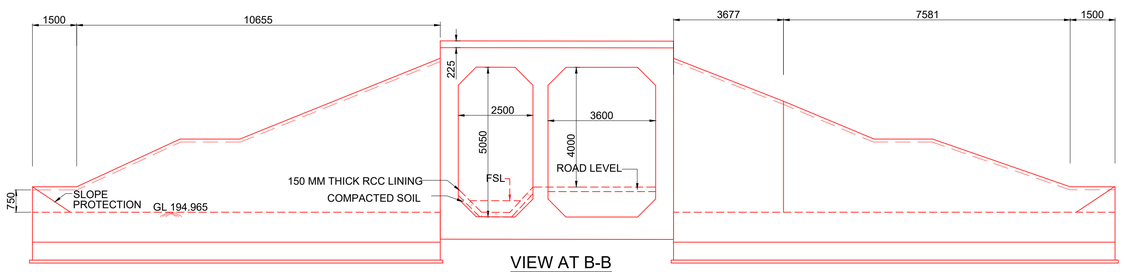
SCALE : AS SHOWN | ISSUE DATE 23-08-2023 | REVISED DATE 19-12-2023



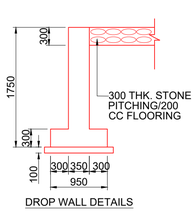
SECTIONAL ELEVATION AT A-A
SCALE 1:100



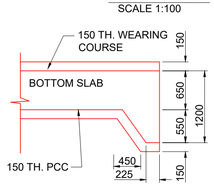
PLAN AT TOP
SCALE 1:100



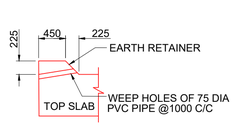
VIEW AT B-B
SCALE 1:100



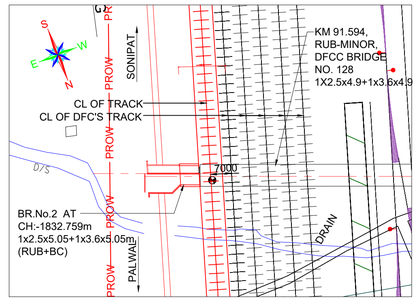
DROP WALL DETAILS
SCALE 1:50



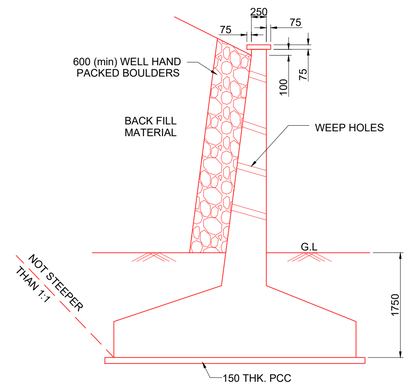
SHEAR KEY
SCALE 1:50



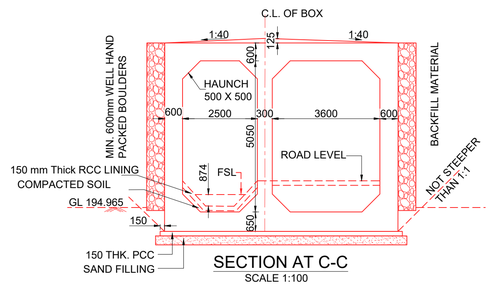
EARTH RETAINER
SCALE 1:50



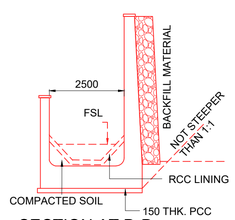
KEY PLAN
SCALE NTS



TYPICAL DETAIL OF RETURN WALL / WING WALL
SCALE 1:50



SECTION AT C-C
SCALE 1:100



SECTION AT D-D
SCALE 1:100

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
VC	VERTICAL CLEARANCE
PROW	PROPOSED HORC'S ROW

NOTES :

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6. ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL , BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
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8. ENGINEER IN CHARGE SHALL ENSURE THE SAFETY OF DFC TRACK AND STRUCTURE DURING EXECUTION OF WORK.
9. ENGINEER IN CHARGE SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK. CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/Sig.NR,DFCCIL ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
10. DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
11. THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
12. DETAILED DESIGN DRAWING WILL BE PREPARED BASED ON THIS CONCEPTUAL APPROVED GAD.

B) TECHNICAL NOTES :

1. BOX BRIDGE IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
2. DESIGN CRITERIA SHALL BE BASED ON FOLLOWING IRS CODES
   (i) IRS BRIDGE RULE
   (ii) IRS CONCRETE BRIDGE CODE
   (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
3. SEISMIC ZONE- IV
4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
   GRADE OF CONCRETE :
   (i) ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
   (ii) LEVELING COURSE/PCC : M:20/DETAILED DESIGN DRG.
6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
7. PROTECTION WORK ON SLOPES OF BANK UP TO 15M,BOTH SIDES ON APPROACHES OF BRIDGE SHALL BE DONE AS PER SKETCH NO. GC-HRIDC-SK-GEN-015
8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BOX AFTER PROTECTION WORK.
9. FOR PROPER DRAINAGE OF WATER,SUITABLE SLOPE TO BE PROVIDED ON TOP OF BOX SLAB.
10. ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH THERMOCOL. .
11. ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM. CONFIRMING TO IS: 3117.
12. PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE, DRAINAGE &NATURAL GROUND PROFILE.
13. THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB- STRUCTURE AND FOUNDATION CODE. ANGLE OF INTERNAL FRICTION OF BACKFILL SHALL NOT BE LESS THAN 33 °.
14. 75mm DIA WEEP HOLES TO BE PROVIDED @1000 C/C HORIZONTAL AND 1000 MM C/C VERTICALLY IN RETURN WALL & ABUTMENT THROUGHOUT.
15. BEARING CAPACITY OF SOIL SHALL BE ENSURED AS PER DETAILED DESIGN REQUIREMENT. IF REQUIRED GROUND IMPROVEMENT MAY BE CARRIED OUT AND CONFIRMED THROUGH FIELD TESTING.
16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. HEIGHT GAUGE SHALL BE PROVIDE AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
2. SPEED BREAKER SHOULD BE PROVIDED ON EITHER APPROACH OF RUB AT A DISTANCE OF 20M FROM THE BRIDGE COVERING FULL WIDTH OF THE ROAD INCLUDE BERMS.
3. ADEQUATE SLOPE IN BOTTOM SLAB OF RCC BOX TOWARDS DIRECTION OF FLOW SHALL BE PROVIDED.
4. RCC LINING SHALL BE CONSTRUCTED FOR CANAL FROM ROW TO ROW OF HORC INCLUDING IN RCC BOX & U-TROUGH.
5. RCC LINING SHALL BE OF MIN 150 MM THICK AND HAVING AT LEAST MIN TEMP REINFORCEMENT.

IMPORTANT NOTE:

TOP OF BOTTOM SLAB OF RCC BOX SHALL NOT BE KEPT ABOVE THE NATURAL GROUND LEVEL.HOWEVER, ROAD LEVEL AND VERTICAL CLEARANCE ABOVE ROAD LEVEL SHALL BE MAINTAINED AS SHOWN IN THE DRAWING.OVERALL HEIGHT OF THE BOX MAY NEED MODIFICATION ACCORDINGLY.THE HEIGHT OF RCC BOX SHALL BE PROVIDED KEEPING ABOVE PROVISION IN VIEW.

PROJECT:

HARYANA ORBITAL RAIL CORRIDOR

CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:

GENERAL CONSULTANT FOR
HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

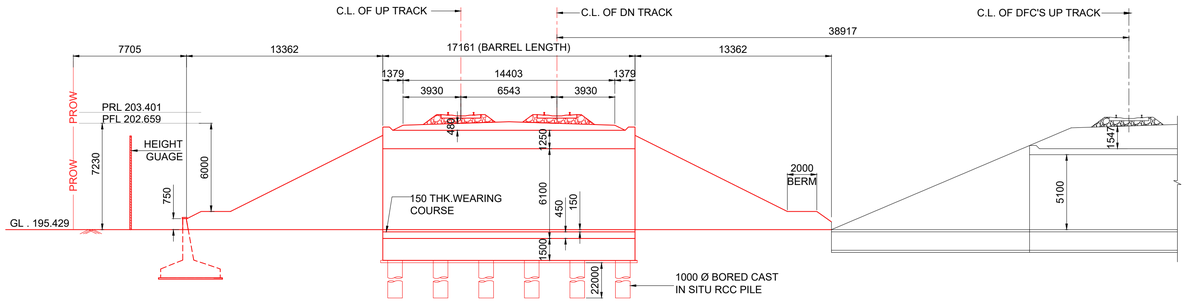
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR BALANCING CULVERT + RUB BRIDGE NO. 02
SPAN 1X2.5X5.05+1x3.6x5.05, RCC BOX, AT CH: -1832.759

DRG. NO. GC-HRIDC-C5-DRW-BRD-GAD_01002_A1

SHEET NO.

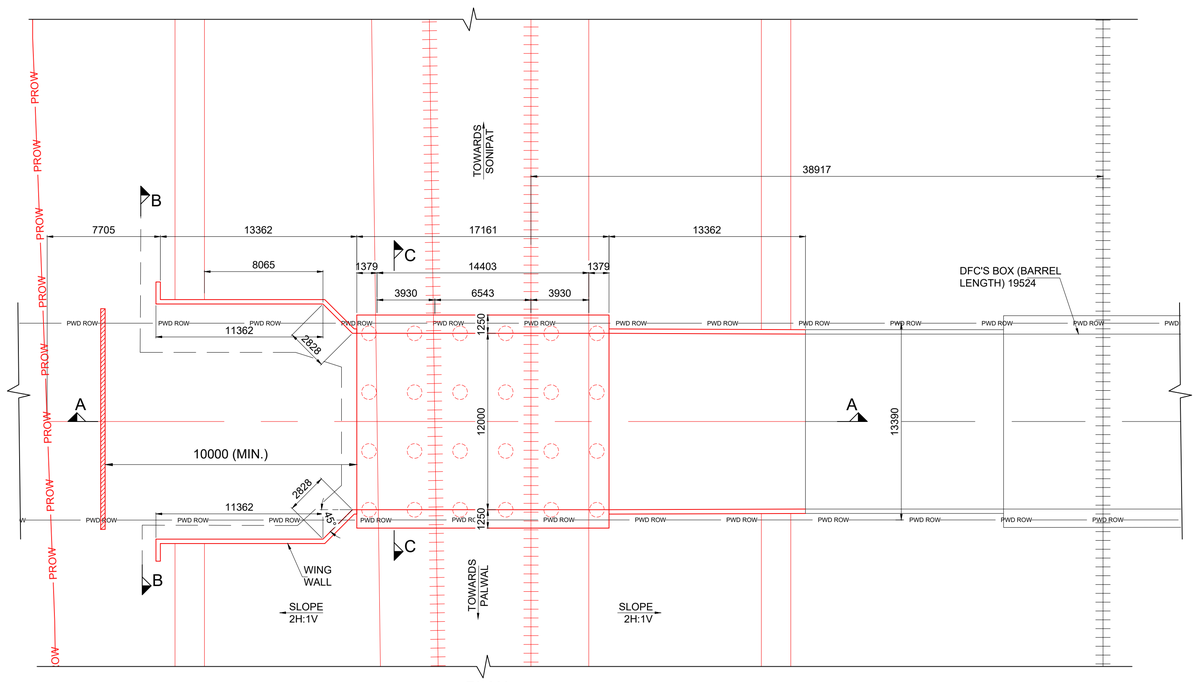
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	06-12-2023

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL			



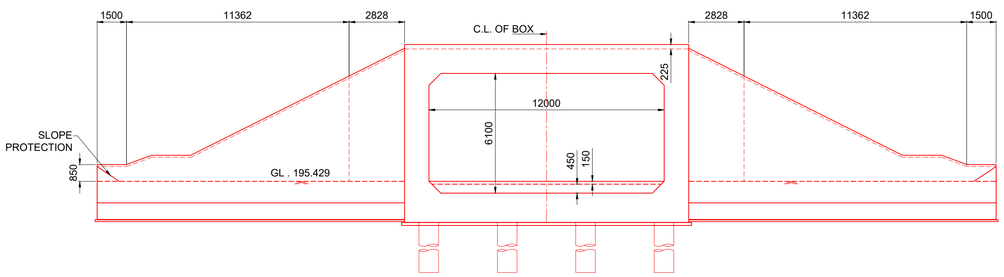
SECTIONAL ELEVATION AT A-A

SCALE 1:200



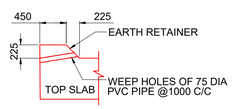
PLAN

SCALE 1:200



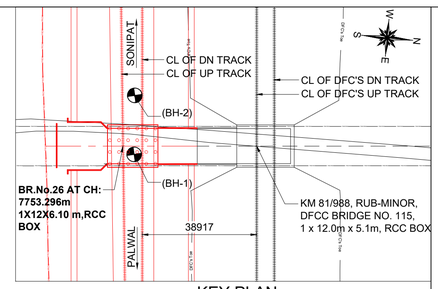
SECTION B-B

SCALE 1:150



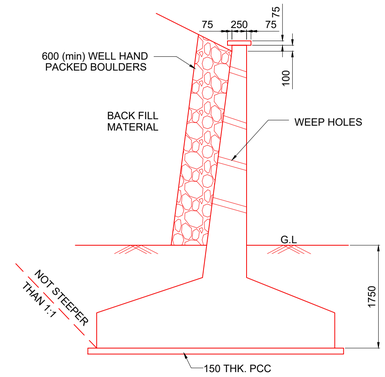
EARTH RETAINER

SCALE 1:50



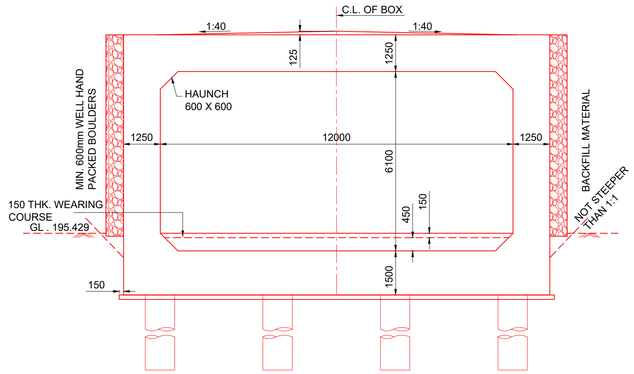
KEY PLAN

SCALE NTS



TYPICAL DETAIL OF RETAINING WALL(RW) / WING WALL

SCALE 1:50



SECTION C-C

SCALE 1:100

NOTES :

A) GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
3. THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
4. FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC, REFER L-SECTION.
5. THE EXISTING DETAILS ARE AS PER PRELIMINARY SITE SURVEY AND SHALL BE VERIFIED BY THE CONCTRACTOR BEFORE EXECUTION.
6. ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL, BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
7. SUITABLE BED SLOPE SHALL BE PROVIDED AND ADJUSTED AS PER SITE CONDITIONS
8. ENGINEER IN CHARGE SHALL ENSURE THE SAFETY OF DFC TRACK AND STRUCTURE DURING EXECUTION OF WORK.
9. ENGINEER IN CHARGE SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE /OFC DURING EXECUTION OF WORK. CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/(Sig)NR,DFCCIL ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
10. DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
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12. DETAILED DESIGN DRAWING WILL BE PREPARED BASED ON THIS CONCEPTUAL APPROVED GAD.

B) TECHNICAL NOTES :

1. BOX BRIDGE IS TO BE DESIGNED FOR 32.5 T LOADING AS APPLICABLE.
2. DESIGN CRITERIA SHALL BE BASED ON FOLLOWING IRS CODES
   (i) IRS BRIDGE RULE
   (ii) IRS CONCRETE BRIDGE CODE
   (iii) IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
3. SEISMIC ZONE- IV
4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
   GRADE OF CONCRETE .
   (i) ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
   (ii) LEVELING COURSE/PCC : M:20/DETAILED DESIGN DRG.
6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
7. PROTECTION WORK ON SLOPES OF BANK UP TO 15M,BOTH SIDES ON APPROACHES OF BRIDGE SHALL BE DONE AS PER SKETCH NO. GC-HRIDC-SK-GEN-015
8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BOX AFTER PROTECTION WORK.
9. FOR PROPER DRAINAGE OF WATER,SUITABLE SLOPE TO BE PROVIDED ON TOP OF BOX SLAB.
10. ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH THERMOCOL. .
11. ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM. CONFIRMING TO IS: 3117.
12. PLACEMENT LEVEL OF BOX AS SHOWN IN THIS GAD IS INDICATIVE AND MAY BE SUITABLY LOWERED/ELEVATED BASED UPON THE REQUIREMENT OF CLEARANCE, DRAINAGE &NATURAL GROUND PROFILE.
13. 75mm DIA WEEP HOLES TO BE PROVIDED @1000 C/C HORIZONTAL AND 1000 MM C/C VERTICALLY IN RETURN WALL & ABUTMENT THROUGHOUT.
14. THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB- STRUCTURE AND FOUNDATION CODE. ANGLE OF INTERNAL FRICTION OF BACKFILL SHALL NOT BE LESS THAN 33 °.
15. BEARING CAPACITY OF SOIL SHALL BE ENSURED AS PER DETAILED DESIGN REQUIREMENT.
16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. HEIGHT GAUGE SHALL BE PROVIDE AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
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IMPORTANT NOTE:
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LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PROW	PROPOSED HORC'S ROW

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		SHIV OM DWIVEDI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANK DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL			

PROJECT:

HARYANA ORBITAL RAIL CORRIDOR

CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:

GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR

RITES Limited in consortium with SMEC International Pty. Ltd.

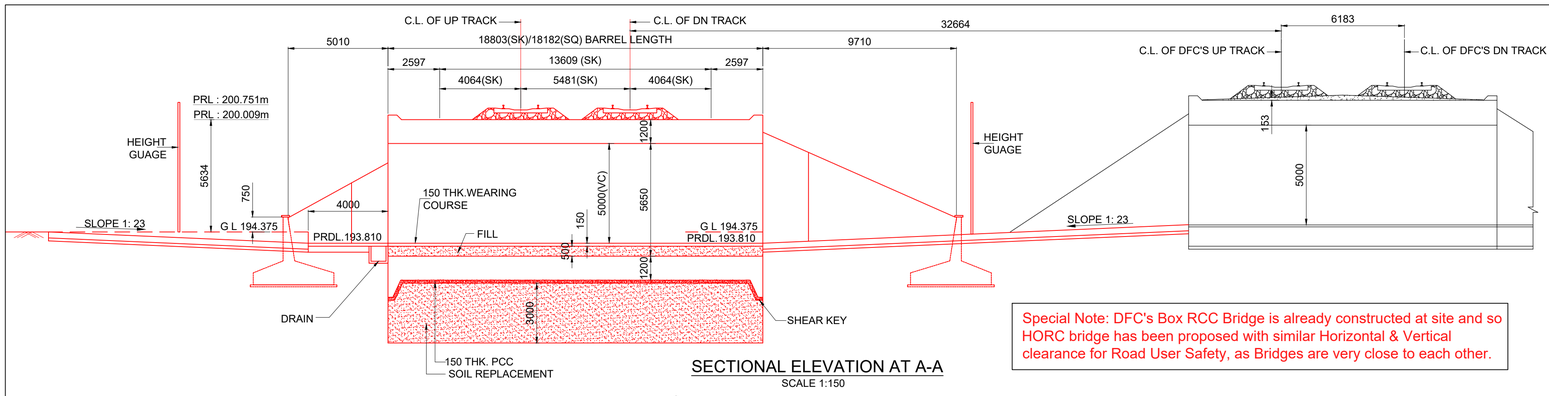
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING

PROPOSED RUB BRIDGE NO. 26
1X12X6.10 RCC BOX CH: 7753.296m

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_01026_A0	1 OF 1

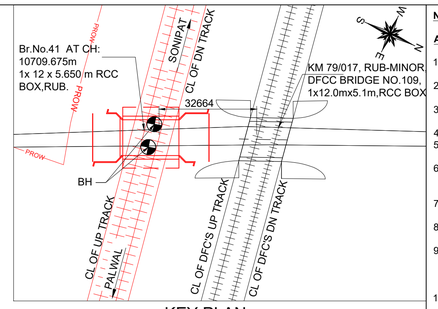
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	



SECTIONAL ELEVATION AT A-A

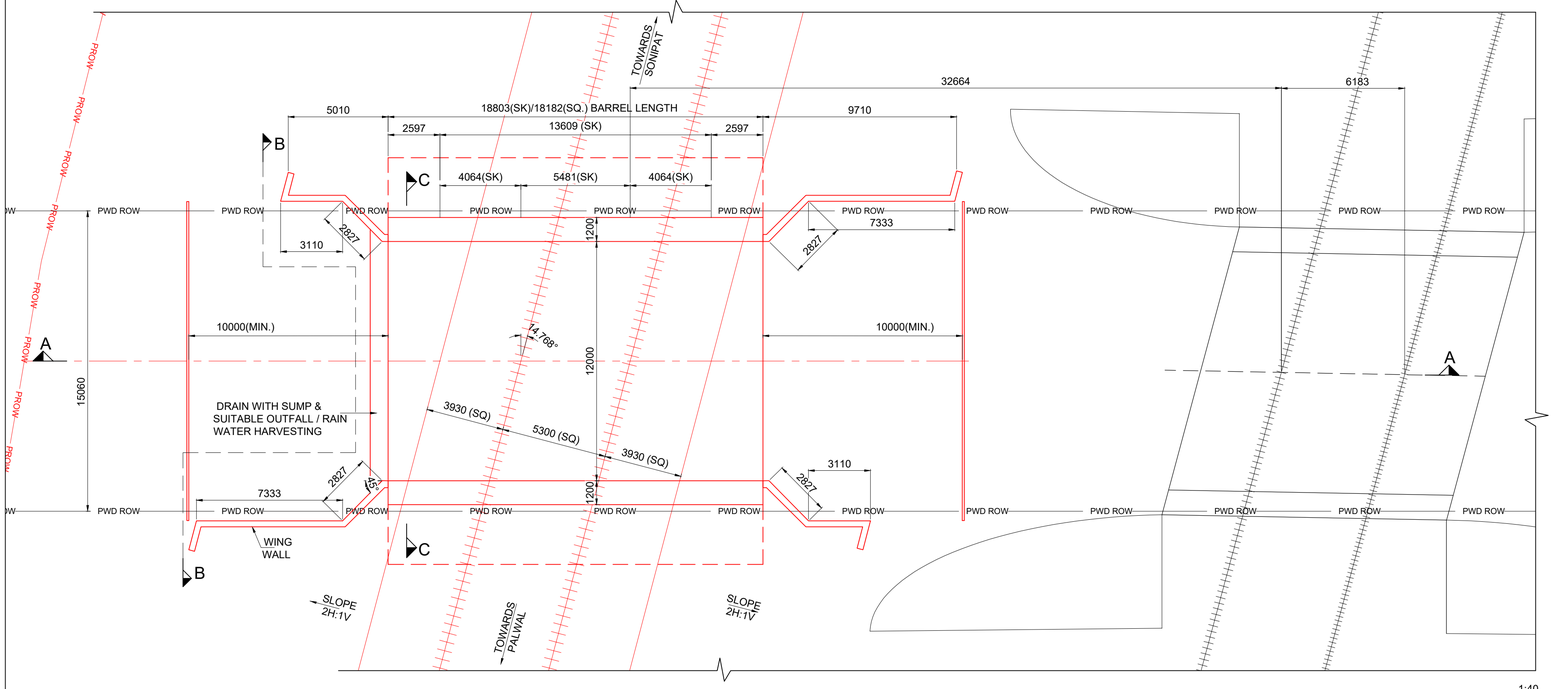
SCALE 1:150

Special Note: DFC's Box RCC Bridge is already constructed at site and so HORC bridge has been proposed with similar Horizontal & Vertical clearance for Road User Safety, as Bridges are very close to each other.



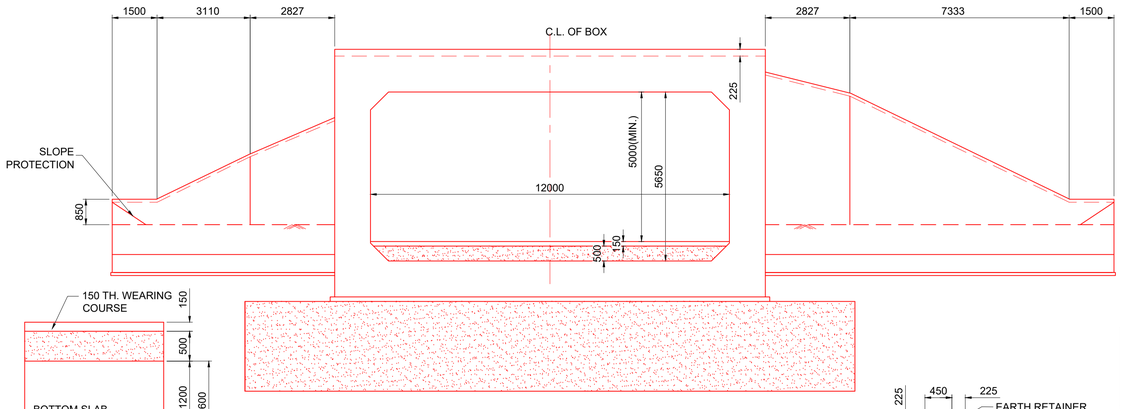
KEY PLAN

SCALE NTS



PLAN AT TOP

SCALE 1:150

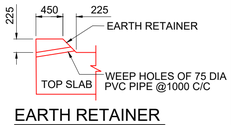


VIEW B-B

SCALE 1:100

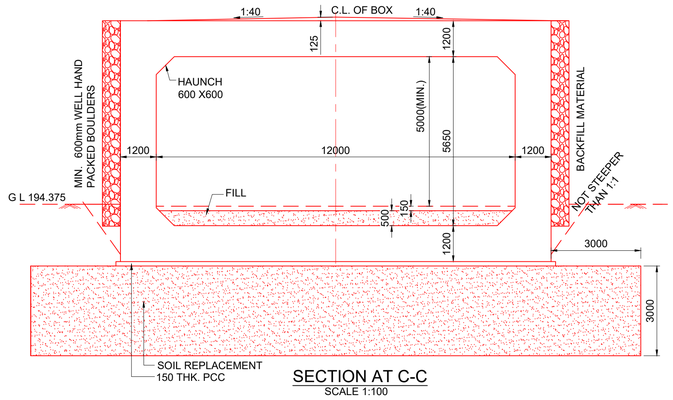
SHEAR KEY

SCALE 1:50



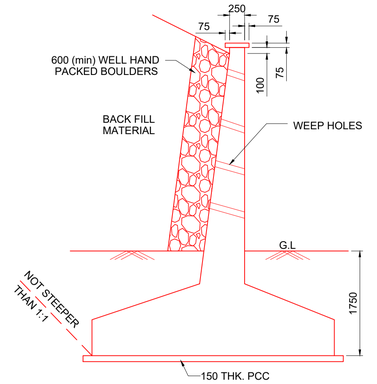
EARTH RETAINER

SCALE 1:50



SECTION AT C-C

SCALE 1:100



TYPICAL DETAIL OF RETURN WALL(RW) / WING WALL

SCALE 1:50

LEGEND

	PROPOSED
	EXISTING
	DISMANTLE

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
GL	GROUND LEVEL
PRDL	PROPOSED ROAD LEVEL
PROW	PROPOSED HORC'S ROW

NOTES :

A) GENERAL NOTES

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4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
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15. BEARING CAPACITY OF SOIL SHALL BE ENSURED AS PER DETAILED DESIGN REQUIREMENT. IF REQUIRED GROUND IMPROVEMENT MAY BE CARRIED OUT AND CONFIRMED THROUGH FIELD TESTING.
16. THICKNESS OF STRUCTURAL MEMBERS ARE TENTATIVE AND WILL BE FINALISED AFTER DETAILED DESIGN.

C) OTHER NOTES :

1. HEIGHT GAUGE SHALL BE PROVIDE AS PER RDSO STANDARD DRAWING NO. RDSO/M0001.
2. SPEED BREAKER SHOULD BE PROVIDED ON EITHER APPROACH OF RUB AT A DISTANCE OF 20M FROM THE BRIDGE COVERING FULL WIDTH OF THE ROAD INCLUDE BERMS.
3. GROUND IMPROVEMENT DEPTH SHALL BE AS PER DETAILED GT INVESTIGATION AND DESIGN REQUIREMENTS.

IMPORTANT NOTE:

TOP OF BOTTOM SLAB OF RCC BOX SHALL NOT BE KEPT ABOVE THE NATURAL GROUND LEVEL.HOWEVER, ROAD LEVEL AND VERTICAL CLEARANCE ABOVE ROAD LEVEL SHALL BE MAINTAINED AS SHOWN IN THE DRAWING.OVERALL HEIGHT OF THE BOX MAY NEED MODIFICATION ACCORDINGLY.THE HEIGHT OF RCC BOX SHALL BE PROVIDED KEEPING ABOVE PROVISION IN VIEW.

PROJECT:

HARYANA ORBITAL RAIL CORRIDOR

CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:

GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR

RITES Limited in consortium with SMEC International Pty. Ltd.

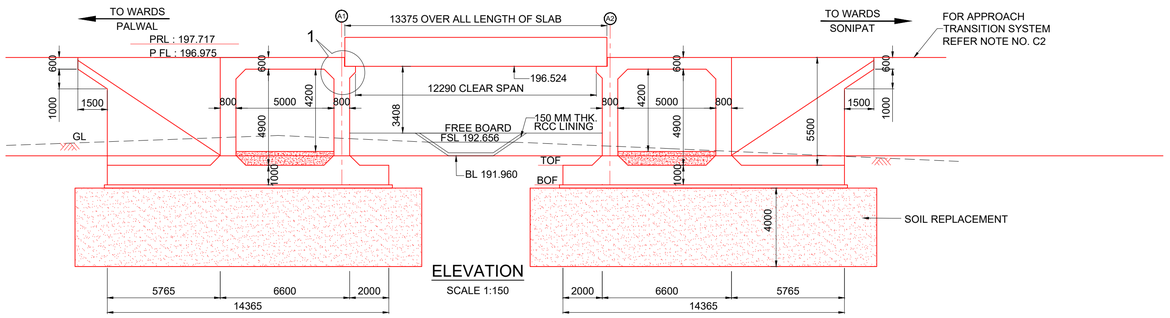
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD	ChahateyRam	SHIV OM DWIVEDI CPM/SOUTH	Shivom
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANK DGM/CIVIL	
REETU PATIAL CDE/ CIVIL	Reetu	MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL	P.K.Singh		

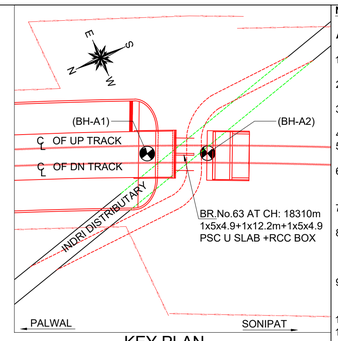
TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR ROAD UNDER BRIDGE NO. 41 SPAN 1X12X5.650 RCC BOX AT CH: 10709.675

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD_01041_A0	1 OF 1

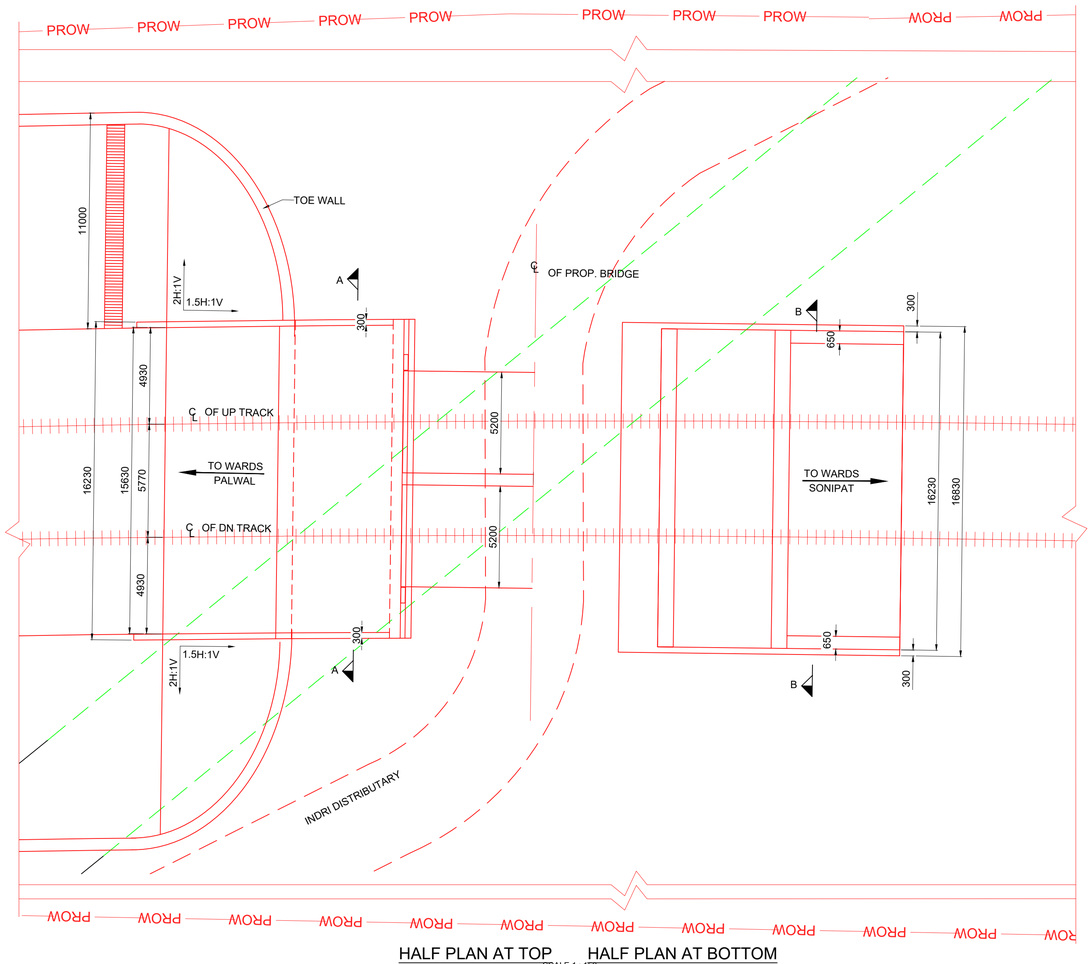
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	



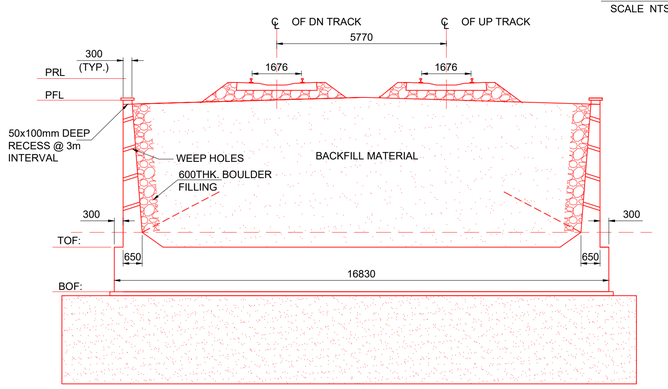
ELEVATION
SCALE 1:150



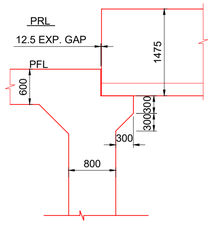
KEY PLAN
SCALE NTS



HALF PLAN AT TOP HALF PLAN AT BOTTOM
SCALE 1 : 150



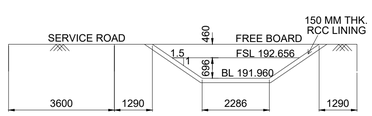
SECTION B-B
SCALE 1:100



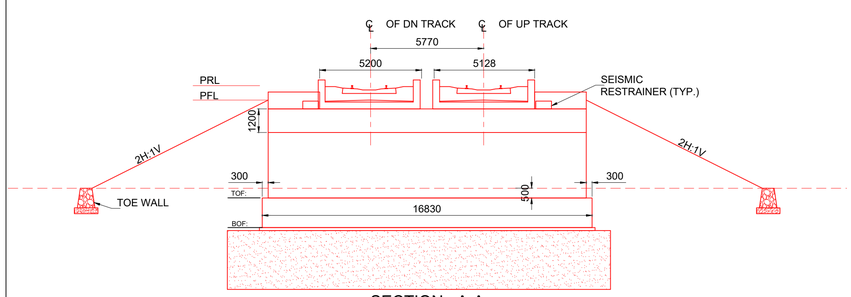
DETAIL -1
SCALE 1:50

HYDRAULIC DATA OF DRAIN

1	NAME OF CANAL	INDRI DISTRIBUTARY
2	RD	18310/11260
3	BED LEVEL (BL)	191.960m
4	FULL SUPPLY LEVEL (FSL)	192.656m
5	DISCHARGE	42.94 cusec
6	BED WIDTH	2.286m
7	FSD	1.143 m
8	SIDE SLOPE	1.5:1
9	W S SLOPE	0.20%
10	VELOCITY	0.338m/sec
11	ROW	49.5m
12	FREE BOARD	193.116



CROSS SECTION OF DRAIN
(SCALE NTS)



SECTION A-A
SCALE 1:150

LEGEND

	PROPOSED
	DISMANTEL
	DISMANTEL

CONSTRUCTION DEPTH

1) RAIL	172 mm
2) RUBBER PAD	10 mm
3) PSC SLEEPER	210 mm
4) BALLAST	350 mm
TOTAL	742 mm

ABBREVIATION

PRL	PROPOSED RAIL LEVEL
PFL	PROPOSED FORMATION LEVEL
RD.L	ROAD LEVEL
TOF	TOP OF FOUNDATION
BOF	BOTTOM OF FOUNDATION
THK.	THICKNESS
EXP. GAP	EXPANSION GAP
CC	CEMENT CONCRETE
TYP.	TYPICAL
GL	GROUND LEVEL
PROW	PROPOSED HORC ROW
ROW	ROAD ROW

NOTES :

A) GENERAL NOTES

1. ALL DIMENSIONS ARE IN MILLIMETERS EXCEPT LEVELS WHICH ARE IN METER, UNLESS OTHERWISE MENTIONED.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
3. THE CHAINAGES SHOWN ARE RECKONED FROM C/L OF PRITHALA STATION BUILDING TAKEN AS 0.00 M, WITH RESPECT TO UP MAIN LINE.
4. FOR RAIL LEVELS, FORMATION LEVEL, GRADES ETC. REFER L-SECTION.
5. THE EXISTING DETAILS ARE AS PER PRELIMINARY SITE SURVEY AND SHALL BE VERIFIED BY THE CONCTRACTOR BEFORE EXECUTION.
6. ENGINEER IN CHARGE/ SITE ENGINEER SHOULD VERIFY THE RAIL LEVEL FORMATION LEVEL , BED LEVEL & TRACK CENTER AT SITE BEFORE COMMENCEMENT OF WORK.
7. ENGINEER IN CHARGE SHALL ENSURE THE SAFETY OF DFC TRACK AND STRUCTURE DURING EXECUTION OF WORK.
8. ENGINEER IN CHARGE SHALL TAKE NECESSARY PRECAUTIONS TO PREVENT DAMAGE OF S&T CABLE/OFC DURING EXECUTION OF WORK. CONCERNED DEPT. SUCH AS BSNL/AIRTEL/SSE/ (Sig.)/ NR, DFCCI ETC. SHALL BE INFORMED WELL IN ADVANCE BEFORE EXECUTION OF WORK.
9. DURING CONSTRUCTION, IF REQUIRED, ROAD CLOSURE TO BE OBTAINED FROM CONCERNED ROAD/CIVIL AUTHORITIES. DIVERSION OF ROAD IF ANY, REQUIRED IS TO BE DONE BY CONTRACTOR AT HIS COST
10. THIS DRAWING IS THE PROPERTY OF HRIDC AND FOR EXCLUSIVE USE OF HORC.
11. DETAILED GAD WILL BE PREPARED BASED ON THIS CONCEPTUAL APPROVED GAD.

B) TECHNICAL NOTES :

1. STANDARD OF LOADING :- SUPER STRUCTURE-32.5T (RDSO STANDARD OWG),& SUB STRUCTURE-32.5T- LOADING..
2. DESIGN CRITERIA SHALL BE BASED ON FOLLOWING IRS CODES
   a.IRS BRIDGE RULE
   b.IRS CONCRETE BRIDGE CODE
   c.IRS BRIDGE SUB-STRUCTURE & FOUNDATION CODE
   d.IS 2911 PART-1 SECTION-2.
3. SEISMIC ZONE- IV
4. EXPOSURE CONDITION-MODERATE.
5. FOR CONCRETE SPECIFICATION REFER IRS CONCRETE BRIDGE CODE.
   GRADE OF CONCRETE :
   a. ALL RCC /WEARING COURSE : M:35/DETAILED DESIGN DRG.
   b. LEVELING COURSE/PCC : M:20/DETAILED DESIGN DRG.
6. REINFORCEMENT SHALL BE Fe 500D (TMT) CONFORMING TO IS 1786.
7. PROTECTION WORK ON SLOPES OF BANK UP TO 30M,BOTH SIDES ON APPROACHES OF BRIDGE SHALL BE DONE AS PER SKETCH NO. GC-HRIDC-SK-GEN-015
8. INSPECTION STEPS SHALL BE PROVIDED AT DIAGONALLY OPPOSITE SIDES ON BOTH ENDS OF THE BRIDGE AFTER PROTECTION WORK.
9. ALL CLEAN/ EXPANSION JOINTS SHALL BE FILLED WITH THERMOCOL. .
10. ALL RCC SURFACES COMING IN CONTACT WITH SOIL SHOULD BE PAINTED WITH BITUMEN OR COAL TAR OF APPROVED QUALITY @ 1.464 K.G/SQM. CONFIRMING TO IS: 3117.
11. 75mm DIA WEEP HOLES TO BE PROVIDED @1000 C/C HORIZONTAL AND 1000 MM C/C VERTICALLY IN RETURN WALL & ABUTMENT THROUGHOUT.
12. THE BACK FILL MATERIAL SHALL BE CONFORMING TO CLAUSE 7.5 OF IRS SUB-STRUCTURE AND FOUNDATION CODE. ANGLE OF INTERNAL FRICTION OF BACKFILL SHALL NOT BE LESS THAN 33 °.
13. BEARING CAPACITY OF SOIL SHALL BE ENSURED AS PER DETAILED DESIGN REQUIREMENT. IF REQUIRED GROUND IMPROVEMENT MAY BE CARRIED OUT AND CONFIRMED THROUGH FIELD TESTING.
14. THE STRUCTURAL DIMENSIONS AND SIZES ARE INDICATIVE AND THESE MAY VARY DURING DETAIL DESIGN.
15. SIZE, TYPE OF FOUNDATION & GROUND IMPROVEMENT DETAILS SHOWN ARE TENTATIVE AND MAY CHANGE DURING DETAILED DESIGN.
16. SEISMIC ARRESTOR SHALL BE PROVIDED ON THE PIER/ABUTMENT CAP.
17. DETAIL OF TOE WALL SHALL BE PROVIDED AS PER SKETCH NO. GC-HRIDC-SK-GEN-014_A1

C) OTHER NOTES :

1. FOR SUPERSTRUCTURE DETAIL FOLLOW RDSO DRG.NO'S : RDSO 10281,10281/1 AND 10281/2.
2. TRANSITION SYSTEM TO BE ADOPTED ON BRIDGE APPROACHES SHALL BE AS PER RDSO REPORT NO. GE:R-50(TRANSITION SYSTEM ON APPROACHES OF BRIDEGES). FOR DETAILS REFER SKETCH NO. GC-HRIDC-SK-GEN-019.
3. RCC LINING SHALL BE CONSTRUCTED FOR CANAL FROM ROW TO ROW OF HORC .
4. RCC LINING SHALL BE OF MIN 150 MM THICK AND HAVING AT LEAST MIN TEMP REINFORCEMENT.

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE
SMEC Member of the Surbana Jurong Group

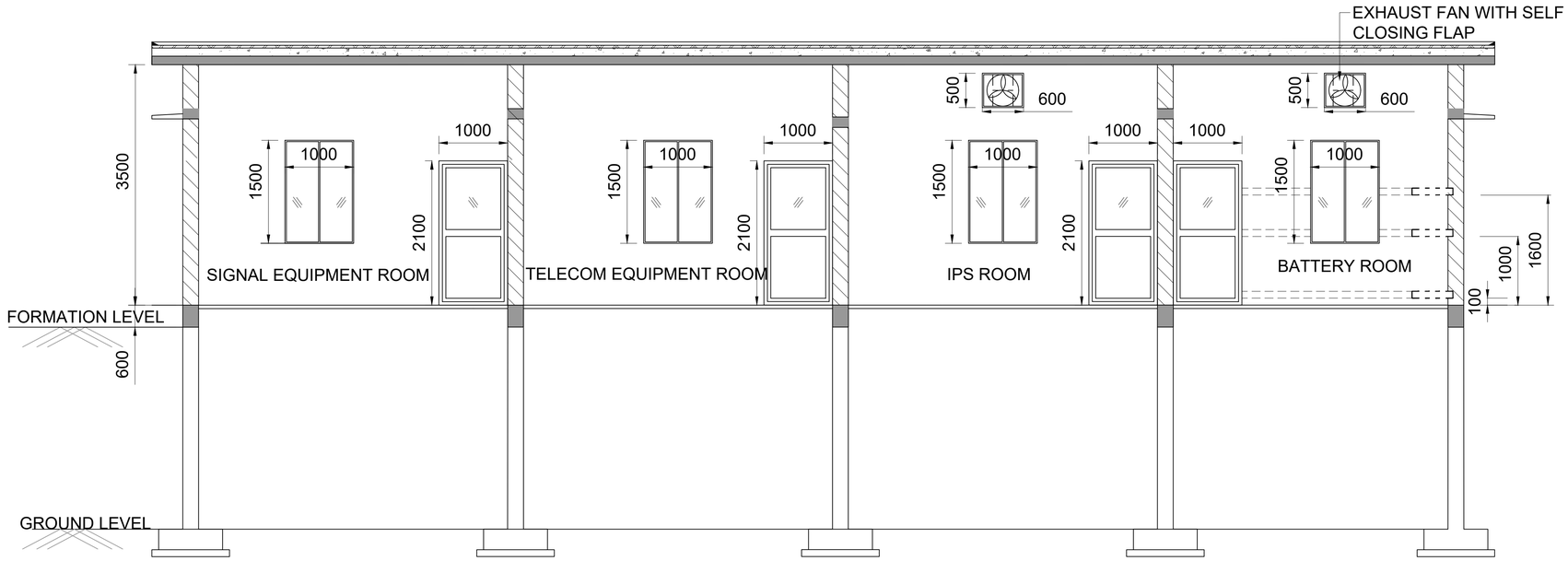
GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
PUSHPENDRA KR.SINGH SDE/ CIVIL			

TITLE:- CONCEPTUAL GENERAL ARRANGEMENT DRAWING FOR PROP. DRAIN CROSSING BRIDGE NO. 63 1x5x4.9+1x12.2m+1x5x4.9 (PSC U SLAB +RCC BOX) AT CH: 18310 (CANAL CROSSING INDRI DISTRIBUTARY RD 11260)

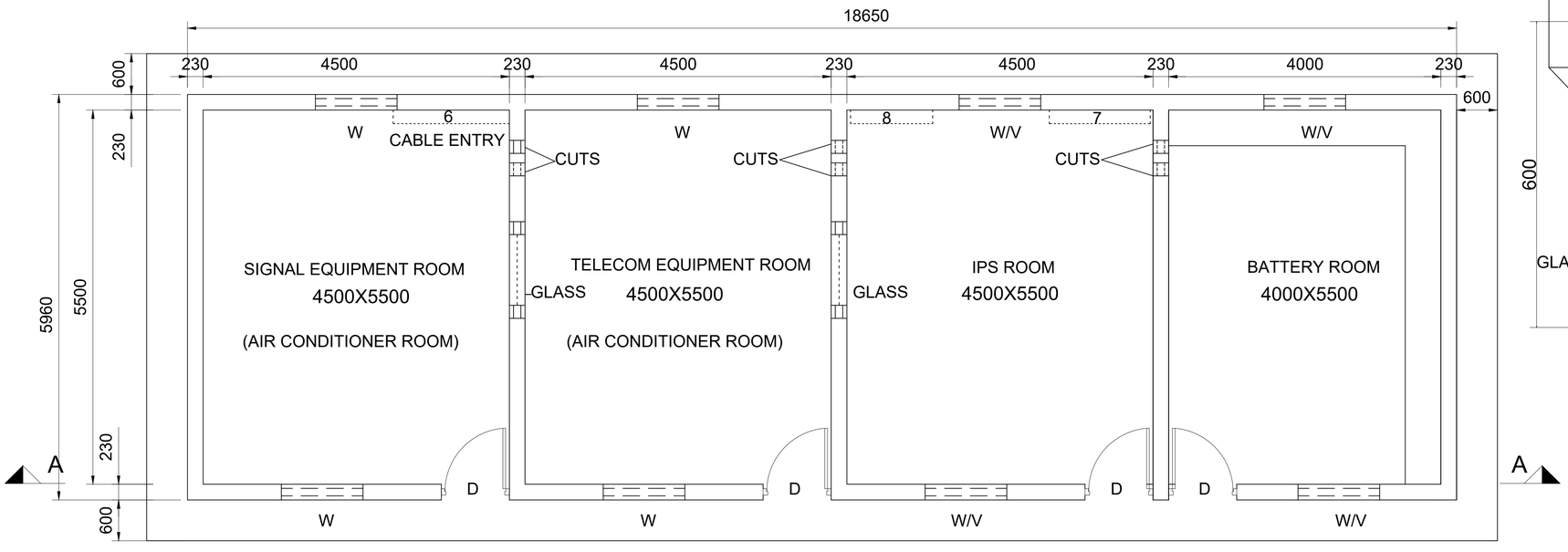
DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-BRD-GAD-01063_A0	1 OF 1

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	10-10-2023	06-12-2023

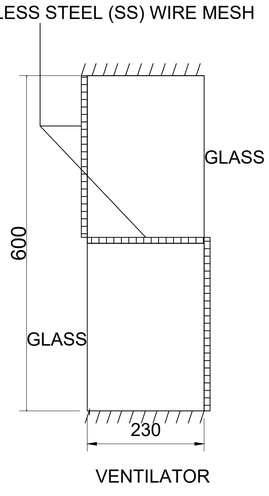
Miscellaneous Drawings (Conceptual Plans) (Revised and New Additional)



SECTION ELEVATION A-A
(SCALE 1:100)



PLAN
(SCALE 1:100)



SCHEDULE

DOOR	2100x1000
WINDOW	1000x1500
VENTILATOR	600x500

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. PLINTH LEVEL SHALL BE KEPT AT LEAST 300mm ABOVE FORMATION LEVEL.
3. HEAVY DUTY TWO RCC SHELF IN BATTERY ROOM ON TWO SIDES 750mm WIDE FOR BATTERIES, 100mm PLINTH SHALL BE MADE BELOW SHELF. FIRST SHELF AT 1000mm & SECOND SHELF AT 1600mm FROM GROUND LEVEL.
4. TWO OPENINGS 100mmX100mm AT 2500mm FROM FLOOR IN PARTITION WALLS.
5. OPENING DUCT FOR CABLE ENTRY IN FLOOR OF EQUIPMENT ROOM @ 1000mm(L)X 600mm(H)X 600mm DEEP.
6. POWER CABLE ENTRY 300mm(L)x300mm(H)x600mm DEEP IN POWER ROOM.
7. TELECOM/OFC CABLE ENTERY IN POWER ROOM 300mm(L)X300mm(H)X600mm DEEP.
8. MS STEEL GRILL ON WINDOWS & VENTILATORS.
9. EQUIPMENT ROOM TO BE PROTECTED FOR DUST.
10. 1000mmX600mm TOUGHENED GLASS IN THE PARTITION WALL BETWEEN EQUIPMENT ROOM & IPS ROOM.
11. OIL PAINT IN INTERIOR IN S & T EQUIPMENT ROOM.
12. HEAVY DUTY EXHAUST FAN IN IPS & BATTERY ROOM FRONT WALL WITH SELF CLOSING FLAP.
13. SIGNAL & TELECOME EQUIPMENT ROOM SHALL BE AIRCONDITIONED.

GC/HORC		HRIDC	
NAME / DEGINATION	SIGN	NAME / DEGINATION	SIGN
CHAHATEY RAM PD	ChahateyRam	NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/C-SOUTH	
RAJENDRA KR. BHAUGUNA DPD / EST			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

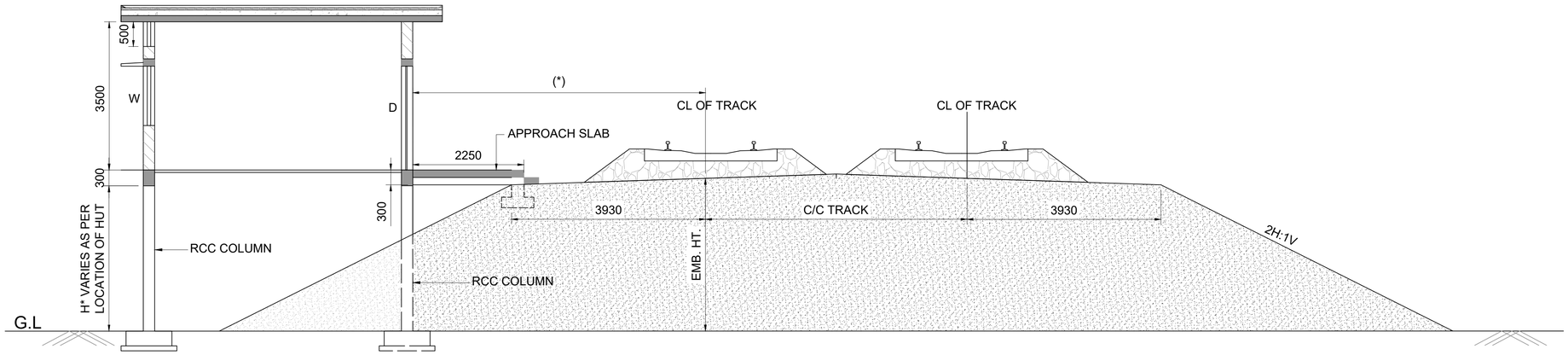
CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

TITLE:-
CONCEPTUAL PLAN OF AUTO LOCATION HUT (S & T)

SKETCH NO.	SHEET NO.
GC-HRIDC-SK-GEN-012_A1	1 OF 1

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	31-08-2023	07-12-2023



(*)
BLOCK SECTION AREA - 6 M (min)
STATION YARD - 8 M (min)

TYPICAL CROSS-SECTIONAL SKETCH OF AUTO LOCATION HUT

NOTES :

1. NO DIMENSION SHALL BE SCALED FROM THE DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
2. REFER SKETCH NO. GC-HRIDC-SK-GEN-012_A0.
3. H* VARIES FROM 1.3 M TO 11.0 M.

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

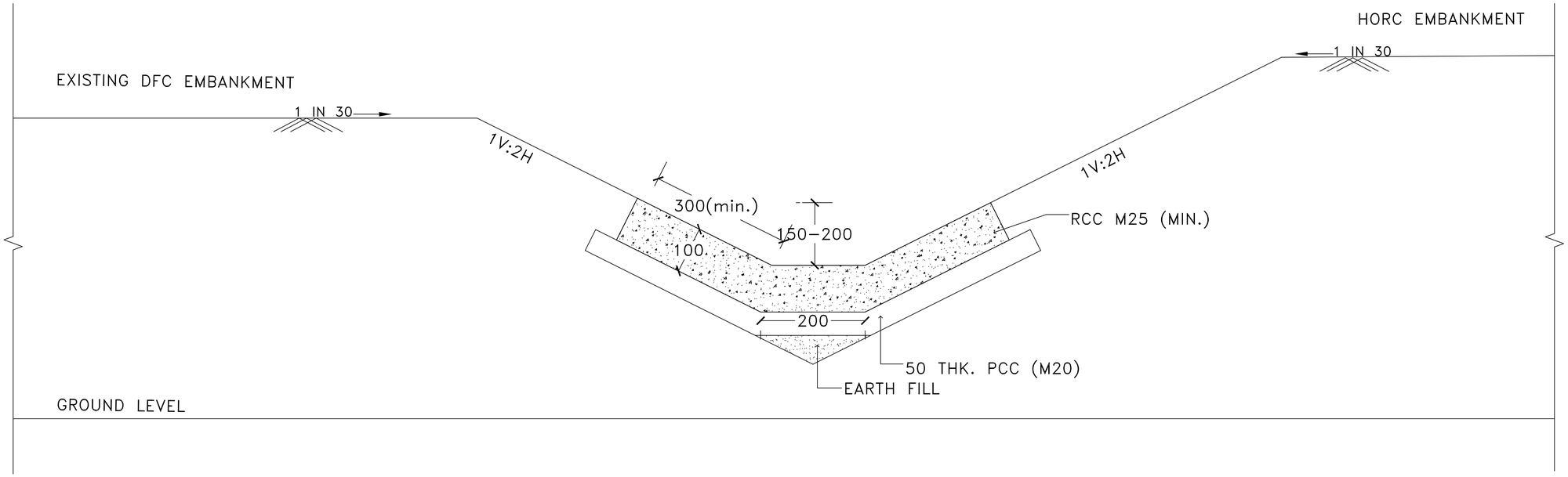
CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

GC/HORC		HRIDC	
NAME / DEGINATION	SIGN	NAME / DEGINATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/C-SOUTH	
RAJENDRA KR. BHAUGUNA DPD / EST			

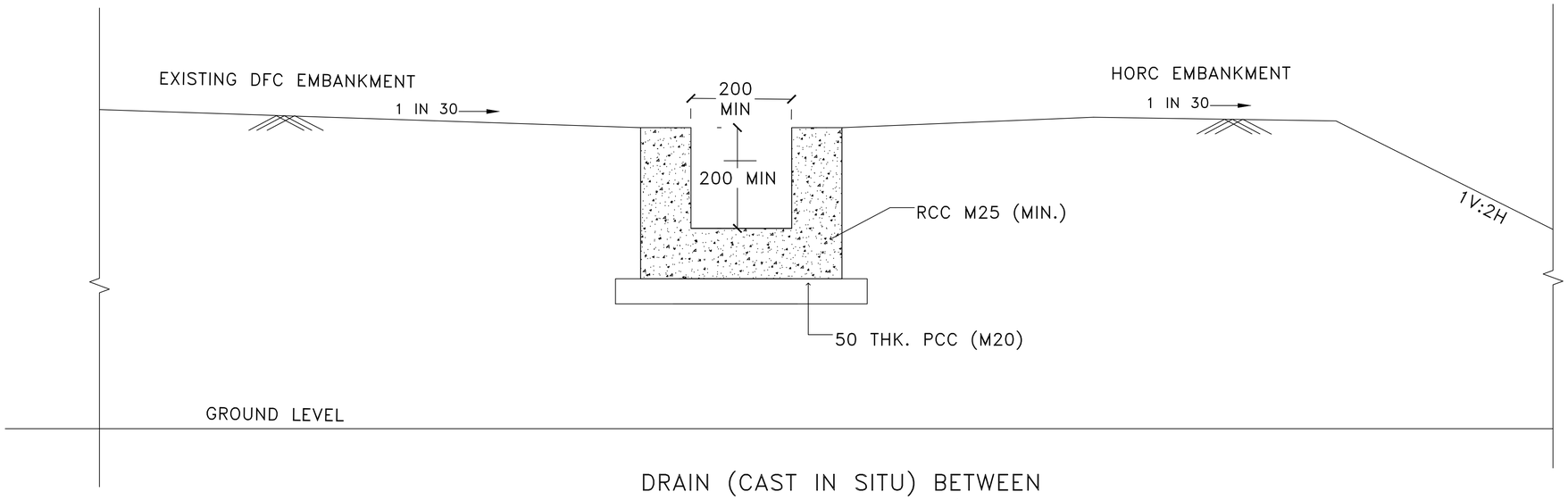
TITLE:-
CONCEPTUAL CROSS-SECTIONAL SKETCH OF ALH

SKETCH NO.	SHEET NO.
GC-HRIDC--SK-GEN-039_A0	1OF1

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	14-12-2023	



DRAIN (CAST IN SITU) BETWEEN
HORC & DFC EMBANKMENT
(CASE– I)



DRAIN (CAST IN SITU) BETWEEN
HORC & DFC EMBANKMENT (OVERLAPPING
OF BANK AT FORMATION LEVEL)

(CASE– II)

NOTES :-
1. ALL DIMENSION ARE IN MM.
2. NO DIMENSION SHALL BE SCALED FROM DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
3. MIN GRADE OF CONCRETE:
   A) CAST IN SITU - M25.
   B) PCC - M20.

GC/HORC		HRIDC	
NAME / DEGINATION	SIGN	NAME / DEGINATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/HRIDC	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/C-SOUTH	
REETU PATIAL CDE/ CIVIL			
MEENAKSHI SHARMA SDE/ CIVIL			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

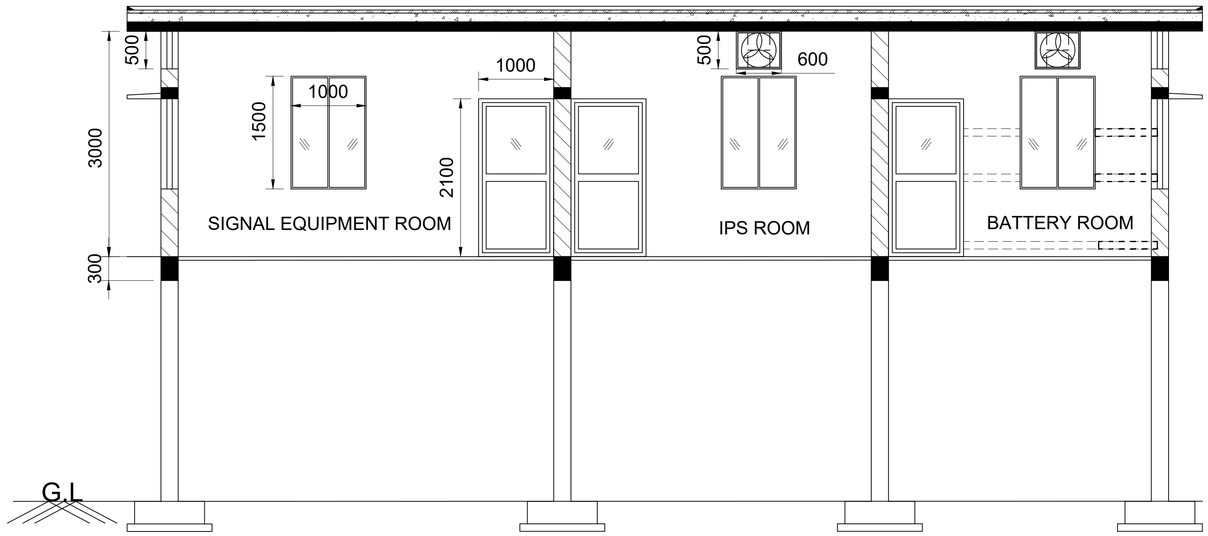
CONSULTANT:
GENERAL CONSULTANT FOR
HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

THE INFRASTRUCTURE PEOPLE
Member of the Surbana Jurong Group

TITLE:- CONCEPTUAL PLAN
DRAINS BETWEEN
HORC EMBANKMENT & DFC

SKETCH NO. GC-HRIDC-SK-GEN-041_A0	SHEET NO. 1 OF 1

SCALE :	ISSUE DATE	REVISED DATE
NTS	14.12.2023	

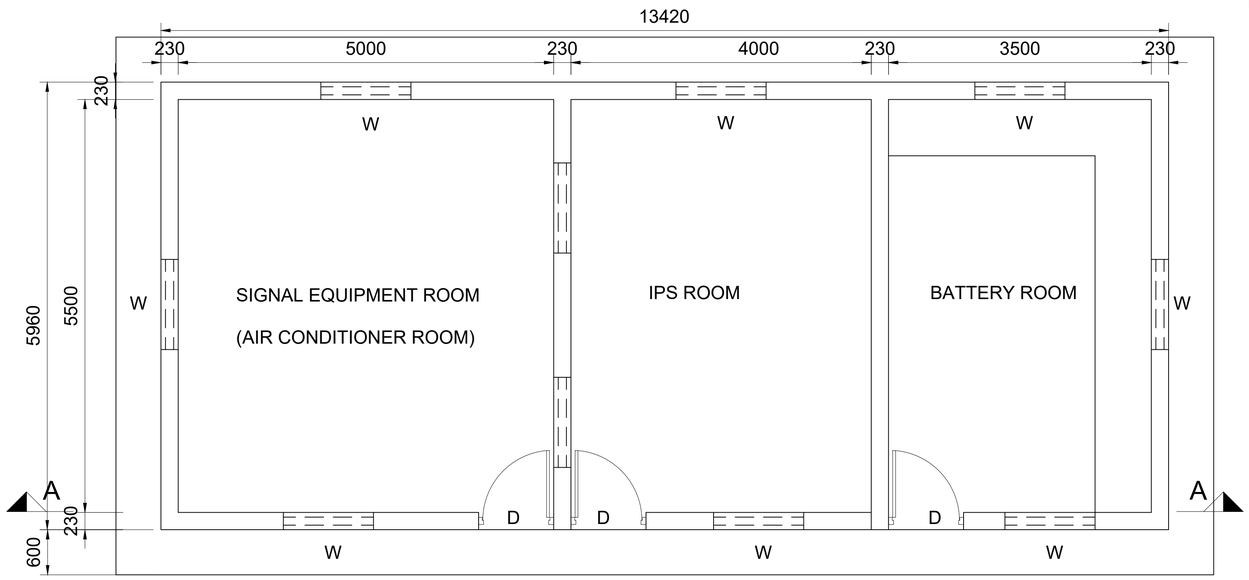


SECTIONAL ELEVATION A-A

(SCALE 1:100)

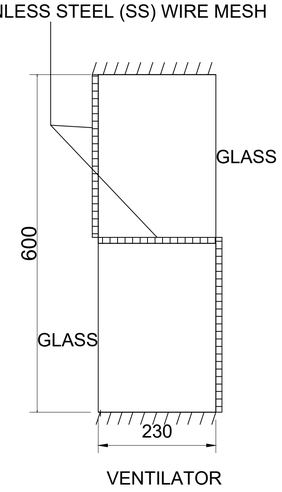
SCHEDULE

DOOR	2100x1000
WINDOW	1000x1500
VENTILATOR	600x500



PLAN

(SCALE 1:100)



VENTILATOR

NOTES :

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. PLINTH LEVEL SHALL BE KEPT AT LEAST 300mm ABOVE THE GROUND LEVEL.
3. DPC SHALL BE PROVIDED ABOVE PLINTH LEVEL.
4. FOUNDATION SHALL BE DESIGNED BY THE CONTRACTOR AND APPROVED BY THE ENGINEER.
5. DOOR SHUTTERS SHALL BE 35MM THICK FLUSH DOORS.
6. WINDOWS AND VENTILATORS SHALL BE AS PER RELEVANT IS CODES.
7. SIGNAL & TELECOM EQUIPMENT ROOM SHALL BE AIR CONTITIONED.
8. HEAVY DUTY TWO RCC SHELF IN BATTERY ROOM ON TWO SIDES 750mm WIDE FOR BATTERIES, 100mm PLINTH SHALL BE MADE BELOW SHELF. FIRST SHELF AT 1000mm & SECOND SHELF AT 1600mm FROM GROUND LEVEL.
9. TWO OPENINGS 100mmX100mm AT 2500mm FROM FLOOR IN PARTITION WALLS.
10. OPENING DUCT FOR CABLE ENTRY IN FLOOR OF EQUIPMENT ROOM @ 1000mm(L)X 600mm(H)X 600mm DEEP.
11. POWER CABLE ENTRY 300mm(L)x300mm(H)x600mm DEEP IN POWER ROOM.
12. TELECOM/OFC CABLE ENTERY IN POWER ROOM 300mm(L)X300mm(H)X600mm DEEP.
13. MS STEEL GRILL ON WINDOWS & VENTILATORS.
14. EQUIPMENT ROOM TO BE PROTECTED FOR DUST.
15. 1000mmX600mm TOUGHENED GLASS IN THE PARTITION WALL BETWEEN EQUIPMENT ROOM & IPS ROOM.
16. OIL PAINT IN INTERIOR IN S & T EQUIPMENT ROOM.
17. HEAVY DUTY EXHAUST FAN IN IPS & BATTERY ROOM FRONT WALL WITH SELF CLOSING FLAP.
18. SIGNAL & TELECOME EQUIPMENT ROOM SHALL BE AIRCONDITIONED.

GC/HORC		HRIDC	
NAME / DEGINATION	SIGN	NAME / DEGINATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/C-SOUTH	
RAJENDRA KR. BHAUGUNA DPD / EST			

PROJECT:

HARYANA ORBITAL RAIL CORRIDOR

CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:

HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:

GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR

RITES Limited in consortium with SMEC International Pty. Ltd.

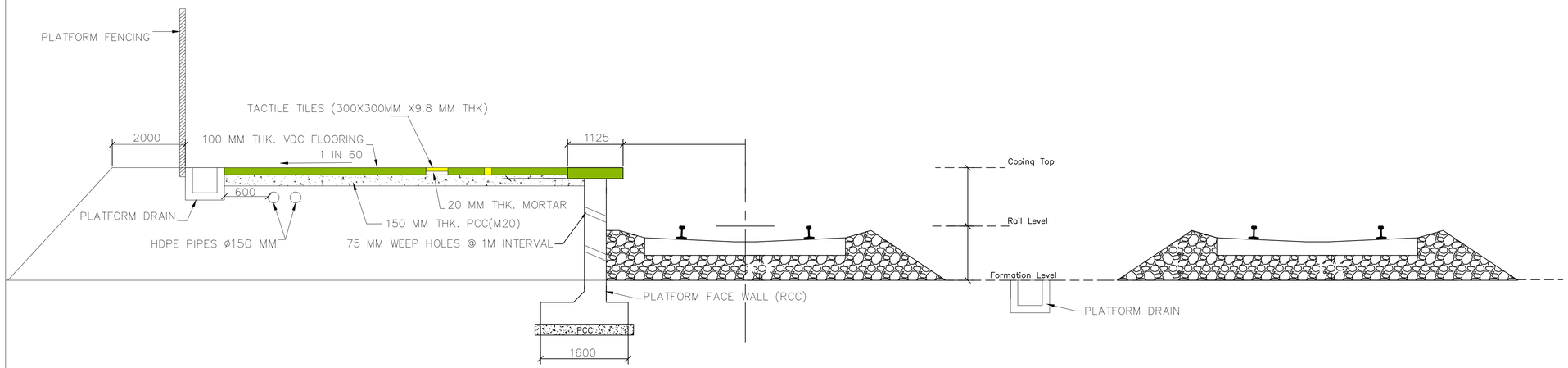
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

TITLE:-

CONCEPTUAL PLAN S & T HUT

SKETCH NO.	SHEET NO.
GC-HRIDC--SK-GEN-002_A0	1OF1

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	07-12-2023	



NOTES :

1. ALL DIMENSION ARE IN MM.
2. NO DIMENSION SHALL BE SCALED FROM THE DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
3. FOR DETAIL OF PLATFORM FACE WALL REFER SKETCH NO.GC-HRIDC-SK-GEN-024.
4. FOR PLATFORM DRAINS REFER SKETCH NO.

A) GC-HRIDC-C5-SK-CIVIL-002-A1 FOR PRITHLA STATION.
B) GC-HRIDC-C5-SK-CIVIL-003-A1 FOR SILANI STATION.
C) GC-HRIDC-C5-SK-CIVIL-004-A1 FOR IMT SOHNA STATION.

GC/HORC		HRIDC	
NAME / DEGINATION	SIGN	NAME / DEGINATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANKI DGM/C-SOUTH	
REETU PATIAL CDE / CIVIL			
MEENAKSHI SHARMA SDE / CIVIL			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
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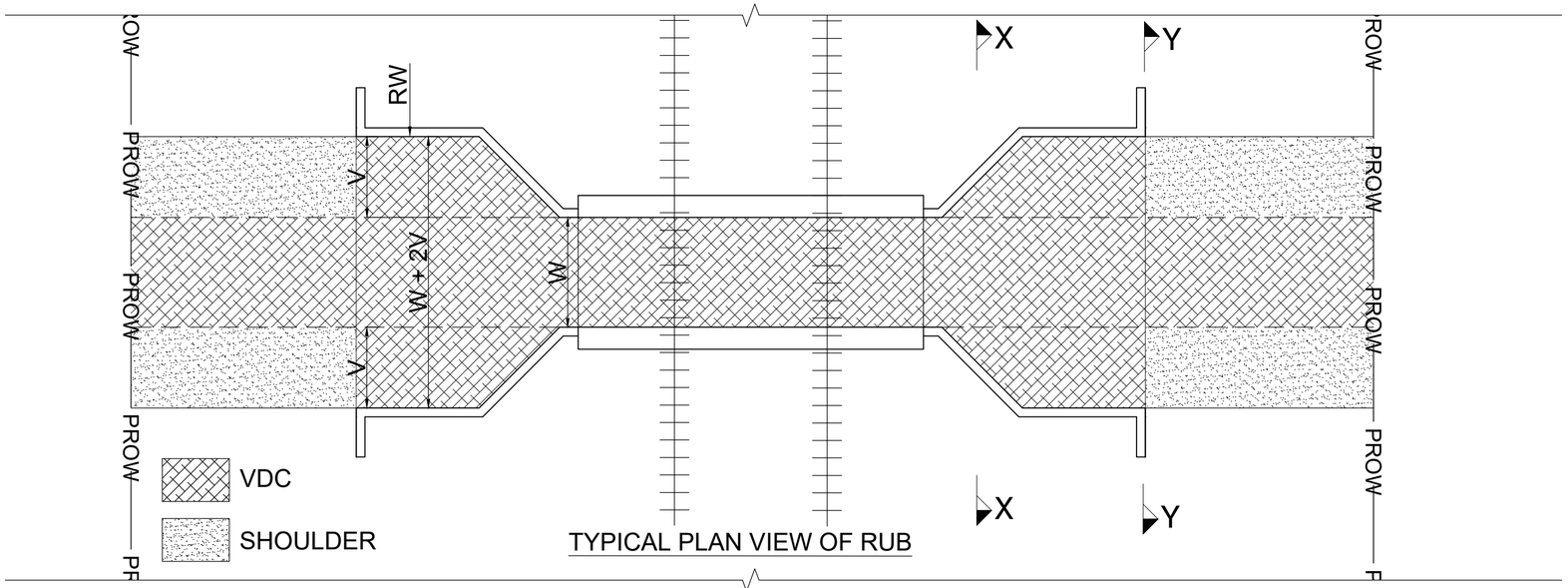
CONSULTANT:
GENERAL CONSULTANT FOR
HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

THE INFRASTRUCTURE PEOPLE
Member of the Surbana Jurong Group

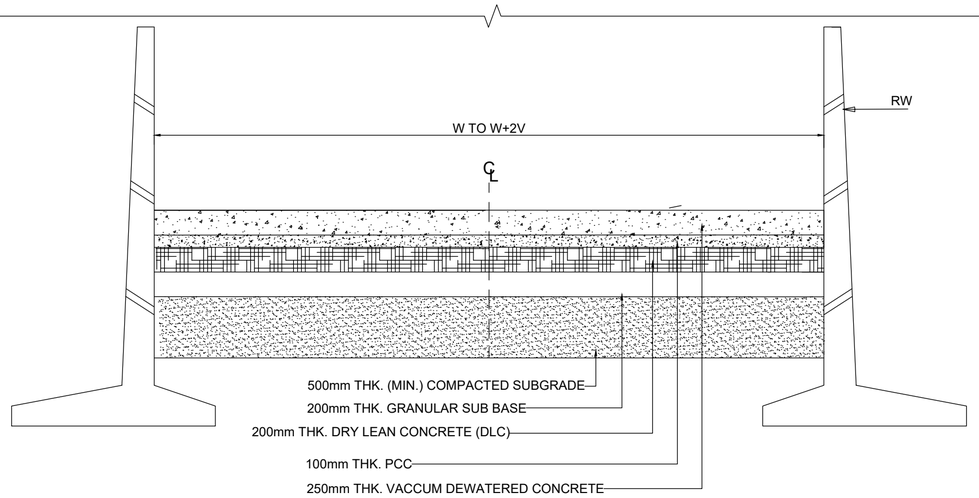
TITLE:-
TYPICAL CONCEPTUAL
CROSS-SECTIONAL SKETCH OF PLATFORM

SKETCH NO.	SHEET NO.
GC-HRIDC--SK-GEN-042_A0	1OF1

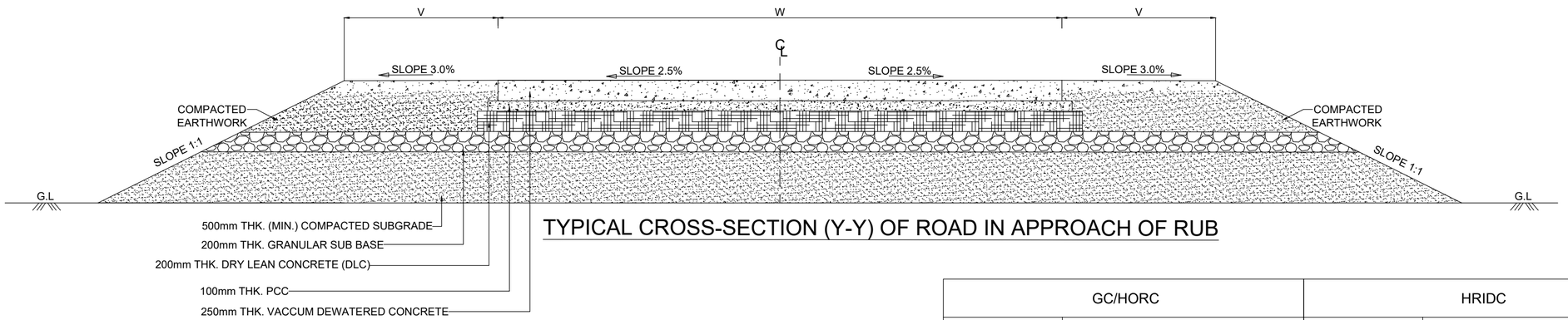
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	14-12-2023	



TYPICAL PLAN VIEW OF RUB



TYPICAL CROSS-SECTION (X-X) OF ROAD IN APPROACH OF RUB



TYPICAL CROSS-SECTION (Y-Y) OF ROAD IN APPROACH OF RUB

NOTES:
1. ALL DIMENSION ARE IN MILLIMETERS EXPECT LEVELS WHICH ARE IN METERS. NO DIMENSION SHALL BE SCALED FROM DRAWING ONLY WRITTEN DIMENSION ARE TO BE FOLLOWED.
2. ROAD,CRASH BARRIER & MEDIAN SHALL BE CONSTRUCTED AS PER MORTH STANDARDS.
3. LAYING OF PAVE BLOCK SHALL BE AS PER IRC PROVISION.
4. IRC 58 SHALL BE FOLLOWED FOR DESIGN OF PLAIN JOINTED RIGID PAVEMENT.
5. IN DOUBLE CELL BOX, A MEDIAN SHALL BE PROVIDED (FROM ROW TO ROW) IN LINED WITH THE CENTRAL WALL OF THE BOX.

ABBREVIATION

RW	RETURN WALL
℄	CENTER LINE
W	WIDTH OF BOX
PROW	PROPOSED HORC'S ROW

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		NEERAJ BHANDARI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		RAJU SOLANK DGM/CIVIL	
REETU PATIAL CDE/ CIVIL		MOHD. ISHAK EXECUTIVE/CIVIL	
MEENAKSHI SHARMA SDE/ CIVIL			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

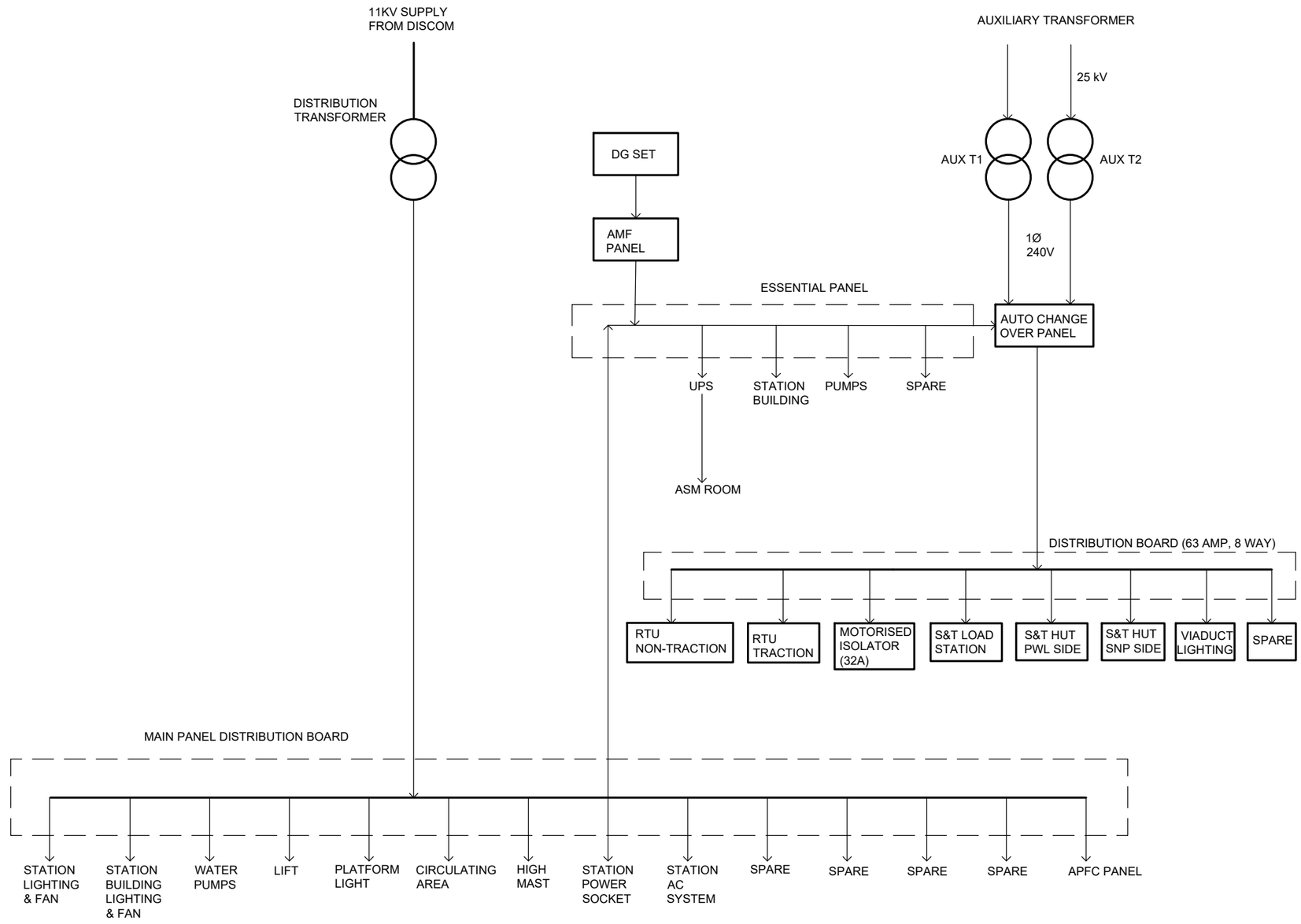
TITLE:- CONCEPTUAL SKETCH FOR ROAD IN APPROACH OF RUB

DRG. NO.	SHEET NO.
GC-HRIDC-SK-GEN-043_A0	1 OF 1

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	19-12-2023	

General Electrical Services Drawings (Revised)

INDICATIVE LT SUPPLY SYSTEM WITH LOCAL, DG & AUXILIARY TRANSFORMER SUPPLY



GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		SHIV OM DWIVEDI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		VIKRAM YADAV GM/ A&IE/HRIDC	
A.S.JANGHU CRE/ELECT.		JYOTI SANGWAN DGM/Elect.	
VIKAS KUMAR HARIT SRE/GEN/Elect.			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

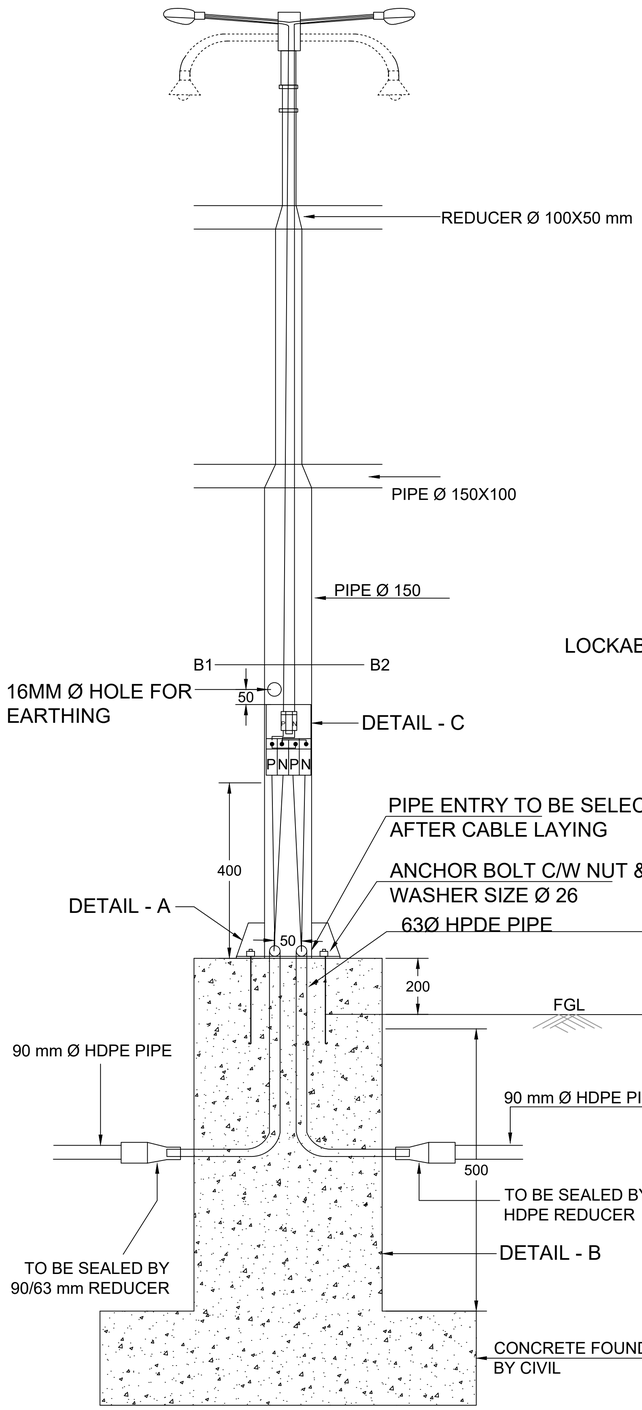
CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

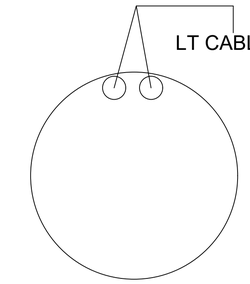
TITLE:-
INDICATIVE LT SUPPLY SYSTEM WITH LOCAL, DG & AUXILIARY TRANSFORMER SUPPLY

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-ELE-001_A1	

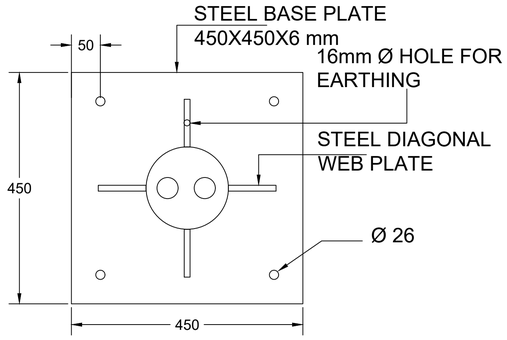
SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	08.07.2023	05.12.2023



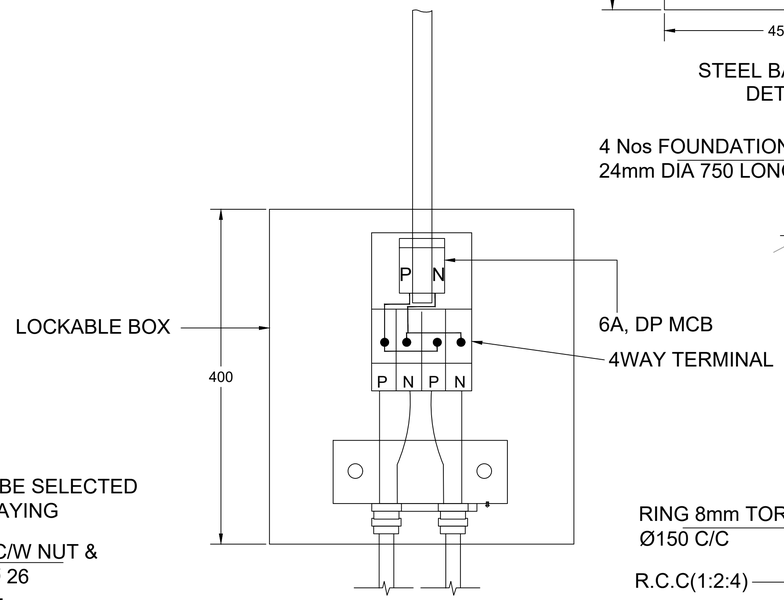
DECORATIVE LIGHT POLE DETAILS



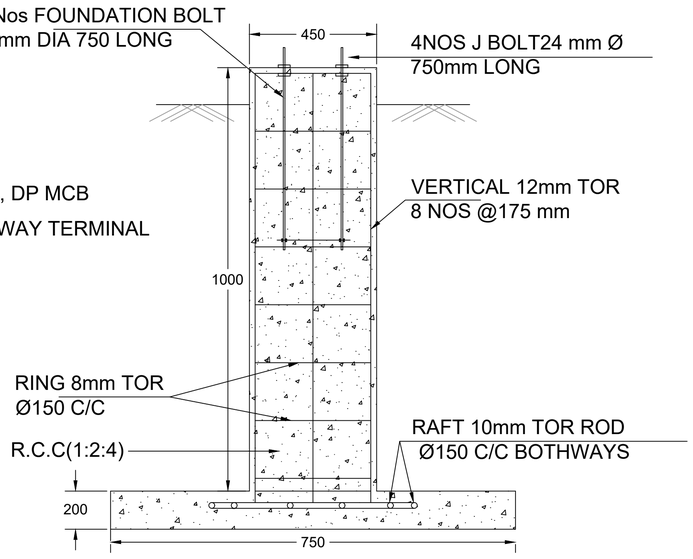
CROSS-SECTION OF B1 - B2
DETAIL-C



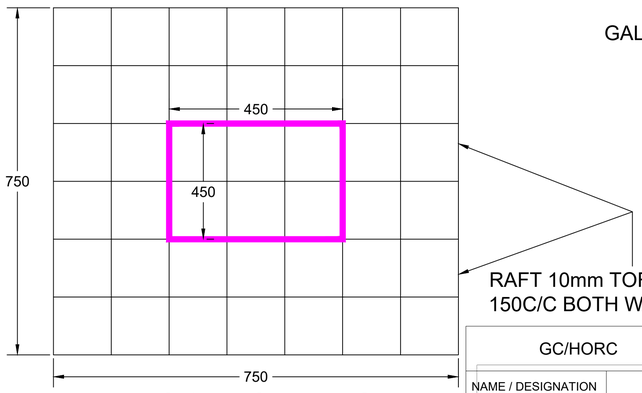
STEEL BASE PLATE
DETAIL - A



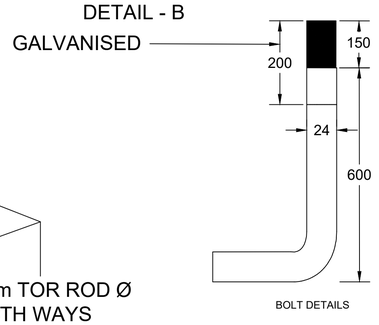
DETAIL - C



DETAIL - B



FOUNDATION DETAILS



BOLT DETAILS

NOTE:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. ALL LOOSE WIRES SHOULD BE BOUND NEATLY BY CABLE TIES.
3. EARTH WIRE TO BE SEPERATELY RUN & CONNECTED TO THE COLUMN EARTHING TERMINAL.
4. TYPE OF INSTALLATION ARM (SINGLE /DOUBLE AND STRAIGHT/CURVED HANGING) OF LIGHT SHALL BE DECIDED BY ENGINEER .

GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		SHIV OM DWIVEDI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		VIKRAM YADAV GM/ A&IE/HRIDC	
A.S.JANGHU CRE/ELECT.		JYOTI SANGWAN DGM/Elect.	
VIKAS KUMAR HARIT SRE/GEN/Elect.			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR
HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.

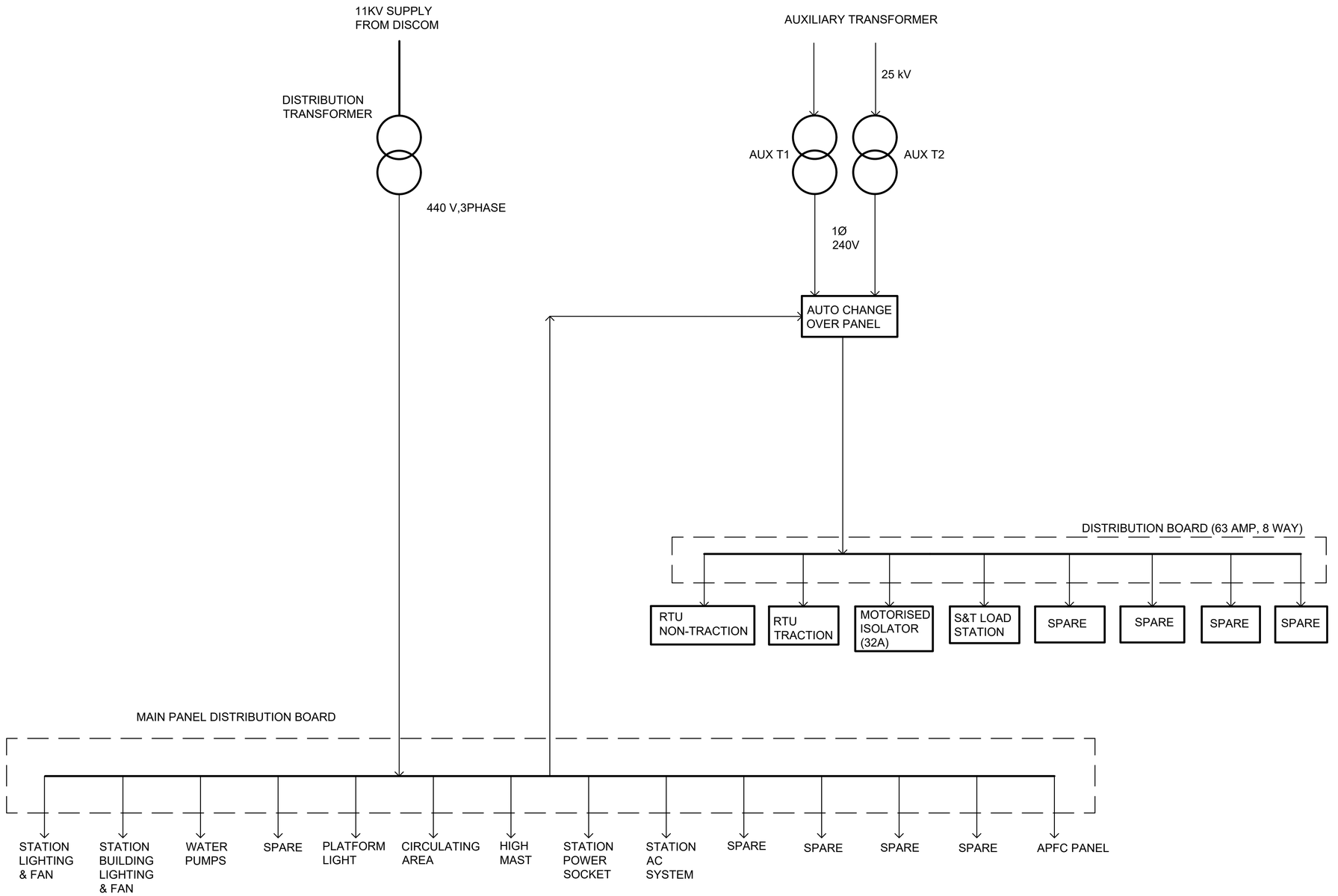
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

TITLE:-
INDICATIVE ARRANGEMENT OF DECORATIVE STREET LIGHT POLE AT STATION AND PLATFORM

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-ELE-03_A1	

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	26.08.2023	05.12.2023

INDICATIVE LT SUPPLY SYSTEM WITH LOCAL & AUXILIARY TRANSFORMER SUPPLY



GC/HORC		HRIDC	
NAME / DESIGNATION	SIGN	NAME / DESIGNATION	SIGN
CHAHATEY RAM PD		SHIV OM DWIVEDI CPM/SOUTH	
SUDHIR AGRAWAL DPD/CIVIL		VIKRAM YADAV GM/ A&IE/HRIDC	
A.S.JANGHU CRE/ELECT.		JYOTI SANGWAN DGM/Elect.	
VIKAS KUMAR HARIT SRE/GEN/Elect.			

PROJECT:
HARYANA ORBITAL RAIL CORRIDOR
CONNECTING PALWAL TO SONIPAT BYPASSING DELHI AREA BY LINKING ASAOTI-PATLI-SULTANPUR-ASAUDAH BY NEW ELECTRIFIED BG DOUBLE LINE

CLIENT:
HARYANA RAIL INFRASTRUCTURE DEVELOPMENT CORPORATION LIMITED.

CONSULTANT:
GENERAL CONSULTANT FOR
HARYANA ORBITAL RAIL CORRIDOR
RITES Limited in consortium with SMEC International Pty. Ltd.
RITES THE INFRASTRUCTURE PEOPLE | SMEC Member of the Surbana Jurong Group

TITLE:-
INDICATIVE LT SUPPLY SYSTEM WITH LOCAL & AUXILIARY TRANSFORMER SUPPLY

DRG. NO.	SHEET NO.
GC-HRIDC-C5-DRW-ELE-007_A1	

SCALE :	ISSUE DATE	REVISED DATE
AS SHOWN	22.09.2023	05.12.2023

Section VII-8B
Documents

	Black colour shows Documents which have not been revised
	Blue colour shows Documents which have been revised
	Red colour shows New additional Documents

S.NO	LIST OF DOCUMENTS / *R1*	Pg. No
1.	List of Curve and Gradients	1-5
2.	List of Control Points	1-8
3.	List of Charted Utilities /R1	1-3
4.	Indicative List of Existing Structures to be Dismantled /to be filled (Tube Wells, Bore Wells and Wells)/R1	1-2
5.	Approved Manufactures/Suppliers List	1-4
6.	DFC Letter – Approval of GAD of HORC alignment crossing under DFC bridge 87	1-2
7.	**Geotechnical Investigation Reports**	
7.1	**Report No: SMC – 2050 - Viaduct Report**	1 - 356
7.2	**Report No: SR No.544_21-22**	
	PART-A: Connecting Line from Prithala to New Prithla Old Ch. (-)2+514 to Old Ch. (-)0+934 [New Ch. (-)1+838 to (-)0+248]	1 - 117
	PART-B (Main Line) – New Ch. 0+000 to Old Ch. 10+859 (New Ch: 11+543) & Old Ch. 17+625 to Old Ch. 20+300 (New Ch: 18+310 to 20+985)	1 - 606
7.3	***Additional Geotechnical Investigation Reports***	
	Report No: 1901-HORC-I	1-115
	Report No: 1901-HORC-II	1-147
	Report No: 1901-HORC-III	1-317
	Report No: 1901-HORC-IV	1-313
	Report No: 1901-HORC-V	1-312
	Report No: 1901-HORC-VI	1-129
	Report No: 1901-HORC-VII	1-57
	Report No: 1901-HORC-VIII	1-61
	Report No: 1901-HORC-X	1-67

3. List of Charted Utilities / *R1*

3. List of Charted Utilities/R1

Ref. Sub-Clause 10.45 & 10.46, Appendix 10, Section VII-9: Appendices, Part 2- Employer's Requirements

3.1.1 Overground Electrical Crossings

a) Overhead Electrical Crossings: LT and HT (up to 33 KV)

S. No.	Type of crossings	Chainage No.
1	11kV HT Parallel	(-) 0+880 to (-)1+470
2	11kV HT Crossing	(-880)
3	11kV HT Crossing	(-1470)
4	11kV HT Crossing	(-) 1+390
5	11kV HT Parallel	(-) 1+055 to (-) 1+390
6	11kV HT Parallel	(-724 to -319)
7	11kV HT Crossing	(-724)
8	11kV HT Crossing	(-319)
9	11kV HT Crossing	0+429
10	11kV HT Crossing	0+860
11	11kV HT Crossing	1+642
12	11kV HT Parallel	1+600 to 1696
13	11kV HT Crossing	1+651
14	11kV HT Crossing	2+863
15	11kV HT Crossing	3+106
16	11kV HT Crossing	3+513
17	11kV HT Crossing	4+123
18	11kV HT Crossing	4+294
19	11kV HT Crossing	4+805
20	11kV HT Crossing	4+826
21	11kV HT Crossing	5+805
22	11kV HT Crossing	6+954
23	11kV HT Parallel	7+289 to 7+300
24	11kV HT Crossing	7+289
25	11kV HT Parallel	7+289+100
26	11kV HT Crossing	7+657
27	11kV HT Crossing	7+807
28	11kV HT Crossing	9+226
29	11kV HT Crossing	11+879
30	11kV HT Parallel	11+879 TO 12+070
31	11kV HT Crossing	12+070
32	11kV HT Crossing	20+045
33	33 kV HT Parallel	20+058 to 21+880
34	11kV HT Crossing	20+206
35	11kV HT Crossing	21+668
36	33 kV HT Crossing	20+400
37	33 kV HT Crossing	20+400

S. No.	Type of crossings	Chainage No.
38	33 kV HT Crossing	20+403
39	33 kV HT Crossing	20+403
40	33 kV HT Crossing	20+407
41	33 kV HT Crossing	20+407
42	33 kV HT Crossing	20+260
43	33 kV HT Crossing	20+104
44	33 kV HT Crossing	20+260
45	33 kV HT Crossing	20+261
46	11kV HT Crossing	23+041
47	11 kV HT Parallel	23+536
48	11 kV HT Parallel	23+746

b) EHT (above 33 KV)

S. No.	Type of crossings (Voltage Level)	Owner	Feeder name	Chainage (m)	Remarks
1	EHT Crossing (220 kV)	HVPNL	BTPS - Alwar Line	00+815	Not Required to be modified
2	EHT Crossing (400 kV)	GPTL	Prithla - Kaderpur Line	03+070	Not Required to be modified
3	EHT Crossing (400 kV)	PGCIL	Ballabhgarh - Agra Line	05+676	Not Required to be modified
4	EHT Crossing (220 kV)	HVPNL	Sec-72-Rangala Rajpur LILO Line (IMT Sohna)	19+950	Modification work is in progress
5	EHT crossing (66 kV)	HVPNL	Sohna-Nuh Nagina Line	20+500	Modification work Completed

4. Indicative List of Existing Structures to be Dismantled /to be filled (Tube Wells, Bore Wells and Wells)/R1

4. Indicative List of Existing Structures to be Dismantled /*to be filled (Tube Wells, Bore Wells and Wells)/R1*

(Ref. Sub-Clause 10.14, Appendix 10, Section VII-9: Appendices, Part 2 – Employer's Requirements)

Structures in Main Line							
S. No.	**Type of Structure**	**Chainage (in m)**	**District**	**Sub Division**	**Length of Obstruction to be considered (in m)**	**Chainage**	
						From	**To**
1	Tubewell with one room	-1015	Palwal	Palwal	20		
2	Water Pipe Line	-821	Palwal	Palwal	20		
3	Boundary wall	-730	Palwal	Palwal	140	-730	-640
4	Bore well	-555	Palwal	Palwal	20		
5	Bore Well	-530	Palwal	Palwal	20		
6	Bore Well	-250	Palwal	Palwal	20		
7	Bore Well	-225	Palwal	Palwal	20		
8	Open Well	-215	Palwal	Palwal	20		
9	Shamshan Ghat/Boundary wall	-90	Palwal	Palwal	100	-174	-90
10	Bore well	0	Palwal	Palwal	20		
11	Bore well	140	Palwal	Palwal	20		
12	Tubewell with one room	800	Palwal	Palwal	20		
13	Tubewell with one room	1585	Palwal	Palwal	20		
14	Village Habitation at Mandpuri Village	1640 to 1800	Palwal	Palwal	160		
15	Bore well	4450	Palwal	Palwal	20		
16	House/Structure	4535	Palwal	Palwal	60		
17	Tubewell with one room	6485	Gurugram	Sohna	20		
18	Bore well	6595	Gurugram	Sohna	20		
19	Hand Pump	6681	Gurugram	Sohna			
20	Bore well	7265	Gurugram	Sohna	20		
21	Bore well	7280	Gurugram	Sohna	20		

Structures in Main Line							
S. No.	**Type of Structure**	**Chainage (in m)**	**District**	**Sub Division**	**Length of Obstruction to be considered (in m)**	**Chainage**	
						From	**To**
22	Bore well	7570	Gurugram	Sohna	20		
23	Bore well	7630	Gurugram	Sohna	20		
24	Bore well with Room	7715	Gurugram	Sohna	20		
25	Bore well	9230	Gurugram	Sohna	20		
26	*Deleted*						
27	Open well	11135	Gurugram	Sohna	20		
28	Structure/Room	11165	Gurugram	Sohna	40		
29	Structure/Bhumiya	11215	Gurugram	Sohna	20		
30	Boundary wall,Farm house	11615	Gurugram	Sohna	185	11615	11800
31	Structue/Room	18310	Nuh	Indri	40		
32	Bore well	18900	Nuh	Indri	20		
33	Water tank and Room	20985	Nuh	Indri	40		
34	Water *Pipe* Line	20985	Nuh	Indri	675	20985	21660
35	Kabristan/Boundary wall	21420	Nuh	Indri	140	21420	21560
36	Small Hut	21580	Nuh	Indri	10		
37	Bore well/Handpump	24120	Nuh	Indri	20		
38	Structure/Teen shed Factory	24180	Nuh	Indri	60		
32	Small Hut	24280	Nuh	Indri	20		

7. Geotechnical Investigation Reports

CONTENTS

7.3 *Additional Geotechnical Investigation Reports*

Tenderer shall download Additional Geotechnical Investigation Reports from HRIDC website for their reference. Additional Geotechnical Investigation Reports are available for downloading under Active Tender Section on HRIDC website (https://hridc.co.in/active-tender.php).

Alternate Link for downloading Additional Geotechnical Reports is given below:

https://drive.google.com/file/d/1bftmPZhYcSGwm6hYhKVEX41Zs_Payk68/view?usp=drive_web

Tender No. HORC/HRIDC/C-5/2023

Attachment 6

to

Corrigendum No. 1

Part 3, Section VII-9: Employer's Requirements-Appendices

APPENDIX-5 INTERFACE, COORDINATION AND COOPERATION WITH OTHER PARTIES

1. Sub Clause 5.11: Interface Table/R1

5.11 INTERFACE TABLE */ R1*

Item No.	Item Description	Civil Contractor (C-5)	Civil, Track and System Contractors (C-4, T-2, SYS-1and SYS-2)
1.	Information exchange on alignment with following details: a) Formation Cross section b) Track alignment Drawings c) Coordinates of track centre d) Curves e) Gradient f) Rail levels, g) Yard layouts	(i) C-5 Contractor shall provide details of formation cross section, Plan & L-Section, curves and gradient to T-2 and SYS-1 contractors.	(i) T-2 contractor shall carry out detailed survey and verify plan & L-section, cross section etc and shall prepare final track alignment drawings, yard ESP, curves, gradients, rail level etc and share with SYS-1 and SYS-2 contractors.
2.	Handing/Taking over of abutment A-2 of viaduct for construction of superstructure.	(i) C-5 Contractor shall provide the design parameters for design of abutment A-2 to C-4 Contractor.	(i) C-4 Contractor shall construct abutment A-2 of viaduct and handover the site to C-5 Contractor for construction of superstructure.
3.	Handing/Taking over of site for laying of track on formation.	(i) C-5 Contractor shall share the handing over schedule with T-2 Contractor. (ii) C-5 Contractor shall complete the work of formation and bridges as per schedule and handover formation to T-2 Contractor for laying of track.	(i) T-2 Contractor shall take access to the formation and complete installation of track.

Item No.	Item Description	Civil Contractor (C-5)	Civil, Track and System Contractors (C-4, T-2, SYS-1and SYS-2)
4.	Cross Section of bank at junction with C-4 Contractor.	C-5 Contractor shall complete formation at junctions with C-4 Contractor.	(i) C-4 contractor shall provide stepped profile of bank at junction with C-5 contractor at Ch.12000 and Ch.18000 as shown in Tender drawings
5.	Provide access to site for SYS-1 and SYS-2 contractors for OHE and S&T works	(i) C-5 contractor in coordination with T-2 Contractor shall share the handing over schedule to SYS-1 and SYS-2 Contractors as per schedule.	(ii) SYS-1 Contractor shall take access to the formation /track from Civil and Track Contractors and complete OHE works SYS-2 contractor shall take telecom and signalling access and lay cabels and install S&T outdoors indoor equipment.
6.	*Bridges (Concrete / Steel) - OHE Load on the Pier cap of bridges due to OHE Masts*	*(i) C-5 Contractor shall share the relevant bridge drawings with SYS-1 Contractor.* *(ii) C-5 Contractor shall take into account the OHE mast location, loads and bending moment etc. provided by SYS-1 Contractor and ensure that the Pier Caps are designed and constructed suitable for OHE Mast.* (iii) *C-5 Contractors shall supply & provide holding down bolts as per design given by SYS-1 Contractor and also provide template for keeping bolts in*	*(i) SYS-1 Contractor shall provide OHE Layout Plan (LOP) of proposed locations of OHE Masts.* *(ii) SYS-1 Contractor shall also share values of max direct load, Bending Moment, etc. arising due to the OHE Masts, fittings and anchors, which have to be considered in the design of Piers.* *(iii) SYS-1 Contractor shall coordinate with C-5 contractor and confirm suitability of Holding down bolts, template etc. as per design and*

Item No.	Item Description	Civil Contractor (C-5)	Civil, Track and System Contractors (C-4, T-2, SYS-1and SYS-2)
		position during concreting.	*specification and extend all assistance in installation of Holding Down Bolts (HDB) and template as per approved design/drawings to the C-5 Contractor.* (iv) *SYS-1 Contractor shall provide staff to witness the provisions made by the C-5 contractor for adequacy and suitability.*
7.	Electrical Clearances at Bridges (ROBs),Rail Fly Overs(RFOs) and other Over Head Structures above tracks or OHE	(i) Civil Contractors shall supply list of Bridges (ROBs),Rail Fly Overs(RFOs) and other Over Head Structures indicating their specific locations, cross-sections, height above rail level and dimensional details for evaluation of infringements, if any. (ii) Civil Contractors shall accommodate the requirement of the SYS-1 Contractor as approved by the Engineer.	(i) SYS-1 Contractor shall interface with C-5 Contractor for infringements to Electrical Clearances and required modifications / improvements. (ii) SYS-1 Contractor shall update /modify traction OHE drawings based on the interface information. (iii) SYS-1 Contractor shall interface and get all drawings & schemes approved from the

Item No.	Item Description	Civil Contractor (C-5)	Civil, Track and System Contractors (C-4, T-2, SYS-1and SYS-2)
			Engineer ascertaining adequacy of electrical clearances.
8.	Earthing and bonding of Steel Bridges.	(i) Civil Contractors shall facilitate SYS-1 Contractor for earthing and bonding of steel bridges.	(i) SYS-1 Contractor shall provide schematic drawings for earthing & bonding of overhead steel bridges.
9.	*Earthing & Bonding of concrete of pier of major bridges and Viaduct.*	*(i) C-5 Contractor shall install dedicated reinforcement earth bars in concrete at each pier for each track to ensure earth continuity as per approved drawings.* *(ii) C-5 Contractor shall allow SYS-1 Contractor to witness casting of each bar to ensure the continuity of the earth conductor as per the approved drawings.* *(iii) C-5 Contractor shall paint mark on the concrete surface of designated earth bar to facilitate supervision.* *(iv) C-5 Contractor shall supply and install brought out connections viz. terminal plates on*	*(i) SYS-1 Contractor shall provide schematic drawings for earthing & bonding connections with dedicated reinforcement bars in concrete of pier cap to piles/legs of concrete bridges.* *(ii) SYS-1 Contractor shall interface and get all drawings & schemes approved from the Engineer.* *(iii) SYS-1 Contractor shall supply and install flexible cable / jumper/GI flat and connect the terminal plates with OHE System and BEC (if required) at every consecutive spans.* *(iv) SYS-1 Contractor shall arrange adequate supervision of appropriate level at*

Item No.	Item Description	Civil Contractor (C-5)	Civil, Track and System Contractors (C-4, T-2, SYS-1and SYS-2)
		every pier cap for each track to ensure earthing & bonding connection with OHE system and BEC (if required).	*various stages of construction to ensure provisions of earth continuity in concrete structures.*
10.	S&T service structures at stations and auto signal huts	(i) C-5 contractor shall share the handing over schedule of S&T service structures with SYS-1 & SYS–2 contractors and hand over to SYS-2 contractor as per schedule.	(i) SYS-1 and SYS – 2 contractors shall take the access to S&T service structures. SYS-1 contractor shall install electric fitting/fixture and SYS-2 contractor shall install S&T equipment.
11.	Signals post & junction box on viaducts	(i) C -5 contractor shall take into account signal post & junction box location, loads etc. and ensure the viaduct girder is designed and constructed for signals post & junction box. (ii) C-5 contractor shall provide holding down bolts as per details provided by SYS-2 contractor and also provide template for keeping bolts in position.	(i) SYS-2 contractor shall provide location, loads and fixing details of signal posts & junction box to C-5 contractor, which have to be considered in design of viaduct girders. (ii) SYS-2 contractor shall coordinate with C-5 contractor and confirm for suitability and extend all assistance in providing holding down bolts as per approved design / drawing. (iii) SYS-2 contractor shall provide staff to witness the provisions made by

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			C-5 contractor for adequacy and suitability.
12.	S&T cable duct in stations area.	(i) C-5 contractor shall construct S&T cable ducts in station yard. The C-5 contractor shall share handing over schedule to SYS-2 contractor and hand over cable ducts to SYS-2 contractor as per schedule.	(i) SYS-2 contractor shall take over the cable duct and lay S&T cables as per approved design/drawings.
13.	Safety Precautions during working in DFCCIL Track.	C-5 Contractor will take necessary precautions while working in Br No.87.	
14.	Working in Prithla Yard of DFCCIL	C-5 Contractor shall interface with DFCCIL for works of Prithla Junction (South) SSP.	
15.	*Viaduct deck slab - fixing of anchor bolts of OHE guy rod arrangement.*	*(i) C-5 Contractor shall share the relevant viaduct drawings with SYS-1 Contractor.* *(ii) C-5 Contractor shall take into account the OHE anchor location, loads and bending moment etc. provided by SYS-1 Contractor and ensure that the viaduct decks are designed and constructed suitable for OHE anchor requirement.* *(iii) C-5 Contractor shall*	*(i) SYS-1 Contractor shall provide OHE Layout Plan (LOP) of proposed locations of OHE anchors.* *(ii) SYS-1 Contractor shall share values of maximum direct load, bending moment, pulling load etc. arising due to the OHE anchors, fittings and load, which have to be considered in the design of viaduct deck slab.* *(iii) SYS-1 Contractor shall provide design details,*

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		arrange the GI anchor bolts as per details given by SYS-1 Contractor and install the GI anchor bolts on viaduct deck during concreting as per approved drawings.	*material composition etc. of anchor bolts of guy rod arrangement to C-5 Contractor.* *(iv) SYS-1 Contractor shall provide staff to witness the provisions made by the C-5 Contractor for adequacy and suitability of anchors.*
16.	*DFC New Prithla Yard SSP - Retaining wall between HORC Track and DFC Prithla SSP*	*(i) C-5 Contractor shall coordinate with SYS-1 Contractor and integrate the cross feeder gantry structure OHE foundations in the retaining wall between HORC track and DFC Prithla SSP.* *(ii) C-5 Contractor shall take into account OHE foundation data i.e direct load, bending moment, foundation design with dia and depth etc. for design of the retaining wall.*	*(i) SYS-1 Contractor shall coordinate with C-5 Contractor for integration of cross feeder gantry structures foundations with retaining wall at DFC Prithla SSP location.* *(ii) SYS-1 Contractor shall provide all cross feeder gantry OHE foundation data i.e direct load, bending moment, foundation design with dia and depth etc. for design of retaining wall to C-5 Contractor.* *(iii) SYS-1 OHE Contractor shall provide staff during concreting of retaining wall to ensure that cross feeder gantry structure foundation is cast as per approved drawings.*

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17.	*Construction of railway formation by utilizing surplus earth released from C-4 Package*	*C-5 Contractor shall carry out C&G of the site where surplus earth is to be used and record levels before allowing C-4 contractor to dump surplus earth.*	*C-4 Contractor shall ensure that dumping of surplus earth in C-5 package is done only after C&G of the site and recording of the level by C-5 Contractor.*