**Madhya Pradesh Metro Rail Corporation Limited (MPMRCL)**

(A Joint Venture of Government of India and Government of Madhya Pradesh)

**CIN: U75100MP2015SGC034434**

**2nd Floor, Smart City Development Corporation Limited Office Building,**

**Kalibadi Road, BHEL, Sector A, Berkheda, Bhopal – 462022, Madhya Pradesh, India**

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**Corrigendum – 03**

**No.: 0027/MPMRCL/2022** **Date: 10.01.2022**

With reference to Tender Notification No.: 1458/MPMRCL/2021/Package IN–09, Date: 10.11.2021, regarding "Engineering, Supply, Erection, Testing and Commissioning of Power Supply Receiving Sub–Station (RSS), Traction Sub-Station (TSS), Auxiliary Sub-Station (ASS), 750 V DC 3rd Rail and SCADA System" for Indore Metro Rail Project, following corrigendum are issued in pursuant to clause 3.5 of Volume I – ITT. The corrigendum will be part of the said tender document

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| 1. | Volume I – Part 3: EQC | Sub-Clause No. 9.2.2 (f), (65 of 132) | New Sub-clause 9.2.2. (f) added. | **(f) However, in case of consortium/JV between companies and their subsidiaries where either the parent or the subsidiary or both is/are (an) Indian company/companies registered in** |

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| | | (Newly added) | | **India, parent company shall be eligible to bid on the basis of credentials of their owned subsidiaries. Subsidiaries shall be eligible to bid on the basis of credentials of their parent company. Here it will be mandatory that the bidders must enter into a consortium /JV agreement with a token participation of such parent/subsidiary whose credentials are being sought to be used. This consortium /JV agreement should clearly stipulate that the individual companies (i.e the parent and the JV) shall be jointly and severally responsible and liable for the timely execution of the contract and failure to do so will make all of them liable to the penal conditions of the contract. In such case there will be no requirement of the minimum threshold of 26% participation by each member of the consortium/JV.** |

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| 2. | Volume I – Part 3: EQC | Clause No. 10.2 Work Experience: Sub-clause No. 10.2.1,<br>(66/132) | Work Experience: Subclause 10.2.1<br>The tenderers will be qualified only if they satisfy the minimum eligibility criteria (a) or (b) or (c) as given below within the past 10 years ending on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above):<br>a. A minimum number of one *"Similar Work" of value INR 413 Cr. that have been satisfactorily and @Substantially completed.<br>OR<br>b. A minimum number of two *"Similar Works" each of value INR 258 Cr. or above, that have been satisfactorily and @Substantially completed.<br>OR<br>c. A minimum number of three *"Similar Works" each of value INR 206 Cr. or above, that have been satisfactorily and @Substantially completed.<br>* "Similar Works" for this tender shall be Supply, Erection, Testing and commissioning work of:<br>either | Work Experience: Subclause 10.2.1<br>The tenderers will be qualified only if they satisfy the minimum eligibility criteria (a) or (b) or (c) as given below within the past 10 years ending on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above):<br>a. A minimum number of one *"Similar Work" of value INR 413 Cr. **or above** that have been satisfactorily and @Substantially completed<br>OR<br>b. A minimum number of two *"Similar Works" each of value INR 258 Cr. or above, that have been satisfactorily and @Substantially completed<br>OR<br>c. A minimum number of three *"Similar Works" each of value INR 206 Cr. or above, that have been satisfactorily and @Substantially completed.<br>* "Similar Works" for this tender shall be Supply, Erection, Testing and commissioning work of:<br>either<br>Power supply receiving /distribution System of |

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| | | | Power supply receiving /distribution System of Voltage Level 66kV and above, Traction distribution System for Metro Rail/Suburban Rail/Main line Railways /Mono Rail /Tramways.<br><br>or<br><br>High voltage (33 kV and above) electrical power supply work involving transmission lines, Cabling, Transformers, Switch gear, Protection system in Power Plant / Power Transmission & Distribution works for Heavy industries like Cement, Steel, Petrochemicals.<br><br>@ "Substantially completed" for criteria (a), (b) and (c) above, shall mean at least eighty percent (80%) completion (value wise) under the contract | Voltage Level **33 kV** and above, Traction distribution System for Metro Rail/Suburban Rail/Main line Railways/Mono Rail/Tramways.<br><br>or<br><br>High voltage (33 kV and above) electrical power supply work involving transmission lines **/** Cabling, Transformers, Switch gear, Protection system in Power Plant / Power Transmission & Distribution works for Heavy industries like Cement, Steel, Petrochemicals, **Utilities and/or Electricity Authority**.<br><br>@ "Substantially completion" shall be based on **eighty percent (80%) value wise or more works completed under the contract and same being equal to or more than criteria (a) or (b) or (c) above as the case may be.**<br><br>**Or**<br><br>@ "Substantially completion" shall be based on **at least one section of minimum 6km route length completed including testing and commissioning under the contract and value of executed work being equal to or more than criteria (a) or (b) or (c) above as the case may be.** |

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| 3. | Volume I – Part 3: EQC | Clause No. 10.2 Work Experience: Sub-clause No. 10.2.2,<br>(68/132) | Work Experience: Subclause 10.2.2<br>Key Activities-<br>For the contracts under para 10.2.1 and /or other contracts completed and under implementation, a minimum construction experience in the following key activities completed.<br>a) RSS<br>Construction, Supply, testing and commissioning of at least One Receiving Substations (GIS **and AIS**) with primary voltages 66kV and above along with other associated works.<br>b) ASS<br>Supply, erection, testing and commissioning of at least 10 Auxiliary Substations with **dry type** transformer primary voltages 11kV and above voltage level<br>c) Cabling<br>Supply, installation, testing and commissioning of HV (33kV or above) three phase cable network | Work Experience: Subclause 10.2.2<br>Key Activities-<br>For the contracts under para 10.2.1 and /or other contracts completed and under implementation, a minimum construction experience in the following key activities completed.<br>a) RSS<br>Construction, Supply, testing and commissioning of at least **One Receiving Substation (GIS)** with primary voltages **33 kV** and above along with other associated works.<br>b) ASS<br>Supply, erection, testing and commissioning of at least 10 Auxiliary Substations with transformer primary voltages 11kV and above voltage level.<br>c) Cabling<br>Supply, installation, testing and commissioning of |

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| | | | system for minimum length of 10 Route Kilometre (RKM).<br><br>d) TSS<br>Supply, erection, testing and commissioning of at least 06 Traction substations of 600V DC or above with the use of AIS/GIS for Metro Rail/Suburban Rail/Main line Railways/Mono Rail/Tramways.<br><br>e) Third Rail***<br>Supply, erection, testing and commissioning of 600 V DC or above Third rail Traction system for Metro Rail/ Suburban Rail for minimum length of 10 Route Kilometre (RKM) or 20 Track Kilometre (TKM).<br><br>f) SCADA<br>Supply, erection, testing and commissioning of SCADA system for Metro Rail/Suburban Rail/Main line Railways/Mono Rail/Tramways for 10 Route Kilometre (RKM) or 20 Track Kilometre (TKM). | HV (33kV or above) three phase cable network system for minimum length of 10 Route Kilometre (RKM).<br><br>d) TSS<br>Supply, erection, testing and commissioning of at least 06 Traction substations of 600V DC or above with the use of AIS/GIS for Metro Rail/Suburban Rail/Main line Railways/Mono Rail/Tramways.<br><br>e) Third Rail***<br>Supply, erection, testing and commissioning of 600 V DC or above Third rail Traction system for Metro Rail/ Suburban Rail / **Main line Railways/ Mono Rail/ Tramways** for minimum length of 10 Route Kilometre (RKM) or 20 Track Kilometre (TKM).<br><br>f) SCADA<br>Supply, erection, testing and commissioning of SCADA system for Metro Rail/Suburban Rail/Main line Railways/Mono Rail/Tramways for 10 Route Kilometre (RKM) or 20 Track Kilometre (TKM). |

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<tr><td></td><td></td><td></td><td>g) Stray Current Monitoring & Mitigation System#<br>Supply, erection, testing and commissioning of Stray Current Monitoring & Mitigation System for Metro Rail/ Suburban Rail/ Main line Railways/Mono Rail/Tramways for 10 Route Kilometer (RKM) or 20 Track Kilometer (TKM).</td><td>g) Stray Current Monitoring System#<br>Supply, erection, testing and commissioning of Stray Current Monitoring System for Metro Rail/Suburban Rail/Main line Railways/Mono Rail/Tramways for 10 Route Kilometer (RKM) or 20 Track Kilometer (TKM).</td></tr>
<tr><td>4.</td><td>Volume I – Part 3: EQC</td><td>Clause No. 10.3 Financial Standing: Sub-clause No. 10.3.1,<br>(72/132)</td><td>
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<tr><th colspan="2" rowspan="2">Criteria</th><th>Requirement</th><th></th></tr>
<tr><th>Single Entity</th><th>JV/ Consortium</th><th></th></tr>
<tr><th></th><th></th><th></th><th>Combined</th><th>Each Partner</th></tr>
<tr><td>a</td><td>Liquidity:<br>minimum INR 25 Crores<br>[Refer Note iii below]</td><td>Must meet</td><td>Must meet the criteria by weighted average method based on percentage participation of each partner</td><td>Must meet at least to the percentage participation of the criteria</td></tr>
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<tr><td>b</td><td>Net Worth:</td><td>Must</td><td>Must meet</td><td>Must meet</td></tr>
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<tr><td></td><td></td><td></td><td>b</td><td>Net Worth:<br>minimum INR 52 Crore during last audited financial year</td><td>Must meet</td><td>Must meet the criteria by weighted average method based on percentage participation of each partner</td><td>Net Worth must be positive only</td><td></td><td>Net worth should be positive in any three of the last five audited financial years.</td><td>meet</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>c</td><td>Average Annual Turnover:<br>average annual turnover from Power Supply and Traction Electrification Works of last five financial years should be minimum INR 147 Crores</td><td>Must meet</td><td>Must meet the criteria by weighted average method based on percentage participation of each partner</td><td>Not Applicable</td><td></td><td>c</td><td>Average Annual Turnover:<br>average annual turnover from Power Supply and Traction Electrification Works of last five financial years should be minimum INR 147 Crores</td><td>Must meet</td><td>Must meet the criteria by weighted average method based on percentage participation of each partner</td><td>Must meet at least the percentage participation of the criteria.</td></tr>
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| 5. | Volume I – Part 3: EQC | Sub-Clause No. 10.3.1, Notes: (ii), (72 of 132) | C = all available credits including lines of credit, overdraft facilities and other financial means<br>Letter(s) (as per proforma given in Annexure – 6 of ITT) from Scheduled Bank(s) in India (meaning a bank which has been included in the Second Schedule of Reserve Bank of India Act, 1934, with subsequent amendments if any; including Scheduled Commercial Foreign Banks with branch in India), excluding Cooperative Banks, should clearly substantiate the amount of lines of credit, overdraft facilities and other financial means, as on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above). | C = all available credits including lines of credit, overdraft facilities and other financial means<br>Letter(s) (as per proforma given in Annexure – 6 of ITT) from Scheduled Bank(s) in India (meaning a bank which has been included in the Second Schedule of Reserve Bank of India Act, 1934, with subsequent amendments if any; including Scheduled Commercial Foreign Banks with branch in India), excluding Cooperative Banks or in case of foreign members Letter(s) (as per proforma given in Annexure – 6 of ITT) in English language from the principal bank(s) in its country of incorporation or registration, should clearly substantiate the amount of lines of credit, overdraft facilities and other financial means, as on the Credential Cut-Off Date (as confirmed in EQC para 8.1.6 above). |
| 6. | Volume II – Conditions of Contract (GC and PC) | GC Sub-Clause No. 18.1, (106 of 210) | GC 18.1: Exceptional Event<br>**"Exceptional Event"** means an event or circumstance which:<br>a. is beyond a Party's control;<br>the Party could not reasonably have provided against before entering into the Contract;<br>having arisen, such Party could not reasonably have avoided or overcome; and is not | GC 18.1: Exceptional Event<br>**"Exceptional Event"** means an event or circumstance which:<br>**i.** is beyond a Party's control;<br>**ii.** the Party could not reasonably have provided against before entering into the Contract;<br>**iii.** having arisen, such Party could not |

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| | | | substantially attributable to the other Party.<br><br>An Exceptional Event may comprise but is not limited to any of the following events or circumstances provided that conditions (i) to (iv) above are satisfied:<br><br>b. war, hostilities (whether war be declared or not), invasion, act of foreign enemies;<br>c. rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war;<br>d. riot, commotion or disorder by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors;<br>e. strike or lockout not solely involving the Contractor's Personnel and other employees of the Contractor and Subcontractors;<br>f. encountering munitions of war, explosive materials, ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity; or | reasonably have avoided or overcome; and<br>**iv.** is not substantially attributable to the other Party.<br><br>An Exceptional Event may comprise but is not limited to any of the following events or circumstances provided that conditions (i) to (iv) above are satisfied:<br>a. war, hostilities (whether war be declared or not), invasion, act of foreign enemies;<br>b. rebellion, terrorism, revolution, insurrection, military or usurped power, or civil war;<br>c. riot, commotion or disorder by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors;<br>d. strike or lockout not solely involving the Contractor's Personnel and other employees of the Contractor and Subcontractors;<br>e. encountering munitions of war, explosive materials, ionising radiation or contamination by radio-activity, except as may be attributable to the Contractor's use of such munitions, explosives, radiation or radio-activity; or |

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| | | | g. natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon. | f. natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon. |
| 7. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part A – Contact Data<br>Serial No. 14, (143 of 210) | Serial No. 14. Right of access to the site<br>v. Construction Right of Access for Receiving Substations (RSS) at ISBT/MR-10 Flyover will be handed over after 270 days from the commencement date. | Serial No. 14. Right of access to the site<br>v. Construction Right of Access for Receiving Substations (RSS) at ISBT/MR-10 Flyover will be handed over after **75 days** from the commencement date. |
| 8. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part A – Contract Data, Serial. No. 23, (145 of 210) | Serial No. 23. Advance Payment<br>i. The first instalment shall be paid upon **start of mobilisation.** It shall be paid against an Advance Payment Certificate, under Sub-Clause 14.2.2. | Serial No. 23. Advance Payment<br>i. The first instalment shall be paid upon **unconditional acceptance of LOA and submission of acceptable performance security.** It shall be paid against an Advance Payment Certificate, under Sub-Clause 14.2.2. |
| 9. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part A – Contract Data, Serial No. 30, (146 of 210) | Serial No. 30. Minimum amount of Interim Payment Certificates:<br>One percent (1%) of the Contract Price in the currency(ies) and proportions of the Accepted Contract Price. | Serial No. 30. Minimum amount of Interim Payment Certificates:<br>**[Not Applicable]** |

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| 10. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part A – Contract Data, Serial No. 32,<br>(147 of 210) | Serial No. 32. Period of Interim Payment<br>Payment of IPC shall be released within forty-two (42) days of submission of IPA with all the required documents by the Contractor.<br>**The Contractor can submit a maximum of one IPC every month provided he achieves supply or Installation or both of value 1% of the contract value for raising the IPC.** | Serial No. 32. Period of Interim Payment<br>Payment of IPC shall be released within forty-two (42) days of submission of IPA with all the required documents by the Contractor.<br>**Para is deleted** |
| 11. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part A – Contract Data, Serial No. 39,<br>(147 of 210) | Serial No. 39. List of risks which shall not be excluded from the insurance arising from Exceptional Events.<br>All the Exceptional Events under Sub-Clause 18.1<br>of the General Conditions. | Serial No. 39. List of risks which shall not be excluded from the insurance arising from Exceptional Events.<br>The Exceptional Events under Sub-Clause 18.1 of the General Conditions, **as listed below:**<br>**b. terrorism;**<br>**c. riot, commotion or disorder by persons other than the Contractor's Personnel and other employees of the Contractor and Subcontractors;**<br>**d. strike or lockout not solely involving the Contractor's Personnel and other employees of the Contractor and** |

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| | | | | **Subcontractors; and**<br>**f. natural catastrophes such as earthquake, tsunami, volcanic activity, hurricane or typhoon.** |
| 12. | Volume II – Conditions of Contract (GC and PC) | PC<br>Annexure–1 to Part A - Contract Data,<br>(153/210) | Key Dates<br>Note. 2.<br>Delay Damages levied for key dates - GEKD01, GEKD02, GEKD03, GEKD04 & GEKD05 will be refunded if the subsequent key dates are achieved for priority corridors of Indore Metro including related compliances etc. | Key Dates<br>Note. 2 is amended as under.<br>Delay Damages levied for key dates - GEKD01, GEKD02, GEKD03, GEKD04, GEKD05, **PSKD 06.1(a), and PSKD 06.1(b).** will be refunded / **adjusted** if **corresponding** key dates **from PSKD 06.2 to PSKD 06.7** are achieved for priority corridor/**section within the stipulated date or the extended period of completion where such extension has been granted**. |
| 13. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B – Special Provisions.<br>Sub- Clause No. 1.13,<br>(156 of 210) | PC 1.13: Compliance with Laws<br>*Replace entire Sub-Clause 1.13 with the following:*<br>The Contractor shall in performing the Contract, comply with all applicable Laws. The Contractor shall give all notices, pay all taxes, duties and fees, securities and obtain all other permits, permissions, licences and/or approvals, as required by the Laws in relation to the execution of the Works. The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so unless the failure is caused by the | PC 1.13: Compliance with Laws<br>*Replace entire Sub-Clause 1.13 with the following*<br>The Contractor shall in performing the Contract, comply with all applicable Laws. The Contractor shall give all notices, pay all taxes, duties and fees, securities and obtain all other permits, permissions, licences and/or approvals, as required by the Laws in relation to the execution of the Works. The Contractor shall indemnify and hold the Employer harmless against and from the consequences of any failure to do so unless the |

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| | | | Employer's failure to comply with Sub-Clause 2.2 [Assistance];<br>If the Employer incurs additional costs as a result of the Contractor's failure to comply with the above paragraphs, the Employer shall be entitled subject to Sub-Clause 20.2 [Claims for Payment and/or EOT] to payment of these costs by the Contractor. | failure is caused by the Employer's failure to comply with Sub-Clause 2.2 [Assistance];<br>If the Employer incurs additional costs as a result of the Contractor's failure to comply with the above paragraphs, the Employer shall be entitled subject to Sub-Clause 20.2 [Claims for Payment and/or EOT] to payment of these costs by the Contractor.<br>**The Employer shall reimburse statutory fees/charges paid to the concerned statutory authorities like Indore Municipal Corporation (IMC), Indore Development Authority (IDA), Indore Smart City Corporation (ISCC), Madhya Pradesh Jail Nigam, MPPTCL, NHAI etc only towards the work of excavation charges, supervision charges, road cutting charges etc., involved in laying, testing & commissioning of 33 kV UG cables from MPMRCL RSS to nearest ASS/TSS**. |
| 14. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B - Special provisions.<br>Sub-Clause No. 2.1,<br>(157/210) | *Right of Access to the site*<br>*Replace entire Sub-Clause 2.1 with the following:*<br>The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time (or times) stated in the Contract Data. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the Contractor) | *Right of Access to the site*<br>Replace entire Sub-Clause 2.1 with the following:<br>The Employer shall give the Contractor right of access to, and possession of, all parts of the Site within the time (or times) stated in the Contract Data. The right and possession may not be exclusive to the Contractor. If, under the Contract, the Employer is required to give (to the |

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| | | | possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the Employer's Requirements. However, the Employer may withhold any such right or possession until the Performance Security has been received.<br><br>If no such time is stated in the Contract Data, the Employer shall endeavour to give the Contractor right of access to, and possession of, those parts of the Site within such times as may be required to enable the Contractor to proceed in accordance with the Programme or, if there is no Programme at that time, the initial programme submitted under Sub-Clause 8.3 [Programme].<br><br>If the Contractor suffers delay as a result of a failure by the Employer to give any such right or possession within such time, the Contractor shall be entitled to only a reasonable extension of time and no monetary claims whatsoever shall be paid or entertained on this account. | Contractor) possession of any foundation, structure, plant or means of access, the Employer shall do so in the time and manner stated in the Employer's Requirements. However, the Employer may withhold any such right or possession until the Performance Security has been received.<br><br>If no such time is stated in the Contract Data, the Employer shall endeavour to give the Contractor right of access to, and possession of, those parts of the Site within such times as may be required to enable the Contractor to proceed in accordance with the Programme or, if there is no Programme at that time, the initial programme submitted under Sub-Clause 8.3 [Programme].<br><br>**If the Contractor suffers delay and/or incurs Cost as a result of a failure by the Employer to give any such right or possession within such time, then following shall apply.**<br><br>**(a) The Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT only.**<br><br>**(b) No monetary claims whatsoever shall be paid or entertained. However, in case of cumulative EOT is beyond 182 days, then the Contractor shall also be entitled subject** |

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| | | | | **to Sub-Clause 20.2 [Claims For Payment and/or EOT] to payment of such Cost only on account of the following as the case may be. Any other Costs suffered by the Contractor shall be deemed included in the Accepted Contract Amount**<br>**i. Maintenance of all insurances for which the Contractor is responsible.**<br>**ii. Extension of all bank guarantees and equipment warranties.**<br>**iii. Idling if any of the Contractor's Personnel deployed at Indore in connection with the Works, with prior approval of the Engineer. The deployment of the Contractor's Personnel shall be governed by the Engineer based on the Site conditions and requirements. The decision of the Engineer in this regard shall be final and binding on the Contractor.**<br>**iv. Idling if any of the Contractor's Equipment and Temporary Works (which shall not be forming part of the Permanent Works) deployed at Indore in connection with the Works, with prior approval of the Engineer.** |

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| | | | | **The deployment of the Contractor's Equipment and Temporary Works shall be governed by the Engineer based on the Site conditions and requirements. For the purpose of this matter, such idling charges shall be seventy percent (70%) of the actual hire charges or half percent (0.5%) per month of the average depreciated value, whichever is less. The decision of the Engineer in this regard (also including the reasonability of hire charges and depreciated value) shall be final and binding on the Contractor.**<br><br>However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the applicable Contractor's Documents, the Contractor shall not be entitled to such EOT and/or Cost Plus Profit. |
| | | | However, if and to the extent that the Employer's failure was caused by any error or delay by the Contractor, including an error in, or delay in the submission of, any of the applicable Contractor's Documents, the Contractor shall not be entitled to such EOT and/or Cost Plus Profit. | |
| 15. | Volume II – Conditions of Contract (GC and PC) | PC<br><br>Part B - Special Provisions.<br><br>Sub-Clause No. 4.2, (160 of | ***PC 4.2:* Performance Security**<br><br>*<u>Replace first sentence of first paragraph of Sub-Clause 4.2.1</u>*<br><br>"The Contractor shall deliver the Performance Security to the Employer, with a copy to the | ***PC 4.2:* [Deleted]** |

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| | | 210) | Engineer, within 28 days after receiving the Letter of Acceptance."<br><br>*with*<br><br>"The Contractor shall deliver the Performance Security to the Employer, with a copy to the Engineer, within 14 days after receiving the Letter of Acceptance."<br><br>*Add following new Sub-Clause 4.2.4 at the end of Sub-Clause 4.2:*<br><br>4.2.4 Guarantees and Warranties<br><br>In the case, the Contractor (or any member of the JV/ Consortium as applicable) is/are subsidiary company of their parent company, within 30 days after receiving the Letter of Acceptance, the Contractor shall submit to the Employer:<br><br>(a) An undertaking in the approved format (as provided in Schedule 2) from a Parent Company, the identity of which shall have been submitted in writing to the Employer prior to acceptance of the Tender and against which the Employer shall have raised no | |

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| | | | objection.<br>(b) A written guarantee in the approved format (as provided in Schedule 3) from a Parent Company, the identity of which shall have been submitted in writing to the Employer prior to acceptance of the Tender and against which the Employer shall have raised no objection.<br>(c) A warranty in the approved format (as provided in Schedule 4) from the Contractor.<br>In the event that the Contractor shall comprise two or more members, corporations acting in partnership, joint venture, consortium or otherwise each such member or corporation shall submit a Parent Company Undertaking and Guarantee.<br>Notwithstanding any other provision of the Contract:<br>(i) submission by the Contractor of the requisite Performance Security, Parent Company Undertakings and Guarantees shall be condition precedent to the Contractor's | |

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| | | | entitlement to any payment, under the Contract; and<br>failure by the Contractor to provide a Performance Security or Parent Company Undertakings or Parent Company Guarantees shall entitle the Employer either to suspend the Works or to terminate the Contract forthwith by notice in writing to that effect, notwithstanding that the Contractor may have been permitted to proceed with the Works, and the Contractor shall not be entitled to any compensation whatsoever as a consequence of such suspension or termination. | |
| 16. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B - Special Provisions.<br>Sub-Clause No. 4.23,<br>(167 of 210) | PC 4.23: Archaeological and Geological Findings<br>*Replace the last paragraph of Sub-Clause 4.23*<br>"If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of such Cost."<br>*with;*<br>"If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions, the Contractor shall **not** be entitled to EOT and/or payment of such Cost." | PC 4.23: Archaeological and Geological Findings<br>*Replace the last paragraph of Sub-Clause 4.23*<br>"If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of such Cost."<br>*with;*<br>"If the Contractor suffers delay and/or incurs Cost from complying with the Engineer's instructions, the Contractor shall be entitled **subject to Sub-Clause 20.2 [Claims For Payment and/or EOT]** to EOT and/or payment of **only those Cost as** |

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| | | | | **entitled under Sub-Clause 2.1.** |
| 17. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B – Special Provisions.<br>Sub Clause No. 7.4,<br>(170/210) | PC 7.4 Testing by the Contractor<br>*Replace the fifth paragraph of Sub-Clause 7.4*<br>"The Engineer shall give a Notice to the Contractor of not less than 72 hours of his/her intention to attend the tests. If after confirmation by the Engineer, he does not attend at the time and place stated in the Contractor's Notice under this Sub-Clause, the Contractor may proceed with the tests, unless otherwise instructed by the Engineer, which tests shall then be deemed to have been made in the Engineer's presence. If the Contractor suffers delay and/or incurs Cost from complying with any such instruction or as a result of a delay for which the Employer is responsible, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of Cost Plus Profit."<br>*with;*<br>"The Contractor shall give a Notice to the Engineer of not less than 72 hours to attend the tests in India and 15 days notice to attend the test Abroad. If the Engineer does not attend at the time and place stated in the Contractor's Notice under this Sub-Clause, the Contractor may proceed with the tests, | PC 7.4 Testing by the Contractor<br>*Replace the fifth paragraph of Sub-Clause 7.4*<br>"The Engineer shall give a Notice to the Contractor of not less than 72 hours of his/her intention to attend the tests. If after confirmation by the Engineer, he does not attend at the time and place stated in the Contractor's Notice under this Sub-Clause, the Contractor may proceed with the tests, unless otherwise instructed by the Engineer, which tests shall then be deemed to have been made in the Engineer's presence. If the Contractor suffers delay and/or incurs Cost from complying with any such instruction or as a result of a delay for which the Employer is responsible, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of Cost Plus Profit."<br>With;<br>"The Engineer shall give a Notice to the Contractor of not less than 72 hours of his/her intention to attend the tests. If the Engineer does not attend at the time and place stated in the Contractor's Notice under this Sub-Clause, the Contractor may |

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| | | | unless otherwise instructed by the Engineer, which tests shall then be deemed to have been made in the Engineer's presence." | proceed with the tests, unless otherwise instructed by the Engineer, which tests shall then be deemed to have been made in the Engineer's presence. **If the Contractor suffers delay and/or incurs Cost from complying with any such instruction or as a result of a delay for which the Employer is responsible, the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to reasonable EOT and/or payment of only those Cost under sub-paragraph (b) of Sub-Clause 2.1."** |
| 18. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B – Special Provisions.<br>Sub Clause No. 8.10,<br>(Newly added)<br>(173/210) | New Sub-Clause PC 8.10 added. | PC 8.10 Consequences of Employer's Suspension<br>Replace Sub-clause 8.10:<br>"If the Contractor suffers delay and/or incurs Cost from complying with an Engineer's instruction under Sub-Clause 8.9 [Employer's Suspension] and/ or from resuming the work under Sub-Clause 8.13 [Resumption of Work], the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment of such Cost Plus Profit.<br>The Contractor shall not be entitled to EOT, or to payment of the Cost incurred, in making good: |

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| | | | | a. the consequences of the Contractor's faulty or defective (design, if any) workmanship, Plant or Materials; and/or<br>b. any deterioration, loss or damage caused by the Contractor's failure to protect, store or secure in accordance with Sub-Clause 8.9 [Employer's Suspension]".<br>With;<br>"If the Contractor suffers delay and/or incurs Cost from complying with an Engineer's instruction under Sub-Clause 8.9 [Employer's Suspension] and/ or from resuming the work under Sub-Clause 8.13 [Resumption of Work], the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to EOT and/or payment **of only those Cost under sub-paragraph (b) of Sub-Clause 2.1.**<br>"The Contractor shall not be entitled to EOT, or to payment of the Cost incurred, in making good:<br>a. the consequences of the Contractor's faulty or defective (design, if any) workmanship, Plant or Materials; and/or<br>b. any deterioration, loss or damage caused by the Contractor's failure to protect, store or |

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| | | | | secure in accordance with Sub-Clause 8.9 [Employer's Suspension]." |
| 19. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B – Special Provisions.<br>Sub-Clause No. 13.7,<br>(178/210) | PC 13.7: Adjustment for Changes in Cost<br><u>Replace entire Sub-Clause 13.7 with following:</u><br>1. For those items which form part of the permanent works and quoted in ·Indian Rupees-<br>i. The following Price variation Adjustment will be applicable.<br>a. For Supply Portion<br>Price Adjustment as per notification of Indian Electrical and Electronics Manufacturers' Association (IEEMA) shall apply for supply portion which are given at Annexure-B: IEEMA Notifications at the encl of Volume-VII of Pricing document.<br>These are briefly as under<br>For Cables:<br>1. Cir. No.: 117/DIV/CAB/05; dated- 11th December 2017<br>2. Cir. No.: 35/DIV/CAB/05; dated 24th April 2018<br>For LV switchgear & MV switchgear AIS (up to & Including 36KV)<br>1. Cir. No. 09/DIV/LVSWG/05 dated 20th February | PC 13.7: Adjustment for Changes in Cost<br><u>Replace entire Sub-Clause 13.7 with following:</u><br>13.7.1 For those items which form part of the permanent works and quoted in ·Indian Rupees. The following Price variation Adjustment will be applicable.<br>a. <u>For Supply Portion</u><br>Price Adjustment as per notification of Indian Electrical and Electronics Manufacturers' Association (IEEMA) shall apply for supply portion which are given at Annexure-B: IEEMA Notifications at the encl of Volume-VII of Pricing document.<br>These are briefly as under<br>For Cables:<br>1. Cir. No.: 117/DIV/CAB/05; dated- 11th December 2017<br>2. Cir. No.: 35/DIV/CAB/05; dated 24th April 2018<br>For LV switchgear & MV switchgear AIS (up to & Including 36KV) |

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| | | | 2019<br>For Power transformers<br>1. Cir. No. 85/DIV/TRF/05; dated-05th June2015<br>Notes:<br>a. It may please be noted that only latest notifications / circulars shall be considered for price adjustment.<br>b. The above Notifications / Circulars are for reference of the Tenderer and these are also available on IEEMA website (www.ieema.org) and as on date, these are the current ones.<br>b. For Erection Portion<br>For erection works at site, the following formula shall be applicable as mentioned below:<br>VI = Adjustment on account of labour component<br>= p x Rx (I- Io) /Io<br>Where,<br>p = Cost Coefficient of Labour to the Total Cost = 0.05<br>R = Gross value of the work done by the Contractor for the period of work under consideration, after excluding there from the cost of any materials supplied free or at fixed rate to the Contractor. | 1. Cir. No. 09/DIV/LVSWG/05 dated 20th February 2019<br>For Power transformers<br>1. Cir. No. 85/DIV/TRF/05; dated-05th June2015<br>Notes:<br>a. It may please be noted that only latest notifications / circulars shall be considered for price adjustment.<br>b. The above Notifications / Circulars are for reference of the Tenderer and these are also available on IEEMA website (www.ieema.org) and as on date, these are the current ones.<br>b. <u>For Erection Portion</u><br>For erection works at site, the following formula shall be applicable as mentioned below:<br>VI = Adjustment on account of labour component<br>= p x Rx (I- Io) /Io<br>Where,<br>p = Cost Coefficient of Labour to the Total Cost = 0.05<br>R = Gross value of the work done by the Contractor for the period of work under |

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| | | | Io= Consumer Price Index for Industrial workers, published by Ministry of Labour & Employment, Govt of India, as applicable to **Ahmedabad** area for the month in which the tender was opened.<br><br>I = Average of monthly Consumer Price Index for Industrial workers published by Ministry of Labour & Employment, Govt of India, as applicable to Indore area for the period of work under consideration.<br><br>c. For Conductor Rail (BOQ Item No A.1 of Bill No. IN-6.1 for Indore Metro), which form part of the permanent works and quoted in foreign currency and expected to be supplied from outside the Employer's country as per ITB/BDS 4.17. The price adjustment shall be linked to spot rate of aluminium quoted at London Metal Exchange (LME), and shall be governed by the formula given as under:<br><br>Price Adjustment= 0.75xAccepted price x[Current Index-Base Index] x f/Base Index<br><br>Where;<br><br>Current Index is the spot rate cost of aluminium as given on the L.M.E. (London Metal Exchange) 28 (twenty-eight) days prior to the date of notification to Engineer / Employer for inspection of material;<br><br>Base Index is the cost of aluminium as given by the | consideration, after excluding there from the cost of any materials supplied free or at fixed rate to the Contractor.<br><br>Io= Consumer Price Index for Industrial workers, published by Ministry of Labour & Employment, Govt of India, as applicable to **Indore** area for the month in which the tender was opened.<br><br>I = Average of monthly Consumer Price Index for Industrial workers published by Ministry of Labour & Employment, Govt of India, as applicable to Indore area for the period of work under consideration.<br><br>13.7.2 No change in cost shall be applicable for those items which form part of the permanent works and quoted in Foreign Currencies, except for Conductor Rail items (BOQ Item No A.1 of Bill No. IN-6.1); as provided below: -<br><br>For Conductor Rail (BOQ Item No A.1 of Bill No. IN-6.1), which form part of the permanent works and quoted in foreign currency and expected to be supplied from outside the Employer's country, the price adjustment shall be linked to spot rate of aluminium quoted at London Metal Exchange (LME), and shall be governed by the formula given as under: |

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| | | | L.M.E. (London Metal Exchange) 28 (twenty-eight) clays prior to the latest date of Tender submission;<br>= Zo I ZI<br>where;<br>Zo is the number of units of the currency of the index which is equivalent to one unit of bid currency as applicable on 28 (twenty-eight) days prior to the latest date of Tender submission; and ZI is the number of units of the currency of the index which is equivalent to one unit of bid currency as applicable on 28 (twenty-eight) days prior to the date of notification for inspection. | **P1 = P0 + M x (LME1 - LME0)**<br>**Where;**<br>**P1 = Calculated new price of the Conductor Rail based on the LME (EUR per meter)**<br>**P0 = Base Price (Contract Price) of the Conductor rail (EUR per meter).**<br>**M = Mass of Aluminium per meter of Conductor rail in Tonne.**<br>**LME0 = LME rate (EUR per tonne) 28 days prior to latest tender submission date**<br>**LME1 = LME rate (EUR per tonne) 28 days prior to date of notification for inspection.**<br>**Note: The exchange rates to be employed for such conversion shall be the bill selling rate of exchange at the close of business of the State Bank of India on the respective date.**<br>**The price variation on conductor rail shall be applicable for supply prices only.**<br>**For Conductor rail, the latest date of notification for inspection of material for considering price variation shall not be later than 210 (two hundred ten) days** |

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| | | | Conditions Applicable To Price Adjustment<br>The Bidder shall indicate the source of the indexes and the base date indexes as follows:<br>a) The base cost indices or prices shall be those Bases, prevailing on the day 28 days prior to the latest closing date for submission of bids. Current indices or prices shall be those prevailing on the day 28 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, provisional indices as determined by the Engineer will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.<br>b) Price Adjustment shall not be applicable to payments under relevant Price Schedules for | **before that relevant Key date for commission of Third Rails and associated items. However, if the price variation calculated as per the actual date of notification of inspection is resulting in a price advantage to the Employer; the actual date of notification shall be considered for evaluating the price variation.**<br>**The price variation that may accrue during the period from the date of tender submission will not be considered for tender evaluation for deciding inter-se position of the Tenderers**.<br>13.7.3 Conditions Applicable To Price Adjustment for PC 13.7.1 and 13.7.2.<br>(A) The Bidder shall indicate the source of the indexes and the base date indexes as follows:<br>i) The base cost indices or prices shall be those Bases, prevailing on the day 28 days prior to the latest closing date for submission of bids. Current indices or prices shall be those prevailing on the day 28 days prior to the last day of the period to which a particular Interim Payment Certificate is related. If at any time the current indices are not available, |

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| | | | items which are deemed to be incidental in execution of Works such as Surveys, Investigations, Studies, Reports, Design and Drawings, O & M Manuals, As-built drawings, Training of Staff, Testing, Commissioning, etc.<br>c) No price adjustment shall be payable on the portion of the Contract Price paid to the Contractor as an advance payment.<br>d) The responsibility for arranging copies of the labour and material indices, from the appropriate Government Institutions outside the Employer's country, to be delivered to the Employer and the Engineer on a monthly basis, shall rest with the Contractor.<br><br>Non-application of Price Variation Clause to extra items.<br>The Price Variation Clause above shall not be applicable to any extra item of works, not included in the Pricing Document.<br><br>Adjustment on Account of Price Variation<br>Adjustments on account of Price Variations may be positive (in which case an additional amount shall be paid to the Contractor), or | provisional indices as determined by the Engineer will be used, subject to subsequent correction of the amounts paid to the Contractor when the current indices become available.<br>ii) Price Adjustment shall not be applicable to payments under relevant Price Schedules for items which are deemed to be incidental in execution of Works such as Surveys, Investigations, Studies, Reports, Design and Drawings, O & M Manuals, As-built drawings, Training of Staff, Testing, Commissioning, etc.<br>iii) No price adjustment shall be payable on the portion of the Contract Price paid to the Contractor as an advance payment.<br>iv) The responsibility for arranging copies of the labour and material indices, from the appropriate Government Institutions outside the Employer's country, to be delivered to the Employer and the Engineer on a monthly basis, shall rest with the Contractor.<br>(B) Non-application of Price Variation Clause to extra items.<br>The Price Variation Clause above shall not be applicable to any extra item of works, not |

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| | | | negative (in which case the amount of Price Variation shall be recovered from the Contractor). Adjustment on account of Price Variation shall be calculated separately, for each period between two successive dates of the Contractor's statements and paid with the IPC.<br><br>After verifying the statement, the Engineer shall certify the adjustment amount and advise the same to the Employer along with the IPC. Should any extra amount be due to Contractor, the Employer shall pay the same as far as possible within 28 days of certification by the Engineer. Any amount due from the Contractor on account of negative adjustment shall be recovered from his pending or other statements at the earliest.<br><br>Procedure in case of delay in availability of final Indices<br><br>Where the final Price Indices are not available, while making payment towards an IPC, payment towards the Price Variation will be made on provisional basis based on the indices available, to be adjusted in subsequent statements as and when the final Indices figures become available. | included in the Pricing Document.<br><br>(C) Adjustment on Account of Price Variation<br><br>i) Adjustments on account of Price Variations may be positive (in which case an additional amount shall be paid to the Contractor), or negative (in which case the amount of Price Variation shall be recovered from the Contractor). Adjustment on account of Price Variation shall be calculated separately, for each period between two successive dates of the Contractor's statements and paid with the IPC.<br><br>ii) After verifying the statement, the Engineer shall certify the adjustment amount and advise the same to the Employer along with the IPC. Should any extra amount be due to Contractor, the Employer shall pay the same as far as possible within 28 days of certification by the Engineer. Any amount due from the Contractor on account of negative adjustment shall be recovered from his pending or other statements at the earliest.<br><br>(D) Procedure in case of delay in availability of final Indices<br><br>Where the final Price Indices are not |

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| | | | Price Variation during extended period of completion<br>The price adjustment as worked out above i.e., either increase or decrease will be applicable up to the stipulated dates of Completion of the Facilities, including the extended period of completion where such extension has been granted under GC Sub-Clause 8.5, and where such an extension has been granted, the<br>price adjustment will be due as follows:<br>a) In case the indices increase above the indices applicable to a bill made on the last date of original completion period or the extended period under GC Sub-Clause 8.5, the price adjustment for the period of extension granted in accordance with GC Sub-Clause 8.5 will be limited to the amount payable as per the indices applicable to a statement made on the last date of the original completion period or the extended period as the case may be.<br>No price increase will be allowed for periods of delay for which the Contractor is held responsible. The Employer will, however, be entitled to any price decrease occurring during such periods of delay. | available, while making payment towards an IPC, payment towards the Price Variation will be made on provisional basis based on the indices available, to be adjusted in subsequent statements as and when the final Indices figures become available.<br>(E) Price Variation during extended period of completion<br>The price adjustment as worked out above i.e., either increase or decrease will be applicable up to the stipulated dates of Completion of the Facilities, including the extended period of completion where such extension has been granted under GC Sub-Clause 8.5, and where such an extension has been granted, the price adjustment will be due as follows:<br>i) In case the indices increase above the indices applicable to a bill made on the last date of original completion period or the extended period under GC Sub-Clause 8.5, the price adjustment for the period of extension granted in accordance with GC Sub-Clause 8.5 will be limited to the amount payable as per the indices applicable to a statement made on the last date of the original completion period or the extended period as the case may be. |

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| | | | | ii) No price increase will be allowed for periods of delay for which the Contractor is held responsible. The Employer will, however, be entitled to any price decrease occurring during such periods of delay. |
| 20. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B – Special Provisions,<br>(Newly added)<br>(185 of 210) | New PC Clause Number 14.9 added. | Replace second paragraph of GC Clause 14.9: Release of Retention Money.<br><br>"After the latest of the expiry dates of the Defects Notification Periods, the Contractor shall include the second half of the Retention Money in a Statement promptly after such latest date. If a Taking-Over Certificate was (or was deemed to have been) issued for a Section, the Contractor shall include the relevant percentage of the second half of the Retention Money in a Statement promptly after the expiry date of the DNP for the Section."<br>*with*<br>"After the latest of the expiry dates of the Defect Notification Periods, the Contractor shall include the second half of the Retention Money in a Statement promptly after such latest date, **and the second half of the Retention Money shall be released upon expiration of 365 days after the latest of the expiry dates of the DNP or** |

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| | | | | **final payment, whichever is earlier, on certification of the Engineer**. If a Taking-Over Certificate was (or was deemed to have been) issued for a Section, the Contractor shall include the second half of the Retention Money in a Statement promptly after the latest of the expiry dates of the DNPs for the Sections."<br><br>*Add following at the end of Sub Clause 14.9:*<br><br>"The Contractor may, at his option, replace the Retention Money with an unconditional bank guarantee from a Scheduled Bank in India (meaning a bank which is included in the Second Schedule of Reserve Bank of India Act, 1934, and includes Scheduled Commercial Foreign Banks with an Indian branch), excluding Cooperative Banks, payable in Bhopal/ Mumbai/ New Delhi, in the form acceptable to the Employer (generally similar to the Performance Security) at the following stages:<br>i. after the cumulative amount of Retention Money reaches to half the equivalent value of five (5%) of the Accepted Contract Amount; and<br>ii. after the issue of the Taking-Over Certificate for the Works (or last Section as the case |

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| | | | | may be).<br>The bank guarantees against release of Retention Money shall remain valid and enforceable at least three hundred and sixty-five (365) days longer than the anticipated date of, issue of Taking-Over Certificate in case of (i), and DNP in case of (ii) above. If the terms of the bank guarantees specify its expiry date, and the Taking-Over has not been happened or DNP has not been completed by the date 28 days before the expiry date: the Contractor shall extend the validity of this guarantee, immediately submit evidence of this extension to the Employer, with a copy to the Engineer and if the Employer does not receive this evidence 7 days before the expiry date of this guarantee, the Employer shall be entitled to claim under the guarantee the amount of Retention Money which has to be retained.<br>The bank guarantees replaced against the Retention Money shall be released in terms of first and second paragraphs of this sub-clause.” |
| 21. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B – Special Provisions.<br>Sub-Clause No. | PC17.2 Liability for Care of the Works<br>*Replace Sub-Clause 17.2 (e)*<br>“(e) any of the events or circumstances listed under sub-paragraphs (a) to (f) of Sub-Clause 18.1 [Exceptional Events]; and/or” | **[Deleted]** |

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| | | 17.2,<br>(186 of 210) | with<br>"(e) [Not Used]; and/or" | |
| 22. | Volume II – Conditions of Contract (GC and PC) | PC<br>Part B – Special Provisions.<br>Sub-Clause No. 18.4,<br>(186 of 210) | PC 18.4: Consequences of an Exceptional Event<br>*Replace entire Sub-Clause 18.4 with following:*<br>"If the Contractor is the affected Party and suffers delay and/or incurs Cost by reason of the Exceptional Event of which he/she gave a Notice under Sub-Clause 18.2 [Notice of an Exceptional Event], the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to reasonable EOT and no monetary claims whatsoever shall be paid or entertained on this account." | PC 18.4: Consequences of an Exceptional Event<br>*Replace Sub-Clause 18.4:*<br>"If the Contractor is the affected Party and suffers delay and/or incurs Cost by reason of the Exceptional Event of which he/she gave a Notice under Sub-Clause 18.2 [Notice of an Exceptional Event], the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or EOT] to:<br>EOT; and/or<br>if the Exceptional Event is of the kind described in sub-paragraphs (a) to (e) of Sub-Clause 18.1 [Exceptional Events] and, in the case of sub-paragraphs (b) to (e) of that Sub-Clause, occurs in the Country, payment of such Cost."<br>With;<br>"If the Contractor is the affected Party and suffers delay and/or incurs Cost by reason of the Exceptional Event of which he/she gave a Notice under Sub-Clause 18.2 [Notice of an Exceptional Event], the Contractor shall be entitled subject to Sub-Clause 20.2 [Claims For Payment and/or |

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| | | | | EOT] to:<br>EOT; and/or<br>if the Exceptional Event is of the kind described in sub-paragraphs (a) to (e) of Sub-Clause 18.1 [Exceptional Events] and, in the case of sub-paragraphs (b) to (e) of that Sub-Clause, occurs in the Country, payment of such Cost **only under sub-paragraph (b) of Sub-clause 2.1**." |
| 23. | Volume IV – Technical Specification | Sub-clause No. 1.1.8<br>(3/16) | If the Bidder considers any additional equipment, equipment of higher capacities and higher ratings for the systems and sub-systems or any other additions necessary for the complete, safe and reliable operable power supply system, he shall include such items in his bid, as additional items, providing all clarifications and justifications for the same | **[Deleted]** |
| 24. | Volume IV – Technical Specification | Sub-clause No. 1.4.7.8,<br>(12/16) | One TSS is to be provided with inverter recuperation system with inverter capacity of 1MW | One TSS is to be provided with inverter recuperation system with inverter capacity of 1MW **The contractor shall propose the location of inverter on the basis of maximum amount of energy recuperation in line with interface with Rolling Stock contractor pertaining to regeneration parameter** |
| 25. | Volume IV – Technical | Sub-Clause No. 2.1.2.2 | The work to be performed for Yellow Line including Depot shall include but not be limited to: | The work to be performed for Yellow Line including Depot shall include but not be limited to: |

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
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| | Specification | (3/25) | a. Visit the corridors including depots, Stations, Receiving Substations sites & 132 kV cable routes from GSS to RSS including GSS bays meant for feeding RSS for familiarization with the working surroundings and environment. | a. Visit the corridors including depots, Stations, Receiving Substations sites & 132 kV cable routes from GSS to RSS including GSS bays meant for feeding RSS for familiarization with the working surroundings and environment.<br>**Supply and laying of 132kV cables (to be laid between 132 kV GIS and Power Transformer) is under the scope of Power Supply Authority (PSA). The 132 kV termination kit at both ends of GIS including required steel structure like gantry, structure for equipment is under the scope of the contractor.** |
| 26. | Volume IV – Technical Specification | Sub-clause No. 2.2.4.3,<br>(9/25) | The work shall essentially consist of but not be limited to the following<br>i. Cable containment with in substation. | The work shall essentially consist of but not be limited to the following<br>i.**Interface for** cable containment with in substation. |
| 27. | Volume IV – Technical Specification | Sub-clause No. 2.2.5.3<br>(9/25) | One designated TSS shall be provided with inverter recuperation system with inverter capacity of 1MW. | One designated TSS shall be provided with inverter recuperation system with inverter capacity of 1MW. **The contractor shall propose the location of inverter on the basis of maximum amount of energy recuperation in line coordination with Rolling Stock contractor regarding regeneration parameter**. |

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| 28. | Volume IV – Technical Specification | Sub-clause No. 2.5.12.3 (21/25) | The System shall achieve a MTBMA of no less than 7 days for each line. | The System shall achieve a MTBMA of no less than 7 days for each **section of Yellow** line. |
| 29. | Volume IV – Technical Specification | Sub-clause No. 3.2.4 (10/55) | Table no. 3.3, Item no. 2 (b) under column of Traction and Power Supply Contractor<br>b. Shall provide jigs and fixtures required for fixing the dowels correctly to track contractor. | Table no. 3.3, Item no. 2 (b) under column of Traction and Power Supply Contractor<br>b. Shall provide **minimum 60 nos. of** jigs and fixtures **for every 5 RKM of route length to enable track contractor** to fix the dowels correctly. |
| 30. | Volume IV – Technical Specification | Sub-clause No. 3.2.4 (11/55) | Table no. 3.3,<br>Note (for Item-7 & 8):<br>In case MPMRCL decides cable connection to running rails by exothermic Weld, the Welding shall be the responsibility of Traction and power supply Contractor. However, Track Contractor shall supervise the welding process. | Table no. 3.3,<br>Note (for Item-7 & 8):<br>Cable connections to running rails by **exothermic Welding shall be the responsibility of Traction and Power Supply** contractor. However, Track Contractor shall supervise the welding process. |
| 31. | Volume IV – Technical Specification | Sub-clause no 12.1.2.5 (2/203) | Outdoor illumination level in the Receiving Substation yard area shall be in accordance with the relevant Indian Standard. The yard lighting equipment have been defined in Para 12.18.12. | Outdoor and **indoor** illumination level in the Receiving Substation shall be provided as per relevant Indian standard/ **NBC/CBIP Manual/OEM recommendations as applicable.** The yard lighting equipment have been defined in Para 12.18.12. |

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td>32.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no 12.1.3.2.2<br>(3/203)</td><td>Each incoming section of GIS bay shall consist of:<br><br>ix. SF6 to Air bushings with complete incoming feeder bay module</td><td>Each incoming section of GIS bay shall consist of:<br><br>ix. [Deleted]</td></tr>
<tr><td>33.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no 12.1.3.3.2<br>(4/203)</td><td>Each outgoing section of GIS bay shall consist of:<br><br>g. SF6 to Air bushings and Accessories with GIS</td><td>Each incoming section of GIS bay shall consist of:<br><br>g. [Deleted]</td></tr>
<tr><td>34.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no 12.3.3 (a)<br>(21/203)</td><td>Type Test: The transformers should be Type Tested as per IS 2026 or IEC 60076 in conjunction with their relevant Part. Necessary test documents of previously tested similar transformer within last 5 years from date of NIT shall have to be submitted at the time of Vendor approval</td><td>Type Test: The transformers should be Type Tested as per IS 2026 or IEC 60076 in conjunction with their relevant Part. Necessary test documents of previously tested similar transformer shall have to be submitted at the time of Vendor approval. Validity of Type test certificates shall be as per CEA guidelines. For those equipments not covered in CEA guidelines, type test certificates validity shall be 05 years from the date of supply.</td></tr>
<tr><td>35.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no 12.3.9.1<br>(23/203)</td><td>Table 12.5: 132kV/33kV Power Transformer Rating for Gandhinagar, ISBT/MR10 Flyover and Khajrana Square<br><table><tr><th>SN</th><th>Description</th><th>132 / 33 kV Power</th></tr></table></td><td>Table 12.5: 132kV/33kV Power Transformer Rating for Gandhinagar, ISBT/MR10 Flyover and Khajrana Square<br><table><tr><th>SN</th><th>Description</th><th>132 / 33 kV Power Transformer Rating</th></tr></table></td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para<br>(Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><th></th><th></th><th>Transformer Rating</th></tr>
<tr><td>3</td><td>Secondary Rated Voltage</td><td>33 KV</td></tr>
<tr><td>C</td><td>Short circuit impedance</td><td>HV-MV1-15%<br>HV-MV2 -22%<br>MV1-MV2 -5%</td></tr>
<tr><td>D</td><td>No load losses (Max)</td><td>12 kW</td></tr>
<tr><td>E</td><td>Copper losses (Max)</td><td>125 KW</td></tr>
</table>
</td><td>
<table>
<tr><td>3</td><td>a. Secondary Rated Voltage<br>b. Tertiary Rated Voltage</td><td>33 kV<br>11kV</td></tr>
<tr><td>C</td><td>Short circuit impedance</td><td>HV-MV1-12.5%<br>(Primary to Secondary)<br>HV-MV2 -22%<br>(Primary to Tertiary)<br>MV1-MV2 -5%<br>(Secondary to Tertiary)</td></tr>
<tr><td>D</td><td>No load losses (Max)</td><td>12 kW. The bidder is required to guarantee losses for winding temperature of 90° C under standard ambient conditions for rating of 30MVA and 40 MVA</td></tr>
<tr><td>E</td><td>Copper losses (Max)</td><td>125 KW. The bidder is required to guarantee losses for winding temperature of 90° C</td></tr>
</table>
</td></tr>
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<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td></td><td></td><td></td><td></td><td><table><tr><td></td><td></td><td>under standard ambient conditions for rating of 30MVA and 40 MVA.</td></tr></table></td></tr>
<tr><td>36.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no. 12.3.11.8.3<br>(34/203)</td><td>Creepage distance for one bushing should be 3 cm/kV.</td><td>Creepage distance for one bushing should be 25mm/kV.</td></tr>
<tr><td>37.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no. 12.3.16.1.1<br>(40/203)</td><td>For transport either by road, ship or rail, the transformer shall be filled with oil up to windings top and then with Nitrogen at 1bar pressure up to the tank top or alternatively, the transformer may be filled with Nitrogen, in full, during transportation. Contractor shall be responsible for maintaining the gas pressure of nitrogen until the gas is replaced by oil. The gas pressure in the transformer before dispatch shall be recorded. Suitable means shall be provided for monitoring the pressure in tank.</td><td>For transport either by road, ship or rail, the transformer shall be filled with oil up to windings top and then with Nitrogen at 1bar pressure up to the tank top or alternatively, the transformer may be filled with Nitrogen, in full, during transportation. Contractor shall be responsible for maintaining the gas pressure of nitrogen until the gas is replaced by oil. The gas pressure in the transformer before dispatch shall be recorded. Suitable means shall be provided for monitoring the pressure in tank. Alternatively, the transportation of power transformer from factory to site will be as per OEM recommendation and accepted industry practice.</td></tr>
<tr><td>38.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no 12.9.4.1<br>(65/203)</td><td>Table 12.13: 132kV Current Transformer design details<table><tr><th>SN</th><th>Description</th><th>132 kV Current Transformer</th></tr></table></td><td>Table 12.13:132kV Current Transformer design details<table><tr><th>S</th><th>Description</th><th>132 kV Current Transformer</th></tr></table></td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>16</td><td>Incomer Bay<br>Revenue CT Rating (Contractor shall interface with PSA for CT ratio)</td><td>Core 1</td><td>25 / 1A, 5 VA,<br>class 0.2S</td></tr>
<tr><td></td><td></td><td>Core 2</td><td>25 / 1A, 5 VA,<br>Class 0.2S</td></tr>
</table>
</td><td>
<table>
<tr><td>N</td><td></td><td></td><td></td></tr>
<tr><td>16</td><td>Incomer Bay<br>Revenue CT Rating (Contractor shall interface with PSA for CT ratio)</td><td>Core 1</td><td>400/200/1A, 5 VA.<br>class 0.2S</td></tr>
<tr><td></td><td></td><td>Core 2</td><td>400/200/1A, 5 VA.<br>class 0.2S</td></tr>
</table>
</td></tr>
<tr><td>39.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no 12.10.3.1<br>(84/203)</td><td>Table 12.17: 132kV Lightning Arrestor Rating
<table>
<tr><td>S.no.</td><td>Description</td><td>132kV LA Rating</td></tr>
<tr><td>7</td><td>Energy absorption capability</td><td>10 kJ/kV</td></tr>
</table>
</td><td>Table 12.17: 132kV Lightning Arrestor Rating
<table>
<tr><td>S.no.</td><td>Description</td><td>132kV LA Rating</td></tr>
<tr><td>7</td><td>Energy absorption capability</td><td>9.5 kJ/kV</td></tr>
</table>
</td></tr>
<tr><td>40.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.11.3.1<br>(89/203)</td><td>Table 12.20: 33kV Switchgear Rating
<table>
<tr><td>S.no.</td><td>Description</td><td>33kV Vacuum Circuit Breaker</td></tr>
<tr><td>6.</td><td>Rated Normal Current</td><td>1600 A – for RSS Panel<br>1250 A – for ASS, TSS</td></tr>
</table>
</td><td>Table 12.20: 33kV Switchgear Rating
<table>
<tr><td>S.no.</td><td>Description</td><td>33kV Vacuum Circuit Breaker</td></tr>
<tr><td>6.</td><td>Rated Normal Current</td><td>1250 A – for panels of RSS, ASS, TSS and ASS+TSS.</td></tr>
</table>
</td></tr>
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<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para<br>(Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td>41.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no 12.11.3.1<br>(90/203)</td><td>Table 12.20: 33kV Switchgear Rating<table><tr><td>S.no.</td><td>Description</td><td>33kV Vacuum Circuit Breaker</td></tr><tr><td>10.</td><td>Rated Short Circuit withstand capacity</td><td>25kA for 1 Sec</td></tr><tr><td>13.</td><td>Rated operating duty</td><td>O-3min-CO-3min-CO</td></tr></table></td><td>Table 12.20: 33kV Switchgear Rating<table><tr><td>S.no.</td><td>Description</td><td>33kV Vacuum Circuit Breaker</td></tr><tr><td>10.</td><td>Rated Short Circuit withstand capacity</td><td>25kA for 3 Sec</td></tr><tr><td>13.</td><td>Rated operating duty</td><td>O-0.3sec-CO-3min-CO</td></tr></table></td></tr>
<tr><td>42.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.11.4.2.3 (c)<br>(92/203)</td><td>Vacuum Interrupter shall be rated for minimum 100 nos. full short circuit to ascertain the life of Vacuum Interrupter. Bidder should submit the type test reports for Short Circuit Duty with this interrupter.</td><td>Vacuum Circuit Breaker shall be rated for minimum 100 nos. full short circuit to ascertain the life of Vacuum Circuit Breaker. Bidder should submit the type test reports for Short Circuit Duty with this Vacuum Circuit Breaker.</td></tr>
<tr><td>43.</td><td>Volume IV – Technical Specification</td><td>Sub-clause no. 12.11.9.3<br>(100/203)</td><td>SCADA compatibility of all the protection, monitoring and metering equipment shall be ensured by the Contractor. Separate CT metering cores are not proposed</td><td>SCADA compatibility of all the protection, monitoring and metering equipment shall be ensured by the Contractor. For metering purpose, separate core in CT shall be used.</td></tr>
<tr><td>44.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.11.10.3<br>(101 to 107/203)</td><td>Table 12.21: GTP for 33kV Switchgear Rating</td><td>Table 12.21: GTP for 33kV Switchgear Rating</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td></td><td></td><td></td><td>
<table>
<tr><td>S.no.</td><td>Description</td><td>Unit</td><td>Values</td><td>Quoted</td></tr>
<tr><td>B</td><td>CUBICLE (FIXED PART)</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>Cubicle rated current</td><td></td><td></td><td></td></tr>
<tr><td>a.</td><td>Aux. Transformer CB</td><td>A</td><td>400</td><td></td></tr>
<tr><td>b.</td><td>Other CBs</td><td>A</td><td>1600</td><td></td></tr>
<tr><td>13</td><td>Bar set rated continuous current</td><td></td><td></td><td></td></tr>
<tr><td>b.</td><td>Other CBs</td><td>A</td><td>1600</td><td></td></tr>
</table>
</td><td>
<table>
<tr><td>S.no.</td><td>Description</td><td>Unit</td><td>Values</td><td>To be quoted by the contractor at Vendor approval stage</td></tr>
<tr><td>B</td><td>CUBICLE (FIXED PART)</td><td></td><td></td><td></td></tr>
<tr><td>7</td><td>Cubicle rated current</td><td></td><td></td><td></td></tr>
<tr><td>a.</td><td>Aux. Transformer CB</td><td>A</td><td>1250</td><td></td></tr>
<tr><td>b.</td><td>Other CBs</td><td>A</td><td>1250</td><td></td></tr>
<tr><td>13</td><td>Bus bar set rated continuous current</td><td></td><td></td><td></td></tr>
<tr><td>b.</td><td>Other</td><td>A</td><td>1250</td><td></td></tr>
</table>
</td></tr>
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|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 14 | Allowable over current for 1 second | kA rms | 20 | | | CBs | | | |
| | | | | | | | | 14 | Allowable over current for **3 second** | kA rms | **25** | |
| | | | **C** | **CIRCUIT-BREAKER (MOVABLE PART)** | | | | **C** | **CIRCUIT-BREAKER (MOVABLE PART)** | | | |
| | | | 7 | Rated current | A | | | 7 | Rated current | A | | |
| | | | a. | Aux. Transformer CB | A | 400 | | a. | Aux. Transformer CB | A | **1250** | |
| | | | 8 | Allowable over current for 1 second | kA rms | 14 | | 8 | Allowable over current for **3 second** | kA rms | **25** | |
| | | | 10 | Breaking capacity | kA rms | 16 | | 10 | Breaking capacity | kA rms | **25** | |
| | | | 16 | Rated operating cycle | | O-3min- | | 16 | Rated | | O-**0.3** | |

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | | | | | Clause Description (relevant portion) as amended now to be read as | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | CO-3min-CO | | | operating cycle | | **sec-**CO-3min-CO | |
| | | | **D** | **CURRENT TRANSFORMER** | | | | **D** | **CURRENT TRANSFORMER** | | | |
| | | | 13 | Short-circuit current allowable for 1 seconds | kA | 16 | | 13 | Short-circuit current allowable for **3 seconds** | kA | **25** | |
| | | | **I** | **NUMERICAL RELAYS** | | | | **I** | **NUMERICAL RELAYS** | | | |
| | | | 3 | Relevant Standards | | IEC 255 | | 3 | Relevant Standards | | **IEC 60255** | |
| | | | | | | | | | | | | |

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<tr><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>45.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.12.3.1<br>(111/203)</td><td>Table 12.23: Battery & Battery Charger Rating<br><table><tr><th>SN</th><th>Description</th><th>Battery & Battery Charger Rating</th></tr><tr><td>5</td><td>Backup capacity</td><td>8 Hrs</td></tr></table></td><td>Table 12.23: Battery & Battery Charger Rating<br><table><tr><th>SN</th><th>Description</th><th>Battery & Battery Charger Rating</th></tr><tr><td>5</td><td>Backup capacity</td><td>6 Hrs</td></tr></table></td></tr>
<tr><td>46.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.15.3.1<br>(123/203)</td><td>Table 12.26: ACDB Rating<br><table><tr><th>SN</th><th>Description</th><th>ACDB Rating</th></tr><tr><td>2</td><td>CB Rating</td><td>400 A</td></tr><tr><td>3</td><td>Busbar Rating</td><td>400 A</td></tr></table></td><td>Table 12.26: ACDB Rating<br><table><tr><th>SN</th><th>Description</th><th>ACDB Rating</th></tr><tr><td>2</td><td>CB Rating</td><td>630 A</td></tr><tr><td>3</td><td>Busbar Rating</td><td>630 A</td></tr></table></td></tr>
<tr><td>47.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.17.3.3<br>(136/203)</td><td>The main earth mesh will be linked, by means of two 120 sq mm copper equivalent cables</td><td>The main earth mesh will be linked, by means of two GI flats each of 50x6 mm size.</td></tr>
<tr><td>48.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.18.7.3<br>(144/203)</td><td>A minimum grade for PCC and RCC shall be used for all structural/load-bearing members as per latest IS 456</td><td>A minimum grade for PCC and RCC shall be used for all structural/load-bearing members as per Table no.05 of IS 456 (Latest). However, minimum grade for RCC-M25 and for TMT reinforcement steel of Fe-500D grade conforming to IS:1786 (Latest) may also be used.</td></tr>
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<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td>49.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.18.8.7<br>(145/203)</td><td>A separate control wire duct shall be provided for cable connections from the yard equipment to the control room building equipment and within the control room building</td><td>A separate control wire duct shall be provided for cable connections from the yard equipment to the control room building equipment and within the control room building. Alternatively, control wire can be laid in a separate tray / duct through the same trench of power cables and maintaining proper clearances from power cable as per applicable standards.</td></tr>
<tr><td>50.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.19.12.1 (a)<br>(171/203)</td><td>Only one Energy meter is required to be provided, which shall be able to indicate/record/store the total energy of both the incoming feeders, through suitable summation CT and connections). As per the requirements of the power supply Authority for revenue purpose with dedicated CTs and PTs</td><td>Separate energy meter is required to be provided for each incoming bay, which shall be able to indicate/record/store the total energy of each incoming feeder. As per the requirements of the power supply Authority, for revenue purpose dedicated CTs and PTs are also to be provided.</td></tr>
<tr><td>51.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.20.3<br>(177/203)</td><td><u>Table 12.29: LV Cable Rating</u><table><tr><th>SN</th><th>Description</th><th>Elevated & At-grade section</th><th>Underground section</th></tr><tr><td>2</td><td>Conductor</td><td>Bare or tinned copper</td><td>Bare or tinned copper</td></tr></table></td><td><u>Table 12.29: LV Cable Rating</u><table><tr><th>SN</th><th>Description</th><th>Elevated & At-grade section</th><th>Underground section</th></tr><tr><td>2</td><td>Conductor</td><td>tinned copper or Al</td><td>tinned copper</td></tr></table></td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para<br>(Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td>52.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.20.9.7<br>(180/203)</td><td>Systematically, for control and monitoring cables, all the links of a section shall include 15% spare conductors with at least one spare conductor per cable</td><td>Systematically, for control and monitoring cables, all the links of a section shall include 15% spare conductors with at least one spare conductor per cable. Pilot wire relay protection (OFC cables) will be provided for all 33kV cable links between ASS within a station or between two ASSs of adjacent stations for cables laid on viaduct sections, at grade and from RSS to ASS. The specification of OFC cable given as below:
<table>
<tr><th>Parameter</th><th>Range or value</th></tr>
<tr><td>Type of fiber</td><td>Graded-index multimode 62.5/125 m or 50/125 m</td></tr>
<tr><td>Wave length</td><td>820 nm</td></tr>
<tr><td>Optical budget<br>Grade-index multimode 62.5/125m<br>Grade-index multimode 50/125m</td><td><br>13 dB (Typical distance 3 km*)<br>9 dB (Typical distance 2 km*)</td></tr>
<tr><td>Optical connector</td><td>Type ST</td></tr>
</table>
</td></tr>
</table>

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| | | | | <table><tr><td>Protocol</td><td>C37.94</td></tr><tr><td>Data transmission</td><td>Synchronous</td></tr><tr><td>Transmission rate</td><td>64 kbit/s</td></tr><tr><td>Clock source</td><td>Internal or derived from received signal</td></tr><tr><td>No of fibre</td><td>8</td></tr><tr><td>No of tube</td><td>1</td></tr><tr><td>Armoured /Unarmoured</td><td>Armoured</td></tr><tr><td>Single sheath/Double sheath</td><td>Double sheath</td></tr></table> |
| 53. | Volume IV – Technical Specification | Sub Clause no 12.21.1.2 (182/203) | Each incomer Bay (2 Nos.) consisting of;<br>• Voltage Transformer **with motor operated isolation device of rated insulation** | Each incomer Bay (2 Nos.) consisting of;<br>• Voltage Transformer |
| 54. | Volume IV – Technical Specification | Sub Clause no 12.21.1.3 (182/203) | Each Transformer Feeder Bay (4 Nos.) consisting of; | Each Transformer Feeder Bay **(2 Nos.)** consisting of; |

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| 55. | Volume IV – Technical Specification | Sub Clause no 12.21.2.3 (183/203) | Viewing windows shall be provided in **the circuit breaker**, disconnect and grounding switch modules for inspection. The bearings and other such parts shall be permanently lubricated for the entire service life. | Viewing windows shall be provided in disconnect and grounding switch modules for inspection. The bearings and other such parts shall be permanently lubricated for the entire service life |
| 56. | Volume IV – Technical Specification | Sub Clause no 12.21.2.6 (183/203) | Internal insulation level between live parts and earth when the pressure of the gas goes to the atmospheric pressure **should not be less than 1.2*132/1.732kV** | Internal insulation level between live parts and earth when the pressure of the gas goes to the atmospheric pressure shall be **as per IEC 62271-203 (Latest)** |
| 57. | Volume IV – Technical Specification | Sub Clause no 12.21.2.8 (183/203) | GIS should be of modular design, and it should be possible to add feeder bays **for two additional** transformers, **if required the layout of GIS equipment and transformers should show space earmarked for the future provision** | GIS should be of modular design, **and should have provision for bays as indicated in Tender Drawing no. I202-BIG-TRP-00-DWG-RSSSLD1-00016, Rev.01** |
| 58. | Volume IV – Technical Specification | Sub Clause no 12.21.2.9 (183/203) | The termination arrangement of 132 kV system be designed for two such cables, so that additional cables can be terminated later, if required. The outgoing connections from GIS shall be in gas filled enclosure, designed in such a way that vibration from GIS equipment and transformer are not transmitted to each other. The transformer feeder bays should have termination arrangements suitable | The termination arrangement of 132 kV system be designed for **3 phase single circuit consisting of one cable/phase**. **The outgoing connections from GIS shall be carried out through 132kV cables. 132kV cable terminations at GIS end shall be designed** in such a way that vibration from GIS equipment and transformer are not transmitted to each other. The transformer feeder |

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| | | | for cable cross-section required as per current requirements of transformer. The terminations at transformers shall be of normal outdoor type with suitable cable connection from the GIS | bays should have termination arrangements suitable for cable cross-section required as per current requirements of transformer. The terminations at transformers shall be of normal outdoor type with suitable cable connection from the GIS. **The 132kV cable work from GSS to RSS including from 132 kV GIS at RSS to Power Transformer Bay shall be carried out by Power supply authority (PSA), for which contractor shall interface with PSA. The 132 kV termination kit at incoming section and outgoing section of GIS at RSS shall be provided by the contractor. However, termination kit at GSS end and at Power transformer bay shall be provided by PSA.** |
| 59. | Volume IV – Technical Specification | Sub Clause no 12.21.2.12 (184/203) | The conductors/bus bars shall be of copper and enclosure shall be made of Aluminum Alloy | The Conductors/Busbars shall be made of Copper**/Aluminium alloy and enclosure shall be made of Aluminium alloy, suitable for the specified voltage and current ratings** |
| 60. | Volume IV – Technical Specification | Sub Clause no 12.21.2.15 (184/203) | Loss of gas per annum shall not exceed 1% by weight in each compartment | Loss of gas per annum shall not exceed **0.1%** by weight in each compartment |
| 61. | Volume IV – Technical Specification | Sub Clause no 12.21.2.24 (185/203) | The Local Control Cubicles shall be integrated with the GIS and should house IEC 61850 compliant Bay Control Unit (BCU) which should be SCADA compatible. Free standing LCC with conventional | The Local Control Cubicles shall be integrated with the GIS and should house IEC 61850 compliant Bay Control Unit (BCU) which should be SCADA compatible. Free standing LCC with |

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td></td><td></td><td></td><td>system for monitoring and indication shall not be accepted</td><td>conventional system for monitoring and indication shall also be accepted</td></tr>
<tr><td>62.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.21.3.1<br>(186/203)</td><td>Offered numbers and location of UHF sensors shall be submitted based on above said criteria along with attenuation calculation for review/approval of the Engineer. Further UHF sensors shall necessarily be provided near VT compartments</td><td>Offered numbers and location of UHF sensors shall be submitted based on above said criteria along with attenuation calculation for review/approval of the Engineer. Further UHF sensors shall necessarily be provided near VT compartments alternatively UHF sensor shall be provided as per clause no. 12.21.3.2.</td></tr>
<tr><td>63.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.21.11.1<br>(194/203)</td><td>Electrical and Mechanical interlocks shall be provided for absolute and positive protection against potentially harmful mal operations of the switchgear. Electrical interlocking shall be fail-safe type</td><td>Electrical and Mechanical (as applicable) interlocks shall be provided for absolute and positive protection against potentially harmful mal operations of the switchgear. Electrical interlocking shall be fail-safe type</td></tr>
<tr><td>64.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 12.21.15.3<br>(196/203)</td><td>Normally isolable surge arrestors on the Bus Bar should be used. This will facilitate quick isolation and coupling whenever bus bars are required to be exposed to high voltage test</td><td>Normally outdoor type surge arrestors on the Bus Bar should be used. This will facilitate quick isolation and coupling whenever bus bars are required to be exposed to high voltage test</td></tr>
<tr><td>65.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 13.2.3.1<br>(5/21)</td><td><u>Table 13.2: 33 KV Cable Rating</u><table><tr><th rowspan="2">SN</th><th rowspan="2">Description</th><th colspan="2">33 kV Cable Rating</th></tr><tr><th>Power Tr. To RSS panel</th><th>For Interconnection in ASS TSS</th></tr></table></td><td><u>Table 13.2: 33 KV Cable Rating</u><table><tr><th rowspan="2">SN</th><th rowspan="2">Description</th><th colspan="2">33 kV Cable Rating</th></tr><tr><th>Power Tr. To RSS panel</th><th>For Interconnection in ASS, TSS</th></tr></table></td></tr>
</table>

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | | | | Clause Description (relevant portion) as amended now to be read as | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | Room | | | | Rooms |
| | | | 11 | Short circuit current carrying capacity of conductor | 25 KA for 1 sec | 25 KA for 1 sec | 11 | Short circuit current carrying capacity of conductor | 25 KA for **3 sec** | 25 KA for **3 sec** |
| | | | 12 | Short circuit current carrying capacity of metallic screen | 11 KA for 1 sec | 11 KA for 1 Sec | 12 | Short circuit current carrying capacity of metallic screen | 1 KA for **3 sec** | 1 KA for **3 Sec** |

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td>66.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 14.2.2.3 (7/70)</td><td><u>Table 14.1: 33 KV Switchgear Rating</u><table><tr><th>SN</th><th>Description</th><th>33 KV Vacuum Circuit Breaker</th></tr><tr><td>6</td><td>Rated normal current</td><td>400 A (Tr. CB)<br><br>1600 A - For RSS panel<br><br>1250 A – For ASS, TSS</td></tr><tr><td>10</td><td>Rated short circuit withstand capacity</td><td>25 KA For 1 Sec</td></tr><tr><td>11</td><td>CB Breaking time</td><td>Less than 80 ms</td></tr><tr><td>12</td><td>CB Closing time</td><td>Less than 80 ms</td></tr><tr><td>13</td><td>Rated operating duty</td><td>O-CO-3min-CO</td></tr></table></td><td><u>Table 14.1: 33 KV Switchgear Rating</u><table><tr><th>SN</th><th>Description</th><th>33 KV Vacuum Circuit Breaker</th></tr><tr><td>6</td><td>Rated normal current</td><td>1250 A – For Tr. CB, RSS Panel, ASS Panel, ASS/TSS Panel</td></tr><tr><td>10</td><td>Rated short circuit withstand capacity</td><td>25 KA For 3 Sec</td></tr><tr><td>11</td><td>CB Breaking time</td><td>Less than 60 ms</td></tr><tr><td>12</td><td>CB Closing time</td><td>Less than 65 ms</td></tr><tr><td>13</td><td>Rated operating duty</td><td>O-0.3sec-CO-3min-CO</td></tr></table></td></tr>
<tr><td>67.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 14.2.5.1 (c.) (22/70)</td><td>c. Energy meter (electronic energy meter, accuracy class 0.2s, to enable measurement of kWh and instantaneous maximum demand kVA. Only one energy meter is required to be provided, which shall be able to indicate/record/store the values</td><td>[Deleted]</td></tr>
</table>

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para<br>(Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td></td><td></td><td></td><td>of energy (kWh) and max demand (kVA), delivered in total by transformers, through suitable summation CT and connections)</td><td></td></tr>
<tr><td>68.</td><td>Volume IV – Technical Specification</td><td>Sub Clause no 14.2.6.3<br>(23/70)</td><td><u>Table 14.2: GTP for 33 kV Vacuum CB</u>
<table>
<tr><th rowspan="2">S.no.</th><th rowspan="2">Description</th><th rowspan="2">Unit</th><th colspan="2">Values</th></tr>
<tr><th>Required</th><th>Quoted</th></tr>
<tr><td>9</td><td>Cubicle rated current</td><td></td><td></td><td></td></tr>
<tr><td>a.</td><td>Aux. Transformer CB</td><td>A</td><td>400</td><td></td></tr>
<tr><td>b.</td><td>Other CBs</td><td>A</td><td>1200</td><td></td></tr>
<tr><td>16</td><td>Allowable overcurrent for 1 second</td><td>kA rms</td><td>14</td><td></td></tr>
</table></td><td><u>Table 14.2: GTP for 33 kV Vacuum CB</u>
<table>
<tr><th rowspan="2">S.no.</th><th rowspan="2">Description</th><th rowspan="2">Unit</th><th colspan="2">Values</th></tr>
<tr><th>Required</th><th>To be quoted by the contractor at Vendor approval stage</th></tr>
<tr><td>9</td><td>Cubicle rated current</td><td></td><td></td><td></td></tr>
<tr><td>a.</td><td>Aux. Transformer CB</td><td>A</td><td>1250</td><td></td></tr>
<tr><td>b.</td><td>Other CBs</td><td>A</td><td>1250</td><td></td></tr>
<tr><td>16</td><td>Allowable</td><td>kA rms</td><td>25</td><td></td></tr>
</table></td></tr>
</table>

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| | | | | overcurrent for **3 second** |
| 69. | Vol_ IV_ Technical Specification | Sub-Clause N\no. 15.1.2.1.3 (6/112) | Higher values are allowed for short periods only as below:<br>a. 150 V for a 300 s time window<br>b. 170V for 1s | Higher values are allowed for short periods only as below:<br>a. 150 V for a 300 s time window<br>b. **160V for 1s** |
| 70. | Vol_ IV_ Technical Specification | Sub-Clause no. 15.3.5.1.6 (18/112) | Front door shall also be able to close and have provision for interlocking and pad locking at all switchgear track position. | Front door shall also be able to close and have provision for interlocking and pad locking at all switchgear track position.<br>**or**<br>**Covers and doors shall be as per EN 50123-6 and meeting the specified IP protection level including provision for interlocking and pad locking at all switchgear track position.** |

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para<br>(Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td>71.</td><td>Vol_ IV_ Technical Specification</td><td>Sub Clause no. 15.12.3.1<br>(95/112)</td><td><u>Table 15.22: Inverter Rating</u><table><tr><th>SN</th><th>Description</th><th>Specification</th></tr><tr><td>11</td><td>Rated insulated voltage</td><td>2300 V</td></tr><tr><td>23</td><td>Maximum dimensions</td><td>3.2 meters width (including autotransformer cubicle), 1.2 meters depth, 2.2 meters height</td></tr></table></td><td><u>Table 15.22: Inverter Rating</u><table><tr><th>SN</th><th>Description</th><th>Specification</th></tr><tr><td>11</td><td>Rated insulated voltage</td><td>1200 V</td></tr><tr><td>23</td><td>Maximum dimensions</td><td>Contractor shall propose to meet the requirements for review of Engineer and approval. The decision of the Engineer shall be final and binding.</td></tr></table></td></tr>
<tr><td>72.</td><td>Vol_ IV_ Technical Specification</td><td>Sub Clause 16.2.4.2.3<br>(9/44)</td><td>The process used for the composition of conductor rail shall preferably have no gaps between the head of the aluminium section and the stainless-steel wearing strip. There shall be no evidence of ‘hollow ring. The interface resistance between steel and aluminum shall not exceed 10 µΩ</td><td>The process used for the composition of conductor rail shall preferably have no gaps between the head of the aluminium section and the stainless-steel wearing strip. There shall be no evidence of ‘hollow ring. The interface resistance between steel and aluminum shall not exceed 30 µΩ. The contractor shall submit supporting document and calculation for associated heat dissipation to meet all technical requirements and satisfactory performance during entire design life as given in Vol. IV (Technical specification)</td></tr>
</table>

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| 73. | Vol_ IV_ Technical Specification | Sub Clause no. 16.2.4.5.6 (a) (13/44) | a. Typically, 5.0 m for high-speed ramp (over 90 kmph) used on the main lime (slope 1/50) | a. Typically, 5.0 m for high-speed ramp (**up to** 90 kmph) used on the main lime (slope 1/50) |
| 74. | Vol_ IV_ Technical Specification | Sub Clause no. 16.2.4.5.8 (13/44) | The ramp throat shall be 130 mm above surface of conductor rail at the end of the ramp | The ramp throat shall be **typically** 130 mm above surface of conductor rail at the end of the ramp |
| 75. | Vol_ IV_ Technical Specification | Sub Clause no. 16.2.4.6.4 (14/44) | The anchor must be strong enough to withstand all the likely forces from normal expansion and contraction of the rails in service. In the event of overload, for instance from a seized expansion joint or insulator, the anchor shall be designed to move and ease the load in the rail | **[Deleted]** |
| 76. | Vol_ IV_ Technical Specification | Sub Clause no. 16.2.4.7.5 (15/44) | They shall be suitable for the termination of up to three 300 $mm^2$ copper cables | They shall be suitable for the termination of up to **five 400 $mm^2$** copper cables |
| 77. | Vol_ IV_ Technical Specification | Sub Clause no. 16.2.4.8.20 (17/44) | The insulators shall withstand 15 kV industrial frequency voltage in dry conditions for one minute. | The insulator shall withstand **15kV and 10kV industrial frequency voltage in dry and wet conditions for one minute respectively.** |
| 78. | Vol_ IV_ Technical | Sub Clause no. 16.2.4.8.19 | The insulator shall be manufactured with a high creepage distance (not less than140 mm). | The insulator shall be manufactured with a high creepage distance (not less **than130 mm**). |

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td></td><td>Specification</td><td>(17/44)</td><td></td><td></td></tr>
<tr><td>79.</td><td>Vol_ IV_ Technical Specification</td><td>Sub Clause no. 16.3.1.4.5.1<br>(25/44)</td><td>The contact resistance at the aluminum and stainless-steel joint shall not exceed 10 μΩ over the series of measuring points, at a minimum 5 per 15-meter length</td><td>The contact resistance at the aluminum and stainless-steel joint shall not exceed 30 μΩ over the series of measuring points, at a minimum 5 per 15-meter length</td></tr>
<tr><td>80.</td><td>Vol_ IV_ Technical Specification</td><td>Sub Clause no. 16.3.1.4.8.1<br>(25/44)</td><td>A standard length of the conductor rail shall be mounted on the support insulator assemblies and alongside the normal running rails. A short circuit test shall be performed by passing an (alternating) current of 120 kA down the conduct or rail and back along the adjacent running rail, the current pulse lasting for 0.15 seconds.</td><td>A standard length of the conductor rail shall be mounted on the support insulator assemblies and alongside the normal running rails. A short circuit test shall be performed by passing an (alternating) current of 100 kA down the conductor rail and back along the adjacent running rail, the current pulse lasting for 0.15 seconds.</td></tr>
<tr><td>81.</td><td>Vol_ IV_ Technical Specification</td><td>Sub Clause no. 16.3.1.5.3.1<br>(26/44)</td><td>One rail per 100 rails shall be subject to an ultrasonic examination to ensure the absence of any voids in the aluminum to steel interface. The Engineer may require more frequent testing if voids are found in the test rails</td><td>One rail per 100 rails shall be subject to an ultrasonic examination or any other applicable test as per Industry practice to ensure the absence of any voids in the aluminum to steel interface. The Engineer may require more frequent testing if voids are found in the test rails.</td></tr>
<tr><td>82.</td><td>Vol_ IV_ Technical Specification</td><td>Sub Clause no. 18.7.1.5<br>(12/213)</td><td>
<table>
<tr><th>Sr. No.</th><th>Name of Station</th><th>Station Type</th><th>Category</th><th>No. of RTU</th></tr>
<tr><td>7</td><td>Bada Ganpati</td><td>UG</td><td>ASS Cum</td><td>3</td></tr>
</table>
</td><td>
<table>
<tr><th>Sr. No.</th><th>Name of Station</th><th>Station Type</th><th>Category</th><th>No. of RTU</th></tr>
<tr><td>7</td><td>Bada Ganpati</td><td>UG</td><td>ASS Cum TSS</td><td>2</td></tr>
<tr><td>10</td><td>Airport</td><td>UG</td><td>ASS</td><td>2</td></tr>
</table>
</td></tr>
</table>

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| | | | <table><tr><td></td><td></td><td></td><td>TSS</td><td></td></tr><tr><td>10</td><td>Airport</td><td>UG</td><td>ASS Cum TSS</td><td>3</td></tr></table> | <table><tr><td></td><td></td><td></td><td>Cum TSS</td><td></td></tr></table> |
| 83. | Vol_ IV_ Technical Specification | Sub Clause no. 18.8.5.15 (19/213) | Web Server, **Maintenance Planning Server** and Energy Management Server shall be provided behind the Demilitarized Zone (DMZ) network | Web Server and Energy Management Server shall be provided behind the Demilitarized Zone (DMZ) network |
| 84. | Vol_ IV_ Technical Specification | Sub Clause no. 18.17.1.2 (f.) (59/213) | (f.) Each RSS RTU/gateway shall have necessary redundant communication port for transmit RSS data (analogue data, metering data and CBs Operating Status only) to MPPTCL SLDC through wireless communication over Web network with Firewall protection for the purpose of remote viewing only. Any modem or wireless communication device and Firewall for external interface shall be supplied by Traction Power Supply Contractor | (f.) **Deleted** |
| 85. | Vol_ IV_ Technical Specification | Sub Clause no. 18.17.2.3 (b.) (61/213) | (b.) IEC 60870-5-103 Protocol for communication with Relays | **(b.) Deleted** |
| 86. | Vol_ IV_ Technical Specification | Sub Clause no. 18.27.1.3 (95/213) | Supply of Local SCADA hardware & software shall be in the scope of Traction Power Supply Contractor whereas all RSS equipment's, Intelligent electronic devices (IEDs), Bay control units (BCU) and Protection control units (PCU) is in the scope of RSS | Supply of Local SCADA hardware & software shall be in the scope of Traction Power Supply Contractor **including** all RSS equipment's, Intelligent electronic devices (IEDs), Bay control units (BCU) and Protection control units (PCU). |

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td></td><td></td><td></td><td>contractor. Kindly refer Interface chapter of Tender specifications for detailed interface requirements of RSS SCADA and Traction Power Supply Contractors</td><td>Kindly refer Interface chapter of Tender specifications for detailed interface requirements of RSS SCADA.</td></tr>
<tr><td>87.</td><td>Vol_ IV_ Technical Specification</td><td>Sub Clause no. 18.27.17.2<br>(106/213)</td><td>The SCADA system shall be compliant with Cyber Security industry Standards such as NERC, CIP, CERT-In, IEC 62443. Bidders shall provide detailed description of Cyber Security features supported by their offered system and what has been considered for delivery based on the specification</td><td>The SCADA system shall be compliant with Cyber Security industry Standards such as NERC, CIP, CERT-In, CEA regulation 2021 (Latest), IEC 62443 (Part-III &IV). Bidders shall provide detailed description of Cyber Security features supported by their offered system and what has been considered for delivery based on the specification</td></tr>
<tr><td>88.</td><td>Vol_ V_ Technical Specification</td><td>Sub Clause no. 1.2.3<br>(4/47)</td><td>Type test certificates shall be submitted for all major equipments and the certificates shall not have been issued beyond five (05) years from the date of supply</td><td>Type test certificates shall be submitted for all major equipments. Validity of Type test certificates shall be as per CEA guidelines. For those equipments not covered in CEA guidelines, type test certificates validity shall be 05 years from the date of supply.</td></tr>
<tr><td>89.</td><td>Vol_ V_ Technical Specification</td><td>Appendix 1 – List of Proven Make of Equipment<br>(46 to 47/47)</td><td>Appendix 1 – List of Proven Make of Equipment<table><tr><td>S.no.</td><td>Equipment’s</td><td>Supplier</td></tr><tr><td>11</td><td>SCADA and accessories</td><td>ABB India ltd, SIEMENS,</td></tr></table></td><td>Appendix 1 – List of Proven Make of Equipment<table><tr><td>S.no.</td><td>Equipment’s</td><td>Supplier</td></tr></table></td></tr>
</table>

| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
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| | | | <table><tr><td></td><td></td><td></td></tr></table><br><br>Note-<br>i. The Contractor can propose alternative manufacturer with documentary credentials. The Engineer will evaluate the credentials.<br>ii. Regarding selection of the equipment manufacturer, the decision of the Engineer would be final and binding on the Contractor | <table><tr><td>11</td><td>SCADA and accessories</td><td>ABB India ltd, SIEMENS, **Schneider Electric India Pvt Limited**</td></tr></table><br>Note-<br>**i. The above list is indicative only.** The Contractor can propose alternative manufacturer with documentary credentials. The Engineer will evaluate the credentials.<br>**ii.** Regarding selection of the equipment manufacturer, the decision of the Engineer would be final and binding on the Contractor.<br>**iii. Please note that this enlistment does not guarantee award of work/scope of items/product of the Manufacturer/OEM.**<br>**iv. The Engineer reserve the right to inspect the work place/ factory/manufacturing unit for assurance of product quality. Manufacturer/OEM shall arrange inspection of the product as and when required by the Engineer.**<br>**v. It may be noted that any changes in product range. Brand name, location of** |

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| | | | | **work/organization structure/ address/ phone/email, etc. shall be intimated to the engineer immediately along with relevant documents for necessary updating of database.**<br>**vi. The Engineer reserve the sole and absolute right to cancel the enlistment without assigning any reason thereof.** |
| 90. | Vol-VI: Tender Drawings | Tender drawing – | TYPICAL 132KV SINGLE LINE DIAGRAM FOR RSS (AIS)<br>Drg. No. I202-BIG- TRP-00- DWG- RSSSLD1-00002/R00. | TYPICAL 132KV SINGLE LINE DIAGRAM FOR RSS (AIS)<br>Drg. No. I202-BIG- TRP-00- DWG- RSSSLD1-00002/**R01** |
| 91. | Vol-VI: Tender Drawings | Tender drawing | TYPICAL SLD for 132 kV RSS AIS TYPE WITH PROTECTION<br>Drg No: I202-BIG-TRP-00-DWG-RSSSLD1-00003/R00 | TYPICAL SLD for 132 kV RSS AIS TYPE WITH PROTECTION<br>Drg No: I202-BIG-TRP-00-DWG-RSSSLD1-00003/**R01** |
| 92. | Vol-VI: Tender | Tender drawing | TYPICAL 132 kV/33kV RSS SWITCHYARD CABLE TRENCH LAYOUT PLAN | TYPICAL 132 kV/33kV RSS SWITCHYARD CABLE TRENCH LAYOUT PLAN |

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|---|---|---|---|---|
| | Drawings | | Drg No: I202-BIG-TRP-00-DWG-RSSSLD1-00006/R00 | Drg No: I202-BIG-TRP-00-DWG-RSSSLD1-00006/**R01** |
| 93. | Vol-VI: Tender Drawings | Tender drawing | TYPICAL RSS BLOCK FOUNDATION PLAN & DETAIL<br><br>Drg No: I202-BIG-TRP-00-DWG-RSSLYT1-00015/R00 | TYPICAL RSS BLOCK FOUNDATION PLAN & DETAIL<br><br>Drg No: I202-BIG-TRP-00-DWG-RSSLYT1-00015/**R01** |
| 94. | Vol-VI: Tender Drawings | Tender drawing | TYPICAL SLD for 132 kV RSS GIS TYPE WITH PROTECTION<br><br>Drg No: I202-BIG-TRP-00-DWG-RSSSLD1-00016/R00 | TYPICAL SLD for 132 kV RSS GIS TYPE WITH PROTECTION<br><br>Drg No: I202-BIG-TRP-00-DWG-RSSSLD1-00016/**R01** |
| 95. | Vol-VI: Tender Drawings | Tender drawing | TYPICAL 132kV/33kV RSS (GIS) SWITCYARD LAYOUT<br><br>Drg No: I202-BIG-TRP-00-DWG-RSSSLD1-00017/R00 (Sheet 1 to 3) | TYPICAL 132kV/33kV RSS (GIS) SWITCYARD LAYOUT<br><br>Drg No: I202-BIG-TRP-00-DWG-RSSSLD1-00017/**R01**(Sheet 1 to 3) |

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| | | | | |
| 96. | Vol-VI: Tender Drawings | Tender drawing – | TYPICAL 33 kV POWER SUPPLY SLD<br><br>Drg. No. I202-BIG- TRP-00- DWG- ATSSLD1-00103/R00.(Sheet 1 to 5) | TYPICAL 33 kV POWER SUPPLY SLD<br>Drg. No. I202-BIG- TRP-00- DWG- ATSSLD1-00103/**R01** (Sheet 1 to 5) |
| 97. | Vol-VI: Tender Drawings | Tender drawing – | TYPICAL SLD FOR TYPE-C AUXILIARY SUBSTATION<br>Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00305/R00. | TYPICAL SLD FOR TYPE-C AUXILIARY SUBSTATION<br>Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00305/**R01.** |
| 98. | Vol-VI: Tender Drawings | Tender drawing – | TYPICAL KEY PROTECTION SLD OF UNDERGROUND ASS TYPE-C<br><br>Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00306/R00. | TYPICAL KEY PROTECTION SLD OF UNDERGROUND ASS TYPE-C<br>Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00306/**R01.** |
| 99. | Vol-VI: Tender Drawings | Tender drawing – | TYPICAL SLD FOR TYPE-F AUXILIARY SUBSTATION | TYPICAL SLD FOR TYPE-**F1** AUXILIARY SUBSTATION<br>Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1- |

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| | | | Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00311/R00. | 00311/**R01**.<br><br>**TYPICAL SLD FOR TYPE-F2 AUXILIARY SUBSTATION**<br>**Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00311A/R00** |
| 100. | Vol-VI: Tender Drawings | Tender drawing – | TYPICAL KEY PROTECTION SLD OF ELEVATED ASS TYPE-F<br><br>Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00312/R00. | TYPICAL KEY PROTECTION SLD OF DEPOT ASS TYPE-**F1**<br><br>Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00312/**R01**.<br><br>**TYPICAL KEY PROTECTION SLD OF OCC ASS TYPE-F2**<br>**Drg. No. I202-BIG- TRP-00- DWG- ASSSLD1-00312A/R00** |
| 101. | Vol-VI: Tender Drawings | Tender drawing – | TYPICAL EQUIPMENT LAYOUT FOR DEPOT ASS<br><br>Drg. No. I202-BIG- TRP-00- DWG- ASSLYT1-00321/R00. | TYPICAL EQUIPMENT LAYOUT FOR DEPOT ASS<br>Drg. No. I202-BIG- TRP-00- DWG- ASSLYT1-00321/**R01.** |

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| 102. | Vol-VI: Tender Drawings | Tender drawing – | TYPICAL EQUIPMENT LAYOUT FOR OCC ASS<br><br>Drg. No. I202-BIG- TRP-00- DWG- ASSLYT1-00322/R00. | TYPICAL EQUIPMENT LAYOUT FOR OCC ASS<br><br>Drg. No. I202-BIG- TRP-00- DWG- ASSLYT1-00322/**R01.** |
| 103. | Vol-VI: Tender Drawings | Tender drawing – | NEW DRAWING ADDED | **TYPICAL ARRANGEMENT OF GATE AND FENCING OF SWITCHYARD**<br>**Drg. No. I202-BIG- TRP-00- DWG- MISINS1-00704/R00**<br>**(Sheet 1 to 2).** |
| 104. | Vol-VI: Tender Drawings | Tender drawing – | NEW DRAWING ADDED | **TENTATIVE DEPOT LAYOUT GANDHINAGAR**<br>**Drg. No. I202-BIG- TRP-00- DWG- MISINS1-00705/R00.** |
| 105. | VOL-VII-Pricing Document | Sub Clause no. 1.4.4<br>(5/113) | For items manufactured offshore (outside India) and quoted in foreign currency (USD, EURO) the price variation will be governed by the formula given below. For “Conductor Rail” [BOQ Bill No. IN-6.1–Item No. A.1], the price adjustment shall be linked to spot rate of aluminium quoted at London Metal | For items manufactured offshore (outside India) and quoted in foreign currency (USD, EURO) the price variation will be governed as per Volume II, PC, Part B: Special Provisions, Sub-Clause No. 13.7.2 for Conductor Rail items only. |

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| | | | Exchange (LME), and shall be as under:<br>**Price Adjustment = 0.75 x Accepted Price x [Current Index – Base Index] x f**<br>**Base Index**<br>Where;<br>**Current Index** is the spot rate cost of aluminium as given on the L.M.E. (London Metal Exchange) 28 (twenty-eight) days prior to the date of notification to Engineer / Employer for inspection of material;<br>**Base Index** is the cost of aluminium as given by the L.M.E. (London Metal Exchange) 28 (twenty-eight) days prior to the latest date of Tender submission;<br>$f = Z_o / Z_1$<br>$Z_o$ is the number of units of the currency of the index which is equivalent to one unit of bid currency as applicable on 28 (twenty-eight) days prior to the latest date of Tender submission; and<br>$Z_1$ is the number of units of the currency of the index which is equivalent to one unit of bid currency as applicable on 28 (twenty-eight) days prior to the date of notification for inspection.<br>**Note:** The exchange rates to be employed for such conversion shall be the TT selling rate of State Bank of India at the close of business of the State Bank of India on the respective date. | |

<table>
<tr><th>Sr. No.</th><th>Tender Document Reference</th><th>Clause/Sub-Clause/Para (Page No)</th><th>Clause Description (relevant portion) as existing in the Tender Documents</th><th>Clause Description (relevant portion) as amended now to be read as</th></tr>
<tr><td>106.</td><td>VOL-VII-Pricing Document</td><td>Sub Clause no. 1.4.8<br><br>(6/113)</td><td>The total admissible price variation amount for this Contract shall be subject to a ceiling of ± 5 % (five percent) of the Contract Price.</td><td>[Deleted]</td></tr>
<tr><td>107.</td><td>VOL-VII-Pricing Document</td><td>Sub clause no. 1.11.7, (d.)<br>(11/113)</td><td>d. Provision of Safe Custody Bank Guarantee</td><td>d. Provision of Safe Custody Bank Guarantee*<br>*The amount of safe custody Bank Guarantee (SCBG) shall be equal to fifty percent (50%) of the amount due as per the relevant clause of Bill of Quantities. The validity of SCBG will be for the period up to commissioning date of the equipments. The value of the Safe Custody Bank Guarantee would be adjusted/transferred after the respective equipments are commissioned.</td></tr>
<tr><td>108.</td><td>VOL-VII-Pricing Document</td><td>Sub-Clause No. 2.3.2,<br>Item No. A.3.1<br>(27/113)</td><td><table><tr><th>Item No.</th><th>BOQ Item Description</th><th>Explanation<br><br>BOQ Bill Nos. IN-2.1,</th></tr><tr><td>A.3.1</td><td>Supply, laying, termination, testing and commissioning of 33 kV Cables and</td><td>o 33 KV interconnecting Cables at Pul Bogda for feeding</td></tr></table></td><td><table><tr><th>Item No.</th><th>BOQ Item Description</th><th>Explanation<br><br>BOQ Bill Nos. IN-2.1,</th></tr></table></td></tr>
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| Sr. No. | Tender Document Reference | Clause/Sub-Clause/Para (Page No) | Clause Description (relevant portion) as existing in the Tender Documents | Clause Description (relevant portion) as amended now to be read as |
|---|---|---|---|---|
| | | | connections. Ring main between ASS and TSS station for elevated/underground: — ASS/TSS of other corridor. | A.3.1 — Supply, laying, termination, testing and commissioning of 33 kV Cables and connections. Ring main between ASS and TSS station for **At-Grade/** elevated/ underground **Sections**: — **33 KV interconnecting Cables for feeding ASS, TSS and ASS cum TSS** |
| 109. | VOL-VII-Pricing Document | Sub-Clause No. 2.4.1, Item No. A.1.1 to A.1.6 (29 to 33/113) | Item No. — BOQ Item Description — Explanation 33kV Switchgear BOQ Bill Nos. IN-3.1<br>A.1.1 — Supply and erection including testing and commissioning of a set of three panel boards — ○ CB withdrawal Trolley two numbers.<br>A.1.2 — Supply and erection including testing and commissioning of a set of four | Item No. — BOQ Item Description — Explanation 33kV Switchgear BOQ Bill Nos. IN-3.1<br>A.1.1 — Supply and erection including testing and commissioning of a set of three panel boards — ○ CB withdrawal Trolley two numbers **for each elevated/ UG/ At-grade Sub-Stations.**<br>A.1.2 — Supply and erection including testing — ○ CB withdrawal Trolley two |

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| | | | | panel boards | | | and commissioning of a set of four panel boards | numbers **for each elevated/ UG/ At-grade Sub-Stations.** |
| | | | A.1.3 | Supply and erection including testing and commissioning of a set of Six panel boards | ○ CB withdrawal Trolley two numbers. | A.1.3 | Supply and erection including testing and commissioning of a set of Six panel boards | ○ CB withdrawal Trolley two numbers **for each elevated/ UG/ At-grade Sub-Stations.** |
| | | | A.1.4 | Supply and erection including testing and commissioning of a set of Nine panel boards | ○ CB withdrawal Trolley two numbers. | A.1.4 | Supply and erection including testing and commissioning of a set of Nine panel boards | ○ CB withdrawal Trolley two numbers **for each elevated/ UG/ At-grade Sub-Stations.** |
| | | | A.1.5 | Supply and erection including testing and commissioning of a set of Eleven panel boards | ○ CB withdrawal Trolley two numbers. | A.1.5 | Supply and erection including testing and | ○ CB withdrawal Trolley two numbers **for each elevated/** |
| | | | A.1.6 | Supply and erection including testing and commissioning of a set of One panel board | ○ CB withdrawal Trolley two numbers. | | | |

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|---|---|---|---|---|
| | | | between Inverter transformer to 33KV Supply | commissioning of a set of Eleven panel boards **UG/ At-grade Sub-Stations.** |
| | | | | A.1.6 Supply and erection including testing and commissioning of a set of One panel board between Inverter transformer to 33KV Supply ○ CB withdrawal Trolley two numbers **for each elevated/ UG/ At-grade Sub-Stations.** |

The other conditions will remain the same.

Further modifications/amendments (if any) regarding aforesaid tender will be uploaded as and when required.

**Managing Director**

**Madhya Pradesh Metro Rail Corporation Limited**

**Bhopal**

GOVERNMENT OF MADHYA PRADESH
URBAN DEVELOPMENT AND HOUSING DEPARTMENT

MADHYA PRADESH METRO RAIL CORP. LTD.
(MPMRCL)

PACKAGE IN-09
VOL - VI
TENDER DRAWINGS

DECEMBER 2021

PROJECT

# ENGINEERING, SUPPLY, ERECTION, TESTING AND COMMISSIONING OF POWER SUPPLY RECEIVING SUB-STATION (RSS), TRACTION SUB-STATION (TSS), AUXILIARY SUB-STATION (ASS), 750V DC 3RD RAIL AND SCADA SYSTEM FOR INDORE METRO RAIL PROJECT.

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS
General Consultants - Bhopal & Indore Metro Rail Project

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# DRAWINGS INDEX

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| 4 | Typical AIS - SLD of 33kV Side Main Switchboard with Protection | I202-BIG-TRP-00-DWG-RSSSLD1-00004 | R0 |
| 5 | Typical Earth mat Design for 132/33kV RSS Switchyard (Incl of earth pit drawings) | I202-BIG-TRP-00-DWG-RSSSLD1-00005 | R0 |
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| 18 | Typical 132/33kV RSS (GIS) Switchyard Layout | I202-BIG-TRP-00-DWG-RSSLYT1-00017 | R0 |
| 19 | Typical 132/33kV RSS (GIS) Switchyard Layout | I202-BIG-TRP-00-DWG-RSSLYT1-00017 | R0 |
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| 55 | Typical SLD for Type E Auxiliary Substation (Not Applicable) | I202-BIG-TRP-00-DWG-ASSSLD1-00309 | R0 |
| | | | |
| 56 | Typical Key Protection SLD of Elevated ASS Type E (Not Applicable) | I202-BIG-TRP-00-DWG-ASSSLD1-00310 | R0 |

| S.No. | Drawings Title | DRAWING NO | REVISION NO. |
|---|---|---|---|
| 58 | Typical SLD for Type FAuxiliary Substation | I202-BIG-TRP-00-DWG-ASSSLD1-00311-A | R1 |
| 59 | Typical Key Protection SLD of Elevated ASS Type F | I202-BIG-TRP-00-DWG-ASSSLD1-00312 | R1 |
| 60 | Typical Key Protection SLD of Elevated ASS Type F | I202-BIG-TRP-00-DWG-ASSSLD1-00312A | R1 |
| 61 | Typical SLD for Type G Auxiliary Substation (Not Applicable) | I202-BIG-TRP-00-DWG-ASSSLD1-00313 | R0 |
| 61 | Typical Key Protection SLD of Interchange Elevated ASS Type G | I202-BIG-TRP-00-DWG-ASSSLD1-00314 | R0 |
| 62 | Typical SLD for Type H Auxiliary Substation (Not Applicable) | I202-BIG-TRP-00-DWG-ASSSLD1-00315 | R0 |
| 63 | Typical Key Protection SLD of Elevated ASS Type H (Not Applicable) | I202-BIG-TRP-00-DWG-ASSSLD1-00316 | R0 |
| 64 | Typical SLD for Type I Auxiliary Substation | I202-BIG-TRP-00-DWG-ASSSLD1-00317 | R0 |
| 65 | Typical Key Protection SLD of Elevated ASS Type I | I202-BIG-TRP-00-DWG-ASSSLD1-00318 | R0 |
| 66 | Typical SLD for Type J Auxiliary Substation | I202-BIG-TRP-00-DWG-ASSSLD1-00319 | R0 |
| 67 | Typical Key Protection SLD of Underground ASS Type J | I202-BIG-TRP-00-DWG-ASSSLD1-00320 | R0 |
| 68 | Typical Equipment layout for Depot ASS | I202-BIG-TRP-00-DWG-ASSLYT1-00321 | R1 |
| 69 | Typical Equipment layout for OCC ASS | I202-BIG-TRP-00-DWG-ASSLYT1-00322 | R1 |
| 70 | Typical Earthing layout for Depot ASS | I202-BIG-TRP-00-DWG-ASSLYT1-00323 | R0 |
| 71 | Typical Cable Trench layout for Depot ASS (Sheet 01 of 03) | I202-BIG-TRP-00-DWG-ASSLYT1-00324 | R0 |
| 72 | Typical Cable Trench layout for Depot ASS (Sheet 02 of 03) | I202-BIG-TRP-00-DWG-ASSLYT1-00324 | R0 |
| 73 | Typical Cable Trench layout for Depot ASS (Sheet 03 of 03) | I202-BIG-TRP-00-DWG-ASSLYT1-00324 | R0 |
| 74 | Typical Scheme in ACDB DCDB-Type - 1 | I202-BIG-TRP-00-DWG-AUXSCH1-00325 | R0 |
| 75 | Typical Scheme in ACDB DCDB-Type - 2 | I202-BIG-TRP-00-DWG-AUXSCH1-00326 | R0 |
| 76 | Typical Scheme in ACDB DCDB-Type - 3 | I202-BIG-TRP-00-DWG-AUXSCH1-00327 | R0 |
| 77 | Typical Scheme in ACDB DCDB-Type - 4 | I202-BIG-TRP-00-DWG-AUXSCH1-00328 | R0 |
| 78 | Typical Scheme in ACDB DCDB-Type - 5 | I202-BIG-TRP-00-DWG-AUXSCH1-00329 | R0 |
| **Third Rail System** | | | |
| 79 | Typical Third Rail Bracket Design | I202-BIG-TRP-00-DWG-THRLYT1-00401 | R0 |
| 80 | Typical Third Rail Installation Arrangement on Viaduct | I202-BIG-TRP-00-DWG-THRLYT1-00402 | R0 |
| 81 | Typical Third Rail Installation Arrangement on Viaduct - Crossover Locations | I202-BIG-TRP-00-DWG-THRLYT1-00403 | R0 |
| 82 | Typical Third Rail Installation Arrangement in Ballasted Tracks (Depot) | I202-BIG-TRP-00-DWG-THRLYT1-00404 | R0 |
| 83 | Typical Third Rail Installation Arrangement in Tunnels | I202-BIG-TRP-00-DWG-THRLYT1-00405 | R0 |
| 84 | Typical Third Rail Installation Arrangement in Underground Stations | I202-BIG-TRP-00-DWG-THRLYT1-00406 | R0 |
| 85 | Typical Disconnector Switch Locations at Viaducts | I202-BIG-TRP-00-DWG-THRLYT1-00407 | R0 |
| 86 | Typical Traction and Return Power Cable Connection Arrangement | I202-BIG-TRP-00-DWG-THRLYT1-00408 | R0 |
| 87 | Typical DC Feeder Power Cable Arrangement | I202-BIG-TRP-00-DWG-THRLYT1-00409 | R0 |
| 88 | Typical DC Return Power Cable Arrangement | I202-BIG-TRP-00-DWG-THRLYT1-00410 | R0 |
| 89 | Third Rail Feeding Schematic for Yellow line | I202-BIG-TRP-00-DWG-THRINS1-00411 | R0 |
| 90 | Third Rail Feeding Schematic for Gandhi Nagar Depot (SHEET 1 OF 2) | I202-BIG-TRP-00-DWG-THRINS1-00412 | R0 |
| 91 | Third Rail Feeding Schematic for Gandhi Nagar Depot (SHEET 2 OF 2) | I202-BIG-TRP-00-DWG-THRINS1-00412 | R0 |
| 92 | Typical Stinger arrangement at Inspection Bay (Sheet 01 of 02) | I202-BIG-TRP-00-DWG-THRINS1-00413 | R0 |
| 93 | Typical Stinger arrangement at Inspection Bay (Sheet 02 of 02) | I202-BIG-TRP-00-DWG-THRINS1-00413 | R0 |
| 94 | Typical ETS arrangement for ASS, ASS+TSS | I202-BIG-TRP-00-DWG-THRINS1-00414 | R0 |
| **Earthing Bonding & Stray Current Management** | | | |
| 94 | Typical Schematic of Structure Earthing for Elevated Station(Sheet 01 of 02) | I202-BIG-TRP-00-DWG-EBSSCH1-00501 | R0 |
| 95 | Typical Schematic of Structure Earthing for Elevated Station(Sheet 02 of 02) | I202-BIG-TRP-00-DWG-EBSSCH1-00501 | R0 |
| 96 | Typical Earthing, Bonding and Stray Current Protection Scheme for Viaduct | I202-BIG-TRP-00-DWG-EBSSCH1-00502 | R0 |
| 97 | Typical Earthing Arrangement for Standard Pier and End Segment (Sheet 01 | I202-BIG-TRP-00-DWG-EBSSCH1-00503 | R0 |
| 98 | Typical Earthing Arrangement for Standard Pier and End Segment (Sheet 02 | I202-BIG-TRP-00-DWG-EBSSCH1-00503 | R0 |
| 99 | Typical Earthing Arrangement for Standard Pier and End Segment (Sheet 03 | I202-BIG-TRP-00-DWG-EBSSCH1-00503 | R0 |
| 100 | Typical Integrated Earthing Scheme | I202-BIG-TRP-00-DWG-EBSSCH1-00504 | R0 |
| 101 | Typical Depots ASS & TSS Earthing Arrangement | I202-BIG-TRP-00-DWG-EBSSCH1-00505 | R0 |
| **SCADA SYSTEM** | | | |
| 102 | Power Supply Distribution for SCADA at OCC/BCC | I202-BIG-TRP-00-DWG-SCDSLD1-00601 | R0 |
| 103 | General RTU Schematic | I202-BIG-TRP-00-DWG-SCDSCH1-00602 | R0 |
| 104 | General Arrangement of Emergency Trip System – ETS | I202-BIG-TRP-00-DWG-SCDSCH1-00603 | R0 |
| 105 | Typical Configuration for SCADA System at RSS | I202-BIG-TRP-00-DWG-SCDLYT1-00604 | R0 |
| 106 | Typical SCADA Control Centre -Architecture (OCC/BCC) | I202-BIG-TRP-00-DWG-SCDLYT1-00605 | R0 |
| **MISCALLENEOUS** | | | |
| 107 | Ventilation Requirement Layout for Typical ASS, ASS+TSS | I202-BIG-TRP-00-DWG-MISINS1-00701 | R0 |
| 108 | Typical Earthing arrangement at ASS/TSS | I202-BIG-TRP-00-DWG-MISINS1-00702 | R0 |
| 109 | Typical arrangement for Viaduct Lighting | I202-BIG-TRP-00-DWG-MISINS1-00703 | R0 |
| 110 | Typical arrangement of Gate & Fencing of switchyard (Sheet 1 of 2) | I202-BIG-TRP-00-DWG-MISINS1-00704 | R0 |
| 111 | Typical arrangement of Gate & Fencing of switchyard (Sheet 2 of 2) | I202-BIG-TRP-00-DWG-MISINS1-00704 | R0 |
| 112 | Depot layout-Gandinagar | I202-BIG-TRP-00-DWG-MISINS1-00705 | R0 |

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REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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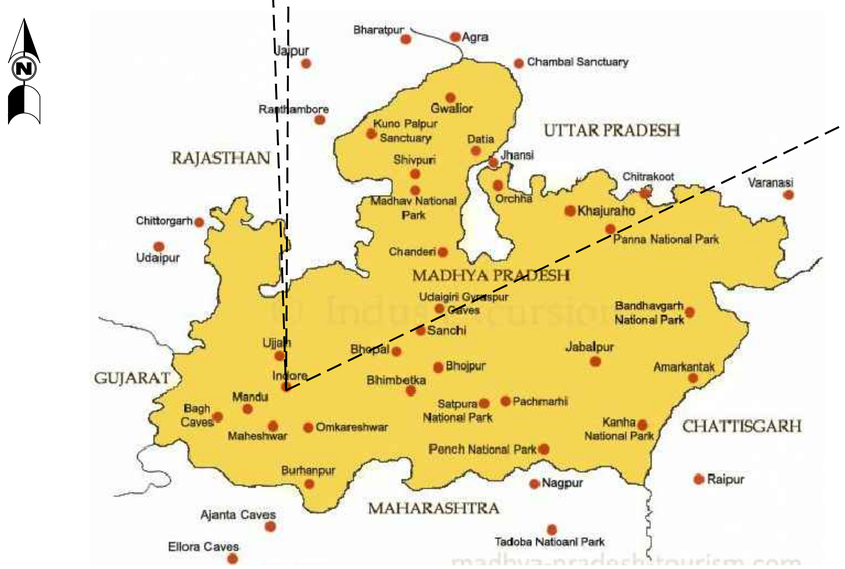
GENERAL CONSULTANT

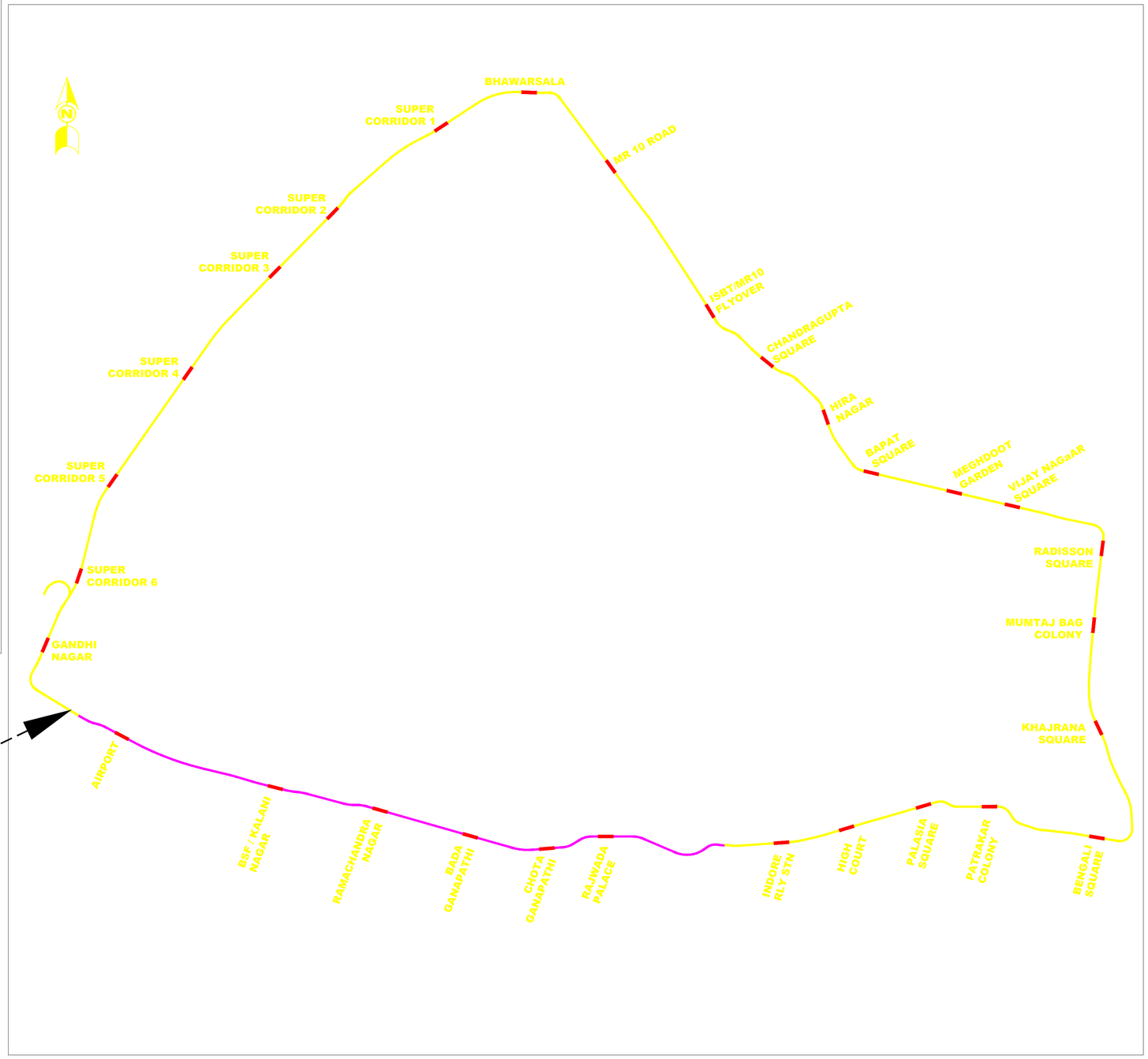
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: DRAWINGS INDEX
DRAWING NUMBER:
REV: R1
SCALE: NTS
DATE: December 2021
STATUS: TENDER DRAWING

# PROJECT LOCATION PLAN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|---|---|---|---|---|---|---|
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| | | | | | | |
| 0 | Oct. 2021 | First Submission | DSR | RS | SB | SF |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

**LEGEND:**

**ELEVATED SECTION**
**UG SECTION**

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | PROJECT LOCATION PLAN<br>INDORE METRO RAIL YELLOW LINE |
| DRAWING NUMBER | I02-BIG-PLP-00-DWG-LIN02-00002 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

A1

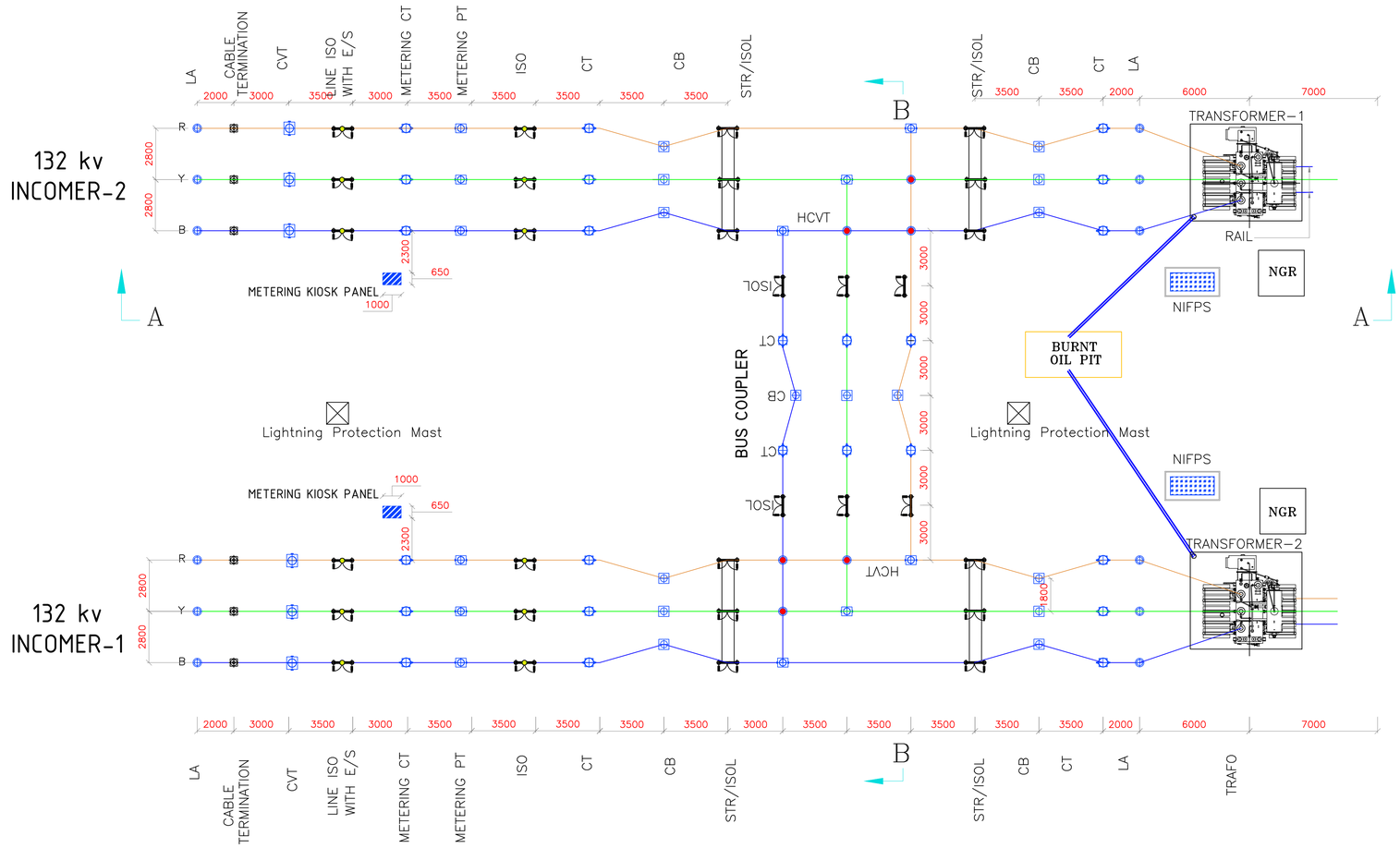
# RSS DESIGN

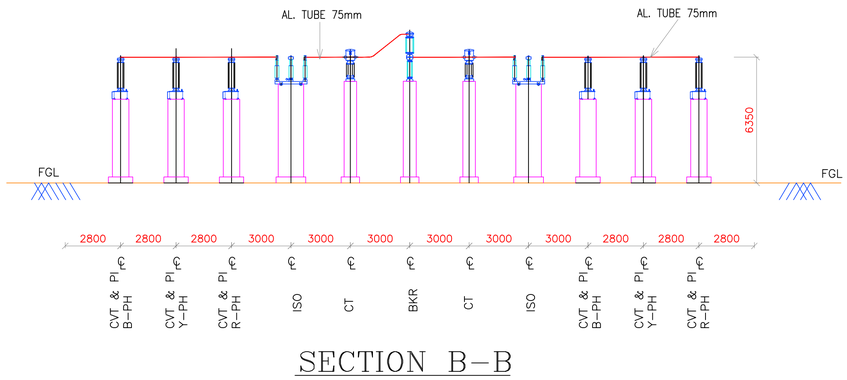
NOTE :

1. As per AC simulation results (report no. ARDANUY–RITES/DDC–PST/IN/ACT/30, R–02, DATED 13–09–2021.),
   (a) Ratings of Power Transformer for all three RSS at Indore is 2x 30/40 MVA
   (b) Size of 33kV Cable from Power Transformer to 33kV I/C Panel 2Rx1Cx240 Sqmm. Cu. Cable.
2. As per usual practice followed in other metros, 02 nos. metering kiosk Panel indicated(01 for each incoming bay)

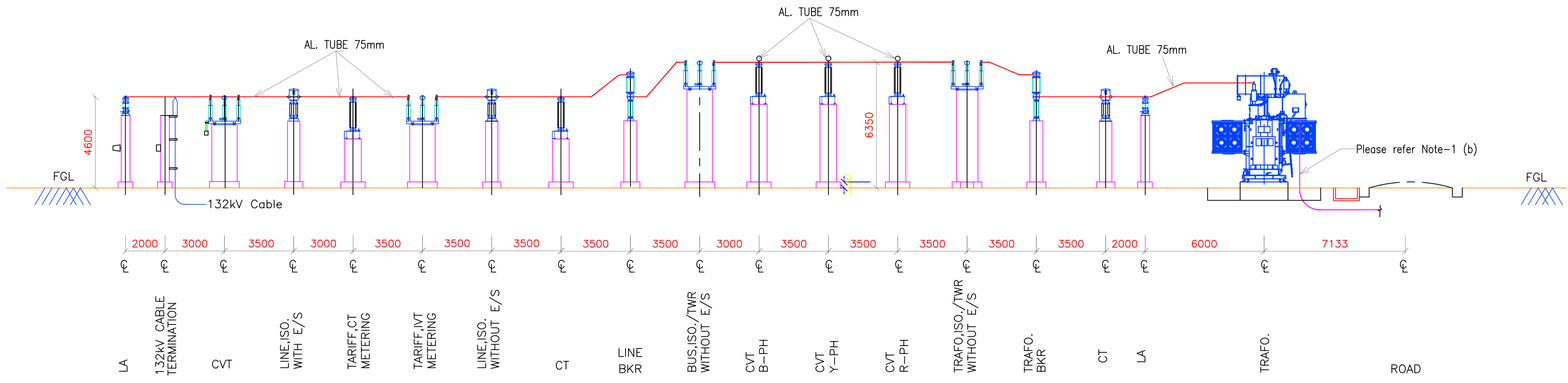
LEGEND:–

| | | |
|---|---|---|
| | LA | LIGHTNING ARRESTER |
| | | CABLE TERMINATION SUPPORT |
| | ISO | ISOLATOR WITH E/S |
| | CT | CURRENT TRANSFORMER |
| | CVT | CAPACITOR VOLT.TRAFO. |
| | CB | SF6 CB |
| | ISO | ISOLATOR WITHOUT E/S |
| | TWR | TOWER |
| | PI | POST INSULATOR |
| | CT | TARIFF METERING SF6 CT |
| | IVT | TARIFF METERING IVT |
| | NGR | NEUTRAL GROUNDING RESISTER |
| | METERING | METERING KIOSK PANEL |
| | | Lightning Protection Mast |
| | | POWER TRANSFORMER |
| | | NIFPS (Nitrogen Injection fire protection system) |




SECTION B–B




SECTION A–A

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
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**TENDER DRAWING**
NOT TO BE USED FOR CONSTRUCTION

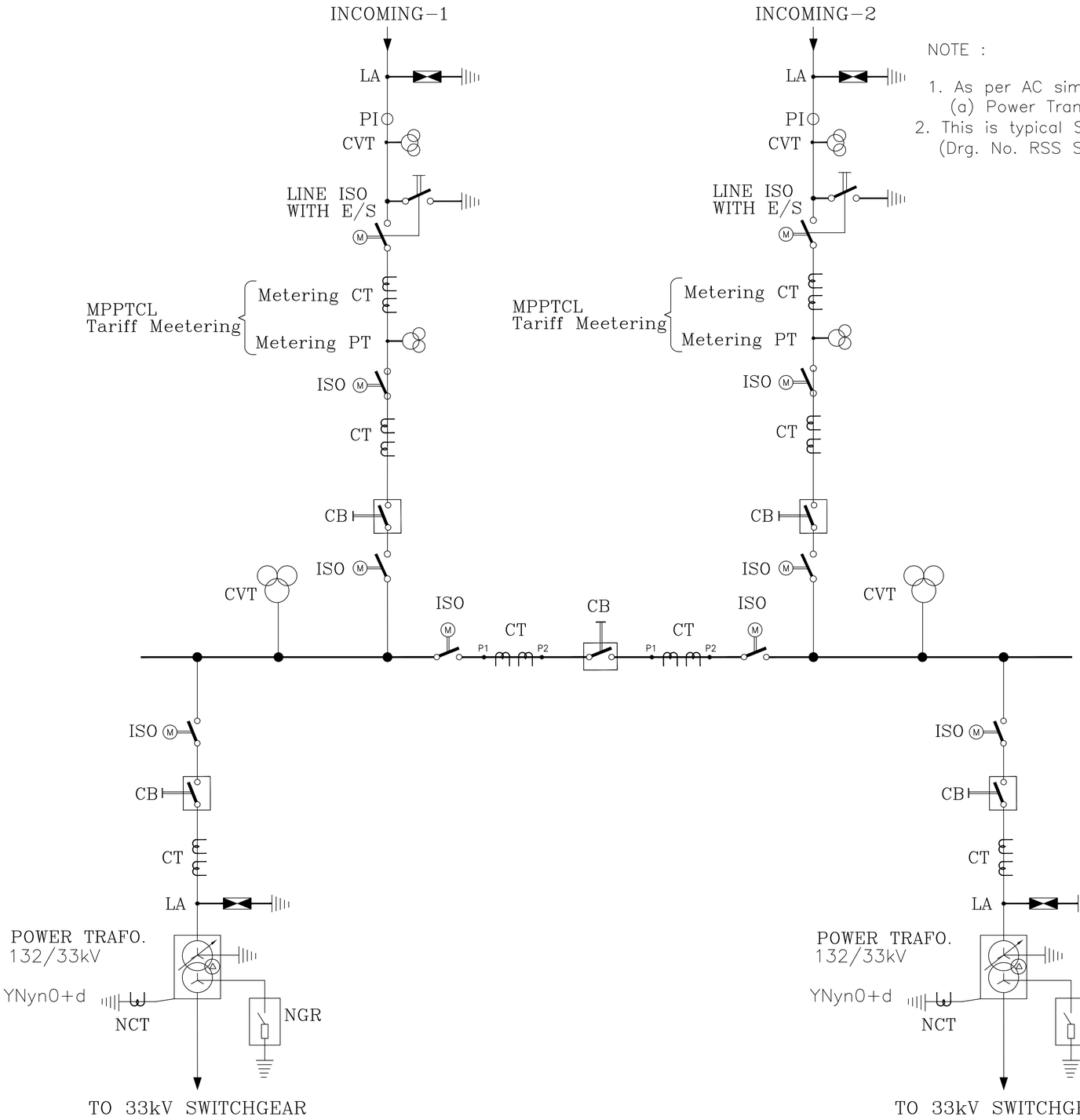
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL 132/33KV RSS □AIS □SWITCHYARD LAYOUT

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSLYT1-00001 REV: 0

SCALE: NTS DATE: October 2021 STATUS: TENDER DRAWING




NOTE :

1. As per AC simulation results of ,Ratings of Power Transformer are as follows:
   (a) Power Transformer Rating for all three RSS at Indore–2x 30/40 MVA
2. This is typical SLD . For CT/PT,LA etc. detail kindly refer protection drawing for 132kV RSS (Drg. No. RSS SLD–00003)

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
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| 1 | Dec.2021 | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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GENERAL CONSULTANT

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL 132KV SINGLE LINE DIAGRAM FOR RSS (AIS)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSSLD1-00002 | REV: R1

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 |  | LIS - LINE MOTORIZED ISOLATOR WITH EARTH SWITCH |
| 2 |  | LS - LINE MOTORIZED ISOLATOR |
| 3 |  | ES - EARTH SWITCH (MANUALLY) |
| 4 |  | LA - LIGHTNING ARRESTOR |
| 5 |  | CB - CIRCUIT BREAKER |
| 6 |  | CT - CURRENT TRANSFORMER |
| 7 |  | VT - VOLTAGE TRANSFORMER |
| 8 |  | CVT - CAPACITIVE VOLTAGE TRANSFORMER |
| 9 |  | CCB - COUPLER CIRCUIT BREAKER |
| 10 |  | ROTR- POWER TRANSFORMER |
| 11 |  | NGR - NEUTRAL GROUND RESISTER |
| 12 |  | 132kV CIRCUIT 1 & 2<br>33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 21 | DISTANCE PROTECTION |
| 25 | INTERLOCKING RELAY |
| 27 | UNDER VOLTAGE RELAY |
| 30 | ANNUNCIATION RELAY |
| 46 | PHASE UNBALANCED RELAY |
| F26 | OVER TEMPERATURE RELAY |
| F49 | THERMAL TEMPERATURE RELAY |
| 49WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 49OT | OIL TEMPERATURE HIGH ALARM & TRIP |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS OVER CURRENT- GROUND |
| 50Z | LOCAL BREAKER BACKUP PROTECTION RELAY |
| 51 | TIME DELAY CURRENT RELAY (IDMT) |
| 51N | TIME OVER CURRENT GROUND (IDMT) |
| 59 | OVER VOLTAGE RELAY |
| 64RH | HV RESTRICTED EARTH FAULT PROTECTION RELAY |
| 64RL | LV RESTRICTED EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| 67<br>67N | DIRECTIONAL OC/EF PROTECTION RELAY |
| 80<br>F80 | DC SUPPLY SUPERVISION RELAY<br>BUCHHOLZ RELAY, ALARM & TRIP |
| 86 | MASTER TRIP RELAY |
| 87L | LINE DIFFERENTIAL PROTECTION RELAY |
| 87B | BUS DIFFERENTIAL PROTECTION RELAY |
| 87T | TRANSFORMER DIFFERENTIAL PROTECTION RELAY |
| 87C | CABLE DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION RELAY |
| TVM | TRI VECTOR METER |
| VS | VOLTMETER SELECTOR SWITCH |
| VT | VOLTAGE TRANSFORMER |
| V | VOLTMETER |
| AS | CURRENT SELECTOR SWITCH |
| A | AMMETER |

**SCHEME OF NOMENCLATURE FOR EQUIPMENT NUMBERING :- XYZA***

| X | | Y | | ZA | | * |
|---|---|---|---|---|---|---|
| 132kV SYSTEM | R | INCOMING FEEDER | I | TRANSFORMER | TR | NUMERICAL FOR NUMBERING |
| 33kV SYSTEM | M | COUPLER | C | VOLTAGE TRANSFORMER | VT | |
| PRIMARY | P | OUTGOING FEEDER | O | CURRENT TRANSFORMER | CT | |
| SECONDARY | S | NEUTRAL | N | CIRCUIT BREAKER | CB | |
| | | EARTHING | E | EARTH SWITCH (MANUALLY) | ES | |
| | | | | TRIVECTOR METER | TVM | |
| | | | | LIGHTING ARRESTOR | LA | |
| | | | | ISOLATOR SWITCH | IS | |
| | | | | LINE MOTORIZED ISOLATOR | LS | |
| | | | | LINE MOTORIZED ISOLATOR WITH EARTH SWITCH | LIS | |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | AS PER PRE BID QUERIES | BS | AS | SP | SPS |
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

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GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL SLD FOR 132 KV RSS - AIS TYPE WITH PROTECTION (SHEET 1 OF 2)

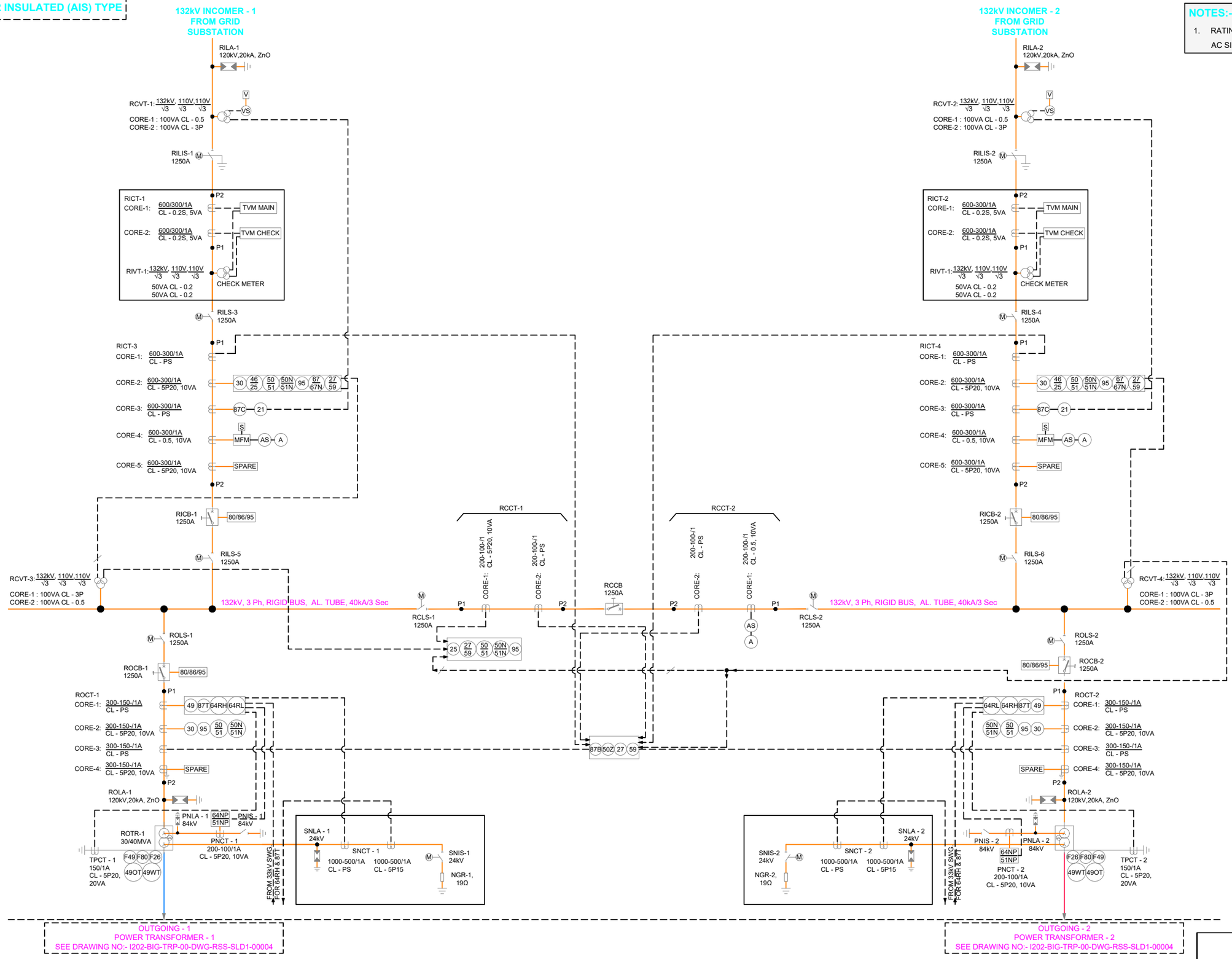
DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSSLD1-00003 | REV: 1

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING

## 132kV AIR INSULATED (AIS) TYPE

**NOTES:-**

1. RATINGS OF ALL EQUIPMENTS ARE INDICATIVE AND AFTER APPROVAL OF AC SIMULATION, THIS WILL BE UPDATED.

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| 1 | Dec.2021 | AS PER PRE BID QUERIES | BS | AS | SP | SPS |
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

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MPMETRO

**TENDER DRAWING**
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|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL SLD FOR 132 KV RSS - AIS TYPE WITH PROTECTION (SHEET 2 OF 2) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-RSSSLD1-00003 |
| REV | 1 |
| SCALE | NTS |
| DATE | December 2021 |
| STATUS | TENDER DRAWING |

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 |  | ES - EARTH SWITCH (MANUALLY) |
| 2 |  | CB - CIRCUIT BREAKER |
| 3 |  | CT - CURRENT TRANSFORMER |
| 4 |  | PT - TWO CORE POTENTIAL TRANSFORMER |
| 5 |  | CCB - COUPLER CIRCUIT BREAKER |
| 6 |  | AT - AUXILIARY TRANSFORMER |
| 7 |  | MCB - MINIATURE CIRCUIT BREAKER |
| 8 |  | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| SCHEME OF NOMENCLATURE FOR EQUIPMENT NUMBERING :- XYZA* | | | | | | |
|---|---|---|---|---|---|---|
| X | | Y | | ZA | | * |
| 33kV SYSTEM | M | INCOMING FEEDER | I | TRANSFORMER | TR | NUMERICAL FOR NUMBERING |
| PRIMARY | P | COUPLER | C | VOLTAGE TRANSFORMER | VT | |
| SECONDARY | S | OUTGOING FEEDER | O | CURRENT TRANSFORMER | CT | |
| | | NEUTRAL | N | CIRCUIT BREAKER | CB | |
| | | EARTHING | E | EARTH SWITCH (MANUALLY) | ES | |
| | | | | TRIVECTOR METER | TVM | |
| | | | | ISOLATOR SWITCH | IS | |

| CODE | DESCRIPTION |
|---|---|
| 25 | INTERLOCKING RELAY |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 46 | TEMPERATURE MONITERING |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS OVER CURRENT- GROUND |
| 51 | TIME DELAY CURRENT RELAY (IDMT) |
| 51N | TIME OVER CURRENT GROUND (IDMT) |
| 51NS | STAND BY EARTH FAULT PROTECTION RELAY |
| 59 | OVER VOLTAGE RELAY |
| 64R | RESTRICTED EARTH FAULT PROTECTION RELAY |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |
| 86 | MASTER TRIP RELAY |
| 87C | LINE DIFFERENTIAL PROTECTION RELAY |
| 87T | TRANSFORMER DIFFERENTIAL PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| TVR | VOLTAGE TRANSDUCER |
| TVM | TRI VECTOR METER |
| VS | VOLTMETER SELECTOR SWITCH |
| VT | VOLTAGE TRANSFORMER |
| V | VOLTMETER |
| AS | CURRENT SELECTOR SWITCH |
| A | AMMETER |
| 3A | HRC FUSE |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy
ARDANUY INGENIERIA, S.A
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DELHI, DELHI 110020

RITES
THE INFRASTRUCTURE PEOPLE
**RITES LTD.**
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GURGAON,HARYANA, INDIA-122001

| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

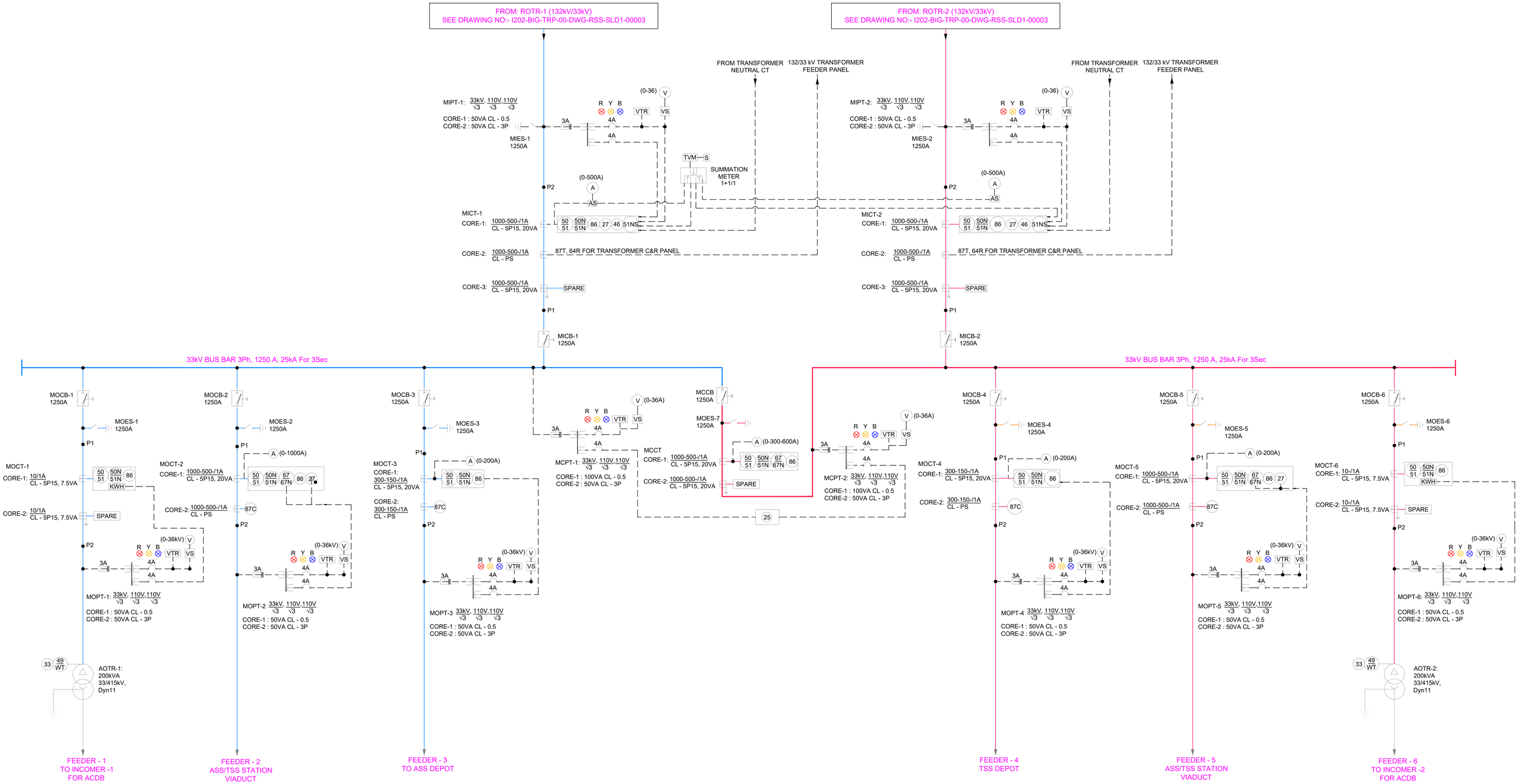
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL AIS - SLD OF 33KV SIDE MAIN SWITCHBOARD WITH PROTECTION (SHEET 1 OF 2)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSSLD1-00004 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING

# 33kV AIR INSULATED (AIS) TYPE




TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

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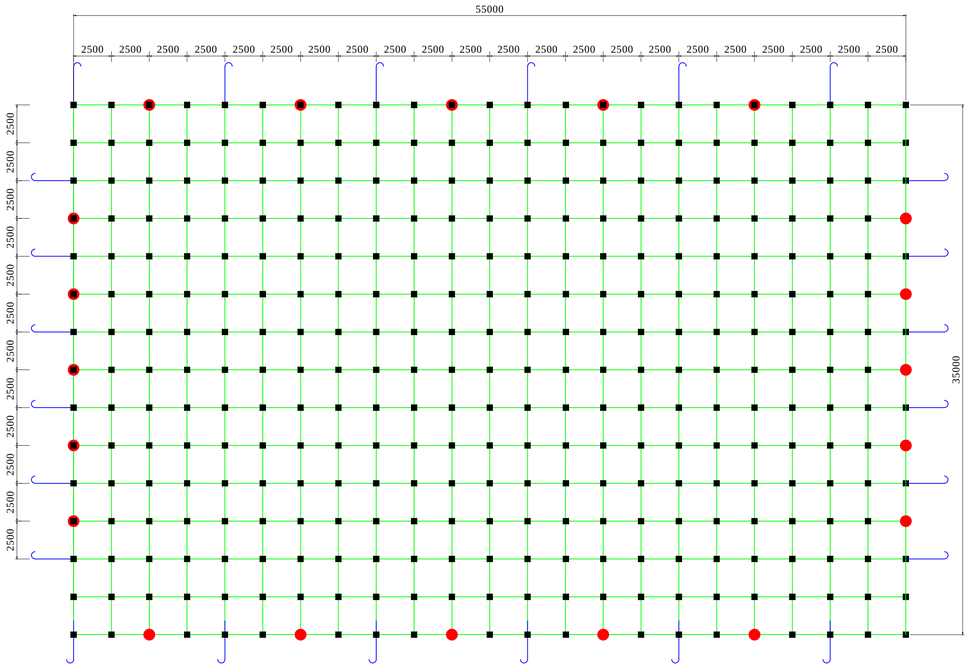
|---|---|---|---|

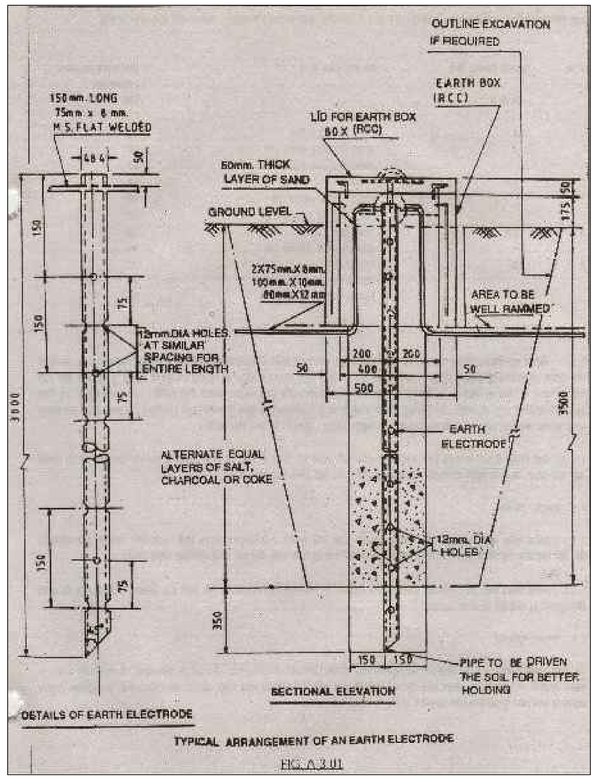
GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL AIS - SLD OF 33KV SIDE MAIN SWITCHBOARD WITH PROTECTION (SHEET 2 OF 2) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-RSSSLD1-00004 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




| MATERIAL DETAILS | | | | |
|---|---|---|---|---|
| S.NO. | LEGEND | DESCRIPTION AND SIZE | MATERIAL | QTY. |
| 1. | | EARTH GRID CONDUCTOR 35MM (MIN.) DIA MS ROD OR EQUIVALENT MS STRIP 75 MM X 12 MM | MS | AS PER DRAWING |
| 2. | | EARTH VERTICAL CONDUCTOR WITH CONNECTION FOR 35MM DIA (MIN.) 3MTR. LONG | MS | 20 NOS. |
| 3. | | PIG TAIL RISERS EITHER 35MM DIA (MIN) MS ROD OR EQUIVALENT STRIP | MS | 24 NOS. |
| 4. | | OVERLAP JOINTS | | 345 NOS. |
| 5. | | EARTHPIT IN SWITCHYARD | | 26 NOS. |

EARTH MAT CALCULATION

1.0 Reference Standards
- a) IEEE STD 80 - 2013 : Guide for Safety in AC Substation Grounding
- b) IS 3043 - 2018 : Indian Standard Code of Practice for Earthing
- d) IEEE Transaction on Power Apparatus and Systems, Vol. PAS-98, No.6, Nov/Dec1979.

2.0 Data

| | Symbol | Value | Unit |
|---|---|---|---|
| Fault Current | If | 40 | kA |
| Time of current flow (for conductor sizing) | tc | 1 | Seconds |
| Duration of shock (for touch & step voltage) | ts | 0.5 | Seconds |
| Current Division Factor for IG | Sf | 0.5 | |
| Soil Resistivity | ρ | 40.00 | Ω-m |
| Surface layer Resistivity (Table-7 IEEE80-2000) | ρs | 10000 | Ω-m |
| Short side grid length | Lx | 35 | m |
| Long side grid length | Ly | 55 | m |
| Thickness of surface layer | hs | 0.3 | m |
| Depth of buried conductor excluding surface layer | h | 0.7 | m |
| Reference depth of grid | h0 | 1 | m |
| Spacing of grid | D | 2.5 | m |
| Number of earth electrodes placed in considered area | nR | 20 | Nos. |
| Length of GI earth electrode of dia 32 mm | Lr | 3 | Mtrs. |
| 5.0 Results | | | |
| | Allowable | Actual | Remarks |
| Diameter of Copper bonded Conductor | 35 | 32 | Acceptable |
| Touch Voltage (in V) | 2,206.05 | 0.43 | Acceptable |
| Step Voltage (in V) | 8,355.68 | 1.15 | Acceptable |
| Grid Resistance (in Ω) | 0.50 | 0.4388 | Acceptable |
| Length of grid conductor as calculated (in m) | | 1690 | Acceptable |
| Number of earth electrodes | | 20 | |

NOTES:-
1. All dimensions are in mm unless otherwise specified.
2. Earthing systems will generally be constructed in accordance with IS: 3043 - code of practice for earthing installation and IEEE80.
3. Supply & installation of the under ground main earth grid, earth pit and pigtail riser are in scope power supply contractor.
4. Earth grid conductor shall be buried in soil at minimum 700 -1000 mm below ground.
5. All the joints of earth grid conductor at the crossing, connections with earth electrode & pigtail riser shall be welded to have good electrical connection duly strengthned with U bolts.
6. Pigtail risers shall be projected about 150 mm above ground level ( location of risers may be decided as per availabilty of space and layout of equipment in ASS/TSS).
7. All pigtail risers for equipment earthing shall rise from ground/ floor near colomns or wall to avoid obstruction for movement.
8. The layout of earthgrid conductor may be suitably changed to avoid fouling with coloumns / foundation during actual construction.
9. Surface layer resitivity of base slab to be > 10000 ohm/m.
10. Present Earthmat Design is based on Typical soil resistity of 40 ohm-meter. However, the design will be revised on the basis of actual soil resistivity of RSS site later on
11. The fault current has been selected for 40 kA for 3 Seconds.
12. Bitumene tapes/suitable Bitumene compound shall be applied on all joints and other exposed earthing conductors
13. Pipe for earth electrode,shall be GI Type.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

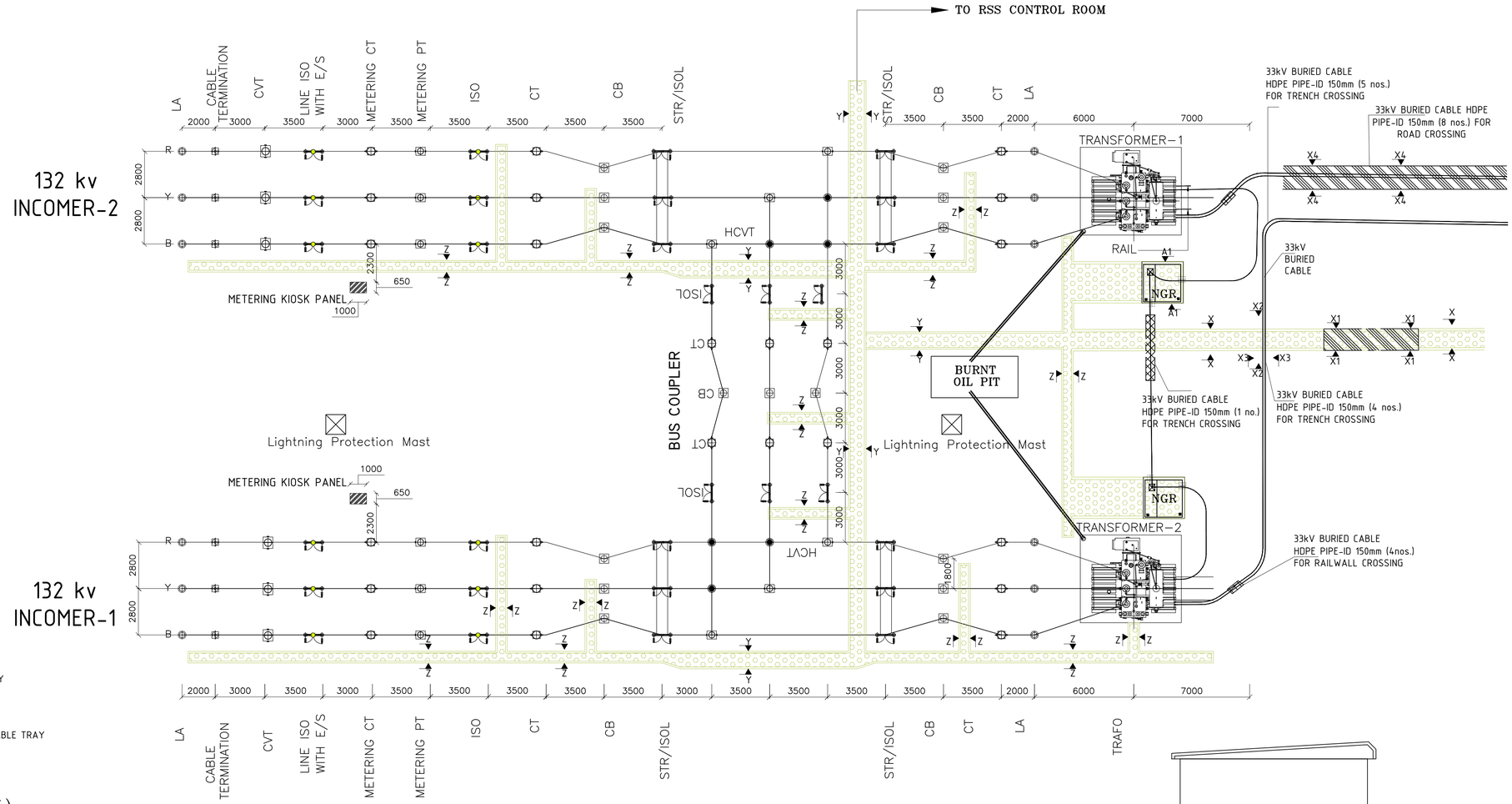
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

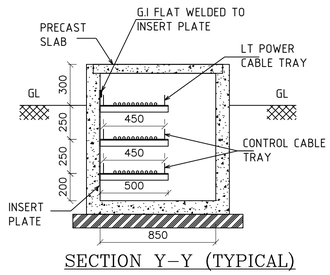
MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL EARTH MAT DESIGN □OR 132□33K□ RSS SWITCHYARD □INCL O□EARTH PIT DRAWINGS□
DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSSLD1-0000□
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

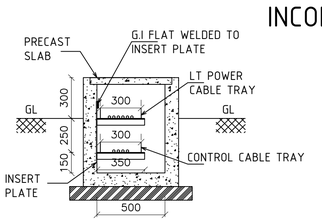
LEGEND:–

| | | |
|---|---|---|
| | LA | LIGHTNING ARRESTER |
| | | CABLE TERMINATION SUPPORT |
| | ISO | ISOLATOR WITH E/S |
| | CT | CURRENT TRANSFORMER |
| | CVT | CAPACITOR VOLT.TRAFO. |
| | CB | SF6 CB |
| | ISO | ISOLATOR WITHOUT E/S |
| | TWR | TOWER |
| | PI | POST INSULATOR |
| | CT | TARIFF METERING SF6 CT |
| | IVT | TARIFF METERING IVT |
| | NGR | NEUTRAL GROUNDING RESISTER |
| | METERING | METERING KIOSK PANEL |
| | | Lightning Protection Mast |
| | | POWER TRANSFORMER |




SECTION Y–Y (TYPICAL)

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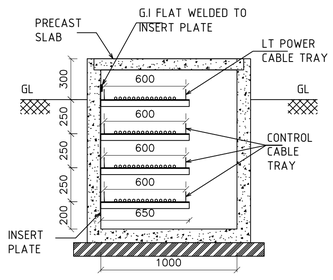
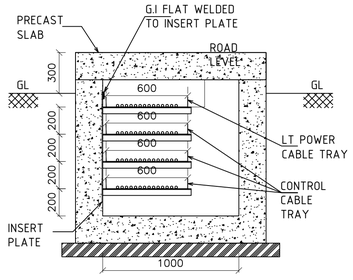
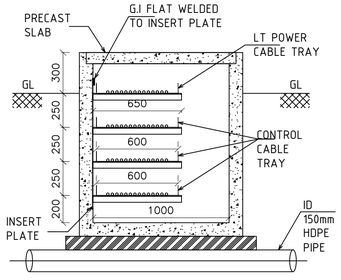


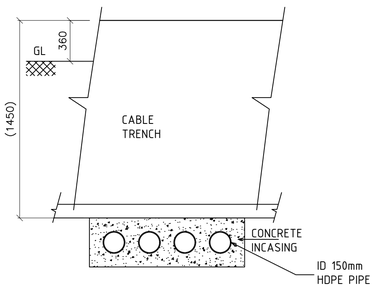

SECTION X–X (TYPICAL)



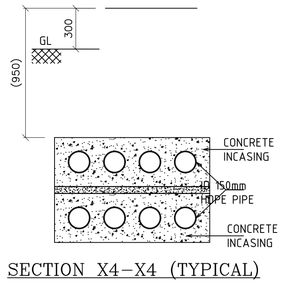

SECTION X1–X1 (TYPICAL FOR ROAD CROSSING)



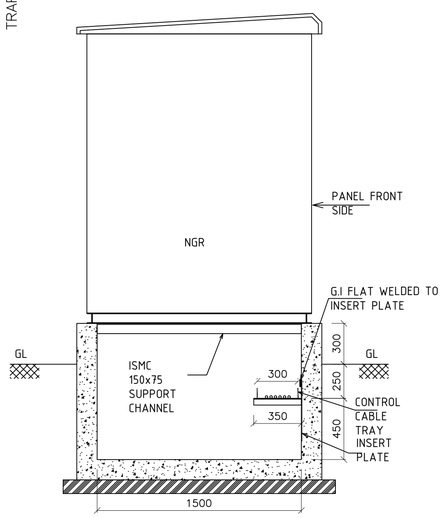

SECTION X2–X2 (TYPICAL) FOR 33kV CABLE




SECTION X3–X3 (TYPICAL) FOR 33kV CABLE




SECTION X4–X4 (TYPICAL) FOR 33kV CABLE




SECTION A1–A1

Note:

1. As per usual partice followed in other metros, 02 nos metering kiosk Panel indicated(01 for each incomming bay)
2. 33kV cable from power transformer to 33kV panel room will be laid in concrete trenches.

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| 1 | DEC.2021 | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW DELHI, DELHI 110020

**RITES LTD.**
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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

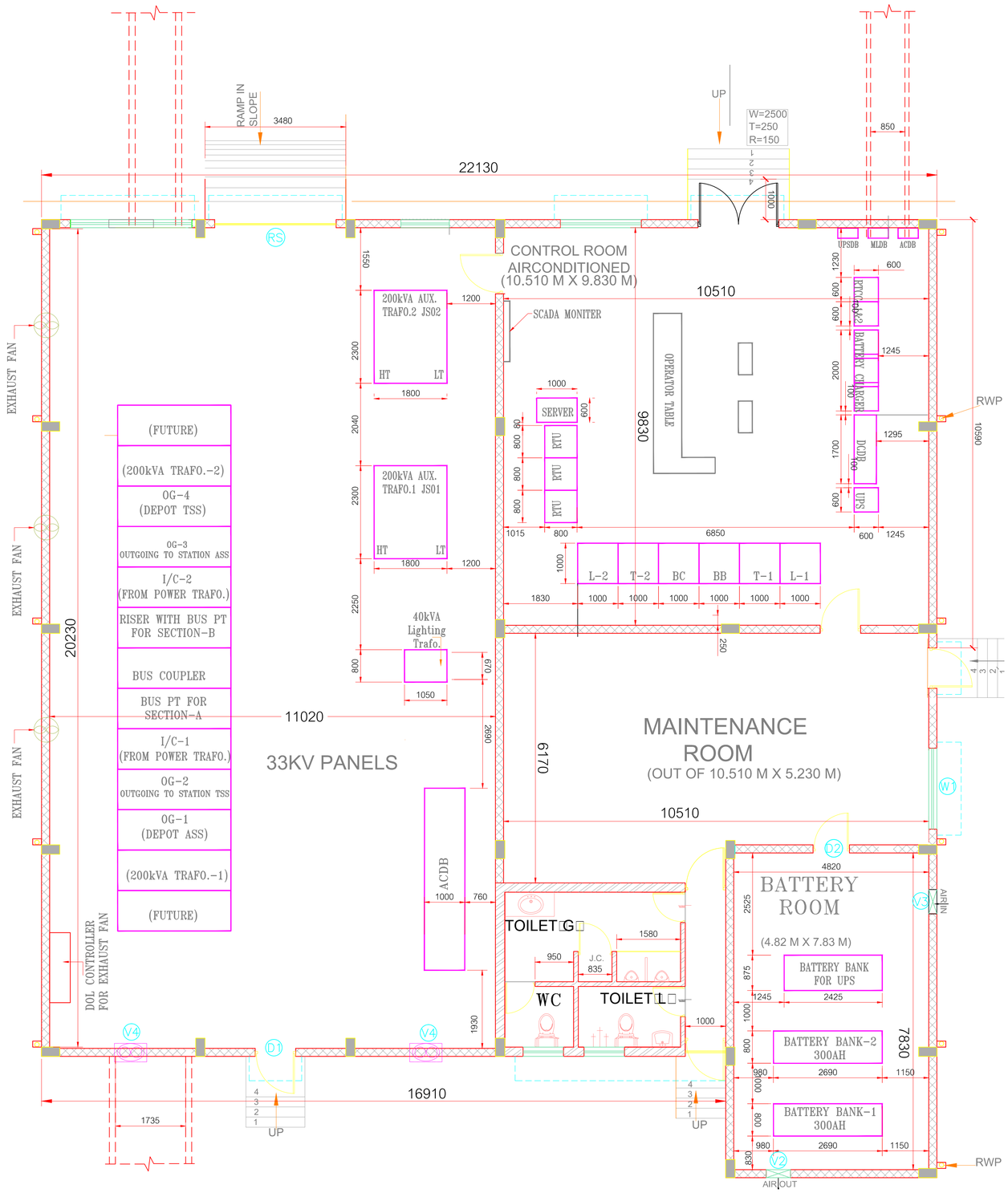
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL 132/33 KV RSS SWITCHYARD CABLE TRENCHE LAYOUT PLAN

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSSLD1-00006 REV R1

SCALE: NTS | DATE: DECEMBER 2021 | STATUS: TENDER DRAWING




## TYPICAL DETAILS OF EQUIPMENT FOR RSS BUILDING

| SL NO | EQUIPMENT | LENGTH | WIDTH | HEIGHT | QUANTITY | WEIGHT (Kg/Unit) |
|---|---|---|---|---|---|---|
| | | (Dimensions of Individual Equipment in mm) | | | | |
| RSS–Building | | | | | | |
| 1 | 200kVA Auxiliary Dry type Transformer with enclosure for RSS | 2300 | 1800 | 2100 | 2 nos. | 2450 |
| 2 | 33KV Switchgear for RSS (FUTURE PANELS BUSPT and BUS RISER Panel) | 2800 | 1000 | 2600 | 1 Set. | 1600 |
| 3 | ACDB (ALTERNATE CURRENT DISTRIBUTION BOARD) | 4500 | 1000 | 2400 | 1 no. | 75 |
| 4 | DCDB (DIRECT CURRENT DISTRIBUTION BOARD) | 1700 | 550 | 2400 | 1 no. | 50 |
| 5 | CONTROL & PROTECTION PANELS<br>L–1 => LINE 1 (INCOMER–1)<br>L–2 => LINE 2 (INCOMER–2)<br>T–1 => TRANSFORMER 1<br>T–2 => TRANSFORMER 2<br>T–2 => TRANSFORMER 2<br>BB => BUSBAR<br>BC => BUS COUPLER | 1000 | 1000 | 2265 | 1 Set. | 1000 |
| 6 | REMOTE TERMINAL UNIT (RTU) | 800 | 800 | 2000 | 3 nos. | 275 |
| 7 | BATTERY BANK (300AH) | 2690 | 800 | 1820 | 1 Set. | 2400 |
| 8 | BATTERY CHARGER (110V, 100A) | 600 | 600 | 1775 | 3 nos. | 500 |
| 9 | BATTERY BANK (FOR UPS) | 2425 | 875 | 1800 | 1 Set. | 2300 |
| 10 | UN INTERRUPTED POWER SUPPLY (UPS) | 600 | 600 | 1275 | 1 no. | 275 |
| 11 | REMOTE TAP CHANGER CONTROL CUBICLE (RTCC–1 & 2) | 600 | 600 | 2200 | 2 nos. | 250 |

NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. TYPICAL HEIGHT OF POWER SUPPLY ROOM ACCESS DOORS SHALL BE MIN.2500mm.
3. EARTH MAT BELOW 50mm SCREEDING & EQUIPMENT EARTHING IS IN THE SCOPE OF POWER SUPPLY CONTRACTOR.
4. PLEASE REFER EQUIPMENT DRAWINGS FOR FURTHER DETAILS.
5. CONTROL ROOM WILL BE AIR CONDITIONED.
6. RATING OF UPS & BATTERY FOR UPS WILL BE FINALIZED AFTER CALCULATING THE ACTUAL LOAD.
7. MAIN GATE WILL BE MOTOR OPERATED.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

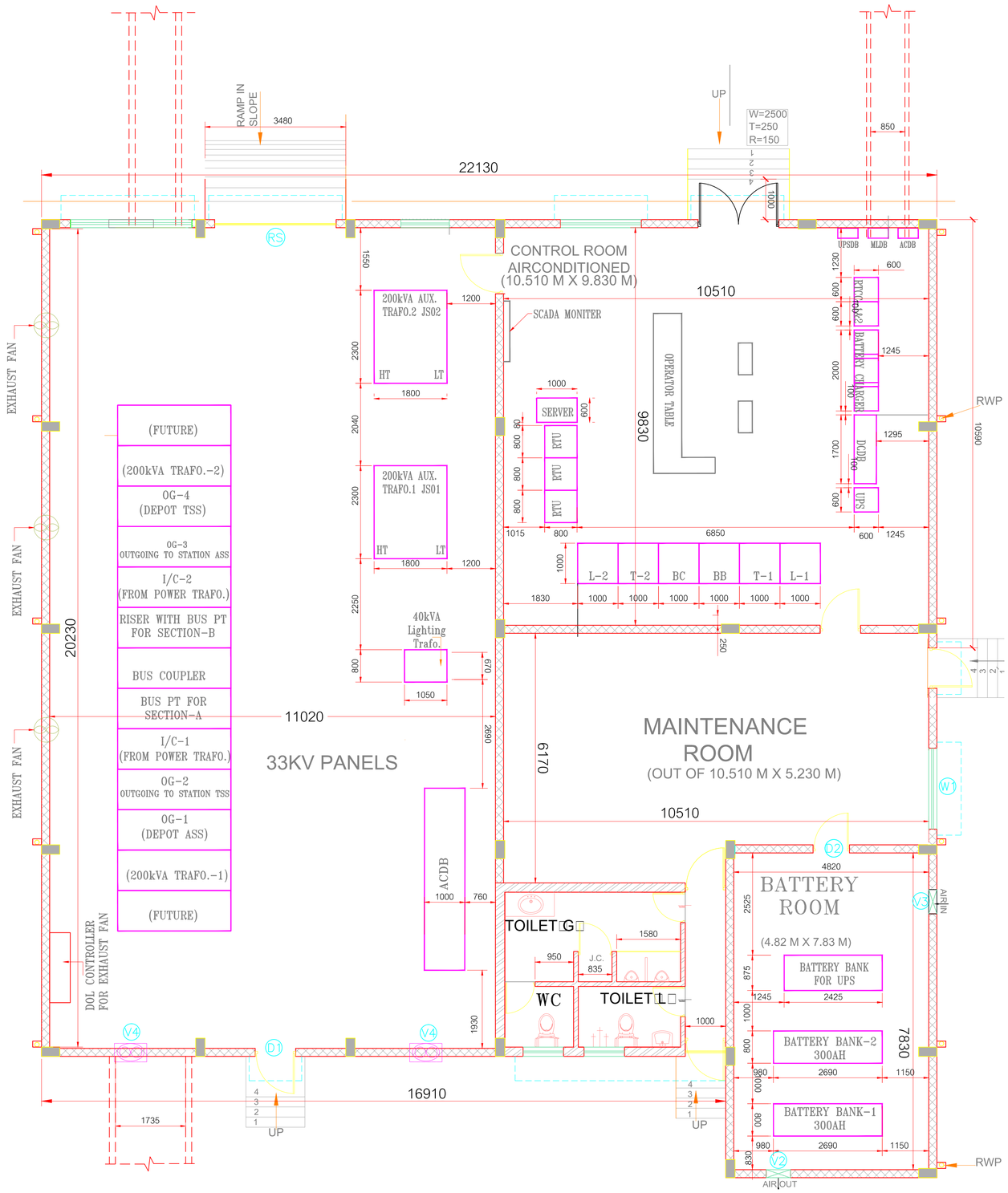
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: BHOPAL METRO RAIL PROJECT
PACKAGE BH-0□

DRAWING TITLE: TYPICAL EQUIPMENT LAYOUT PLAN (AIS) FOR 33KV SWGR & CONTROL ROOM OF RSS

DRAWING NUMBER: B202-BIG-TRP-00-DWG-RSSLYT1-0000□ REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




## TYPICAL DETAILS OF EQUIPMENT FOR RSS BUILDING

| SL NO | EQUIPMENT | LENGTH (Dimensions of Individual Equipment in mm) | WIDTH (Dimensions of Individual Equipment in mm) | HEIGHT (Dimensions of Individual Equipment in mm) | QUANTITY | WEIGHT (Kg/Unit) |
|---|---|---|---|---|---|---|
| RSS–Building | | | | | | |
| 1 | 200kVA Auxiliary Dry type Transformer with enclosure for RSS | 2300 | 1800 | 2100 | 2 nos. | 2450 |
| 2 | 33KV Switchgear for RSS (FUTURE PANELS BUSPT and BUS RISER Panel) | 2800 | 1000 | 2600 | 1 Set. | 1600 |
| 3 | ACDB (ALTERNATE CURRENT DISTRIBUTION BOARD) | 4500 | 1000 | 2400 | 1 no. | 75 |
| 4 | DCDB (DIRECT CURRENT DISTRIBUTION BOARD) | 1700 | 550 | 2400 | 1 no. | 50 |
| 5 | CONTROL & PROTECTION PANELS<br>L–1 => LINE 1 (INCOMER–1)<br>L–2 => LINE 2 (INCOMER–2)<br>T–1 => TRANSFORMER 1<br>T–2 => TRANSFORMER 2<br>T–2 => TRANSFORMER 2<br>BB => BUSBAR<br>BC => BUS COUPLER | 1000 | 1000 | 2265 | 1 Set. | 1000 |
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TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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DELHI, DELHI 110020

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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

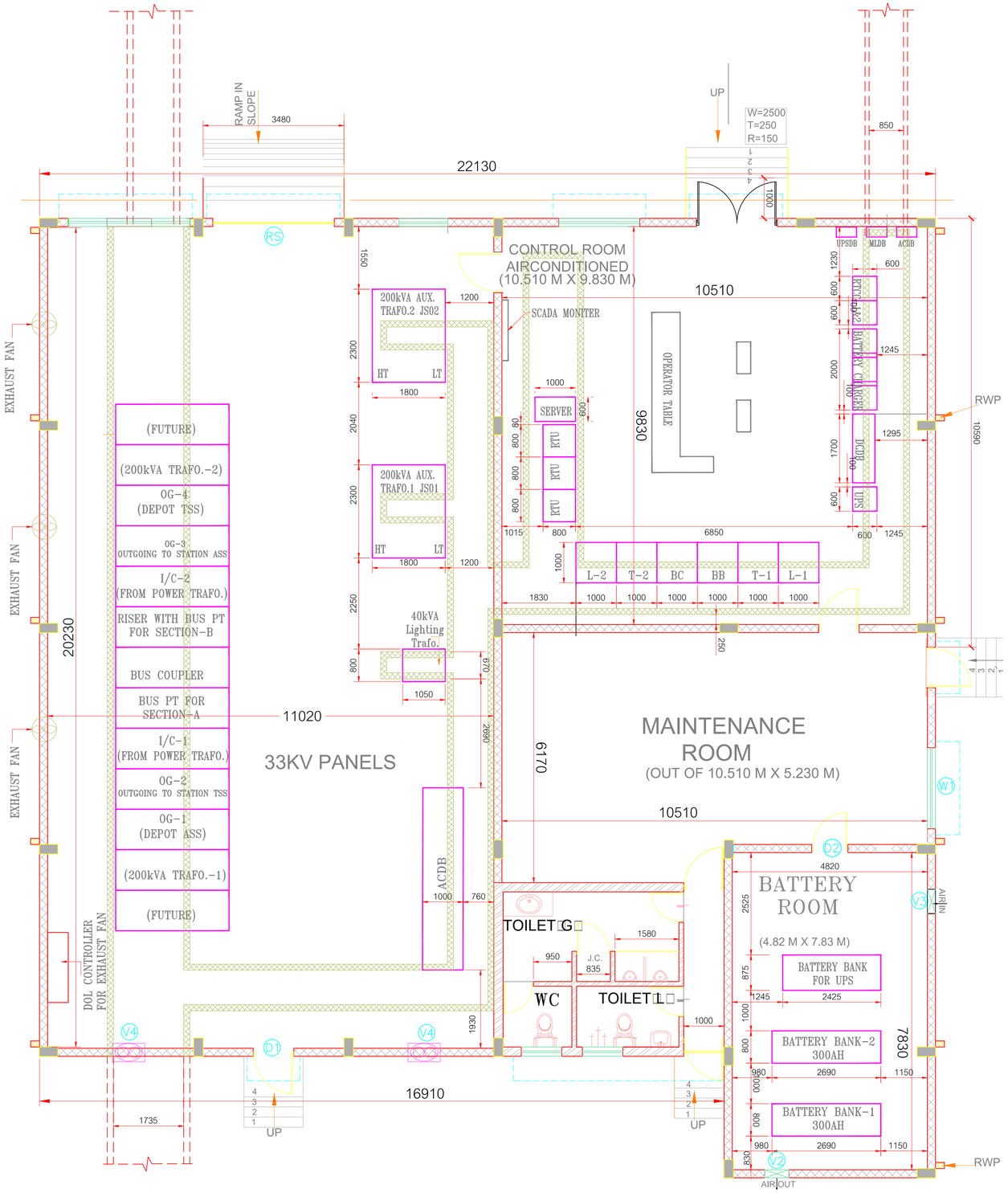
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL EQUIPMENT LAYOUT PLAN (AIS) FOR 33KV SWGR & CONTROL ROOM OF RSS

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSLYT1-0000□ REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




## TYPICAL DETAILS OF EQUIPMENT FOR RSS BUILDING

| SL NO | EQUIPMENT | LENGTH | WIDTH | HEIGHT | QUANTITY | WEIGHT (Kg/Unit) |
|---|---|---|---|---|---|---|
| | | (Dimensions of Individual Equipment in mm) | | | | |
| RSS–Building | | | | | | |
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| 3 | ACDB (ALTERNATE CURRENT DISTRIBUTION BOARD) | 4500 | 1000 | 2400 | 1 no. | 75 |
| 4 | DCDB (DIRECT CURRENT DISTRIBUTION BOARD) | 1700 | 550 | 2400 | 1 no. | 50 |
| 5 | CONTROL & PROTECTION PANELS<br>L-1 => LINE 1 (INCOMER-1)<br>L-2 => LINE 2 (INCOMER-2)<br>T-1 => TRANSFORMER 1<br>T-2 => TRANSFORMER 2<br>T-2 => TRANSFORMER 2<br>BB => BUSBAR<br>BC => BUS COUPLER | 1000 | 1000 | 2265 | 1 Set. | 1000 |
| 6 | REMOTE TERMINAL UNIT (RTU) | 800 | 800 | 2000 | 3 nos. | 275 |
| 7 | BATTERY BANK (300AH) | 2690 | 800 | 1820 | 1 Set. | 2400 |
| 8 | BATTERY CHARGER (110V, 100A) | 600 | 600 | 1775 | 3 nos. | 500 |
| 9 | BATTERY BANK (FOR UPS) | 2425 | 875 | 1800 | 1 Set. | 2300 |
| 10 | UN INTERRUPTED POWER SUPPLY (UPS) | 600 | 600 | 1275 | 1 no. | 275 |
| 11 | REMOTE TAP CHANGER CONTROL CUBICLE (RTCC-1 & 2) | 600 | 600 | 2200 | 2 nos. | 250 |

NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. TYPICAL HEIGHT OF POWER SUPPLY ROOM ACCESS DOORS SHALL BE MIN.2500mm.
3. EARTH MAT BELOW 50mm SCREEDING & EQUIPMENT EARTHING IS IN THE SCOPE OF POWER SUPPLY CONTRACTOR.
4. PLEASE REFER EQUIPMENT DRAWINGS FOR FURTHER DETAILS.
5. CONTROL ROOM WILL BE AIR CONDITIONED.
6. RATING OF UPS & BATTERY FOR UPS WILL BE FINALIZED AFTER CALCULATING THE ACTUAL LOAD.
7. MAIN GATE WILL BE MOTOR OPERATED.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy
ARDANUY INGENIERIA, S.A
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PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

RITES
THE INFRASTRUCTURE PEOPLE
**RITES LTD.**
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

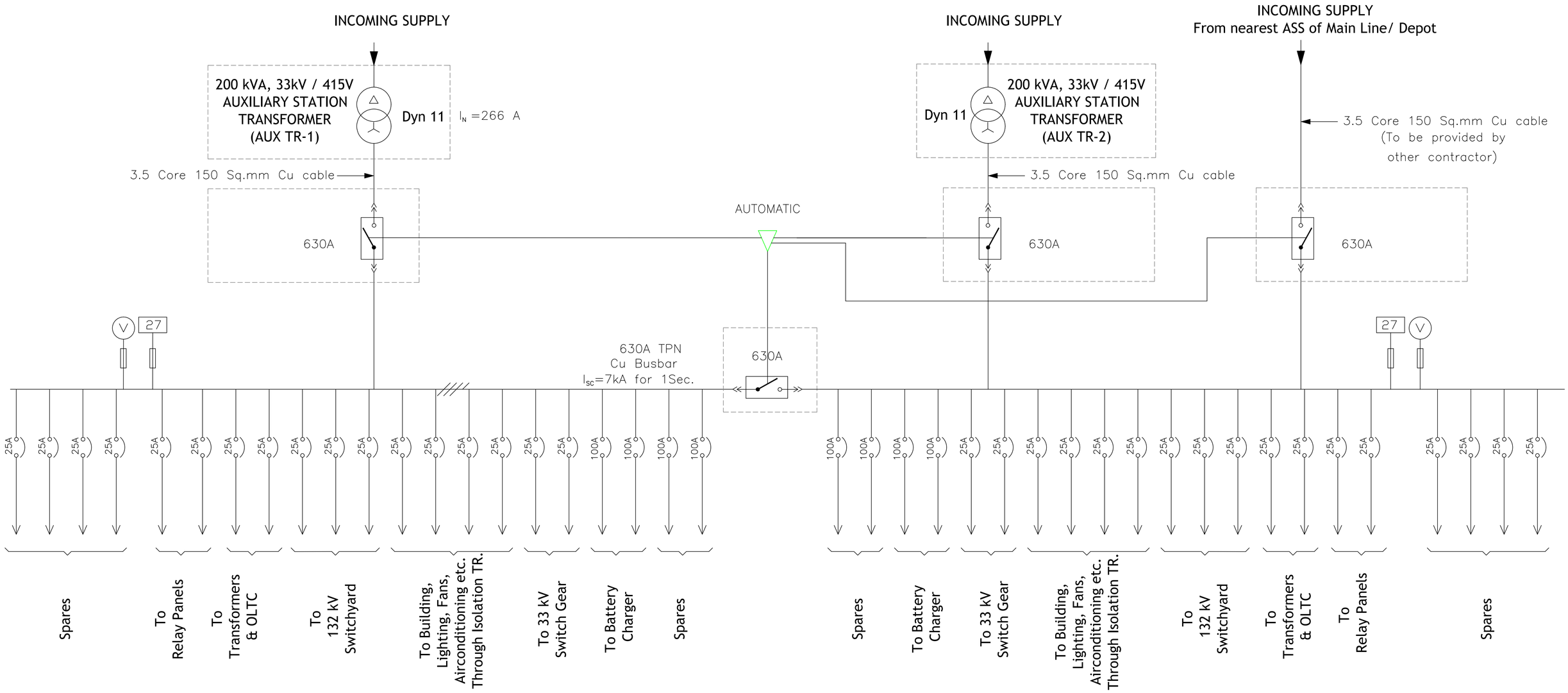
| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL CABLE TRENCH LAYOUT PLAN FOR 33KV SWGR & CONTROL ROOM
DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSLYT1-00009
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




Note:-

1. Current Transformers, meters shall be provided as per particular specification of ACDB,
2. Auxiliary relays shall be provided for alarms and SCADA indication.
3. Suitable rating HRC Fuses, Selector Switches, Push Buttons and Indicator lights shall be provided.
4. Suitable marshall boxes shall be provided in yard with IP 65 protection.
5. For LT Supply from Depot ASS or Station ASS, 415 V , 3 phase cable laying shall be done by Depot/Stn. contractor. Contractor will interface with Depot/Stn. contractor.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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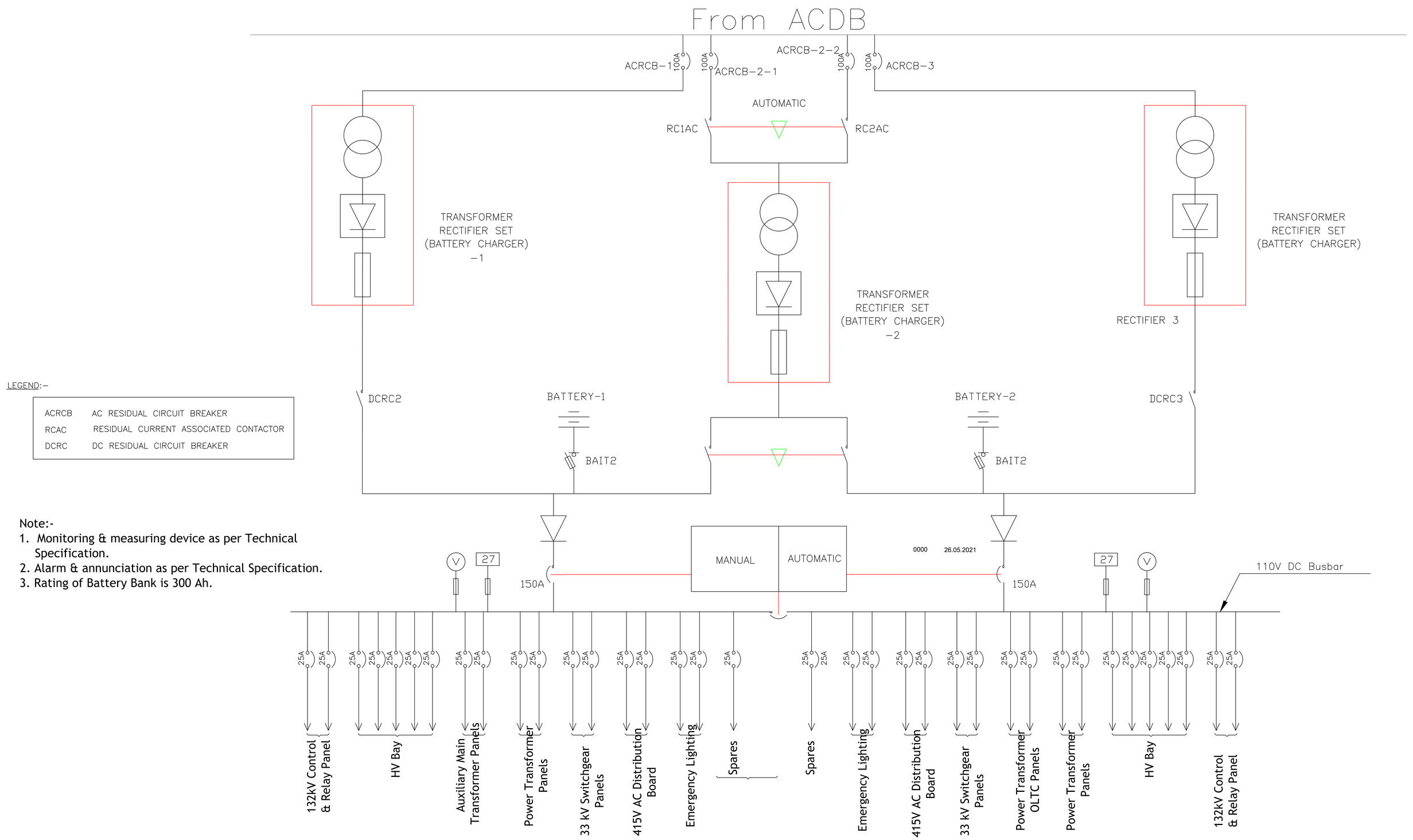
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL 415 V AC DISTRIBUTION SCHEMATIC DIAGRAM FOR RECEVING SUBSTATION (TYPE-6) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-RSSSCH1-00010 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




LEGEND:-

| | |
|---|---|
| ACRCB | AC RESIDUAL CIRCUIT BREAKER |
| RCAC | RESIDUAL CURRENT ASSOCIATED CONTACTOR |
| DCRC | DC RESIDUAL CIRCUIT BREAKER |

Note:-

1. Monitoring & measuring device as per Technical Specification.
2. Alarm & annunciation as per Technical Specification.
3. Rating of Battery Bank is 300 Ah.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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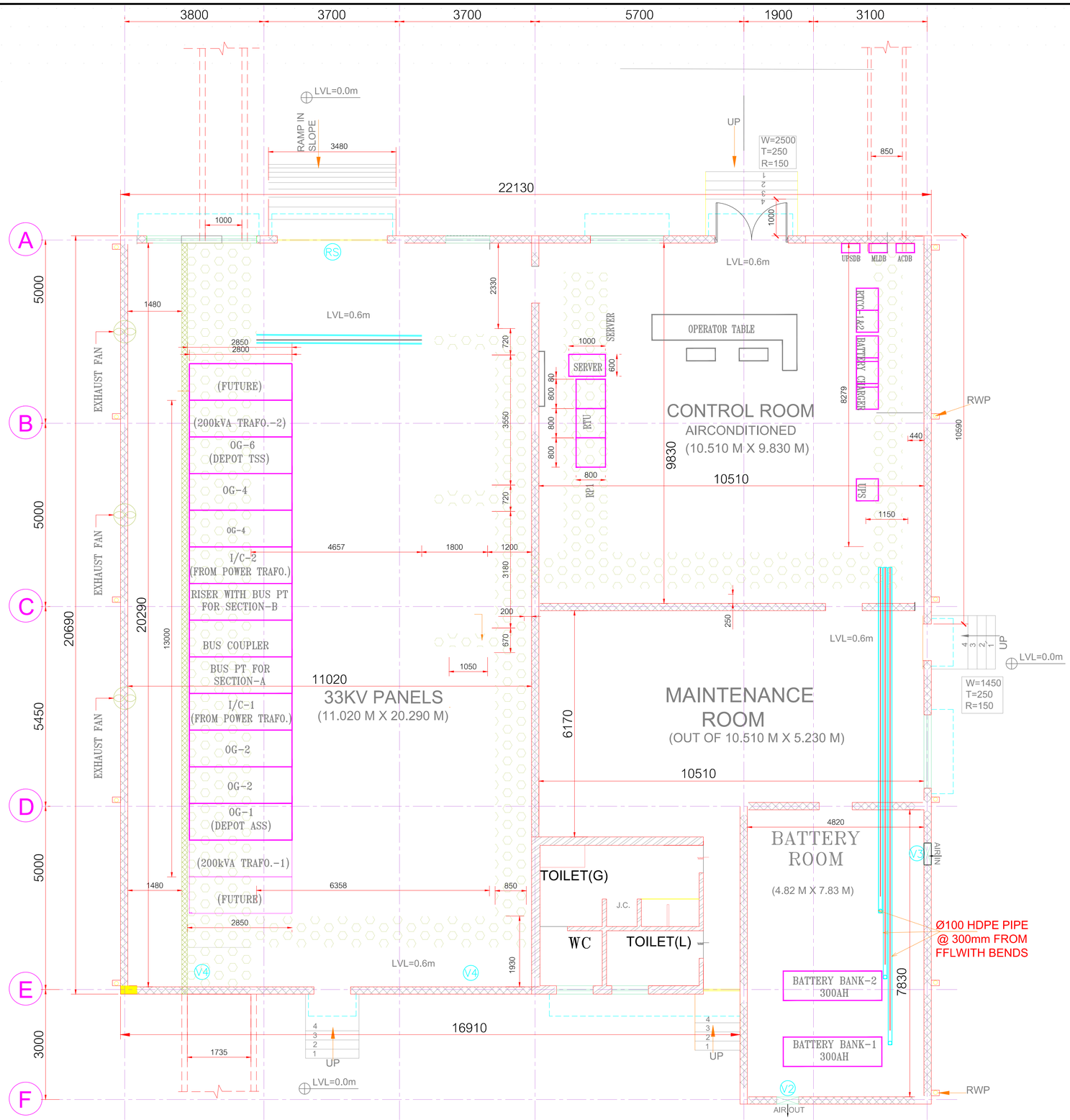
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL 110 V DC DISTRIBUTION SCHEMATIC DIAGRAM FOR RECEIVING SUBSTATION (TYPE-6) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-RSSSCH1-00011 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

# KEY PLAN




## LEGEND

- BLOCK WORK
- BRICK WORK
- TRENCH
- PAVERS
- ROAD

**TENDER DRAWING**
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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|---|---|---|---|
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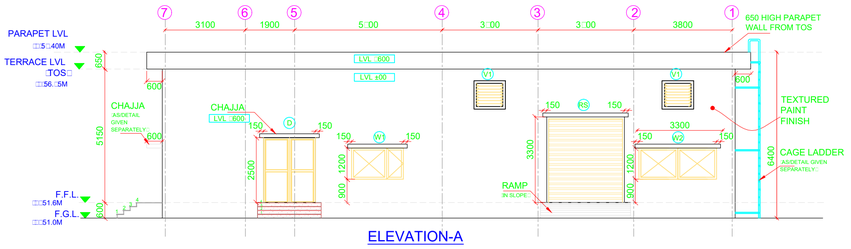
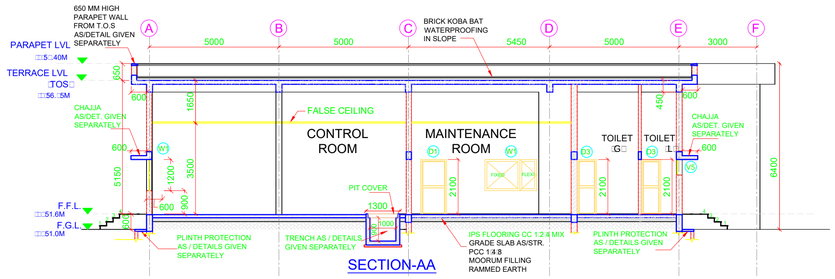
MPMETRO

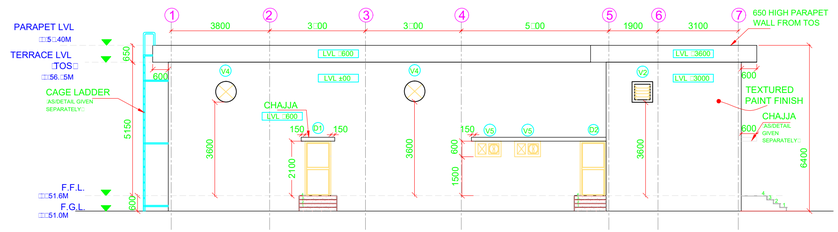
| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL RSS CONTROL ROOM GROUND FLOOR PLAN |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-RSSLYT1-00012 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |



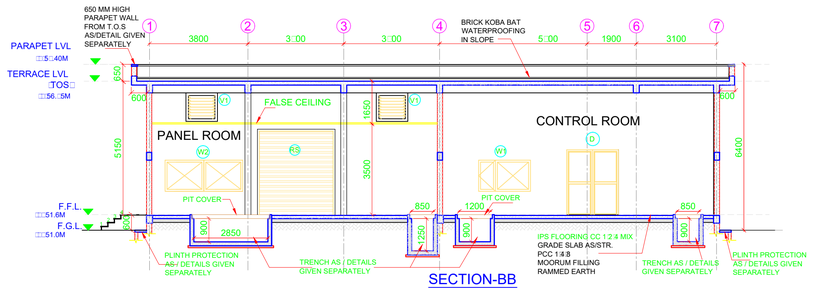

ELEVATION-A



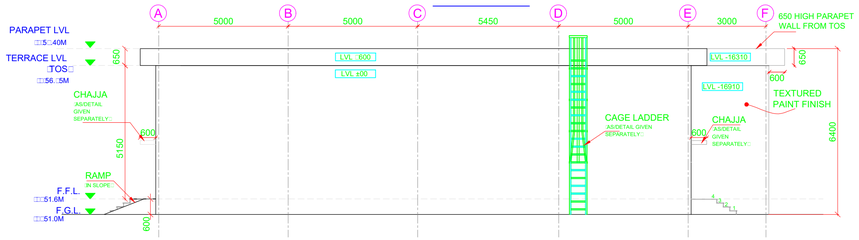

SECTION-AA




ELEVATION-B

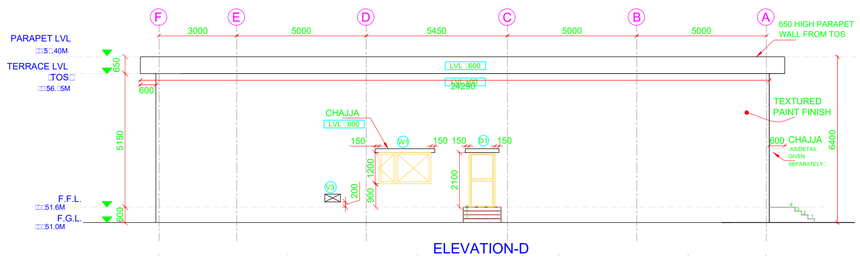



SECTION-BB

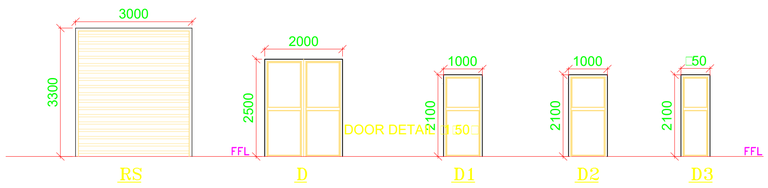



ELEVATION-C




ELEVATION-D




LEGEND :-

- BRICK WORK
- BLOCK WORK

NOTES :-

1. ALL DIMENSIONS ARE IN MM.
2. ALL LEVELS ARE IN METERS UNLESS OTHERWISE NOTED.
3. THIS IS A GENERAL ARRANGEMENT ARCHITECTURAL DRAWING SHOWING DETAILS OF ROOMS AND DOOR-WINDOW SCHEDULES.

## DOOR/WINDOW SCHEDULE

| SYMBOL | DESCRIPTION | NOS. | SIZE | SILL LVL. FROM G.LVL. |
|---|---|---|---|---|
| RS | ROLLING SHUTTER | 1 | 3000 X 3300 | -- |
| D | ALUMINIUM DOOR :DOUBLE SHUTTER: | 1 | 2000 X 2500 | -- |
| D1 | ALUMINIUM DOOR :SINGLE SHUTTER: | 4 | 1000 X 2100 | -- |
| D2 | FIRE PROOF DOOR :SINGLE SHUTTER: | 3 | 1000 X 2100 | -- |
| D3 | PVC DOOR :SINGLE SHUTTER: | 3 | 50 X 2100 | -- |
| W1 | WINDOW | 1 | 2000 X 1200 | 1500 |
| W2 | WINDOW | 1 | 3000 X 1200 | 1500 |
| V1 | VENTILATOR | 2 | 1200 X 1100 | 4200 |
| V2 | VENTILATOR | 1 | 800 X 800 | 4200 |
| V3 | VENTILATOR | 1 | 600 X 300 | 800 |
| V4 | EXHAUST | 3 | 800 MM DIA | 4200 |
| V5 | VENTILATOR | 2 | 1000 X 600 | 2100 |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

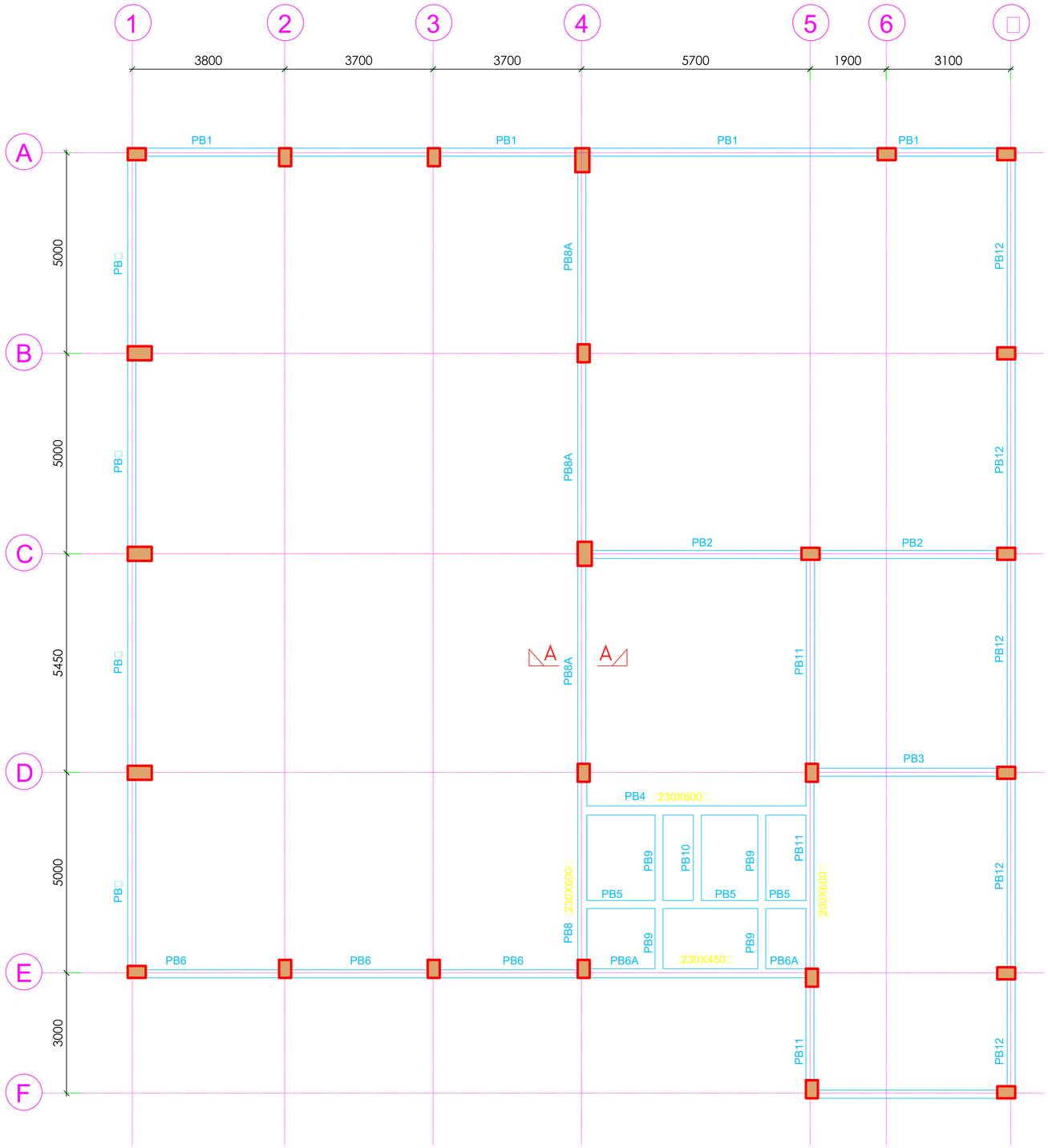
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

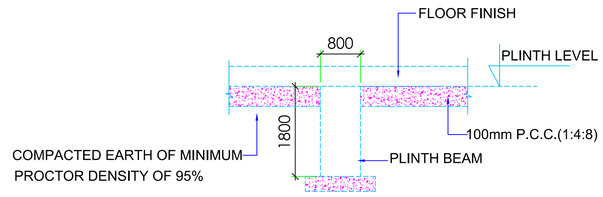
DRAWING TITLE: TYPICAL RSS BUILDING LAYOUT ELEVATION & SECTION

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSLYT1-00013 REV: 0

| SCALE | DATE | STATUS |
|---|---|---|
| NTS | October 2021 | TENDER DRAWING |




PLINTH LEVEL FRAMING PLAN




SECTION A-A

## NOTES

1. ALL DIMENSIONS ARE IN mm.
2. DO NOT SCALE ANY DIMENSION. ALWAYS FOLLOW WRITTEN DIMNESIONS.
3. GENERAL NOTES SHALL BE REFERED IN CONJUCTION WITH THIS DRAWING.
4. PROVIDED 2 – 12 ϕ (T&B) IN SLABS UNDERNEATH WALLS WHEREVER NO BEAM IS PROVIDED
5. ALL R/F SHALL BE COLD TWISTED BARS OF YIELD STRENGHT NOT LESS THAN 500N/$mm^2$CONFORMING TO IS 1786 (LATEST REVISION)
6. FOR RCC WORKS USE GRADE M30 CONFORMING TO IS : 456 LATEST REVISION (U.N.O.)
7. ◯ INDICATES SLAB THICKNESS.
8. ALL CUTOUT LOCATION AND SIZE SHALL BE CONFIRMED WITH RELEVANT ARCHITECTURAL AND SERVICES DRAWINGS.
9. BEAM LAYOUT (U.N.O.) SHALL BE AS PER MASONARY WALL LAYOUT SHOWN IN ARCHITECTURAL DRAWINGS.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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DELHI, DELHI 110020

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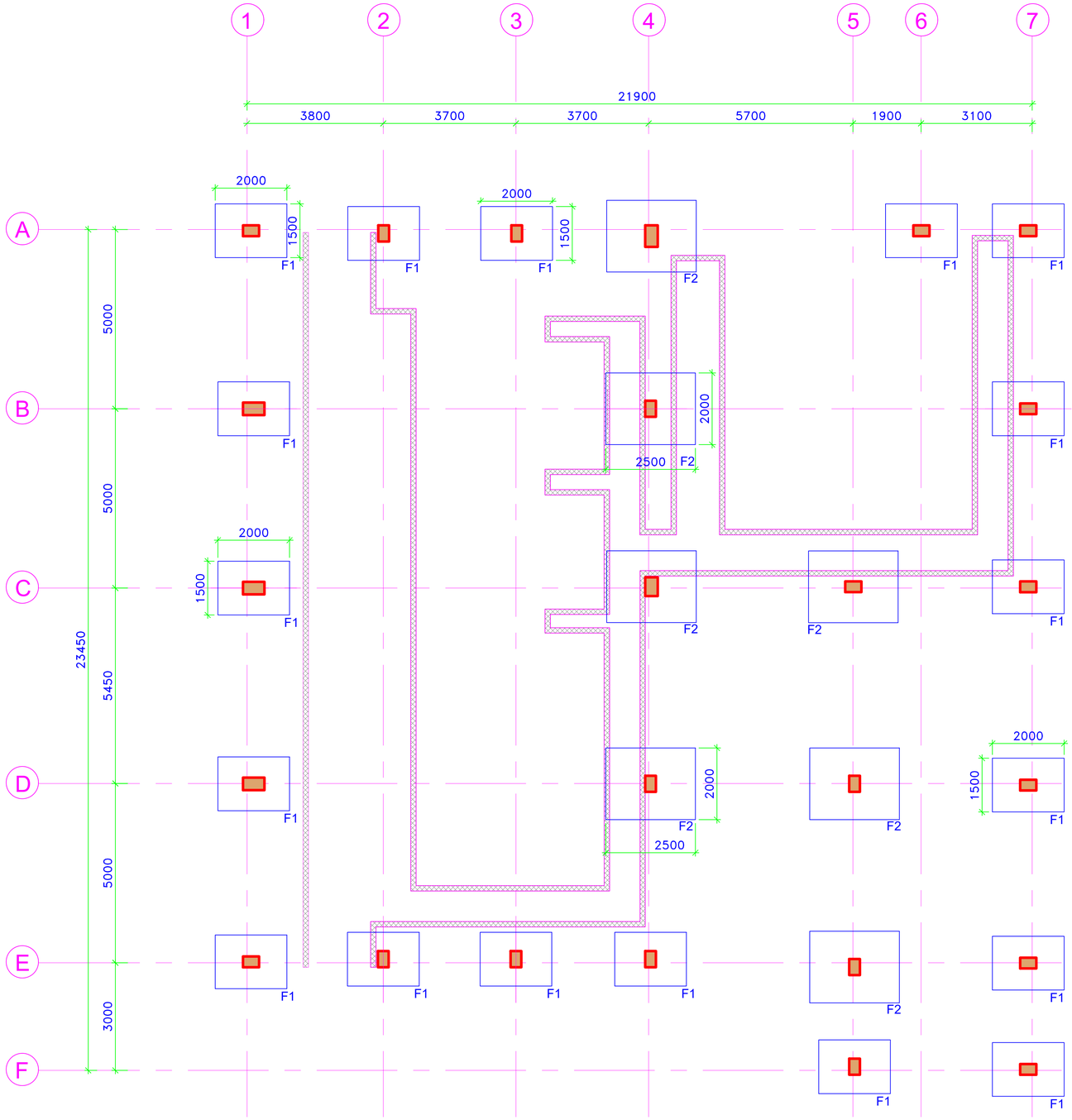
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

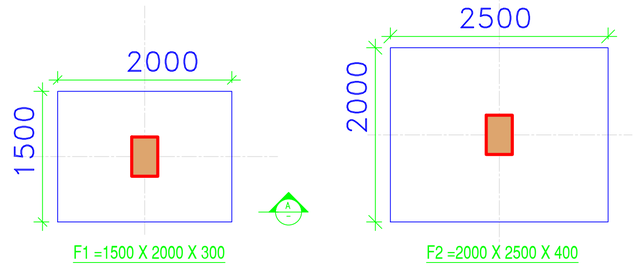
DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

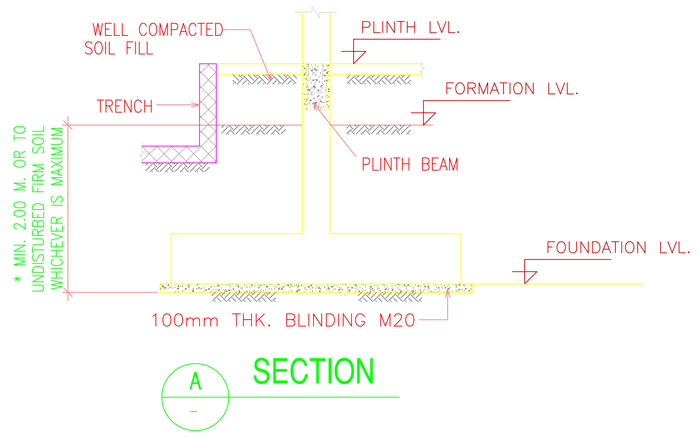
| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL RSS BLOCK PLINTH LEVEL FRAMING PLAN & DETAILS |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-RSSLYT1-0001□ |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




FOUNDATION PLAN




TYPICAL DETAIL FOR FOOTING F1 & F2




A SECTION

NOTES :

1. ALL DIMENSIONS ARE IN MM.
2. DO NOT SCALE ANY DIMENSION.
3. TYPE OF FOUNDATION TO BE DESIGNED BY PST CONTRACTOR ON THE BASIS OF ACTUAL SOIL PROPERTIES OF RSS SITE LOCATION.

- INDICATE COLUMNS

Tender Drg.
Dimensions of structural elements may change during detailed design stage.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL RSS BLOCK FOUNDATION PLAN & DETAILS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSLYT1-00015
REV: R1
SCALE: NTS
DATE: December 2021
STATUS: TENDER DRAWING

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 |  | LIS - LINE MOTORIZED ISOLATOR WITH EARTH SWITCH |
| 2 |  | EIS - MOTORIZED ISOLATOR WITH EARTH SWITCH |
| 3 |  | LA - LIGHTNING ARRESTOR |
| 4 |  | CB - CIRCUIT BREAKER |
| 5 |  | CT - CURRENT TRANSFORMER |
| 6 |  | CVT - CAPACITIVE VOLTAGE TRANSFORMER |
| 7 |  | CCB - COUPLER CIRCUIT BREAKER |
| 8 |  | ROTR - POWER TRANSFORMER |
| 9 |  | NGR - NEUTRAL GROUND RESISTER |
| 10 | | 132kV CIRCUIT - 1 & 2<br>33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| SCHEME OF NOMENCLATURE FOR EQUIPMENT NUMBERING :- XYZA* | | | | | | |
|---|---|---|---|---|---|---|
| X | | Y | | ZA | | * |
| 132kV SYSTEM | R | INCOMING FEEDER | I | TRANSFORMER | TR | NUMERICAL FOR NUMBERING |
| 33kV SYSTEM | M | COUPLER | C | VOLTAGE TRANSFORMER | VT | |
| PRIMARY | P | OUTGOING FEEDER | O | CURRENT TRANSFORMER | CT | |
| SECONDARY | S | NEUTRAL | N | CIRCUIT BREAKER | CB | |
| | | EARTHING | E | MOTORIZED ISOLATOR WITH EARTH SWITCH | EIS | |
| | | | | TRIVECTOR METER | TVM | |
| | | | | LIGHTING ARRESTOR | LA | |
| | | | | ISOLATOR SWITCH | IS | |
| | | | | LINE MOTORIZED ISOLATOR | LS | |
| | | | | SURGE ARRESTOR | SA | |
| | | | | LINE MOTORIZED ISOLATOR WITH EARTH SWITCH | LIS | |

| CODE | DESCRIPTION |
|---|---|
| 21 | DISTANCE PROTECTION |
| 25 | INTERLOCKING RELAY |
| 27 | UNDER VOLTAGE RELAY |
| 30 | ANNUNCIATION RELAY |
| 46 | PHASE UNBALANCED RELAY |
| 49 | TRANSFORMER THERMAL RELAY/ THERMAL OVERLOAD |
| 50 | INSTANTANEOUS OVERCURRENT RELAY |
| 50N | NEUTRAL INSTANTANEOUS OVERCURRENT |
| 51 | TIME DELAY CURRENT RELAY (IDMT) |
| 51N | TIME OVER CURRENT GROUND (IDMT) |
| 59 | OVERVOLTAGE RELAY |
| 64 | TANK PROTECTION RELAY |
| 64NS | RESTRICTED EARTH FAULT RELAY FOR SECONDARY WINDING |
| 64RH | HV RESTRICTED EARTH FAULT PROTECTION RELAY |
| 64RL | LV RESTRICTED EARTH FAULT PROTECTION RELAY |
| 87B | BUS DIFFERENTIAL PROTECTION RELAY |
| 87L | LINE DIFFERENTIAL PROTECTION RELAY |
| 87T | TRANSFORMER DIFFERENTIAL PROTECTION RELAY |
| 95 | TRIP CIRCUIT SUPERVISION RELAY |

| CODE | DESCRIPTION |
|---|---|
| TVM | TRI VECTOR METER |
| VS | VOLTMETER SELECTOR SWITCH |
| VT | VOLTAGE TRANSFORMER |
| V | VOLTMETER |
| AS | CURRENT SELECTOR SWITCH |
| A | AMMETER |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | AS PER PRE BID QUERIES | BS | AS | SP | SPS |
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy

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THE INFRASTRUCTURE PEOPLE

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GURGAON,HARYANA, INDIA-122001

| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

DB GEODATA Louis Berger

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

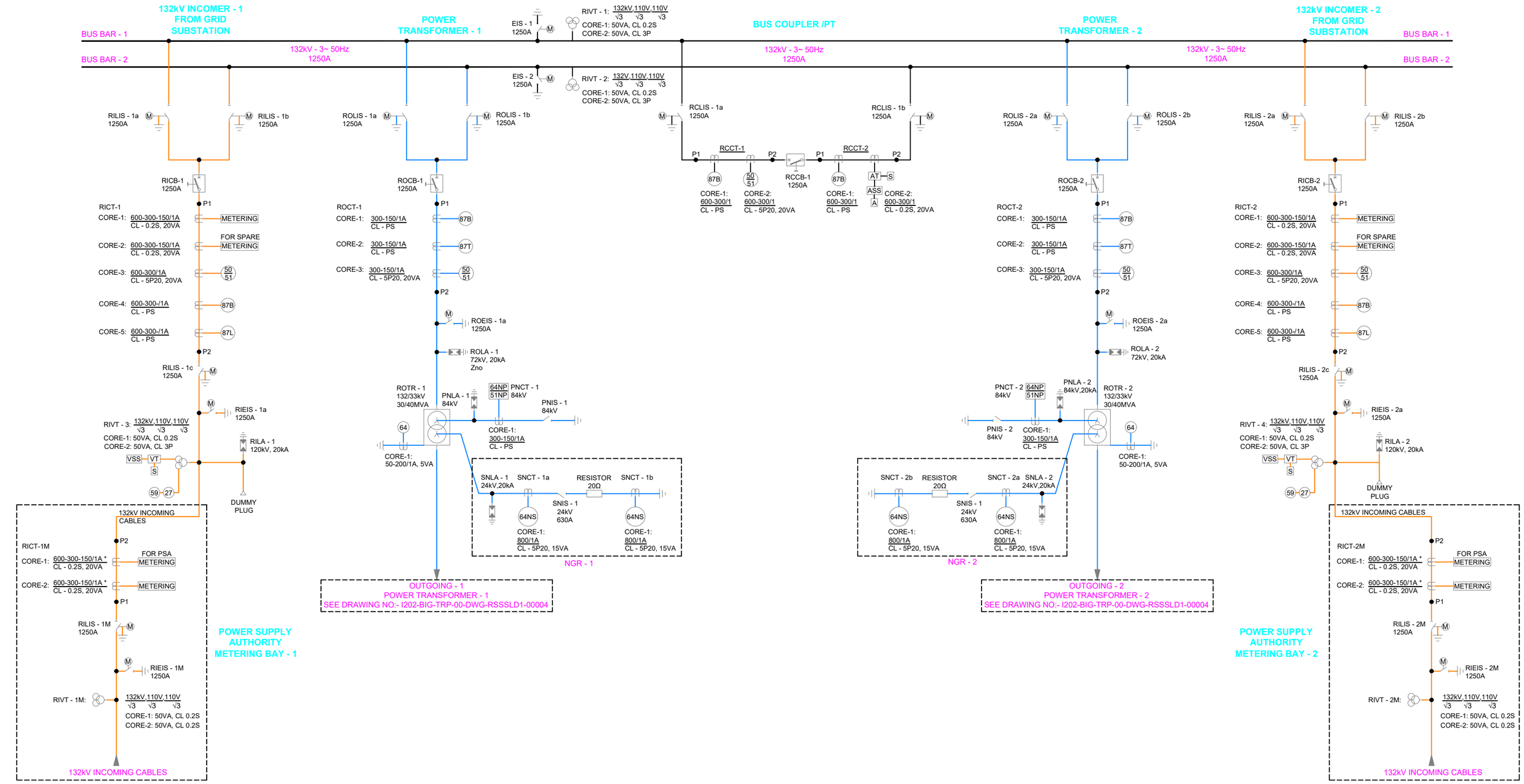
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL SLD FOR 132 KV RSS - GIS TYPE WITH PROTECTION (SHEET 1 OF 2)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSSLD1-00016 | REV: 1

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING

# 132kV AIR INSULATED (AIS) TYPE




| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 1 | Dec.2021 | AS PER PRE BID QUERIES | BS | AS | SP | SPS |
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

DETAILED DESIGN CONSULTANT

Ardanuy
ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE PHASE-3 RD, OKHLA PHASE III, NEW DELHI, DELHI 110020

RITES THE INFRASTRUCTURE PEOPLE
**RITES LTD.**
RITES BHAWAN, 1, SECTOR 29, GURGAON,HARYANA, INDIA-122001

| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

**TENDER DRAWING**
NOT TO BE USED FOR CONSTRUCTION

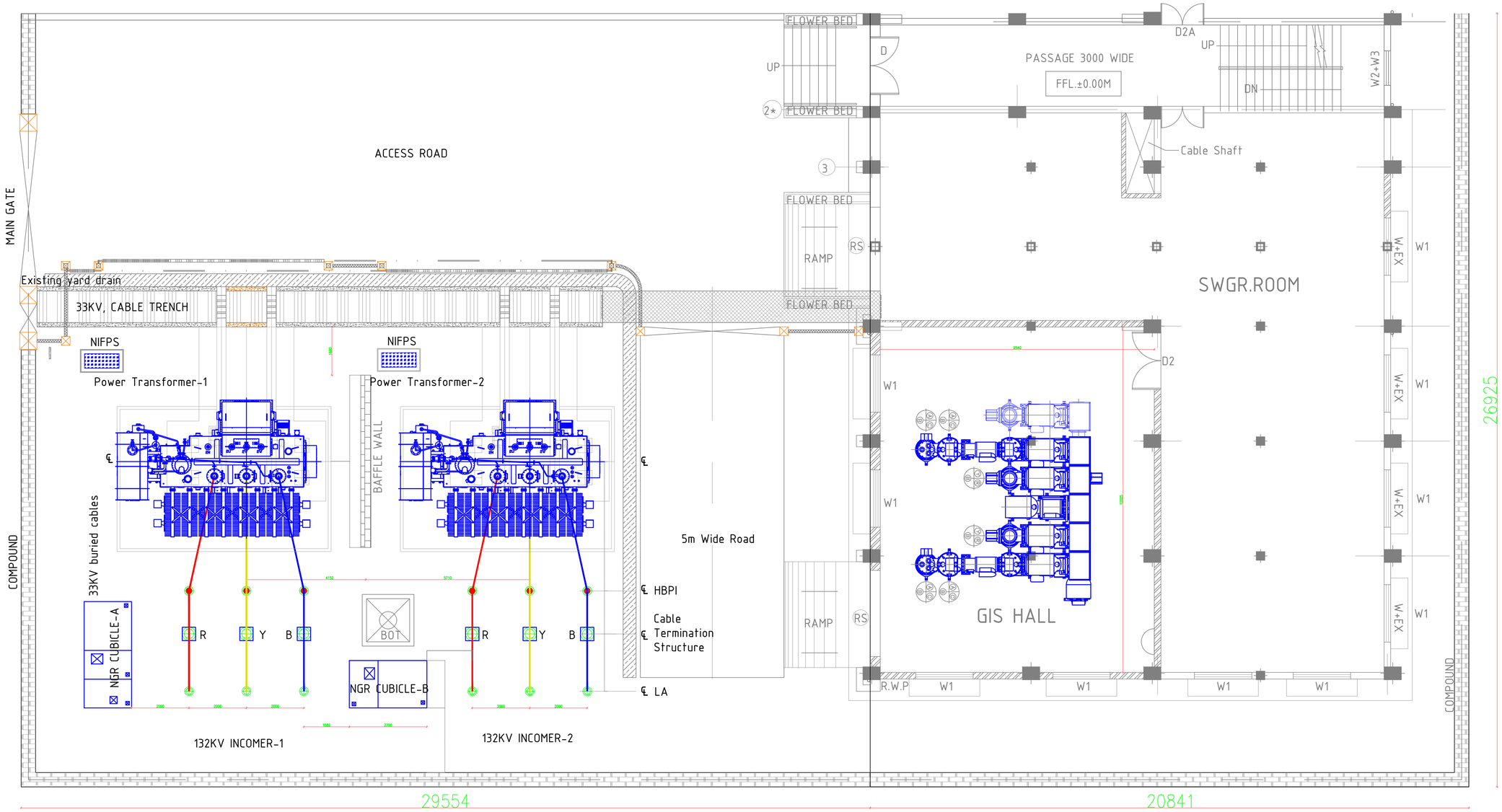
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09

DRAWING TITLE: TYPICAL SLD FOR 132 KV RSS - GIS TYPE WITH PROTECTION (SHEET 2 OF 2)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSSLD1-00016 REV: 1

SCALE: NTS DATE: December 2021 STATUS: TENDER DRAWING




LEGEND:-

| | | |
|---|---|---|
| | LA | LIGHTNING ARRESTER |
| | | CABLE TERMINATION SUPPORT |
| | HBPI | HIGH POST INSULATOR |
| | NGR | NEUTRAL GROUNDING RESISTER |
| | NIFPS (NITROGEN INJECTION FIRE PROTECTION SYSTEM) | |

Note:-

1. 132kV cable work from GSS to RSS(GIS) and from GIS to Transformer bay, is under the scope of PSA(Power supply authority).
2. 132kV cable termination kit at I/C & O/G of GIS shall be provided by the contractor, however termination kit at GSS end and at Transformer bay at RSS, shall be provided by PSA contractor.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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DELHI, DELHI 110020

**RITES LTD.**
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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

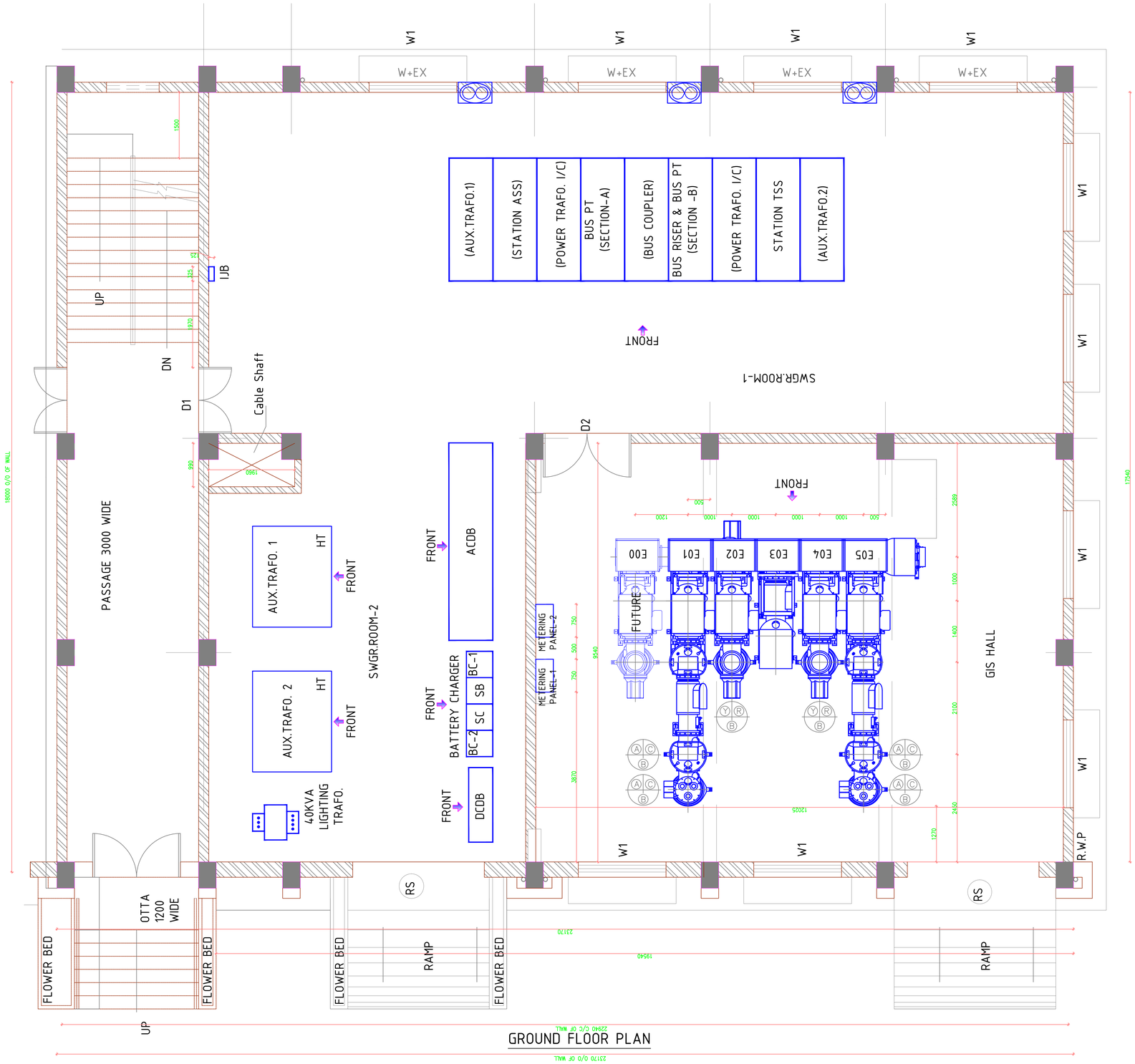
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL 132kV/33kV RSS (GIS)
SWITCHYARD EQUIPEMENT LAYOUT (SHEET - 01 OF 03)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSLYT1-00017 | REV: R1

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING




GROUND FLOOR PLAN

EQUIPMENT DETAILS# FOR RSS BUILDING: -

| SL NO | EQUIPMENT | LENGTH | WIDTH | HEIGHT | QUANTITY | WEIGHT (Kg/Unit) |
|---|---|---|---|---|---|---|
| | | (Dimensions of Individual Equipment in mm) | | | | |
| RSS–Building | | | | | | |
| 1 | 200kVA Auxiliary Dry type Transformer with enclosure for RSS | 2300 | 1800 | 2100 | 2 nos. | 2450 |
| 2 | 33KV panel for RSS including BUSPT and BUS RISER Panel | 2800 | 1000 | 2600 | 1 Set. | 1600 |
| 3 | ACDB (ALTERNATE CURRENT DISTRIBUTION BOARD) | 4500 | 1000 | 2400 | 1 no. | 75 |
| 4 | DCDB (DIRECT CURRENT DISTRIBUTION BOARD) | 1700 | 550 | 2400 | 1 no. | 50 |
| 5 | CONTROL & PROTECTION PANELS<br>L–1 => LINE 1 (INCOMER–1)<br>L–2 => LINE 2 (INCOMER–2)<br>T–1 => TRANSFORMER 1<br>T–2 => TRANSFORMER 2<br>T–2 => TRANSFORMER 2<br>BB => BUSBAR<br>BC => BUS COUPLER | 1000 | 1000 | 2265 | 1 Set. | 1000 |
| 6 | REMOTE TERMINAL UNIT (RTU) | 800 | 800 | 2000 | 3 nos. | 275 |
| 7 | BATTERY BANK (300AH) | 2690 | 800 | 1820 | 1 Set. | 2400 |
| 8 | BATTERY CHARGER (110V, 100A) | 600 | 600 | 1775 | 3 nos. | 500 |
| 9 | BATTERY BANK (FOR UPS) | 2425 | 875 | 1800 | 1 Set. | 2300 |
| 10 | UN INTERRUPTED POWER SUPPLY (UPS) | 600 | 600 | 1275 | 1 no. | 275 |
| 11 | REMOTE TAP CHANGER CONTROL CUBICLE (RTCC–1 & 2) | 600 | 600 | 2200 | 2 nos. | 250 |

# Dimension & Rating of equipements are shown typically.

NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. TYPICAL HEIGHT OF POWER SUPPLY ROOM ACCESS DOORS SHALL BE MIN.2500mm.
3. EARTH MAT BELOW 50mm SCREEDING & EQUIPMENT EARTHING IS IN THE SCOPE OF POWER SUPPLY CONTRACTOR.
4. CONTROL ROOM WILL BE AIR CONDITIONED.
5. MAIN GATE WILL BE MOTOR OPERATED.
6. EQUIPMENT RATINGS SHOWN HERE TYPICALLY SAME WILL BE REIVSED IN LINE WITH AC/DC SIMULATION STUDIES
7. 132KV CABLE WORK FROM GSS TO RSS(GIS) AND FROM GIS TO TRANSFORMER BAY, IS UNDER THE SCOPE OF PSA(POWER SUPPLY AUTHORITY).
8. 132KV CABLE TERMINATION KIT AT I/C & O/G OF GIS SHALL BE PROVIDED BY THE CONTRACTOR, HOWEVER TERMINATION KIT AT GSS END AND AT TRANSFORMER BAY AT RSS, SHALL BE PROVIDED BY PSA CONTRACTOR.

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

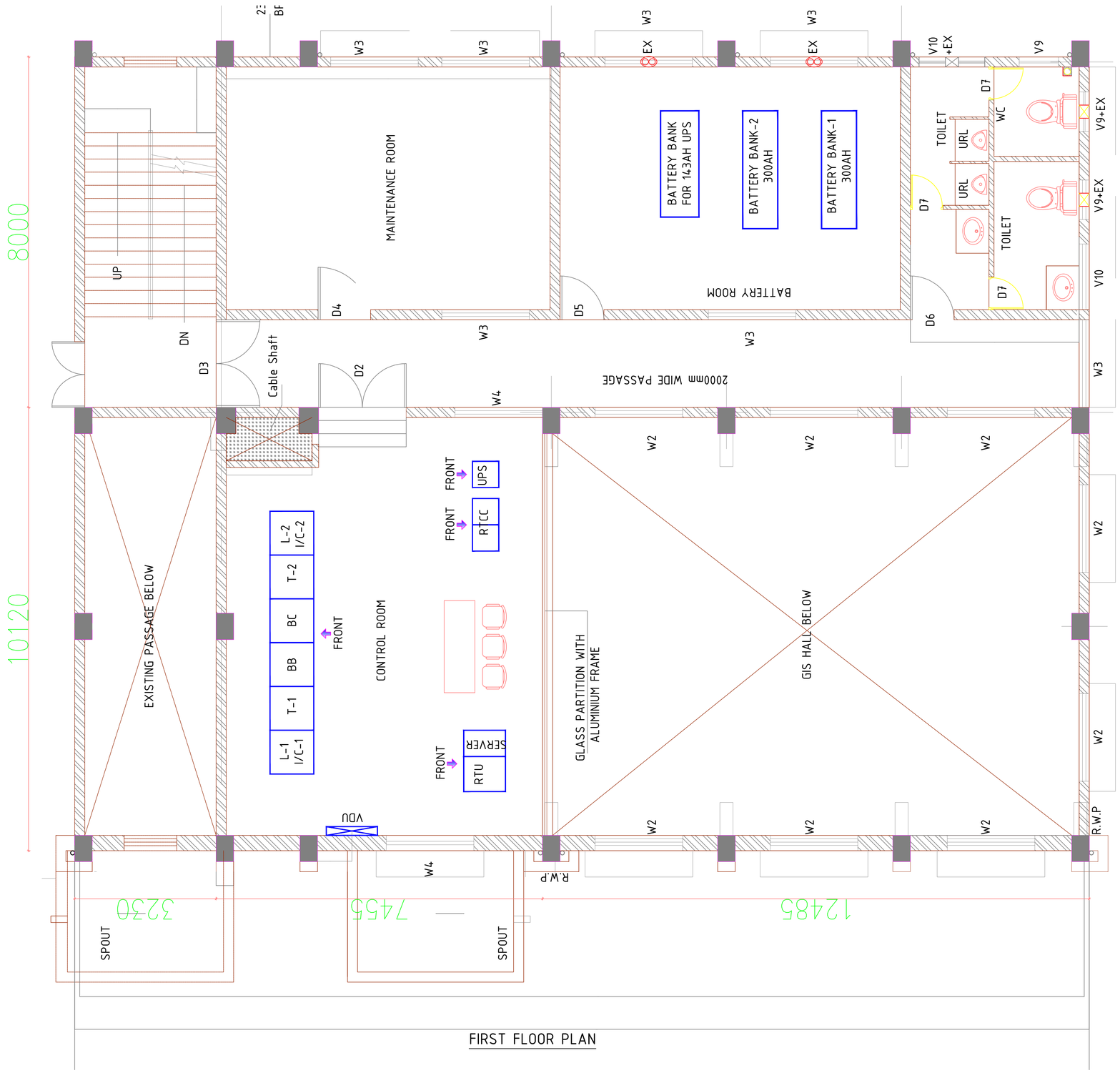
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL RSS (GIS) EQUIPEMENT LAYOUT PLAN FOR 33kV PANEL ROOM & GIS HALL (SHEET - 02 OF 03)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-RSSLYT1-00017 | REV: R1

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING




FIRST FLOOR PLAN

Note:–

1. 132kV cable work from GSS to RSS(GIS) and from GIS to Transformer bay, is under the scope of PSA(Power supply authority).
2. 132kV cable termination kit at I/C & O/G of GIS shall be provided by the contractor, however termination kit at GSS end and at Transformer bay at RSS, shall be provided by PSA contractor.

**TENDER DRAWING**
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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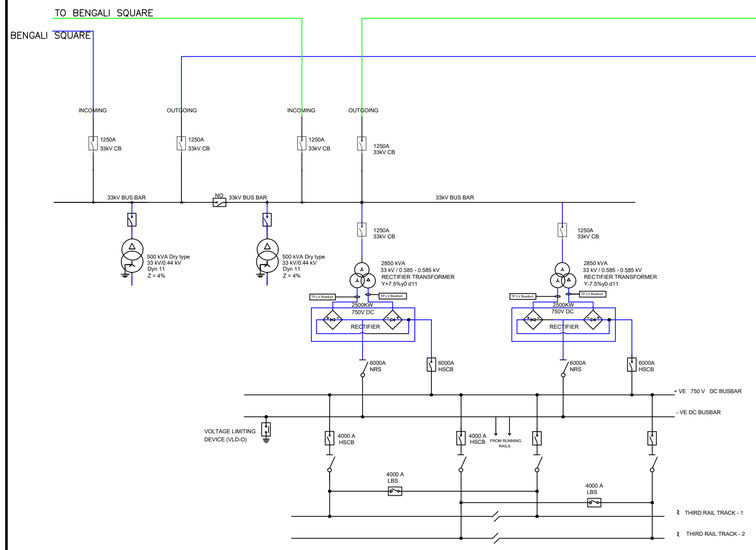
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

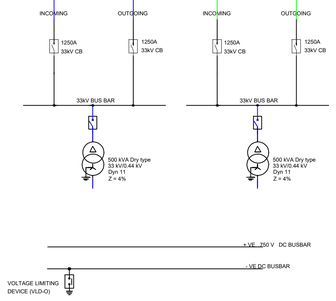
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL CONTROL ROOM EQUIPEMENT<br>LAYOUT PLAN FOR RSS (GIS) (SHEET - 03 OF 03) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-RSSLYT1-00017 |
| REV | R1 |
| SCALE | NTS |
| DATE | December 2021 |
| STATUS | TENDER DRAWING |

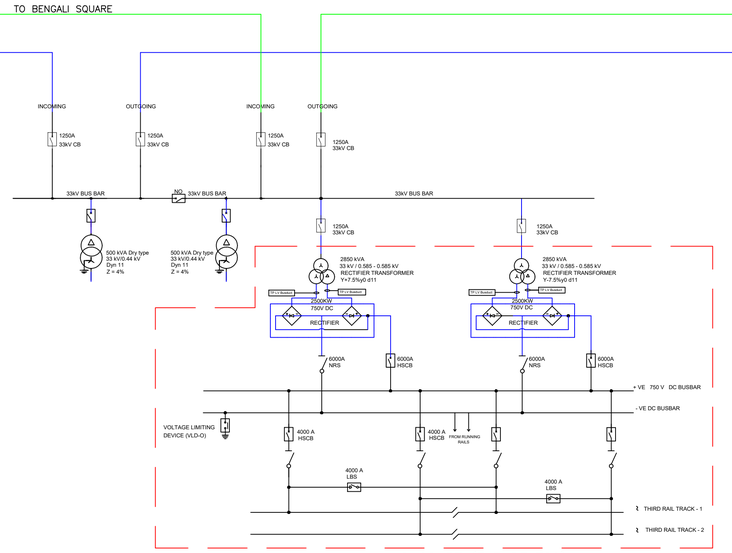
# 33kV POWER SUPPLY



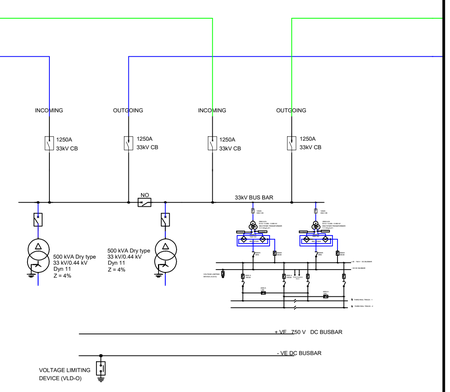

PATRAKAR COLONY
CH: 4.452



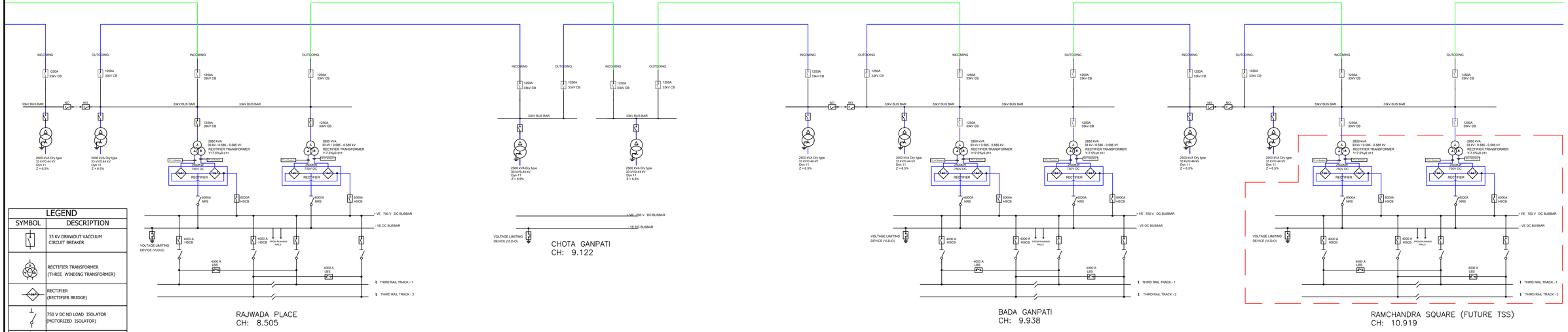

PALASIA SQUARE
CH: 5.133




HIGHCOURT (FUTURE TSS)
CH: 5.956




INDORE RAILWAY STATION
CH: 9.122




RAJWADA PLACE
CH: 8.505




CHOTA GANPATI
CH: 9.122




BADA GANPATI
CH: 9.938




RAMCHANDRA SQUARE (FUTURE TSS)
CH: 10.919

| LEGEND | |
|---|---|
| SYMBOL | DESCRIPTION |
| | 33 KV DRAWOUT VACCUUM CIRCUIT BREAKER |
| | RECTIFIER TRANSFORMER (THREE WINDING TRANSFORMER) |
| | RECTIFIER (RECTIFIER BRIDGE) |
| | 750 V DC NO LOAD ISOLATOR (MOTORIZED ISOLATOR) |
| | DC HIGH SPEED CIRCUIT BREAKER WITHDRAWABLE TYPE (HSCB) LOAD BREAKER SWITCH (LBS) |
| | LOAD BREAKER SWITCH (LBS) |
| | AUX. TRANSFORMER |
| | SHORT CIRCUITING DEVICE |

NOTE:

1. TSS location indicated on the basis of DC simulation report document no.ARDANUY-RITES/DDC-PST/IN/TPS/028,Rev 02 Dated 13/09/2021 by considering head ways 6 car scenario for 2054-2.5 minutes.
2. Future space shall be kept for those TSS which are required for 6 car, 2.5 minute headway, 2054 scenario, as these will come in future.
3. 33kV power supply distribution from different RSS in normal mode of operation and emergency mode of operation shall be as per clause no.-2.15.1 and 2.15.2 of AC simulation results (report no.-ARDANUY-RITES/DDC-PST/IN/ACT/030,Rev 02 Dated 13/09/2021 respectively and accordingly respective CBs will be normally open/close.
4. Size of 33kV Cable will be as per table no.-13.3 of chapter 13 of Vol-4 (Technical Specification).

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| R1 | Dec. 2021 | | | | | |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
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DELHI, DELHI 110020

**RITES LTD.**
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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

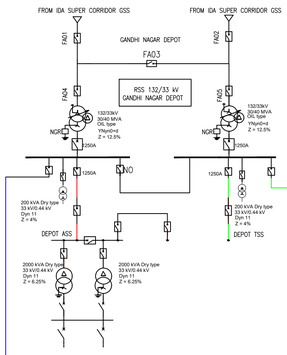
GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | 33 kV POWER SUPPLY SLD FOR INDORE METRO YELLOW LINE SHEET NO- (01 OF 05) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ATSSLD1-00103 |
| REV | R1 |
| SCALE | NTS |
| DATE | December 2021 |
| STATUS | TENDER DRAWING |

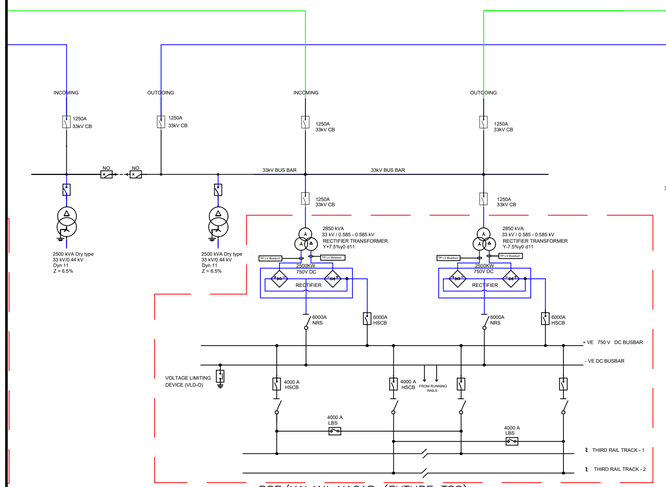
NOTE:

1. TSS location indicated on the basis of DC simulation report document no. ARDANUY-RITES/DDC-PST/IN/TPS/028,Rev 02 Dated 13/09/2021 by considering head ways 6 car scenario for 2054-2.5 minutes.
2. Future space shall be kept for those TSS which are required for 6 car, 2.5 minute headway, 2054 scenario, as these will come in future.
3. 33kV power supply distribution from different RSS in normal mode of operation and emergency mode of operation shall be as per clause no.-2.15.1 and 2.15.2 of AC simulation results (report no.-ARDANUY-RITES/DDC-PST/IN/ACT/030,Rev 02 Dated 13/09/2021 respectively and accordingly respective CBs will be normally open/close.
4. Size of 33kV Cable will be as per table no.-13.3 of chapter 13 of Vol-4 (Technical Specification).

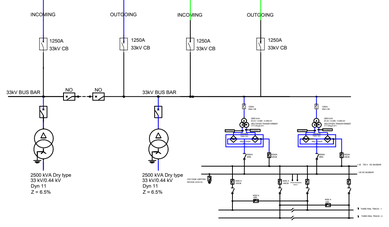



GANDHINAGAR DEPOT
(132/33 kV)

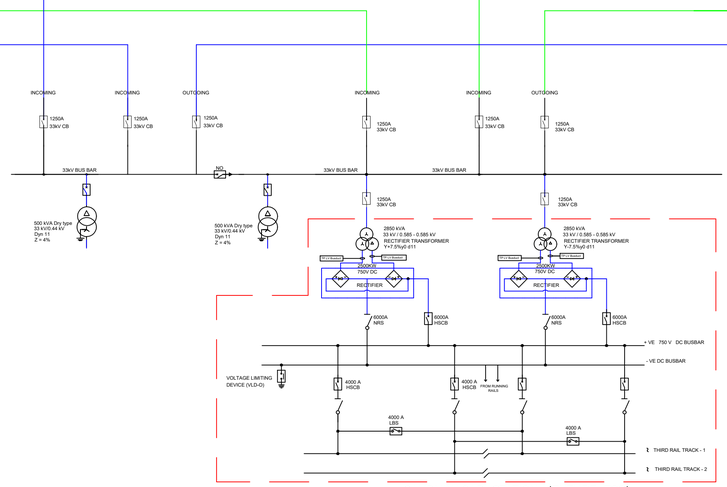
GANDHINAGAR DEPOT
CH: 15.189



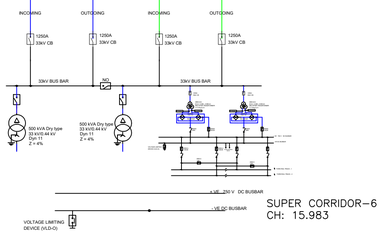

BSF/KALANI NAGAR (FUTURE TSS)
CH: 12.027



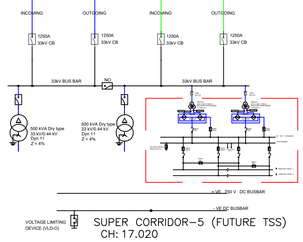

CH: 13.670



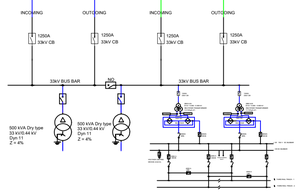

GANDHINAGAR STATION (FUTURE TSS)
CH: 15.189



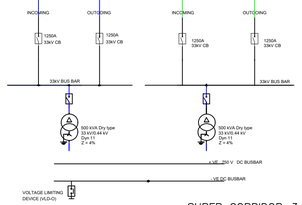

SUPER CORRIDOR-6
CH: 15.983




SUPER CORRIDOR-5 (FUTURE TSS)
CH: 17.020




SUPER CORRIDOR-4
CH: 18.239




SUPER CORRIDOR-3
CH: 19.444

| LEGEND | |
|---|---|
| SYMBOL | DESCRIPTION |
| | 33 KV DRAWOUT VACCUUM CIRCUIT BREAKER |
| | RECTIFIER TRANSFORMER (THREE WINDING TRANSFORMER) |
| | RECTIFIER (RECTIFIER BRIDGE) |
| | 750 V DC NO LOAD ISOLATOR (MOTORIZED ISOLATOR) |
| | DC HIGH SPEED CIRCUIT BREAKER WITHDRAWABLE TYPE (HSCB) LOAD BREAKER SWITCH (LBS) |
| | LOAD BREAKER SWITCH (LBS) |
| | AUX. TRANSFORMER |
| | SHORT CIRCUITING DEVICE |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
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| R1 | Dec. 2021 | | | | | |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

**RITES LTD.**
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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND PREPARED BY | BRAJESH CHECKED BY | SURENDRA PAL SINGH APPROVED BY | SURENDRA PAL SINGH ISSUED BY |
|---|---|---|---|

GENERAL CONSULTANT

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

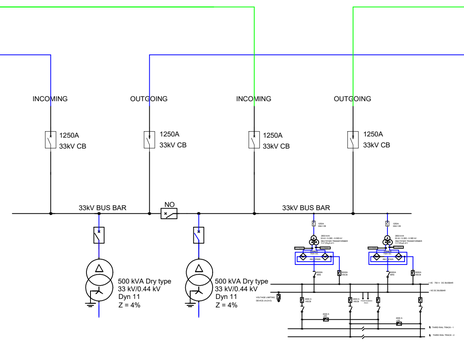
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

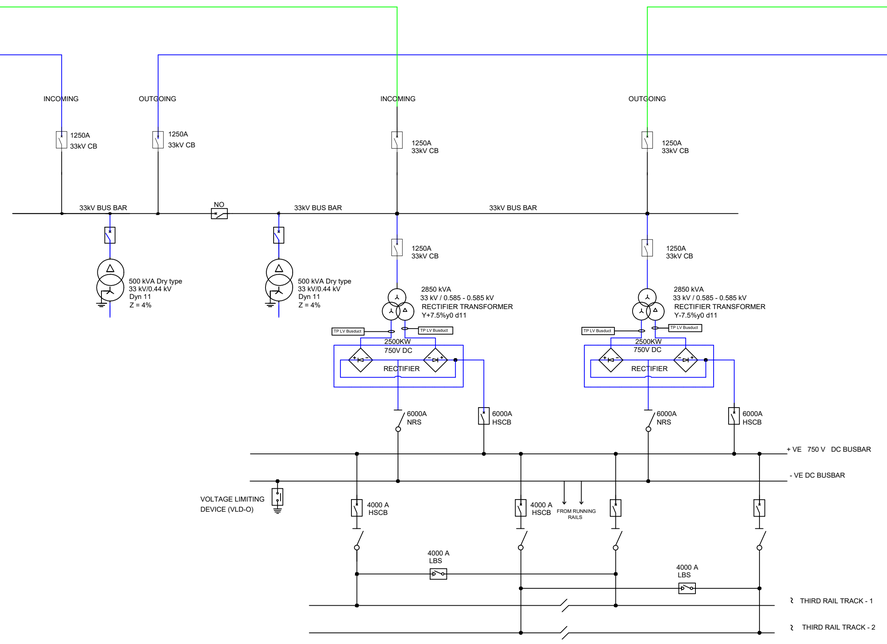
DRAWING TITLE: 33 kV POWER SUPPLY SLD FOR INDORE METRO
YELLOW LINE SHEET NO- (02 OF 05)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ATSSLD1-00103 REV: R1

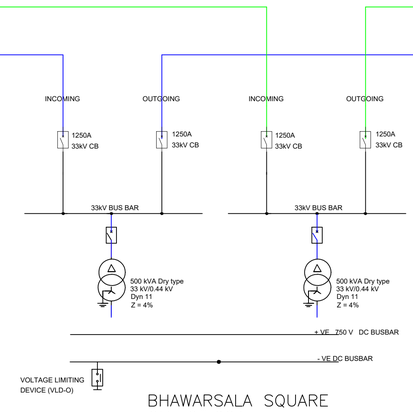
SCALE: NTS DATE: December 2021 STATUS: TENDER DRAWING



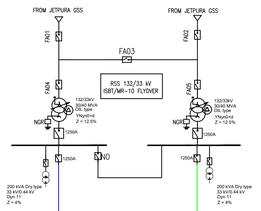

SUPER CORRIDOR–2
CH: 20.496




SUPER CORRIDOR–1
CH: 21.998



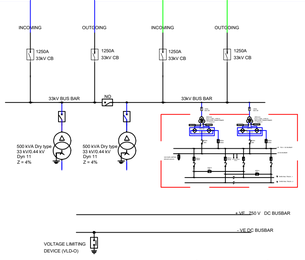

BHAWARSALA SQUARE
CH: 23.021



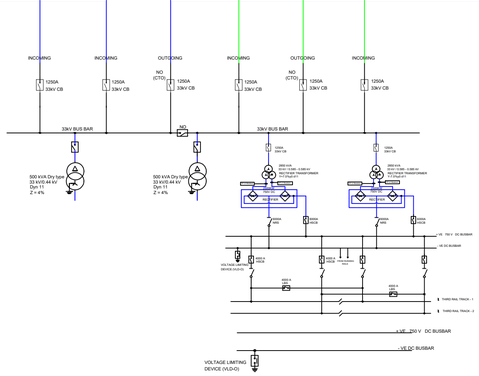

ISBT/MR–10 FLYOVER
(132/33 kV)

NOTE:

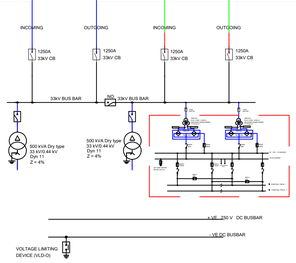
1. TSS location indicated on the basis of DC simulation report document no. ARDANUY-RITES/DDC-PST/IN/TPS/028,Rev 02 Dated 13/09/2021 by considering head ways 6 car scenario for 2054-2.5 minutes.
2. Future space shall be kept for those TSS which are required for 6 car, 2.5 minute headway, 2054 scenario, as these will come in future.
3. 33kV power supply distribution from different RSS in normal mode of operation and emergency mode of operation shall be as per clause no.-2.15.1 and 2.15.2 of AC simulation results (report no.-ARDANUY-RITES/DDC-PST/IN/ACT/030,Rev 02 Dated 13/09/2021 respectively and accordingly respective CBs will be normally open/close.
4. Size of 33kV Cable will be as per table no.-13.3 of chapter 13 of Vol-4 (Technical Specification).




MR–10 ROAD (FUTURE TSS)
CH: 24.250




ISBT/MR–10 FLYOVER
CH: 26.036




CHANDRAGUPTA SQUARE (FUTURE TSS)
CH: 26.834

| LEGEND | |
|---|---|
| SYMBOL | DESCRIPTION |
| | 33 KV DRAWOUT VACCUUM CIRCUIT BREAKER |
| | RECTIFIER TRANSFORMER (THREE WINDING TRANSFORMER) |
| | RECTIFIER (RECTIFIER BRIDGE) |
| | 750 V DC NO LOAD ISOLATOR (MOTORIZED ISOLATOR) |
| | DC HIGH SPEED CIRCUIT BREAKER WITHDRAWABLE TYPE (HSCB) LOAD BREAKER SWITCH (LBS) |
| | LOAD BREAKER SWITCH (LBS) |
| | AUX. TRANSFORMER |
| | SHORT CIRCUITING DEVICE |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| R1 | Dec. 2021 | | | | | |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

DETAILED DESIGN CONSULTANT

Ardanuy

ARDANUY INGENIERIA, S.A
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PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

RITES
THE INFRASTRUCTURE PEOPLE

**RITES LTD.**
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT
MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT
INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE
33 kV POWER SUPPLY SLD FOR INDORE METRO YELLOW LINE SHEET NO- (03 OF 05)

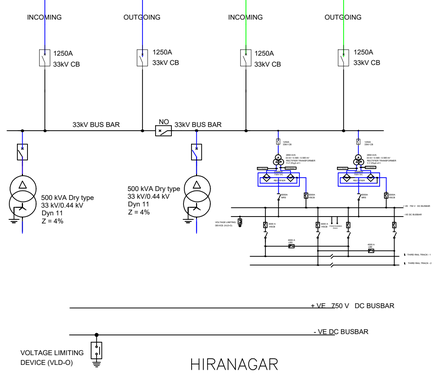
DRAWING NUMBER
I202-BIG-TRP-00-DWG-ATSSLD1-00103

REV
R1

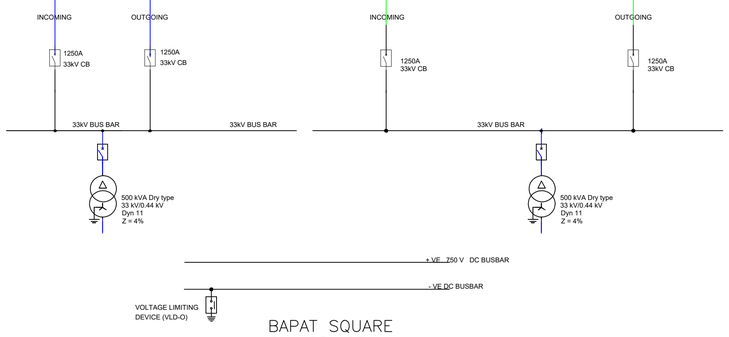
SCALE
NTS

DATE
December 2021

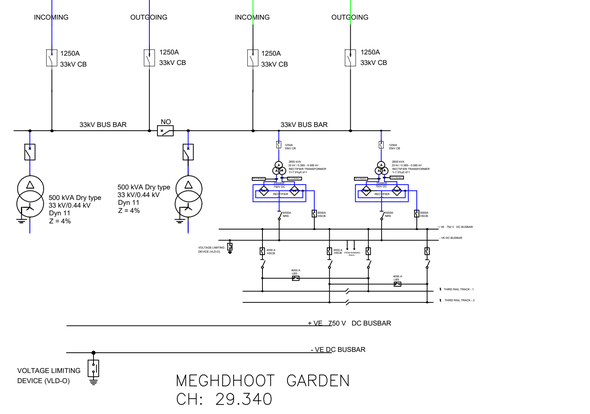
STATUS
TENDER DRAWING



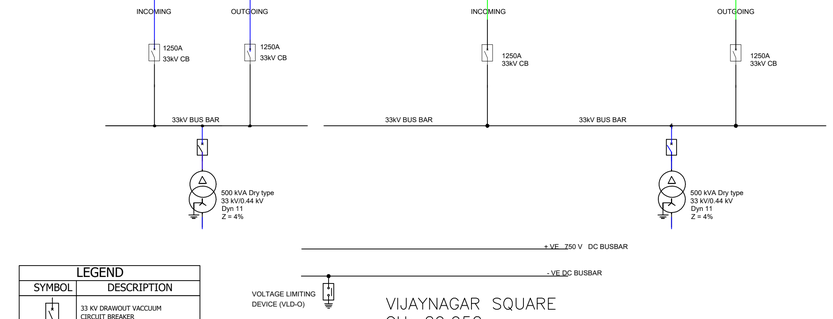

HIRANAGAR
CH: 27.689



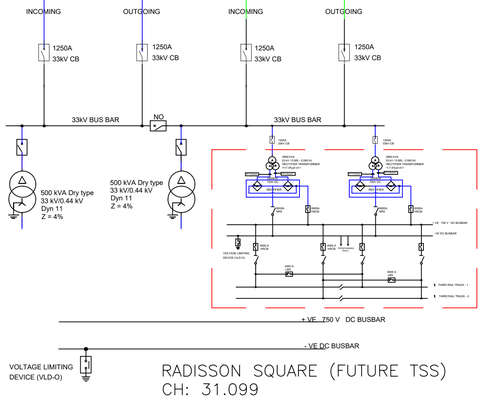

BAPAT SQUARE
CH: 28.465



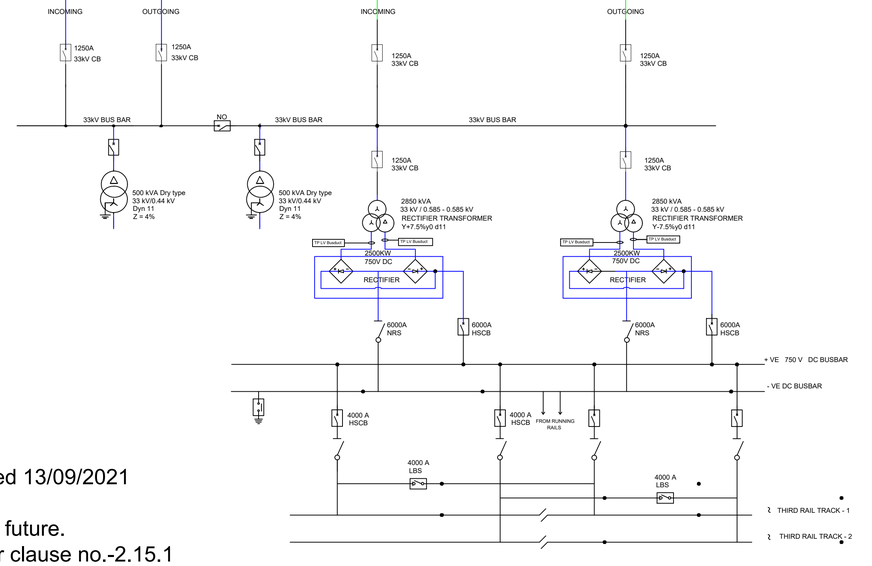

MEGHDHOOT GARDEN
CH: 29.340




VIJAYNAGAR SQUARE
CH: 29.952




RADISSON SQUARE (FUTURE TSS)
CH: 31.099




MUMTAJ BAG COLONY
CH: 31.924

| LEGEND | |
|---|---|
| SYMBOL | DESCRIPTION |
| | 33 KV DRAWOUT VACCUUM CIRCUIT BREAKER |
| | RECTIFIER TRANSFORMER (THREE WINDING TRANSFORMER) |
| | RECTIFIER (RECTIFIER BRIDGE) |
| | 750 V DC NO LOAD ISOLATOR (MOTORIZED ISOLATOR) |
| | DC HIGH SPEED CIRCUIT BREAKER WITHDRAWABLE TYPE (HSCB) LOAD BREAKER SWITCH (LBS) |
| | LOAD BREAKER SWITCH (LBS) |
| | AUX. TRANSFORMER |
| | SHORT CIRCUITING DEVICE |

NOTE:

1. TSS location indicated on the basis of DC simulation report document no.ARDANUY-RITES/DDC-PST/IN/TPS/028,Rev 02 Dated 13/09/2021 by considering head ways 6 car scenario for 2054-2.5 minutes.
2. Future space shall be kept for those TSS which are required for 6 car, 2.5 minute headway, 2054 scenario, as these will come in future.
3. 33kV power supply distribution from different RSS in normal mode of operation and emergency mode of operation shall be as per clause no.-2.15.1 and 2.15.2 of AC simulation results (report no.-ARDANUY-RITES/DDC-PST/IN/ACT/030,Rev 02 Dated 13/09/2021 respectively and accordingly respective CBs will be normally open/close.
4. Size of 33kV Cable will be as per table no.-13.3 of chapter 13 of Vol-4 (Technical Specification).

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| R1 | Dec. 2021 | | | | | |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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**RITES LTD.**
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| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

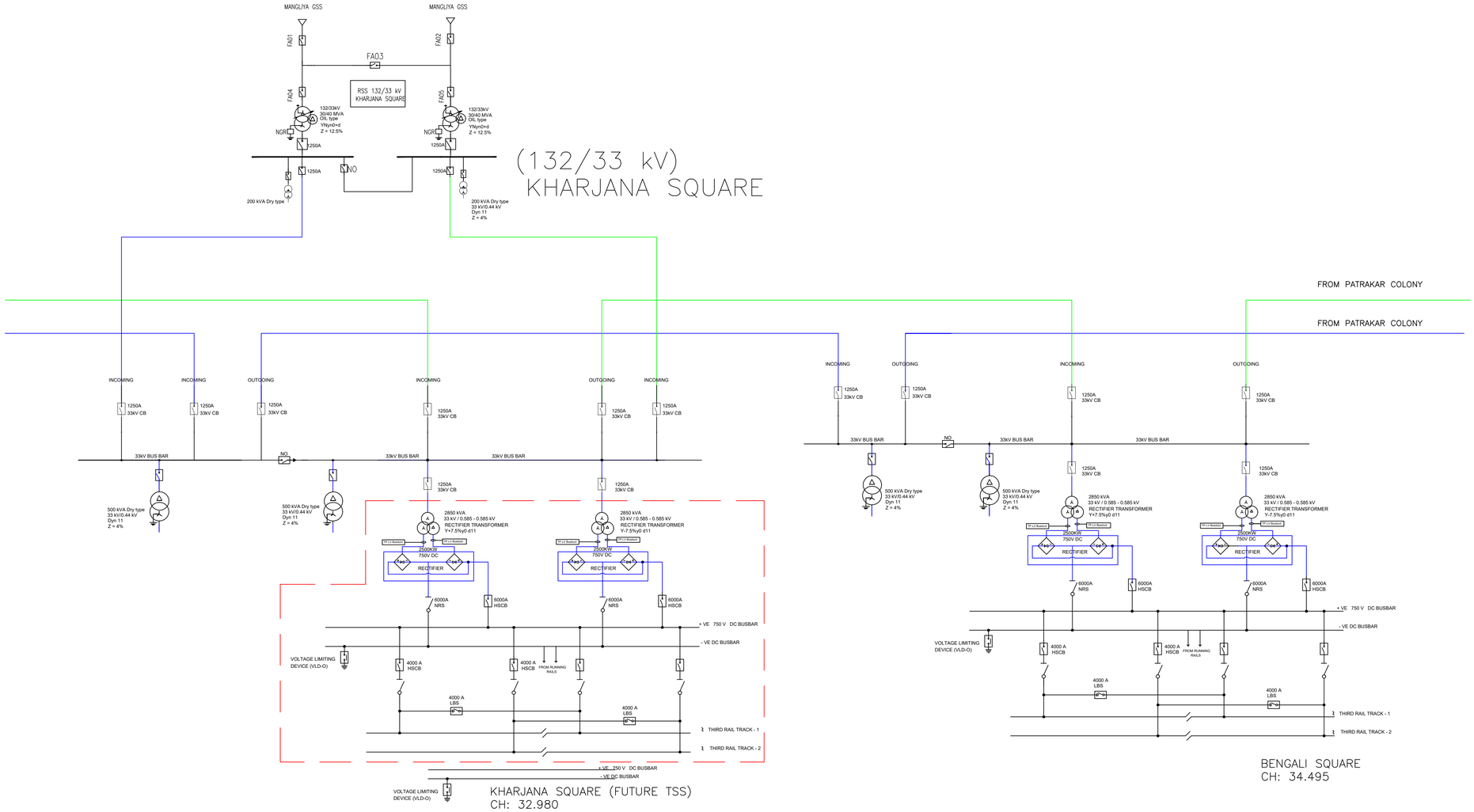
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: 33 kV POWER SUPPLY SLD FOR INDORE METRO
YELLOW LINE SHEET NO- (04 OF 05)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ATSSLD1-00103 REV: R1

SCALE: NTS DATE: December 2021 STATUS: TENDER DRAWING




NOTE:

1. TSS location indicated on the basis of DC simulation report document no.ARDANUY-RITES/DDC-PST/IN/TPS/028,Rev 02 Dated 13/09/2021 by considering head ways 6 car scenario for 2054-2.5 minutes.
2. Future space shall be kept for those TSS which are required for 6 car, 2.5 minute headway, 2054 scenario, as these will come in future.
3. 33kV power supply distribution from different RSS in normal mode of operation and emergency mode of operation shall be as per clause no.-2.15.1 and 2.15.2 of AC simulation results (report no.-ARDANUY-RITES/DDC-PST/IN/ACT/030,Rev 02 Dated 13/09/2021 respectively and accordingly respective CBs will be normally open/close.
4. Size of 33kV Cable will be as per table no.-13.3 of chapter 13 of Vol-4 (Technical Specification).

| LEGEND | |
|---|---|
| SYMBOL | DESCRIPTION |
| | 33 KV DRAWOUT VACCUUM CIRCUIT BREAKER |
| | RECTIFIER TRANSFORMER (THREE WINDING TRANSFORMER) |
| | RECTIFIER (RECTIFIER BRIDGE) |
| | 750 V DC NO LOAD ISOLATOR (MOTORIZED ISOLATOR) |
| | DC HIGH SPEED CIRCUIT BREAKER WITHDRAWABLE TYPE (HSCB) LOAD BREAKER SWITCH (LBS) |
| | LOAD BREAKER SWITCH (LBS) |
| | AUX. TRANSFORMER |
| | SHORT CIRCUITING DEVICE |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| R1 | Dec. 2021 | | | | | |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

**RITES LTD.**
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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

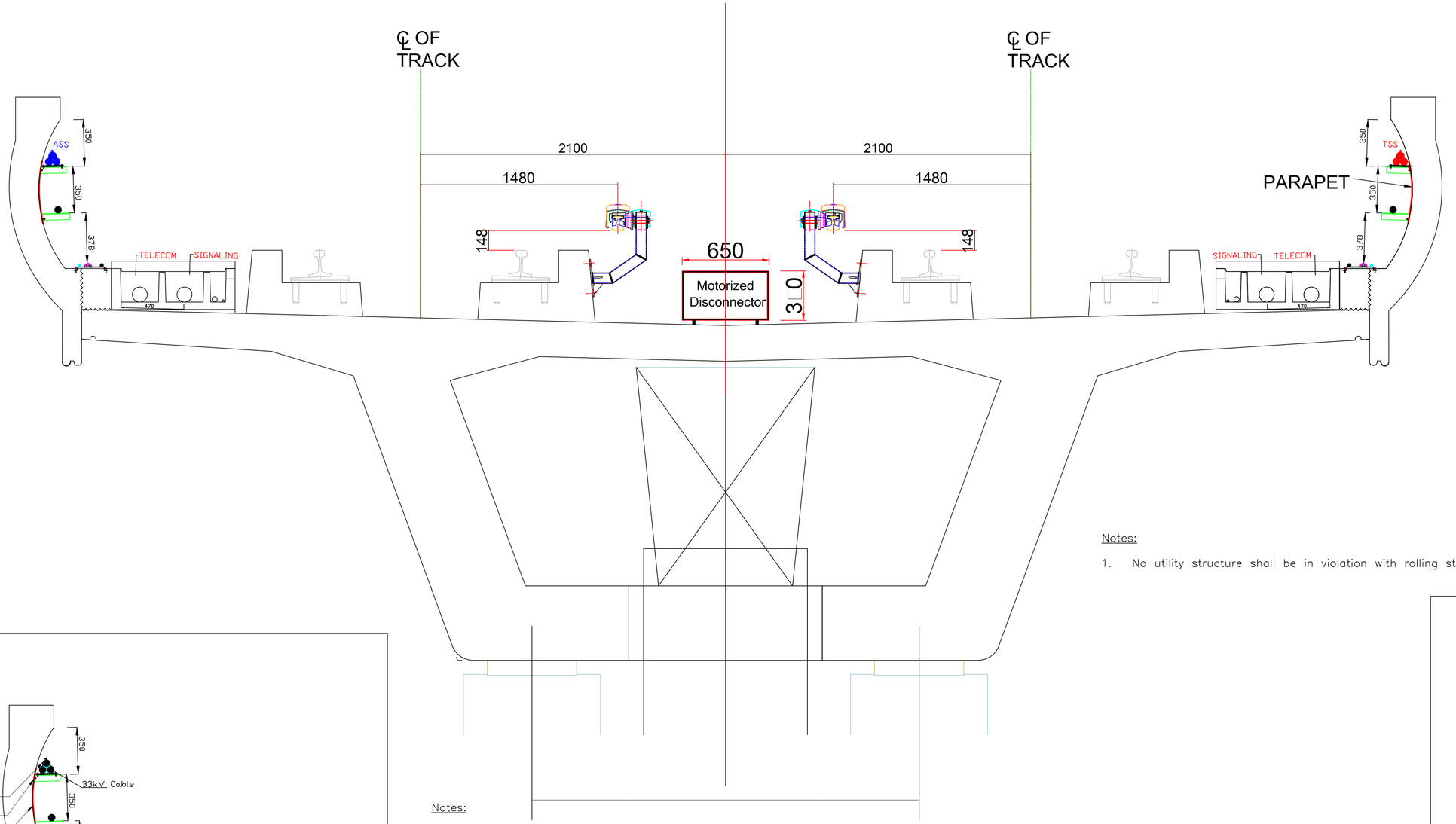
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

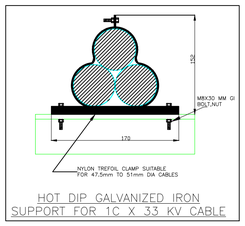
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: 33 kV POWER SUPPLY SLD FOR INDORE METRO
YELLOW LINE SHEET NO- (05 OF 05)

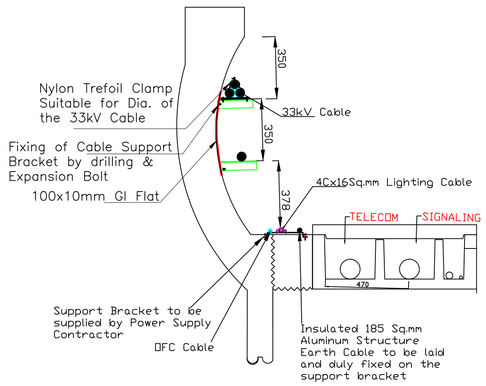
DRAWING NUMBER: I202-BIG-TRP-00-DWG-ATSSLD1-00103 | REV: R1

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING




HOT DIP GALVANIZED IRON SUPPORT FOR 1C X 33 KV CABLE




Notes:

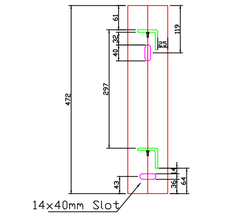
1. All Dimensions are in mm.
2. The longitudinal spacing between the cable support brackets shall be defined by the Power Supply Contractor duly considering the cable weight, permitted sag and requirements of IS 1255–Code of practice for installation and maintenance of power cables.
3. At some locations there may be two 33kV cable circuits or two return feeder on each side of the viaduct.
4. In addition, there may be requirement of laying / three control cables upto track side switches. Contractor shall keep that in view while providing support brackets for control cables.
5. Power Supply Contractor shall be responsible for supply and installation of cable support / brackets for 33kV cables, Return Feeder, Lighting Cable, Control Cables and Structure Earth Cable. He shall coordinate and interface with Viaduct contractor in this regard.
6. Supply Installation of Precast Cable Trough for Signalling and Telecom are in the scope of Viaduct Contractor.
7. The Power Supply Contractor shall ensure before drilling that no reinforcement exists at the location using profo meter or similar instrument.
8. The material for trefoil clamp for elevated and underground stations shall be nylon and aluminum respectively.

Notes:

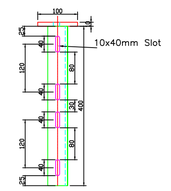
1. No utility structure shall be in violation with rolling stock structure gauge.

LEGEND

- ASS CIRCUIT
- TSS CIRCUIT




FRONT VIEW




TOP VIEW

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy
ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

RITES
THE INFRASTRUCTURE PEOPLE
RITES LTD.
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

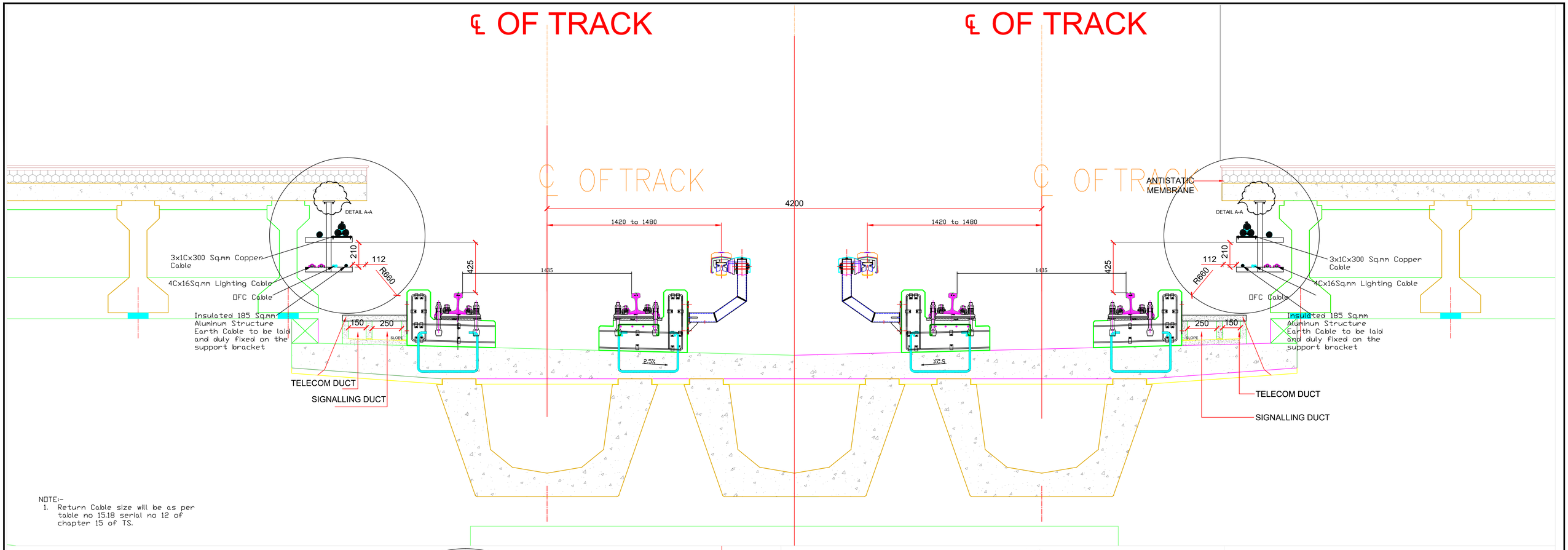
| PHOOL CHAND PREPARED BY | BRAJESH CHECKED BY | SURENDRA PAL SINGH APPROVED BY | SURENDRA PAL SINGH ISSUED BY |
|---|---|---|---|

GENERAL CONSULTANT

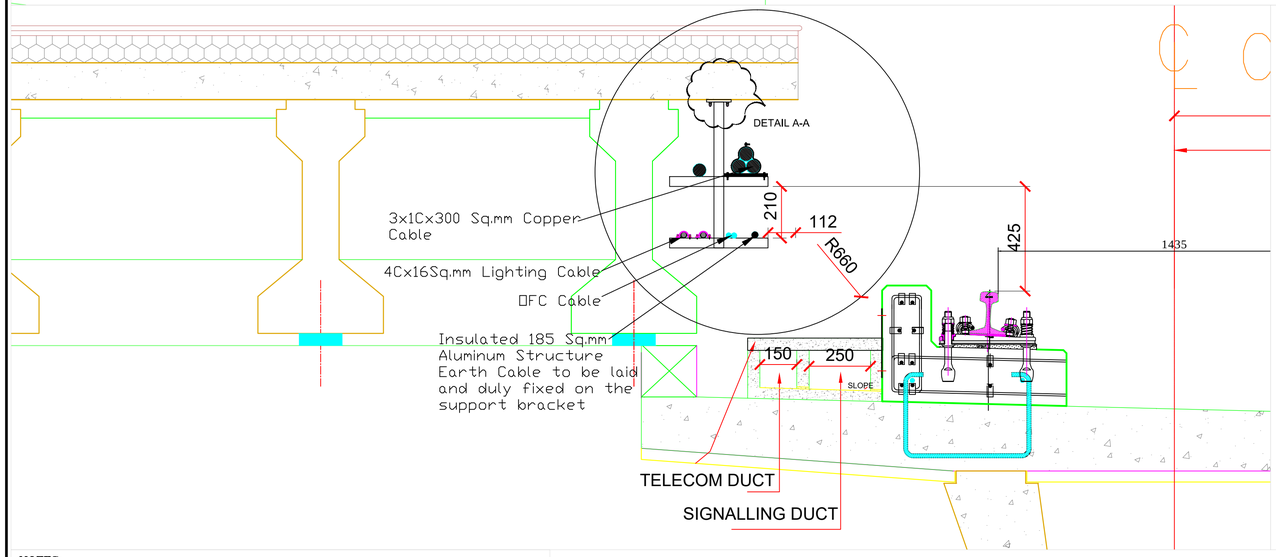
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

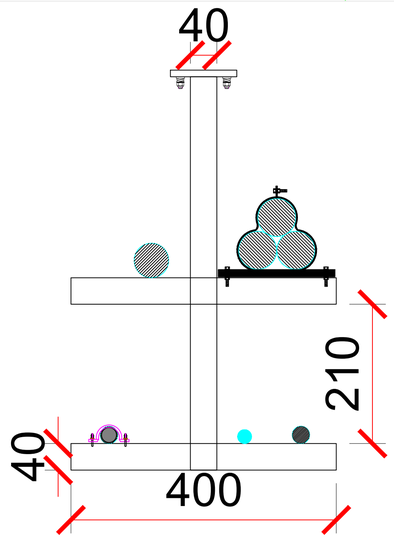
MPMETRO

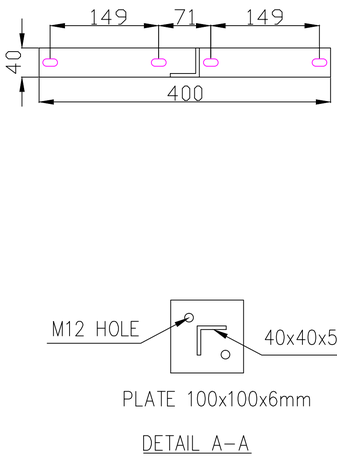
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL 33kV CABLE INSTALLATION ARRANGEMENT ON VIADUCT
DRAWING NUMBER: I202-BIG-TRP-00-DWG-CBLINS1-0010 | REV: 0
SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




NOTE:-
1. Return Cable size will be as per table no 15.18 serial no 12 of chapter 15 of TS.




NOTES:
1. ALL DIMENSIONS ARE IN MM.
2. DISTANCE BETWEEN EACH BRACKET SHALL BE 800 MM.
3. BRACKETS SHALL BE MADE OF G.I.
4. 50 mm DIA. HDPE PIPES ON BOTH SIDES OF THE STATION PLATFORM SHALL BE PROVIDED BY THE STATION BUILDING CONTRACTOR.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE PHASE-3 RD, OKHLA PHASE III, NEW DELHI, DELHI 110020

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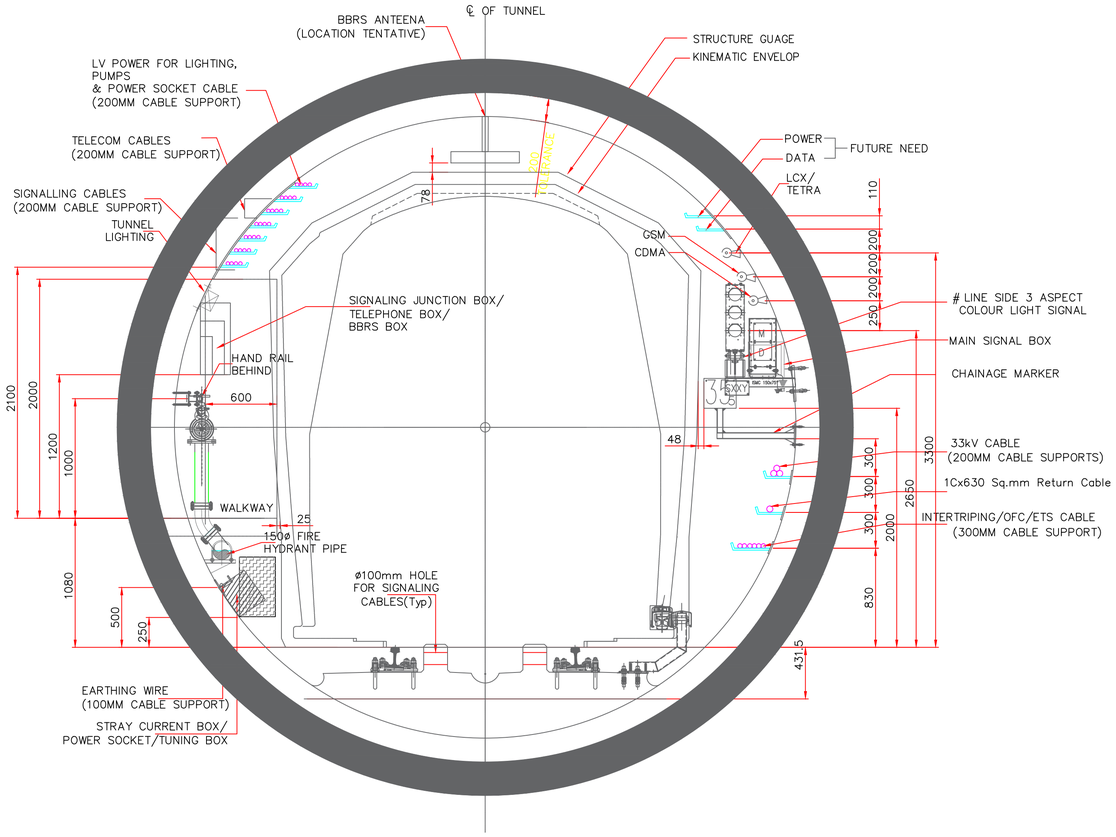
| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

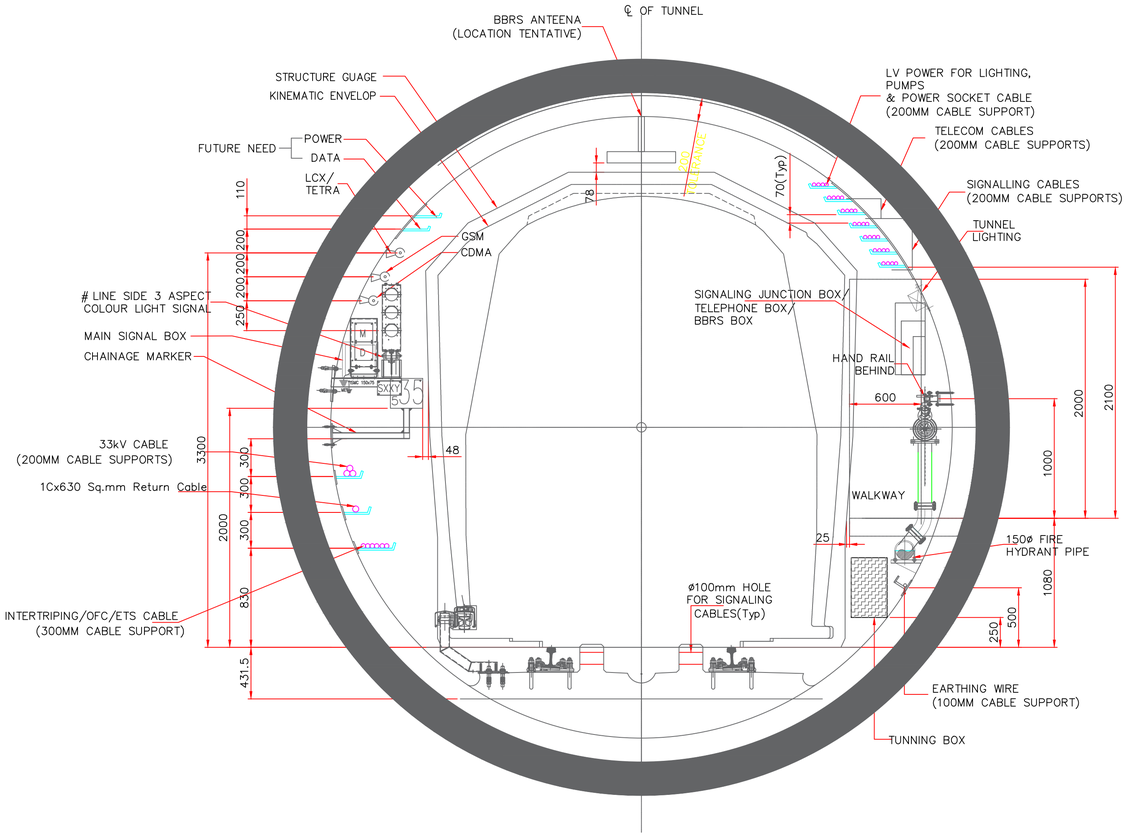
GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL 33kV CABLE INSTALLATION ARRANGEMENT IN STATION AREA
DRAWING NUMBER: I202-BIG-TRP-00-DWG-CBLINS1-0010 □ REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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DELHI, DELHI 110020

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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

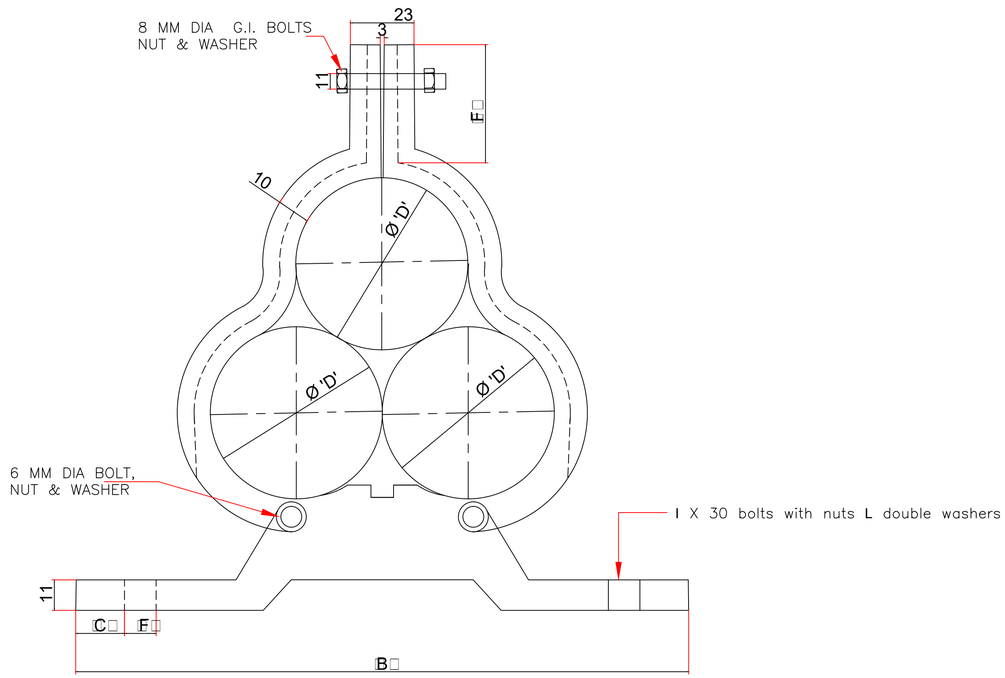
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

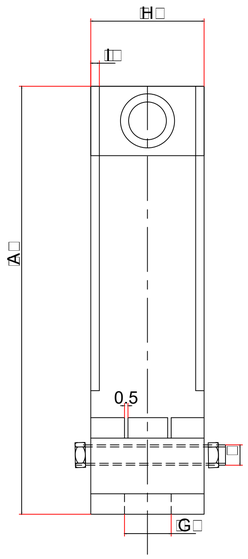
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL 33kV CABLE INSTALLATION ARRANGEMENT IN TUNNEL

DRAWING NUMBER: I202-BIG-TRP-00-DWG-CBLINS1-0010 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




Overall tolerance ±5% Exceot ib "d"

| 'A' | 'B' | 'C' | 'D' | 'E' | 'F' | 'G' | 'H' | 'I' |
|---|---|---|---|---|---|---|---|---|
| 151 | 135 | 8 | 50±2 | 11 | 21 | 21 | 40 | 3 |

Notes:

1. ALL BOLTS, NUTS & WASHERS SHALL BE G.I. passivated.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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GURGAON,HARYANA, INDIA-122001

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

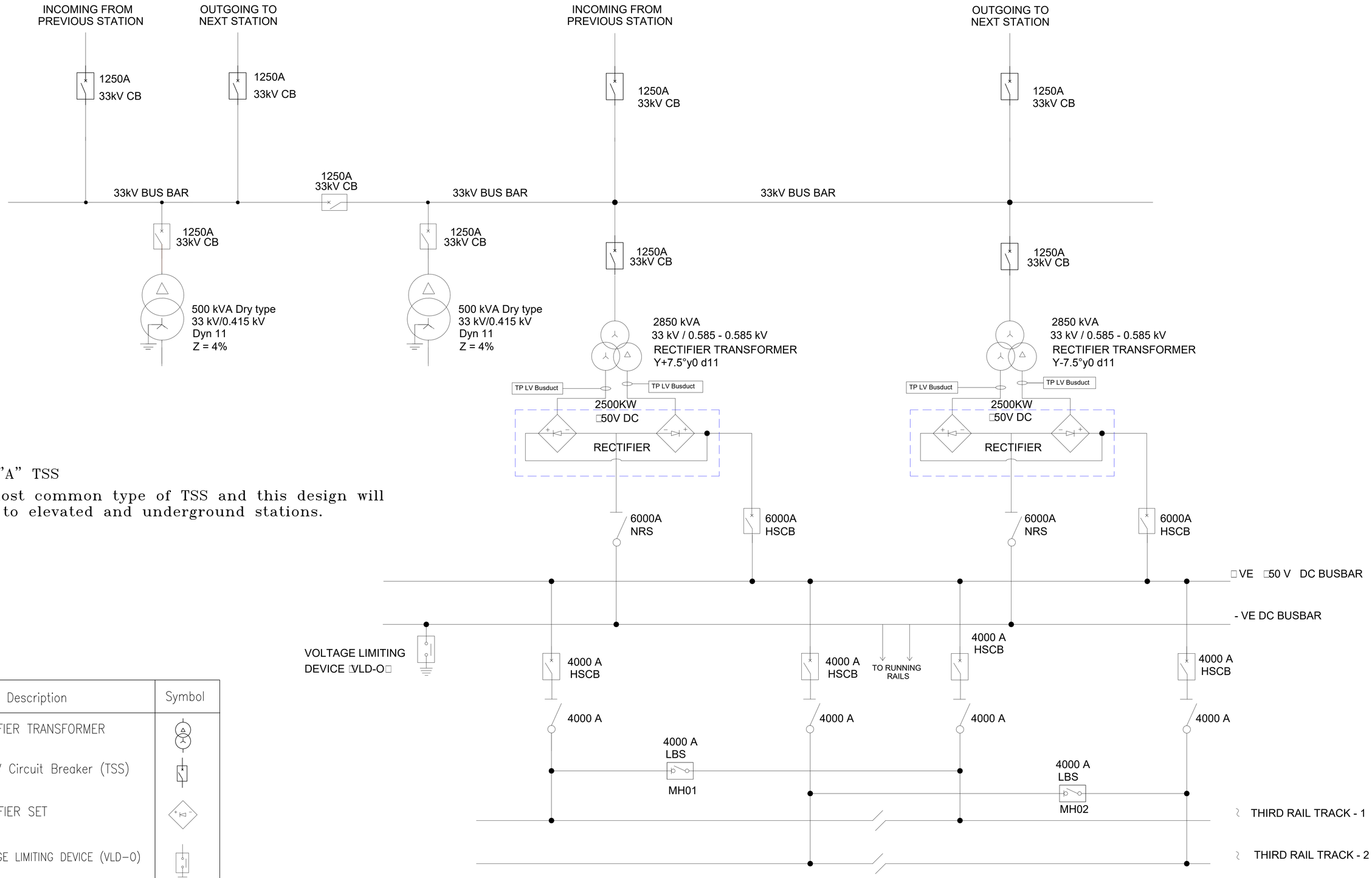
GENERAL CONSULTANT

DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL DRAWINGS FOR ARRANGEMENT OF 33 KV CABLES WITH TREFOIL CLAMPS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-CBLINS1-0010□
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TRACTION SUBSTATION
# (TSS)




NOTE : TYPE "A" TSS

This is the most common type of TSS and this design will be applicable to elevated and underground stations.

LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | RECTIFIER TRANSFORMER | |
| 2 | 33kV Circuit Breaker (TSS) | |
| 3 | RECTIFIER SET | |
| 4 | VOLTAGE LIMITING DEVICE (VLD-O) | |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

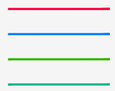
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL SLD FOR TYPE A TRACTION SUBSTATION

DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSSLD1-00201 REV: 0

SCALE: NTS DATE: October 2021 STATUS: TENDER DRAWING

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 |  | ES - EARTH SWITCH (MANUALLY) |
| 2 |  | CB - CIRCUIT BREAKER |
| 3 |  | CT - CURRENT TRANSFORMER |
| 4 |  | AT - AUXILIARY TRANSFORMER |
| 5 |  | CCB - COUPLER CIRCUIT BREAKER |
| 6 |  | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 |  | RT - RECTIFIER TRANSFORMER |
| 8 |  | DR - RECTIFIER |
| 9 |  | PT - DC POTENTIAL TRANSFORMER |
| 10 |  | CT - DC CURRENT TRANSFORMER |
| 11 |  | PT - POTENTIAL TRANSFORMER |
| 12 |  | DL - LOAD BREAK SWITCH |
| 13 |  | DH - DC HIGH SPEED CIRCUIT BREAKER (HSCB) |
| 14 |  | NRP - NEGATIVE RETURN PANEL |
| 15 |  | OVPD - OVER VOLTAGE PROTECTION DEVICE |
| 16 |  | IJ - INSULATED JOINT ASSEMBLY |
| 17 |  | SCD - SHORT CIRCUIT & EARTHING DEVICE |
| 18 |  | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2<br>750V DC +Ve<br>750V DC -Ve |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 21 | DC LINE TESTING DEVICE |
| 26A | 1st DIODE TEMPERATURE RELAY |
| 26T | 2nd DIODE TEMPERATURE RELAY |
| 27 | UNDER VOLTAGE RELAY |
| 32 | REVERSE POWER RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49A | 1st Winding Over Temperature Relay |
| 49T | 2nd Winding Over Temperature Relay |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |
| 51N<br>51N<br>51P | TIME-OVERCURRENT-GROUND<br>TIME DELAY MAXIMUM CURRENT RELAY(Neg./Pos.) |
| 58A | 1st DIODE FAILURE |
| 58T | 2nd DIODE FAILURE |
| 59 | OVER VOLTAGE RELAY |
| 63 | RUNNING RAIL VOLTAGE MONITORING |

| CODE | DESCRIPTION |
|---|---|
| 67<br>67N | DIRECTIONAL OVER CURRENT PROTECTION RELAY<br>DIRECTIONAL EARTH FAULT PROTECTION RELAY |
| 76 | D.C OVER CURRENT SERIES TRIP RELAY |
| 82 | AUTOMATIC RECLOSING OF DC HSCB |
| 85 | TRANSMIT, RECIEVE & MONITOR RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86R | LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| di/dt | DC RATE OF RISE OF CURRENT RELAY |
| 95 | TRIP CIRCUIT SUPERVISION |
| 99 | RECTIFIER SURGE PROTECTION RELAY |
| 64 GD | ENCLOSURE GROUND RELAY |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| RT | 750 Vdc TRACTION TRANSFORMER |
| DR | 750 Vdc RECTIFIER |
| DH | 750 Vdc HIGH SPEED CIRCUIT BREAKER |
| NRP | NEGATIVE RETURN PANEL |
| DI | 750 Vdc ISOLATOR |
| DL | 750 Vdc LOAD BREAK SWITCH |
| ES | EARTH SWITCH (MANUALLY) |
| SCD | SHORT CIRCUIT DEVICE |
| LBS | LOAD BREAK SWITCH |
| E | FRAME EARTH |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy
ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

RITES
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RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

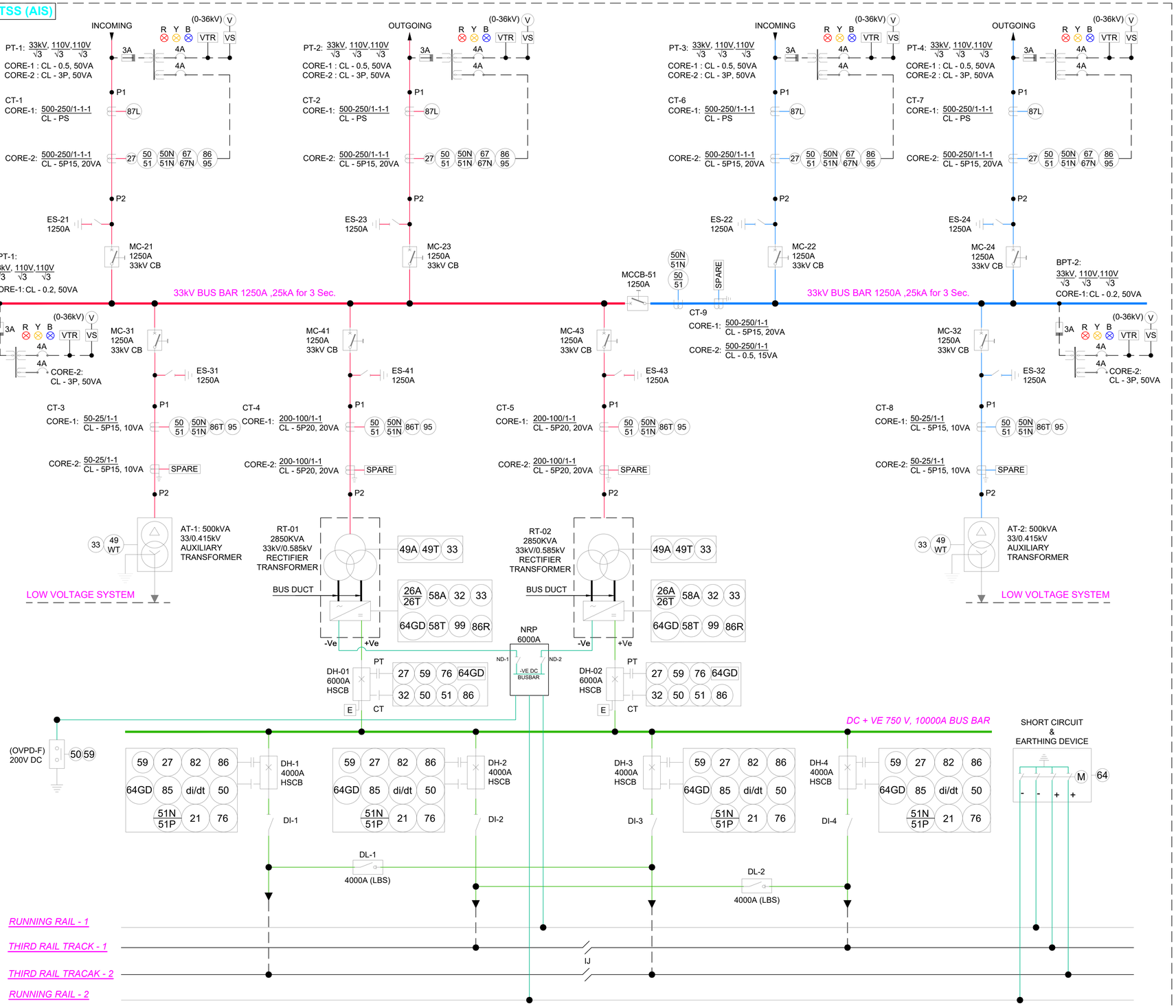
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF ELEVATED ASS+TSS TYPE A (SHEET 1 OF 2)
DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSSLD1-00202
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TYPE - A

ASS+TSS (AIS)




NOTE:- TYPE "A" ASS+TSS

THIS IS THE MOST COMMON TYPE OF ASS+TSS AND THIS DESIGN WILL BE APPLICABLE TO ELEVATED STATIONS.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

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RITES THE INFRASTRUCTURE PEOPLE

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|---|---|---|---|

GENERAL CONSULTANT

DB GEODATA Louis Berger

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

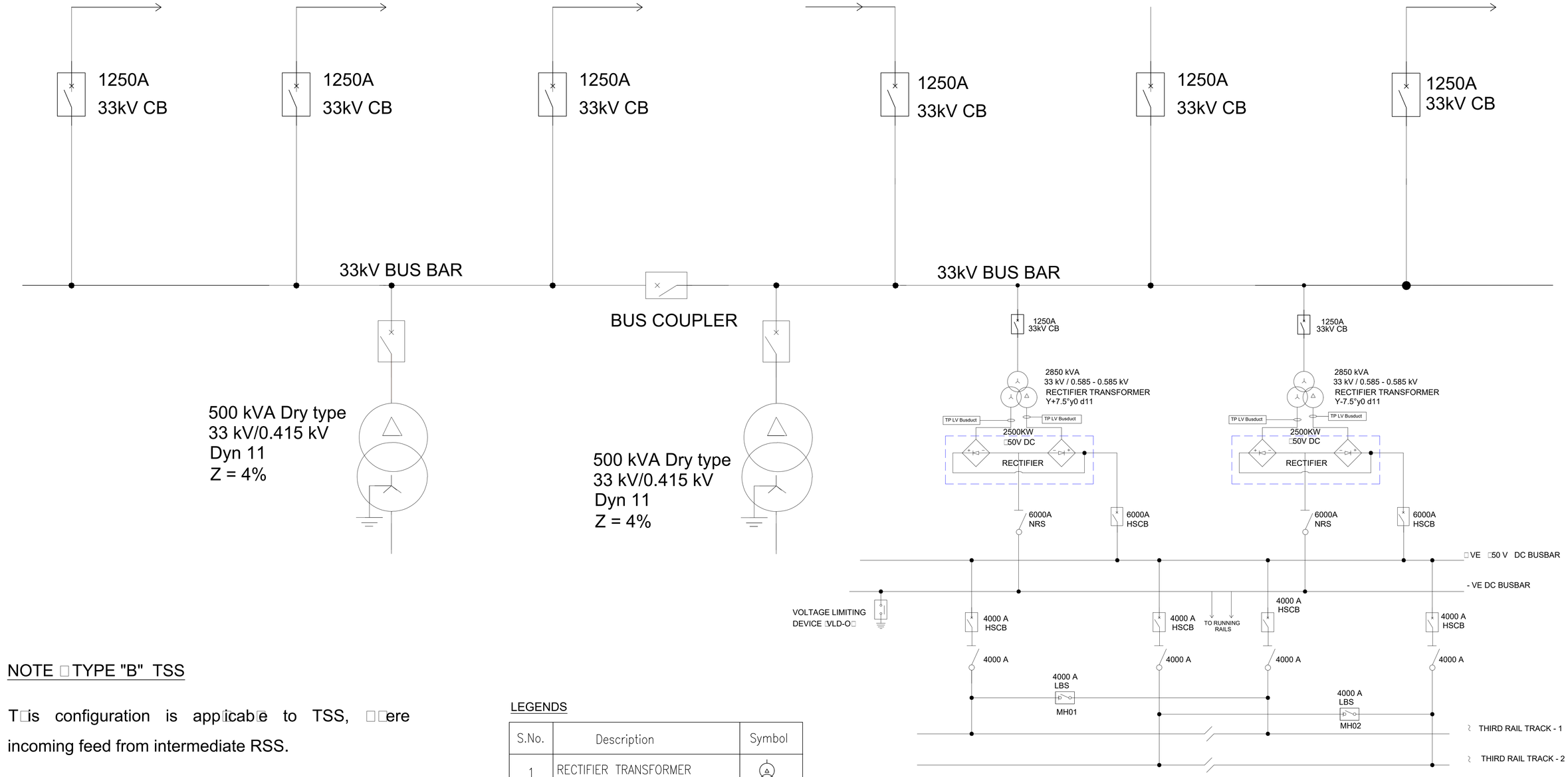
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09

DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF ELEVATED ASS+TSS TYPE A (SHEET 2 OF 2)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSS-SLD1-00202 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




## NOTE TYPE "B" TSS

This configuration is applicable to TSS, where incoming feed from intermediate RSS.

LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | RECTIFIER TRANSFORMER | |
| 2 | 33kV Circuit Breaker (TSS) | |
| 3 | RECTIFIER SET | |
| 4 | VOLTAGE LIMITING DEVICE (VLD-O) | |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND PREPARED BY | BRAJESH CHECKED BY | SURENDRA PAL SINGH APPROVED BY | SURENDRA PAL SINGH ISSUED BY |
|---|---|---|---|

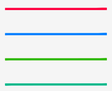
GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL SLD FOR TYPE B TRACTION SUBSTATION |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-TSSSLD1-00203 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 |  | ES - EARTH SWITCH (MANUALLY) |
| 2 |  | CB - CIRCUIT BREAKER |
| 3 |  | CT - CURRENT TRANSFORMER |
| 4 |  | AT - AUXILIARY TRANSFORMER |
| 5 |  | CCB - COUPLER CIRCUIT BREAKER |
| 6 |  | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 |  | RT - RECTIFIER TRANSFORMER |
| 8 |  | DR - RECTIFIER |
| 9 |  | PT - DC POTENTIAL TRANSFORMER |
| 10 |  | CT - DC CURRENT TRANSFORMER |
| 11 |  | PT - POTENTIAL TRANSFORMER |
| 12 |  | DL - LOAD BREAK SWITCH |
| 13 |  | DH - DC HIGH SPEED CIRCUIT BREAKER (HSCB) |
| 14 |  | NRP - NEGATIVE RETURN PANEL |
| 15 |  | OVPD - OVER VOLTAGE PROTECTION DEVICE |
| 16 |  | IJ - INSULATED JOINT ASSEMBLY |
| 17 |  | SCD - SHORT CIRCUIT & EARTHING DEVICE |
| 18 |  | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2<br>750V DC +Ve<br>750V DC -Ve |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 21 | DC LINE TESTING DEVICE |
| 26A | 1st DIODE TEMPERATURE RELAY |
| 26T | 2nd DIODE TEMPERATURE RELAY |
| 27 | UNDER VOLTAGE RELAY |
| 32 | REVERSE POWER RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49A | 1st Winding Over Temperature Relay |
| 49T | 2nd Winding Over Temperature Relay |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |
| 51N<br>51N<br>51P | TIME-OVERCURRENT-GROUND<br>TIME DELAY MAXIMUM CURRENT RELAY(Neg./Pos.) |
| 58A | 1st DIODE FAILURE |
| 58T | 2nd DIODE FAILURE |
| 59 | OVER VOLTAGE RELAY |
| 63 | RUNNING RAIL VOLTAGE MONITORING |

| CODE | DESCRIPTION |
|---|---|
| 67<br>67N | DIRECTIONAL OVER CURRENT PROTECTION RELAY<br>DIRECTIONAL EARTH FAULT PROTECTION RELAY |
| 76 | D.C OVER CURRENT SERIES TRIP RELAY |
| 82 | AUTOMATIC RECLOSING OF DC HSCB |
| 85 | TRANSMIT, RECIEVE & MONITOR RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86R | LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| di/dt | DC RATE OF RISE OF CURRENT RELAY |
| 95 | TRIP CIRCUIT SUPERVISION |
| 99 | RECTIFIER SURGE PROTECTION RELAY |
| 64 GD | ENCLOSURE GROUND RELAY |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| RT | 750 Vdc TRACTION TRANSFORMER |
| DR | 750 Vdc RECTIFIER |
| DH | 750 Vdc HIGH SPEED CIRCUIT BREAKER |
| NRP | NEGATIVE RETURN PANEL |
| DI | 750 Vdc ISOLATOR |
| DL | 750 Vdc LOAD BREAK SWITCH |
| ES | EARTH SWITCH (MANUALLY) |
| SCD | SHORT CIRCUIT DEVICE |
| LBS | LOAD BREAK SWITCH |
| E | FRAME EARTH |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

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| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

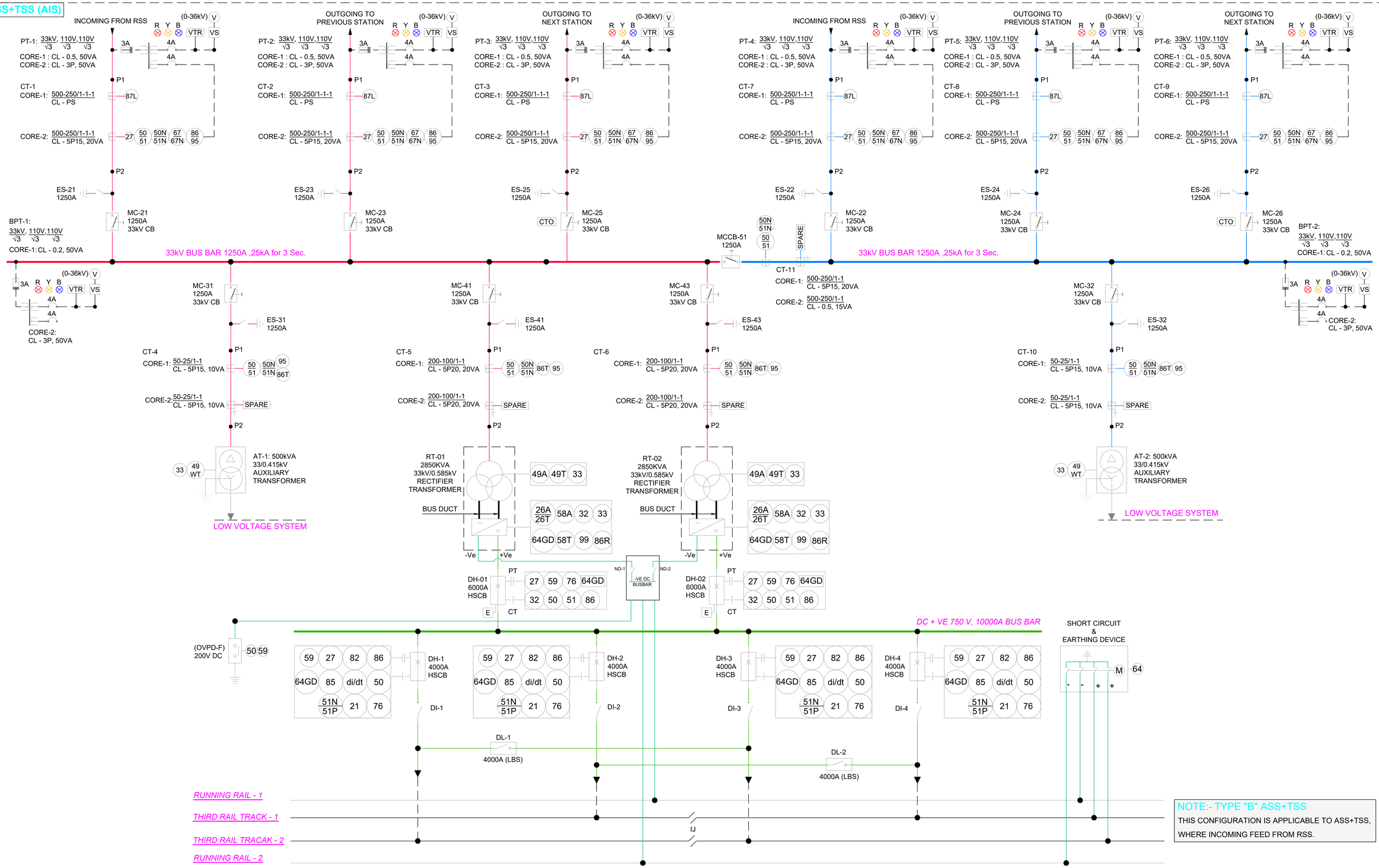
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF ELEVATED ASS+TSS TYPE B (SHEET 1 OF 2)
DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSSLD1-00204
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TYPE - B

## ASS+TSS (AIS)




**NOTE:- TYPE "B" ASS+TSS**

THIS CONFIGURATION IS APPLICABLE TO ASS+TSS, WHERE INCOMING FEED FROM RSS.

**TENDER DRAWING**
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| | | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

DETAILED DESIGN CONSULTANT

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ARDANUY INGENIERIA, S.A
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PHASE-3 RD, OKHLA PHASE III, NEW DELHI, DELHI 110020

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| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

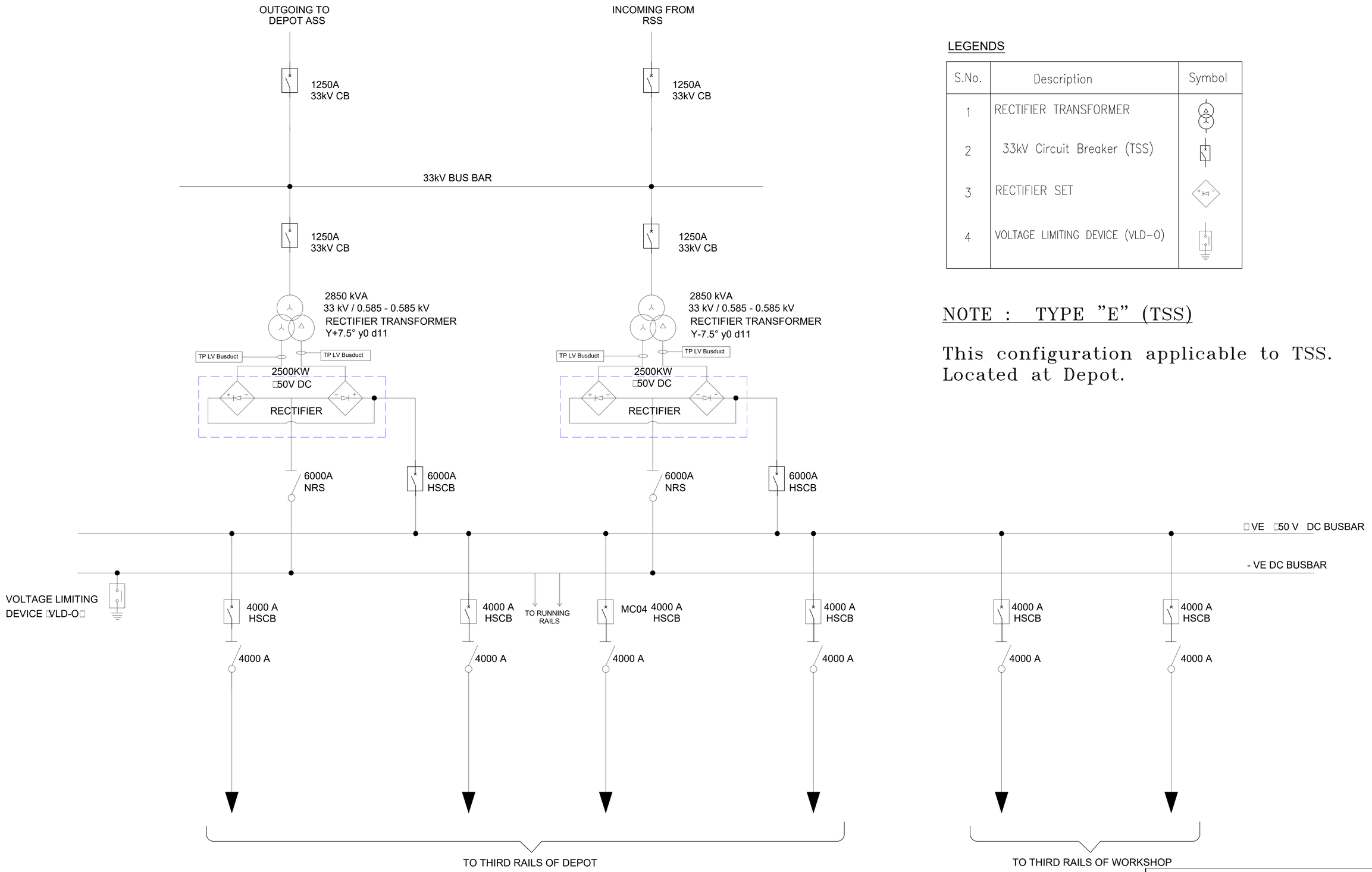
GENERAL CONSULTANT

DB GEODATA Louis Berger

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL KEY PROTECTION SLD OF ELEVATED ASS+TSS TYPE B (SHEET 2 OF 2) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-TSSSLD1-00204 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | RECTIFIER TRANSFORMER | |
| 2 | 33kV Circuit Breaker (TSS) | |
| 3 | RECTIFIER SET | |
| 4 | VOLTAGE LIMITING DEVICE (VLD-O) | |

NOTE : TYPE "E" (TSS)

This configuration applicable to TSS. Located at Depot.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

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GURGAON,HARYANA, INDIA-122001

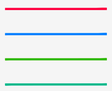
| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SLD FOR TYPE E TRACTION SUBSTATION
DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSSLD1-00209 REV: 0
SCALE: NTS DATE: October 2021 STATUS: TENDER DRAWING

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 |  | ES - EARTH SWITCH (MANUALLY) |
| 2 |  | CB - CIRCUIT BREAKER |
| 3 |  | CT - CURRENT TRANSFORMER |
| 4 |  | AT - AUXILIARY TRANSFORMER |
| 5 |  | CCB - COUPLER CIRCUIT BREAKER |
| 6 |  | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 |  | RT - RECTIFIER TRANSFORMER |
| 8 |  | DR - RECTIFIER |
| 9 |  | PT - DC POTENTIAL TRANSFORMER |
| 10 |  | CT - DC CURRENT TRANSFORMER |
| 11 |  | PT - POTENTIAL TRANSFORMER |
| 12 |  | DL - LOAD BREAK SWITCH |
| 13 |  | DH - DC HIGH SPEED CIRCUIT BREAKER (HSCB) |
| 14 |  | NRP - NEGATIVE RETURN PANEL |
| 15 |  | OVPD - OVER VOLTAGE PROTECTION DEVICE |
| 16 |  | IJ - INSULATED JOINT ASSEMBLY |
| 17 |  | SCD - SHORT CIRCUIT & EARTHING DEVICE |
| 18 |  | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2<br>750V DC +Ve<br>750V DC -Ve |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 21 | DC LINE TESTING DEVICE |
| 26A | 1st DIODE TEMPERATURE RELAY |
| 26T | 2nd DIODE TEMPERATURE RELAY |
| 27 | UNDER VOLTAGE RELAY |
| 32 | REVERSE POWER RELAY |
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| 49A | 1st Winding Over Temperature Relay |
| 49T | 2nd Winding Over Temperature Relay |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
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| 51 | TIME Delay CURRENT RELAY |
| 51N<br>51N<br>51P | TIME-OVERCURRENT-GROUND<br>TIME DELAY MAXIMUM CURRENT RELAY(Neg./Pos.) |
| 58A | 1st DIODE FAILURE |
| 58T | 2nd DIODE FAILURE |
| 59 | OVER VOLTAGE RELAY |
| 63 | RUNNING RAIL VOLTAGE MONITORING |

| CODE | DESCRIPTION |
|---|---|
| 67<br>67N | DIRECTIONAL OVER CURRENT PROTECTION RELAY<br>DIRECTIONAL EARTH FAULT PROTECTION RELAY |
| 76 | D.C OVER CURRENT SERIES TRIP RELAY |
| 82 | AUTOMATIC RECLOSING OF DC HSCB |
| 85 | TRANSMIT, RECIEVE & MONITOR RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86R | LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| di/dt | DC RATE OF RISE OF CURRENT RELAY |
| 95 | TRIP CIRCUIT SUPERVISION |
| 99 | RECTIFIER SURGE PROTECTION RELAY |
| 64 GD | ENCLOSURE GROUND RELAY |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| RT | 750 Vdc TRACTION TRANSFORMER |
| DR | 750 Vdc RECTIFIER |
| DH | 750 Vdc HIGH SPEED CIRCUIT BREAKER |
| NRP | NEGATIVE RETURN PANEL |
| DI | 750 Vdc ISOLATOR |
| DL | 750 Vdc LOAD BREAK SWITCH |
| ES | EARTH SWITCH (MANUALLY) |
| SCD | SHORT CIRCUIT DEVICE |
| LBS | LOAD BREAK SWITCH |
| E | FRAME EARTH |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy
ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
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DELHI, DELHI 110020

RITES
THE INFRASTRUCTURE PEOPLE
RITES LTD.
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

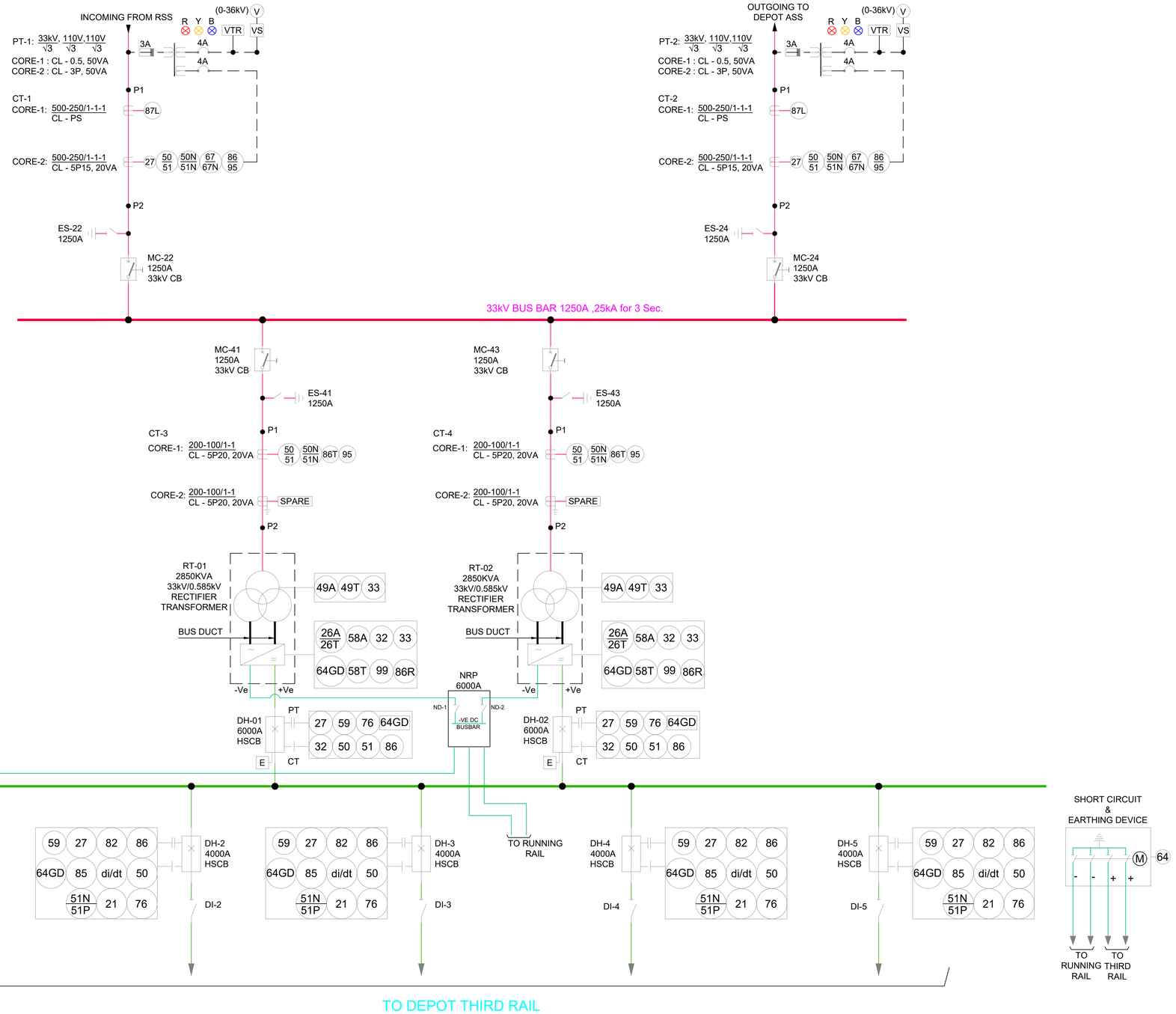
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF DEPOT
ASS+TSS TYPE E (SHEET 1 OF 2)
DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSSLD1-00210
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TYPE - E

## ASS+TSS (AIS)




NOTE:- TYPE "E" ASS+TSS

THIS CONFIGURATION IS APPLICABLE TO ASS+TSS LOCATED AT DEPOT.

**TENDER DRAWING**
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

**RITES LTD.**
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GURGAON,HARYANA, INDIA-122001

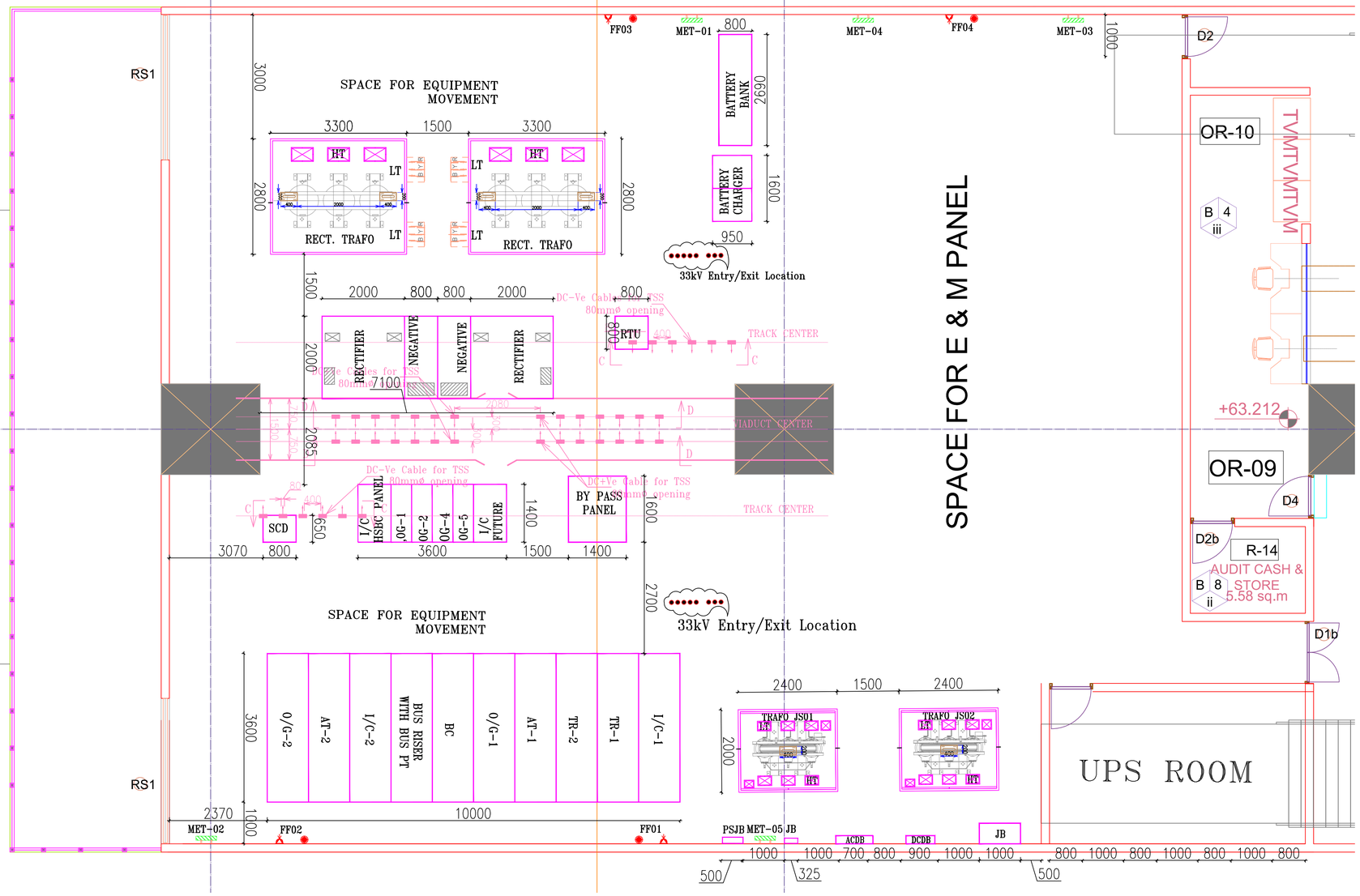
| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

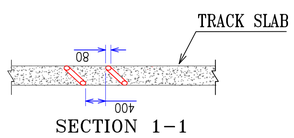
GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

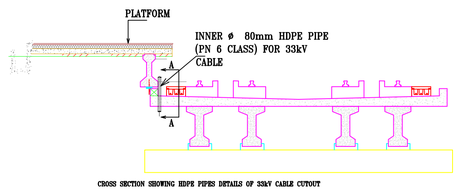
MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL KEY PROTECTION SLD OF DEPOT ASS+TSS TYPE E (SHEET 2 OF 2) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-TSSSLD1-00210 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |



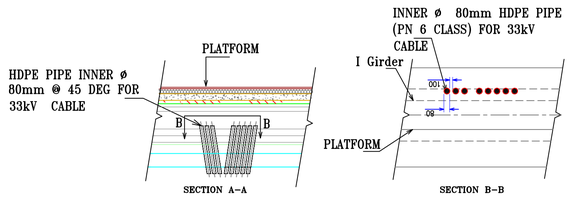




TYPICAL DC CABLES CUTOUT ARRANGEMENT




LEGEND:- FOR METS

| Description | |
|---|---|
| MET01 & 02 | MAIN EARTH GRID |
| | SCD |
| | STRUCTURE EARTH CABLE |
| MET03,& 04 | AUX-TRANSFORMER NEUTRAL |
| MET 05 | RTU |




NOTES:

1. ALL DIMENSIONS ARE IN mm.
2. THE CLEAR HEIGHT INSIDE THE ASS & TSS ROOM SHALL BE MIN 5m.
3. ROLLING SHUTTER FOR ASS/TSS ROOM CLEAR HEIGHT SHALL BE MIN.=3.5m(W) & 3.5(H)METER.
4. ENTRANCE DOOR HEIGHT SHALL BE MIN.= 2.5 METER
5. RUBBER MAT WILL BE PROVIDED INFRONT OF 33kV SWITCHGEAR & DC PANELS.
6. LIFTING EYE TO BE PROVIDED BY STATION BUILDING CONTRACTOR, ONE EACH ABOVE THE AUX TRANSFORMER. & 2 NOS.EACH FOR TRACTION TRANSFORMER THE CAPACITY OF EACH HOOK SHALL TAKE A LOAD OF MIN 5 TONES VERTICAL LOAD & 10 TONES OF ANGULAR LOAD.
7. REMOVABLE TYPE HAND RAILING TO BE PROVIDED ON THE LOADING & UNLOADING PLATFORM TO BE PROVIDED BY STATION BUILDING CONTRACTOR.
8. THERE SHALL BE NO GAP IN BETWEEN THE FLOOR & THE ROLLING SHUTTER, TO AVOID THE WATER SEEPAGE INSIDE THE ASS/TSS ROOM.
9. FLOOR LEVEL ± 1mm/ SECTION LENGTH OF 1m MAX.1mm/m ON THE FLOOR NOT EXCEEDING +/- 3mm OVER TOTAL LENGTH OF THE ENCLOSED ASSEMBLED SIDE BY SIDE.
10. OPENINGS WITH AIR FILTERS AROUND THE ASS/TSS WALL SHALL BE PROVIDED STATION BUILDING CONTRACTOR.
11. FLOOR FINISHING TO BE DONE BY STATION BUILDING CONTRACTOR AFTER THE EARTH GRID IS LAYED UNDER THE 50 mm SCREED.
12. BASE FRAME OF 33kV SWITCHGEAR PANEL SHALL BE EMBEDDED INSIDE THE FLOOR SCREEDING BEFORE THE FLOOR FINISHING IS DONE, BY THE STATION BUILDING CONTRACTOR.
13. 4CX35Sqmm Cu POWER CABLE SHALL BE LAID FROM MDB TO OUR ACDB INSIDE THE ASS/TSS ROOM BY STATION BUILDING CONTRACTOR/E&M CONTRACTOR.
14. 230V 5A 1Ø POWER SUPPLY TO BE PROVIDED FROM UPS BY STATION BUILDING CONTRACTOR/E&M CONTRACTOR AT BOTH ENDS OF PLATFORMS AND STATION CONTROL ROOM FOR EMERGENCY TRIPPING SYSTEM.
15. EMERGENCY STAIRCASE SHOULD NOT INFRINGE/ENCROACH THE LOADING /UNLOADING PLATFORM.
16. NO GRILLS SHOULD BE PROVIDED IN THE ROLLING SHUTTER.
17. HDPE PIPES FOR CABLES ENTERING FROM TRACK LEVEL TO CONCOURSE LEVEL THROUGH TRACK SLAB SHALL BE PROVIDED BY STATION BUILDING CONTRACTOR/E&M CONTRACTOR.
18. HDPE PIPE OPENING FOR 33kV & 750V DC CABLE SHOULD BE SEALED BY WATER SEALANT BY THE STATION BUILDING CONTRACTOR.
19. CABLE TRAY CONNECTIVITY FROM PLATFORM LEVEL TO CONCOURSE LEVEL TO ASS/TSS ROOM & FROM STATION CONTROL ROOM TO ASS/TSS ROOM SHALL BE PROVIDED BY STATION BUILDING CONTRACTOR/E&M CONTRACTOR.
20. THE DIMENSIONS OF EQUIPMENTS ARE TENTATIVE.
21. NO EXPANSION JOINT TO BE PROVIDED IN THE ROOF OF ASS/TSS.
22. PLACEMENT AND SIZE OF E&M PANELS ARE TO BE CONFIRMED BY E&M DDC.

LEGEND:- TYPICAL DETAILS FOR ASS & TSS BUILDING

| S.No. | Description | PANEL SIZE (MM) | | | |
|---|---|---|---|---|---|
| | | L | W | H | Weight (Kg) |
| 1 | AUXILIARY TRANSFORMER (500kVA) 33000/415V | 2400 | 2000 | 2400 | 3150 Kg EACH |
| 2 | 33kV VACUUM CIRCUIT BREAKER (ASS) | 1000 | 2800 | 2524 | 1600 Kg EACH |
| 3 | 33kV VACUUM INTERRUPTER | 1000 | 2800 | 2524 | 1600 Kg EACH |
| 4 | TRACTION TRANSFORMER (33/0.63-0.63 kV 2850kVA) | 3300 | 2800 | 3300 | 12 TONNE EACH |
| 5 | 33kV VACCUUM CIRCUIT BREAKER (TSS) | 1000 | 2600 | 2524 | 2500 Kg EACH |
| 6 | RECTIFIER PANEL (2.5 MW) | 2000 | 2000 | 2300 | 3900 Kg EACH |
| 7 | NEGATIVE RETURN OFF LOAD SWITCH | 800 | 2000 | 2300 | 450 Kg EACH |
| 8 | HSCB PANEL | 800/500 | 1400 | 2300 | 1000 Kg |
| 9 | BY PASS PANEL | 1600 | 1400 | 1200 | 550 EACH |
| 10 | ALTERNATE CURRENT DISTRIBUTION BOARD | 900 | 200 | 1200 | 30 Kg EACH |
| 11 | DIRECT CURRENT DISTRIBUTION BOARD | 700 | 200 | 700 | 35 Kg EACH |
| 12 | REMOTE TERMINAL UNIT | 800 | 800 | 2000 | 1500 Kg EACH |
| 13 | SHORT CIRCUIT DEVICE | 800 | 650 | 1200 | 550 Kg EACH |
| 14 | BATTERY BANK (300AH-NICD) | 2690 | 800 | 1820 | 2100 Kg EACH |
| 15 | BATTERY CHARGER (2x110V 100A) | 950 | 850 | 1800 | 1000 Kg EACH |

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REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09

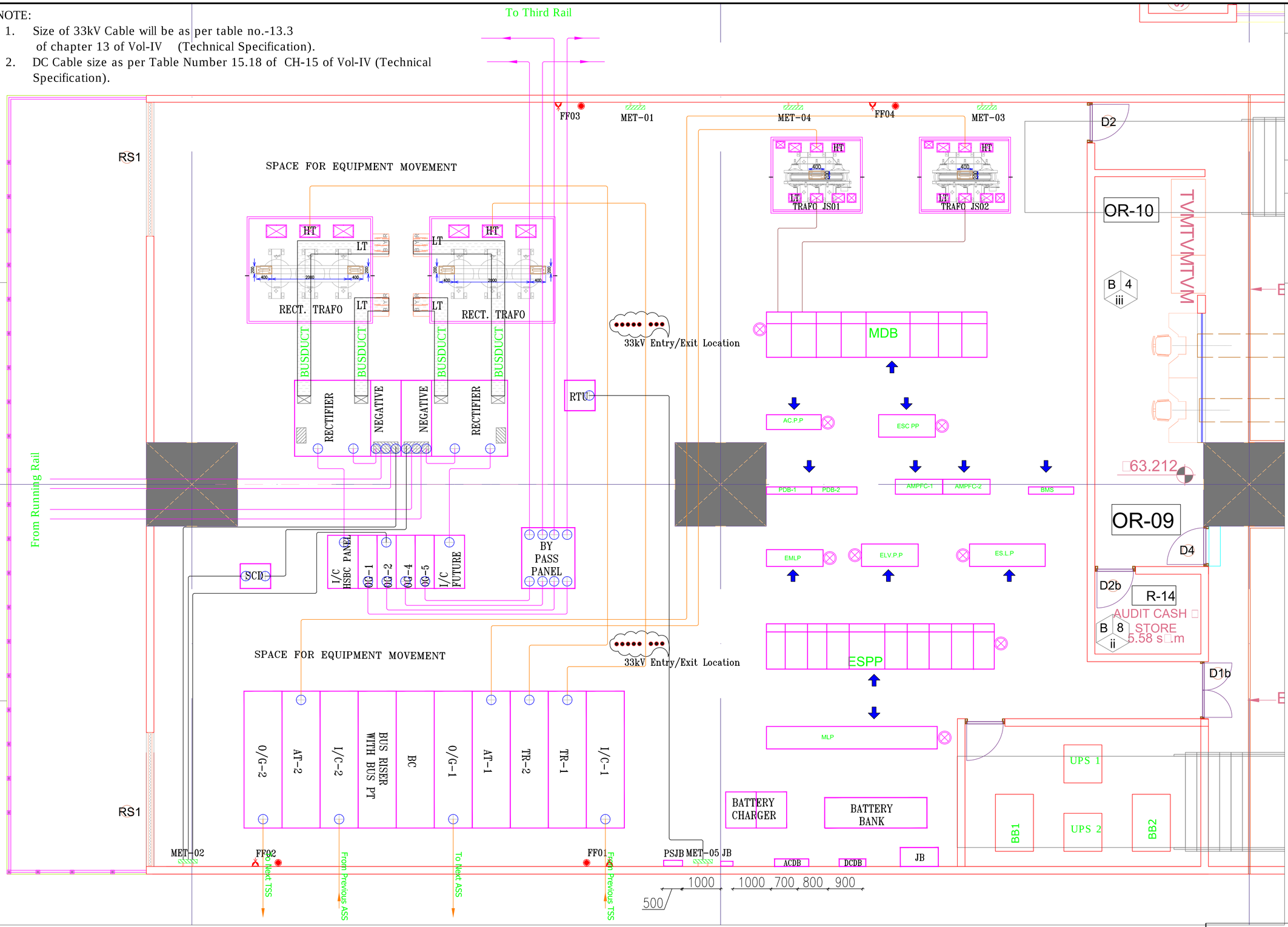
DRAWING TITLE: TYPICAL E□UIPMENT LAYOUT PLAN FOR ASS/TSS

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ATSLYT1-00211 | REV: 0

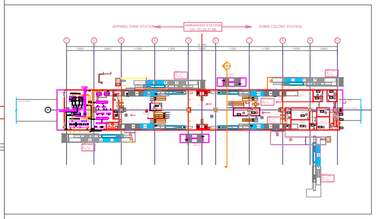
SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING

NOTE:

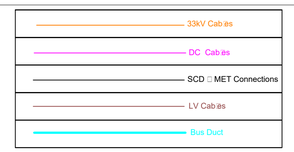
1. Size of 33kV Cable will be as per table no.-13.3 of chapter 13 of Vol-IV (Technical Specification).
2. DC Cable size as per Table Number 15.18 of CH-15 of Vol-IV (Technical Specification).




## KEY PLAN



## LEGEND

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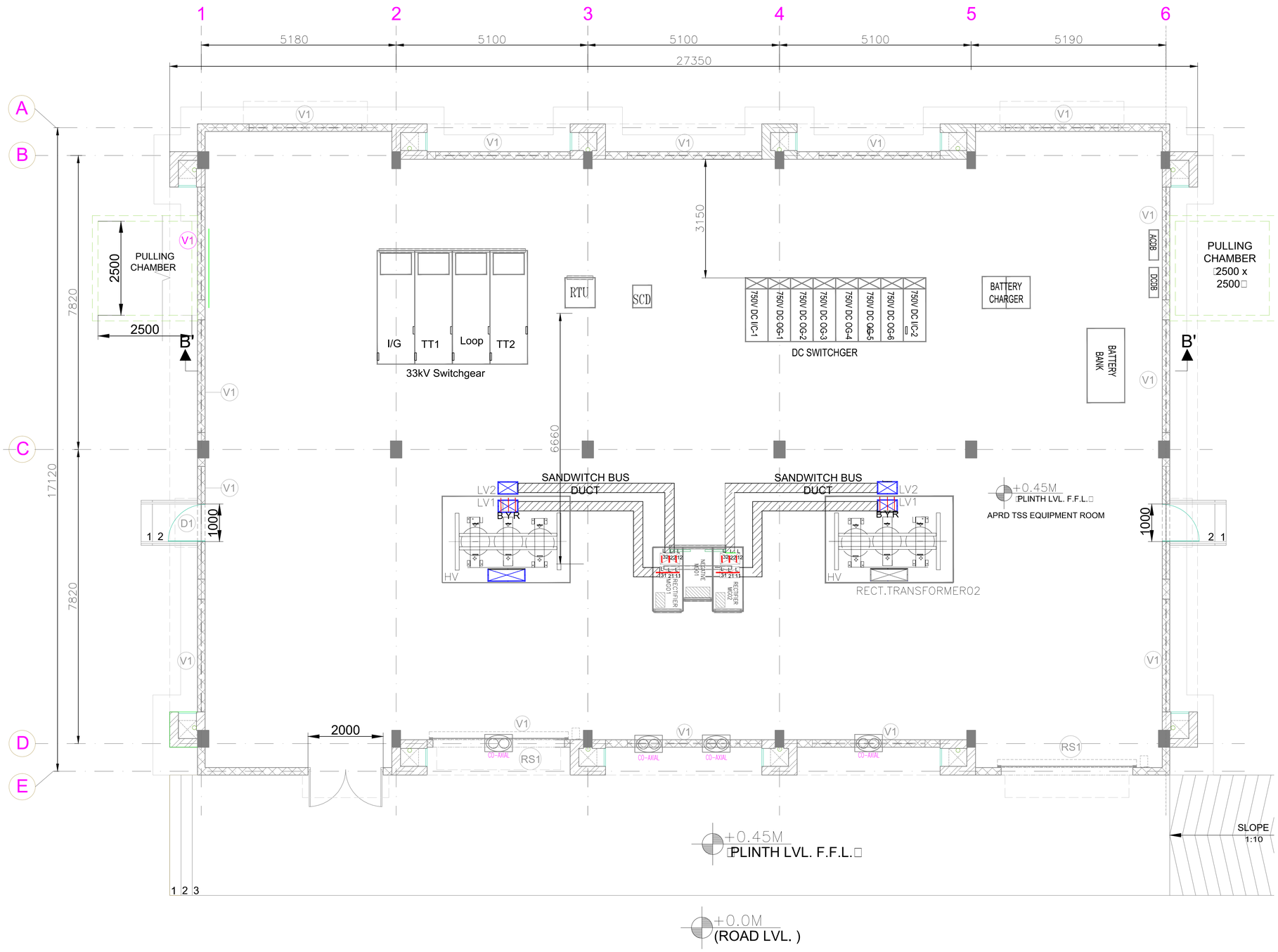
GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL CABLE LAYOUT PLAN FOR STATION ASS/TSS |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ATSSLD1-00212 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




NOTES:–

1. All Dimensions are in mm and Elevations are in meter unless otherwise specified.

2. 33 kV Cable will be fixed to the bracket through cable tie.

| SL NO | EQUIPMENT | LENGTH | WIDTH | HEIGHT | QUANTITY | WEIGHT (Kg/Unit) |
|---|---|---|---|---|---|---|
| | | (Dimensions of Individual Equipment in mm) | | | | |
| DEPOT TSS-Building | | | | | | |
| 1 | 2850kVA Dry type Traction Transformer with enclosure for Depot TSS (JT01, JT02 & JT03-FUTURE) | 3300 | 2800 | 3300 | 2 nos. | 12000 |
| 2 | 33KV Switchgear for ASS (JB01 to JB04 & JB05-FUTURE) | 2600 | 1000 | 2600 | 1 Set. | 2500 |
| 3 | Rectifier, 2.5 MW (MG01, MG02 & MG03-FUTURE) | 2000 | 2000 | 2300 | 2 nos. | 3900 |
| 4 | Negative Return Panel (MD01, MD02 & MD03-FUTURE) | 800 | 2000 | 2300 | 1 no. | 450 |
| 5 | HSCB Incomers (MC01 & MC08) | 800 | 1400 | 2300 | 2 nos. | 1200 |
| 6 | HSCB Feeders (MC02 to MC07) | 500 | 1400 | 2300 | 6 nos. | 1000 |

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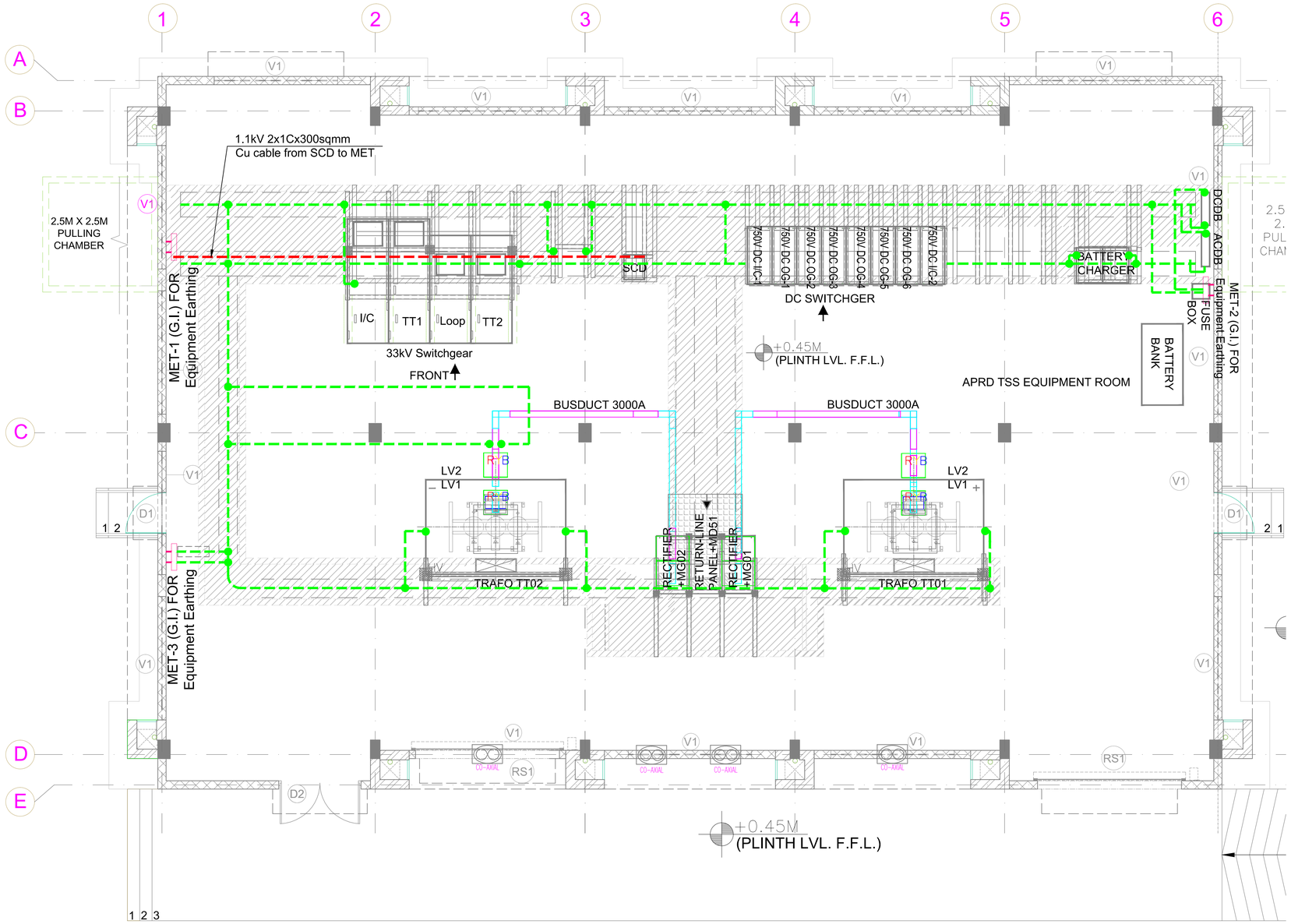
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL E□UIPMENT LAYOUT FOR DEPOT TSS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSSLYT1-00213
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING



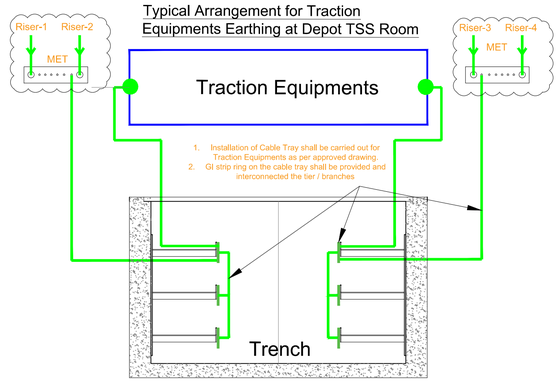

Notes :-

1. All Dimension are in mm and the levels shown here are in mtr.
2. GI earth strip of size 50mm x 6mm shall be laid in the cable tray by depot contractor.

| MET Details for DEPOT TSS | | | |
|---|---|---|---|
| Sr.No. | EQUIPMENT DESCRIPTION | UNIT | QTY. |
| 1. | MET-1, MET-2 & MET-3 FOR EQUIPMENT EARTHING & CABLE TRAY | No | 3 |

| Legends | | | |
|---|---|---|---|
| 1. | | 50x6 | Equipment Body Earthing GI |
| 2. | | | 1.1KV 2X1CX300SQMM CU CABLE FROM SCD TO MET |
| 3. | | | 1.1KV 2X1CX300SQMM CU CABLE FROM MD51 TO MET |

Typical Arrangement for Traction Equipments Earthing at Depot TSS Room

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| PHOOL CHAND PREPARED BY | BRAJESH CHECKED BY | SURENDRA PAL SINGH APPROVED BY | SURENDRA PAL SINGH ISSUED BY |
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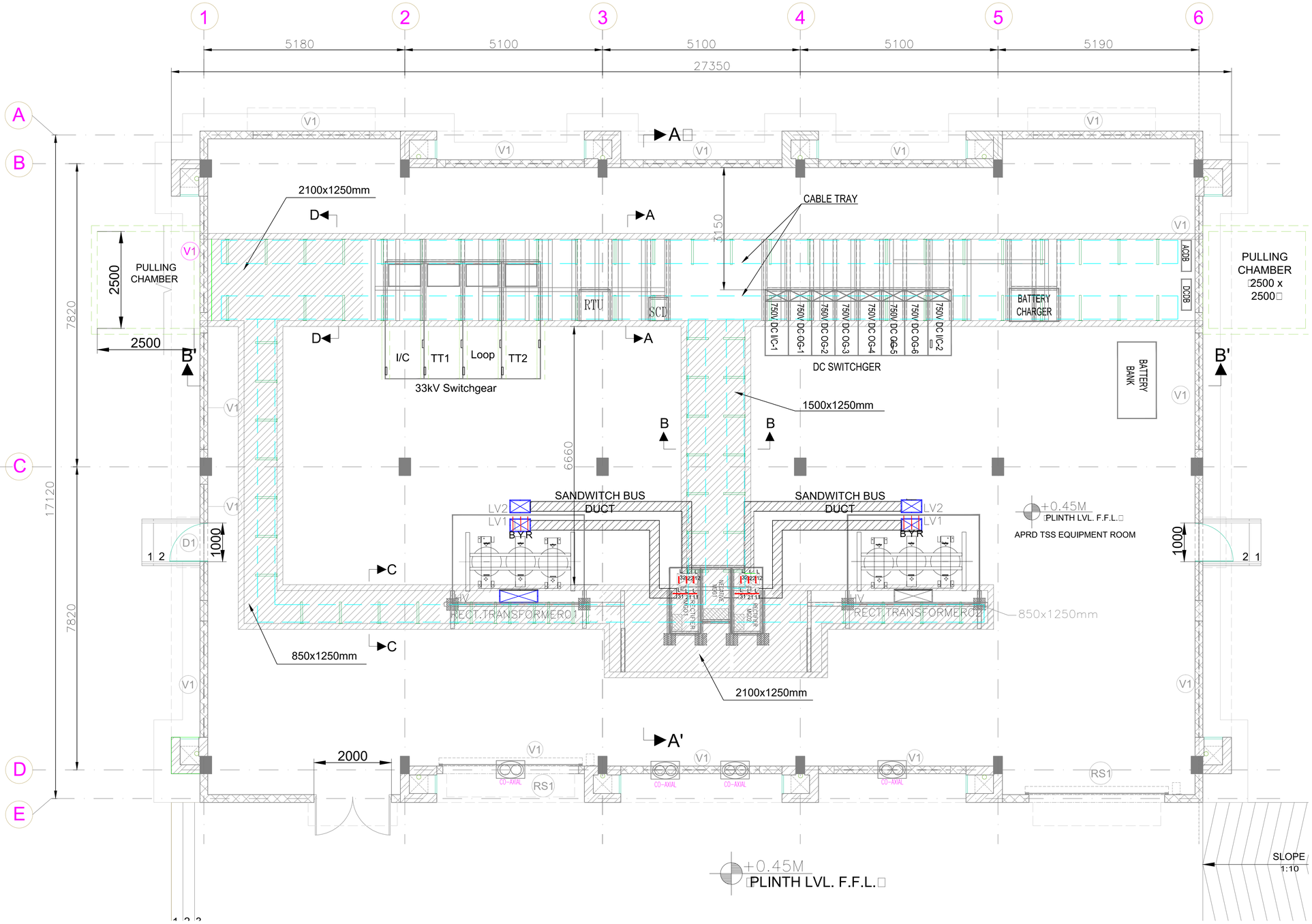
MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL EARTHING LAYOUT FOR DEPOT TSS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSSLYT1-0021 | REV: 0
SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




NOTES:–

1. All Dimensions are in mm and Elevations are in meter unless otherwise specified.
2. 33 kV Cable will be fixed to the bracket through cable tie.
3. Size of 33kV Cable will be as per table no.-13.3 and 13.4 of chapter 13 of Vol-IV (Technical Specification).
4. DC Cable size as per Table Number 15.18 of CH-15 of Vol-IV (Technical Specification).

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| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

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MPMETRO

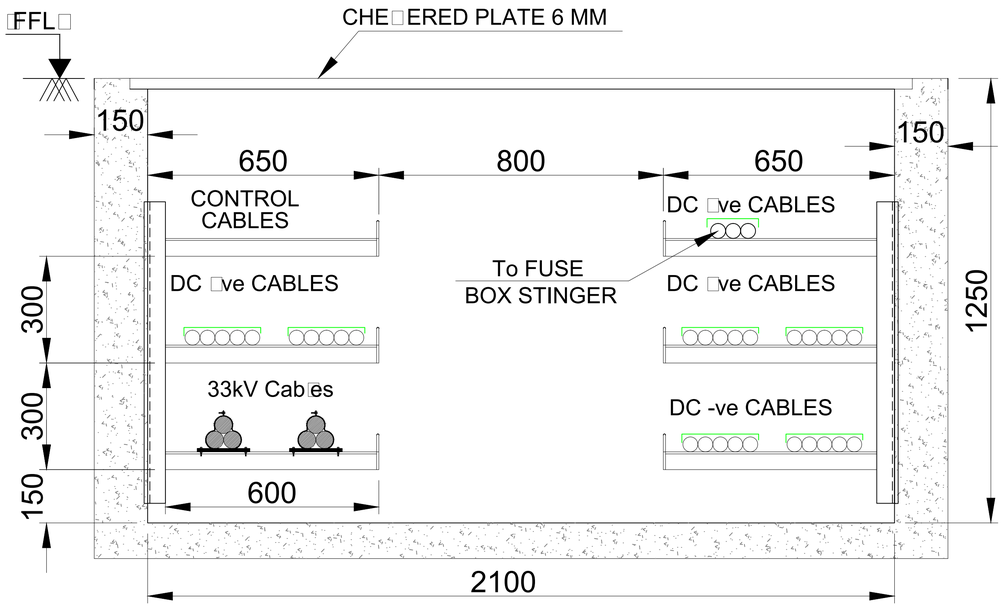
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

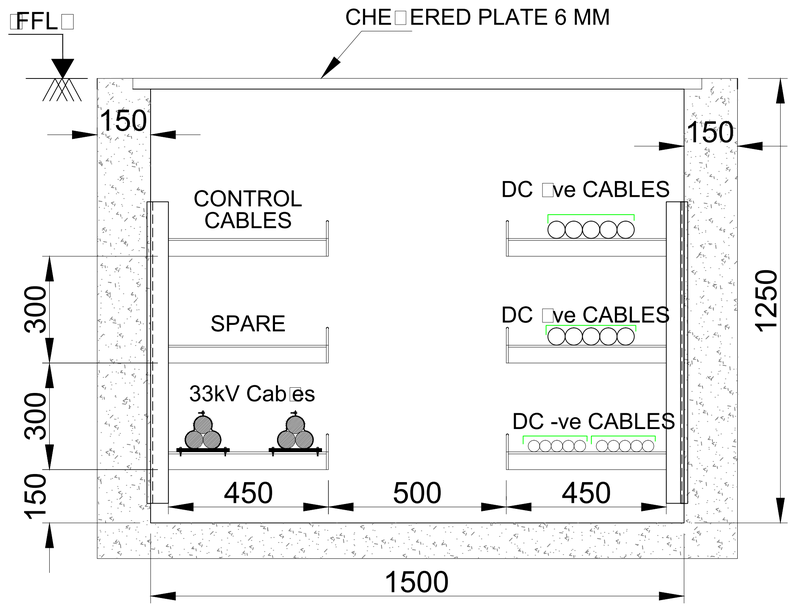
DRAWING TITLE: TYPICAL CABLE TRENCH LAYOUT FOR DEPOT TSS □SHEET 01 OF 04□

DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSLYT1-0021□ REV: 0

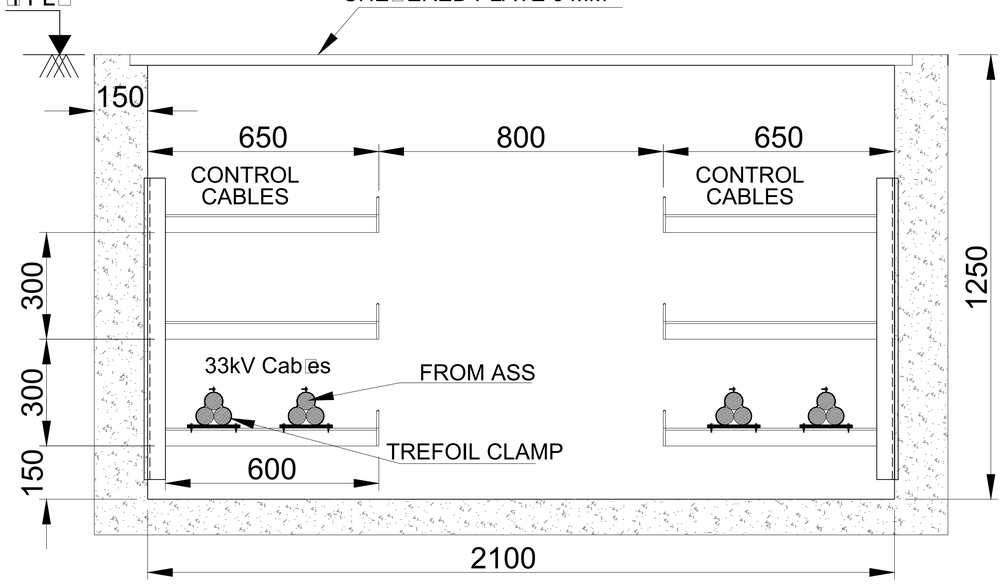
SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING



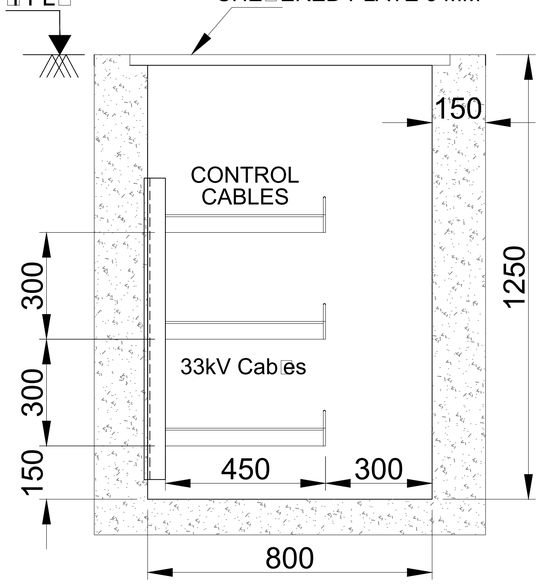

SECTION A-A




SECTION B-B




SECTION D-D




SECTION C-C

| REVISIONS | | | | | | |
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| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

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TENDER DRAWING
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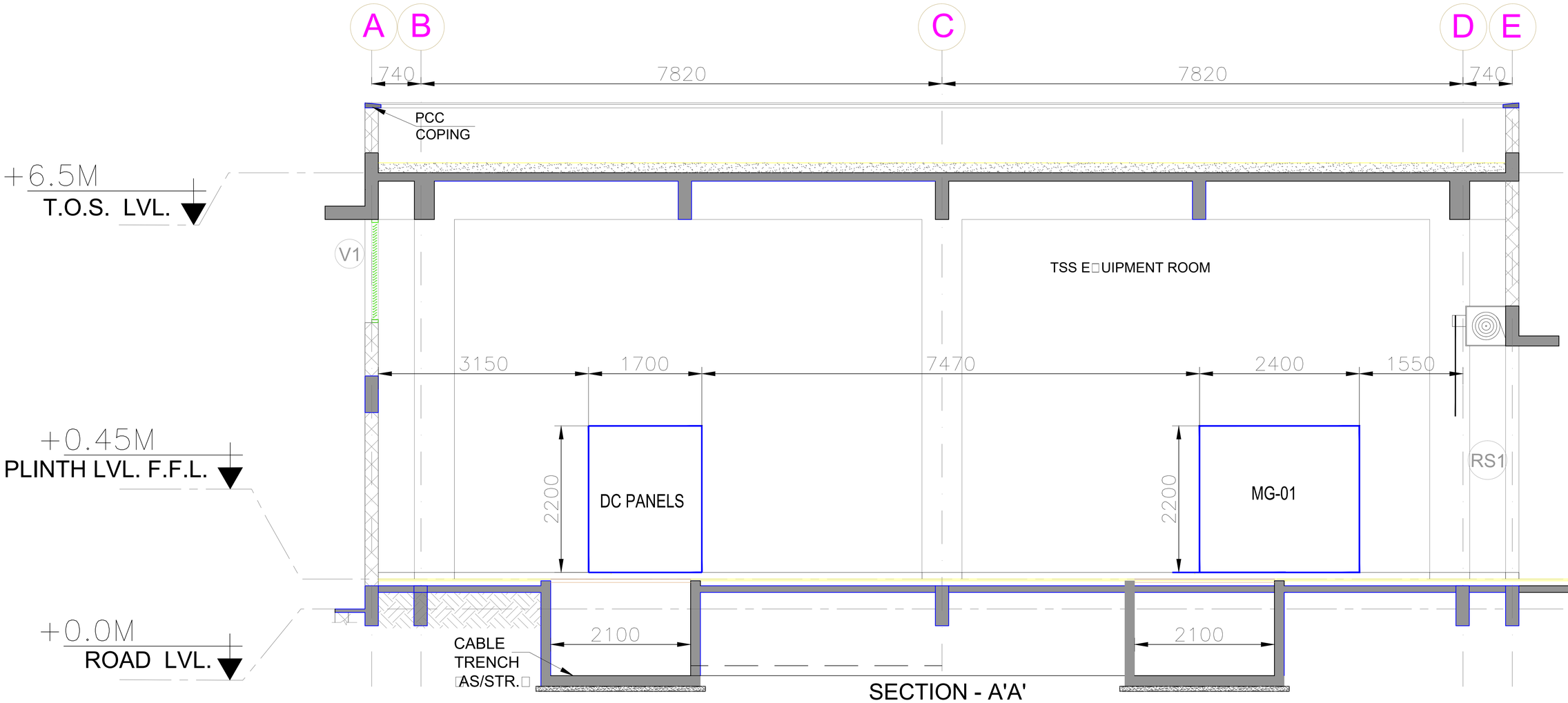
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL CABLE TRENCH LAYOUT FOR DEPOT
TSS SHEET 02 OF 04

DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSLYT1-0021 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




SECTION - A'A'

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REVISIONS

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DETAILED DESIGN CONSULTANT

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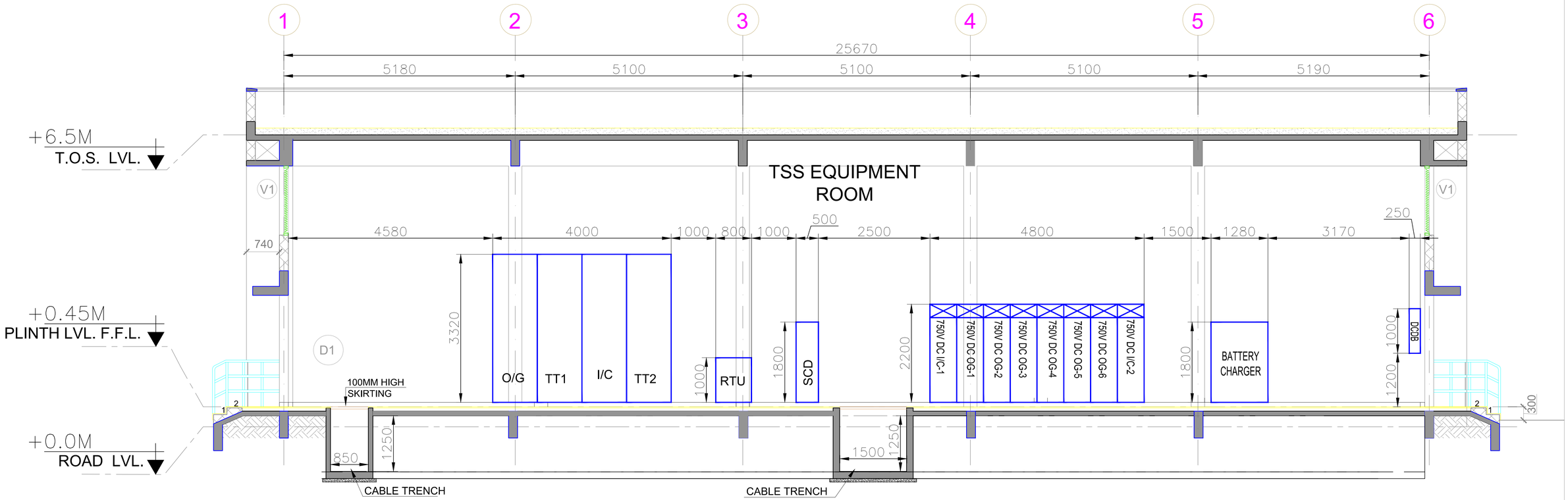
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL CABLE TRENCH LAYOUT FOR DEPOT
TSS □SHEET 03 OF 04□
DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSLYT1-0021□
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




SECTION - B'B'

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

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|---|---|---|---|---|---|---|
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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

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MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

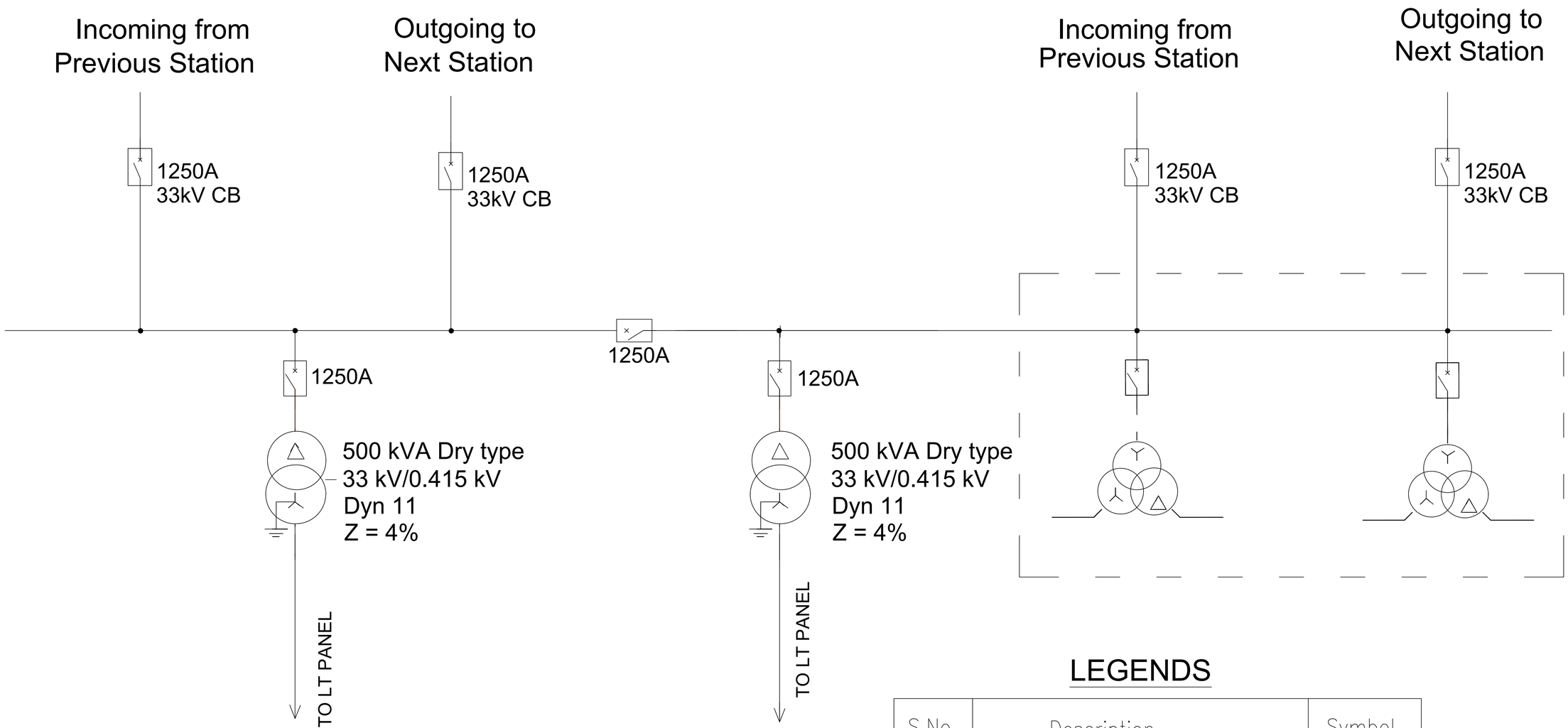
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL CABLE TRENCH LAYOUT FOR DEPOT
TSS □SHEET 04 OF 04□

DRAWING NUMBER: I202-BIG-TRP-00-DWG-TSSLYT1-0021□ | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING

# AUXILIARY SUBSTATION
# (ASS)




## LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | Auxiliary Transformer | |
| 2 | 33kV Circuit Breaker (ASS) | |

## NOTE □ TYPE "A" ASS

T□is is t□e most common type of ASS and t□is design s□a□be app□icab□e to most of t□e e□evated stations □aving ASS cum TSS

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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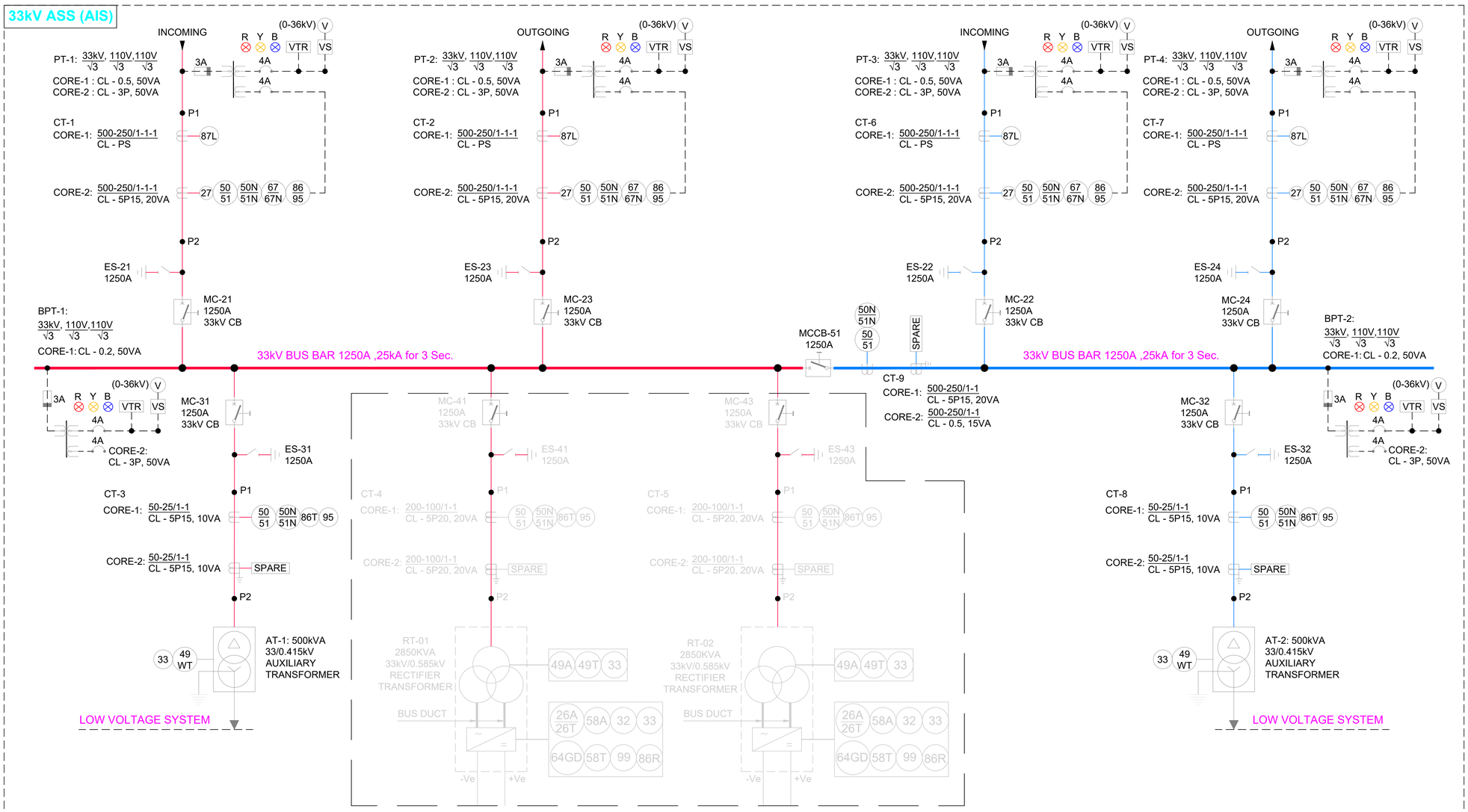
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SLD FOR TYPE A AUXILIARY SUBSTATION
DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00301
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TYPE - A




| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | | ES - EARTH SWITCH (MANUALLY) |
| 2 | | CB - CIRCUIT BREAKER |
| 3 | | CT - CURRENT TRANSFORMER |
| 4 | | AT - AUXILIARY TRANSFORMER |
| 5 | | CCB - COUPLER CIRCUIT BREAKER |
| 6 | | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 | | PT - POTENTIAL TRANSFORMER |
| 8 | | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |

| CODE | DESCRIPTION |
|---|---|
| 51N | TIME-OVERCURRENT-GROUND |
| 63 64GD | RUNNING RAIL VOLTAGE MONITORING ENCLOSURE GROUND RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| ES | EARTH SWITCH (MANUALLY) |

NOTE:- TYPE "A" ASS

THIS IS THE MOST COMMON TYPE OF ASS AND THIS DESIGN SHALL BE APPLICABLE TO MOST OF THE ELEVATED STATIONS HAVING ASS CUM TSS

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

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|---|---|---|---|

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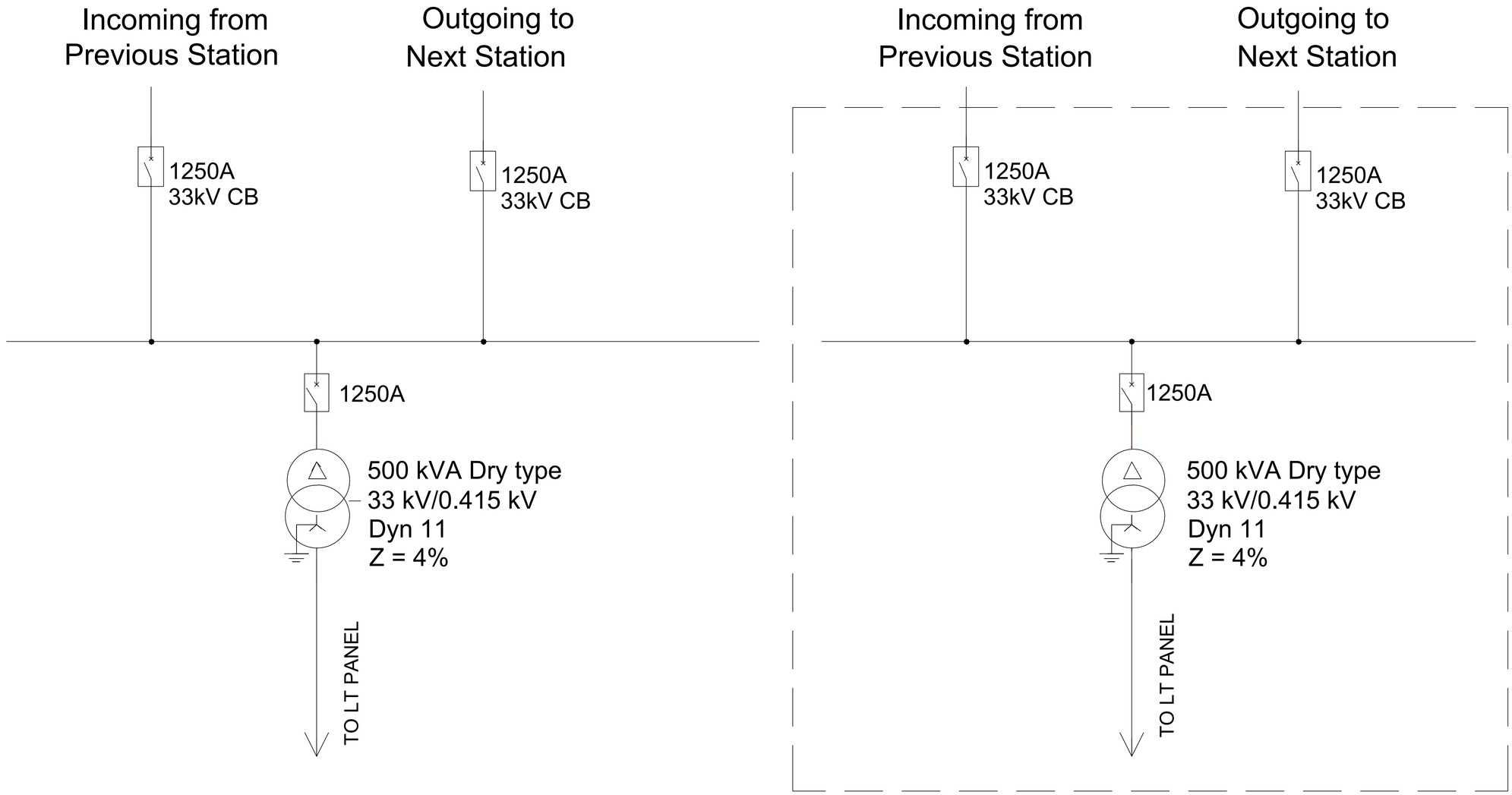
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL KEY PROTECTION SLD OF ELEVATED ASS TYPE A |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ASSSLD1-00302 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




## NOTE : TYPE "B" ASS

This configuration is applicable to elevated station having only ASS

## LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | Auxiliary Transformer | |
| 2 | 33kV Circuit Breaker (ASS) | |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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MPMETRO

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

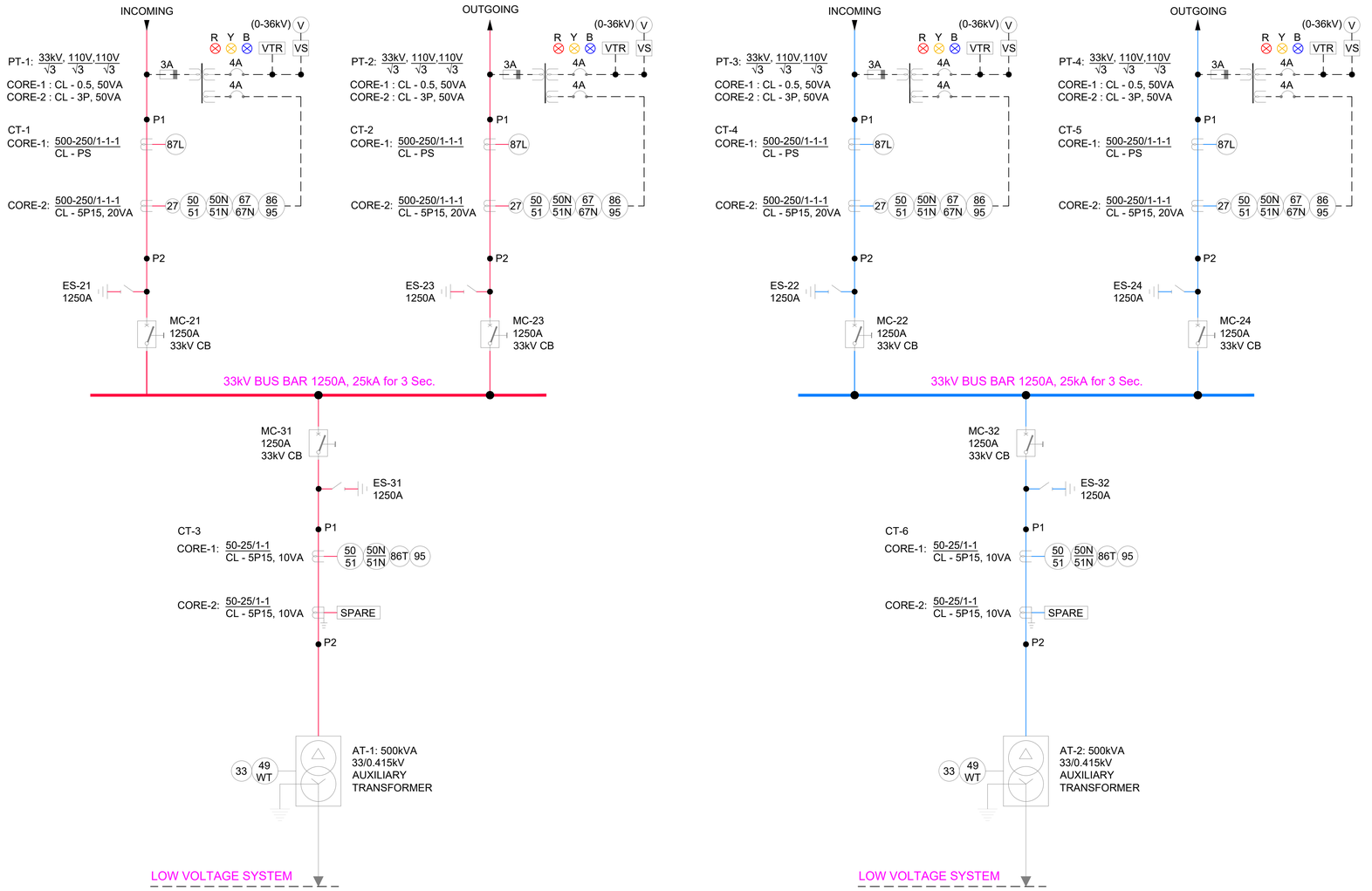
DRAWING TITLE: TYPICAL SLD FOR TYPE B AUXILIARY SUBSTATION

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00303 REV: 0

SCALE: NTS DATE: October 2021 STATUS: TENDER DRAWING

# TYPE - B

## 33kV ASS (AIS)




| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | | ES - EARTH SWITCH (MANUALLY) |
| 2 | | CB - CIRCUIT BREAKER |
| 3 | | CT - CURRENT TRANSFORMER |
| 4 | | AT - AUXILIARY TRANSFORMER |
| 5 | | CCB - COUPLER CIRCUIT BREAKER |
| 6 | | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 | | PT - POTENTIAL TRANSFORMER |
| 8 | | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |

| CODE | DESCRIPTION |
|---|---|
| 51N | TIME-OVERCURRENT-GROUND |
| 63 | RUNNING RAIL VOLTAGE MONITORING |
| 64GD | ENCLOSURE GROUND RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| ES | EARTH SWITCH (MANUALLY) |

NOTE:- TYPE "B" ASS

THIS CONFIGURATION IS APPLICABLE TO ELEVATED STATION HAVING ONLY ASS

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |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GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

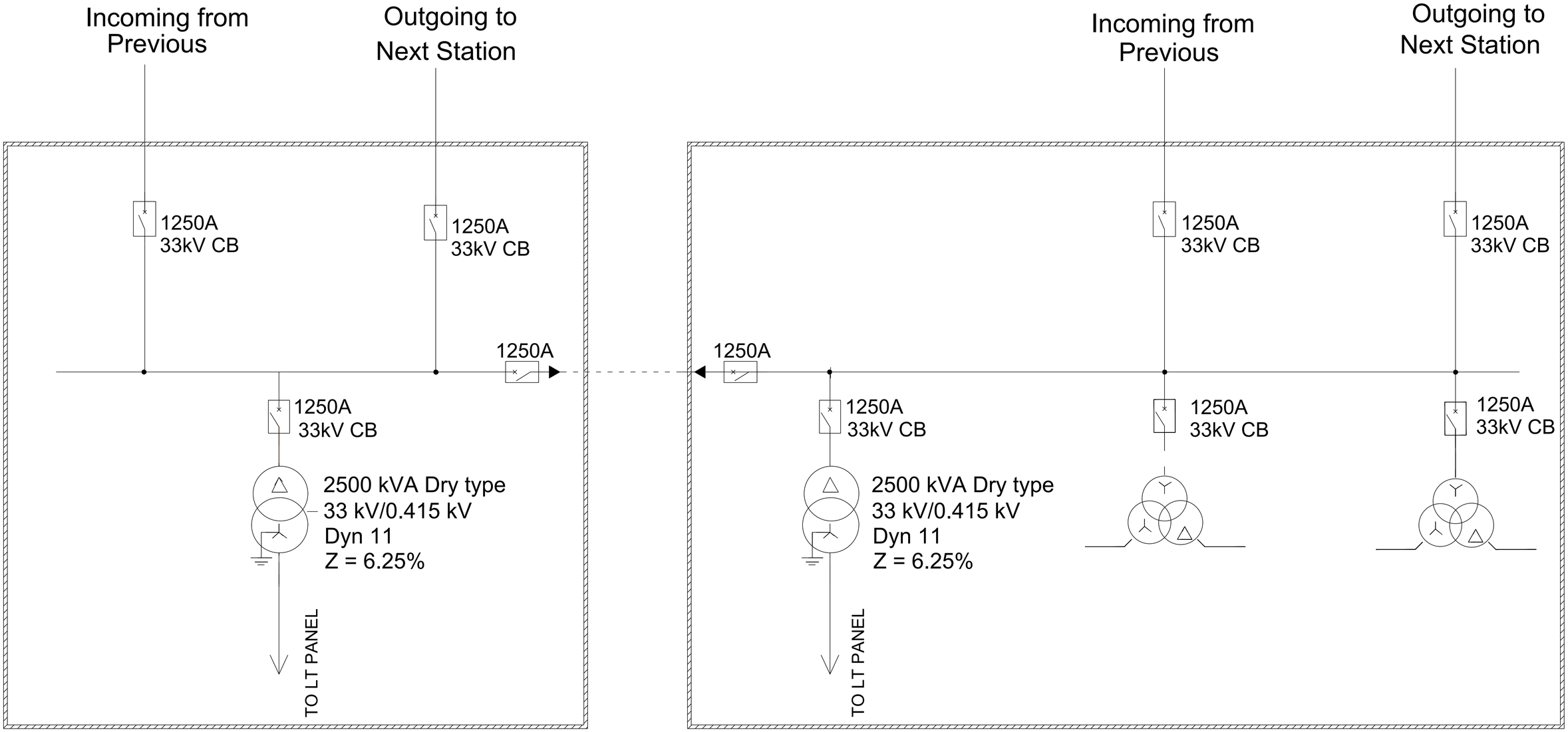

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF ELEVATED ASS TYPE B

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00304 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




## NOTE : TYPE "C" ASS

This is the most common type of ASS for underground stations having ASS cum TSS.

## LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | Auxiliary Transformer | |
| 2 | 33kV Circuit Breaker (ASS) | |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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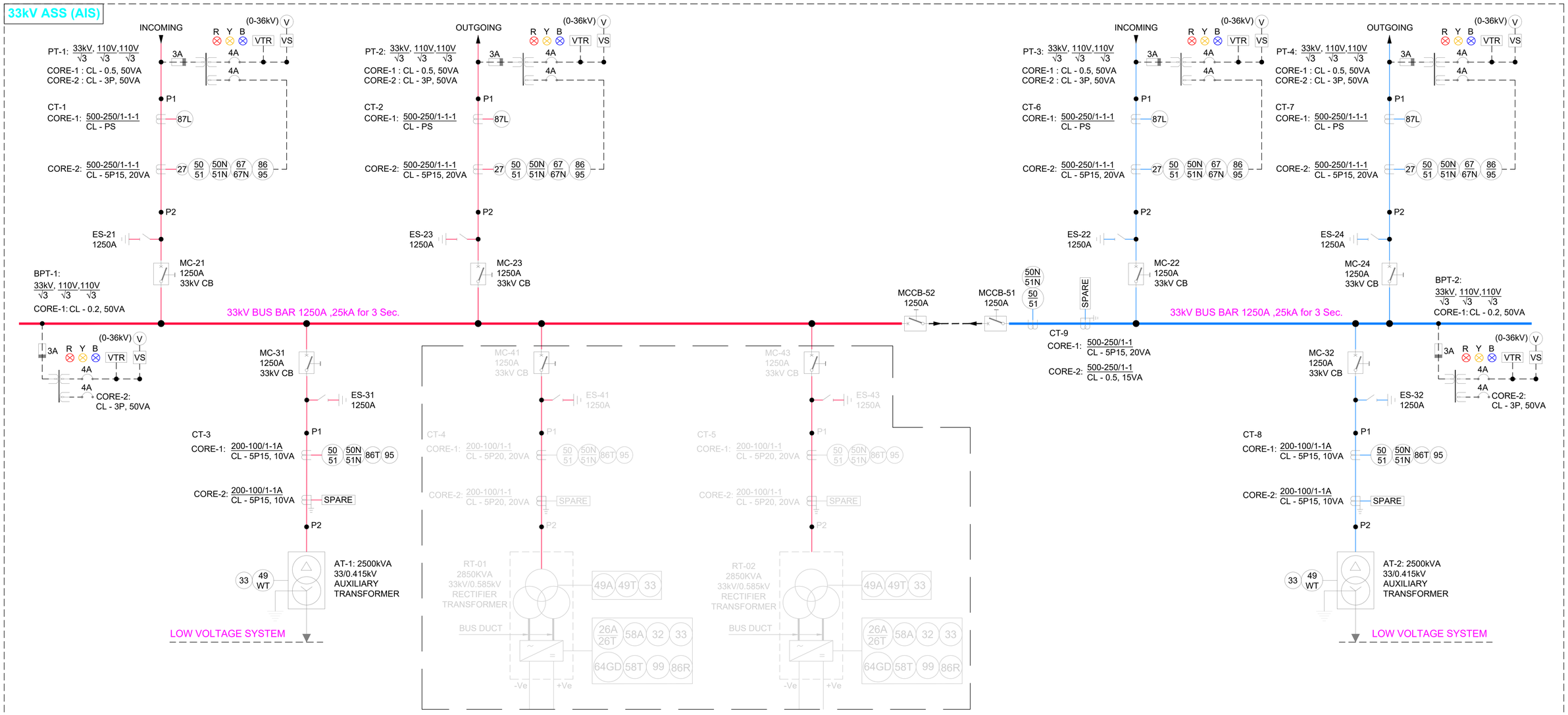
MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SLD FOR TYPE C AUXILIARY SUBSTATION
DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-0030 □ REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TYPE - C




| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | | ES - EARTH SWITCH (MANUALLY) |
| 2 | | CB - CIRCUIT BREAKER |
| 3 | | CT - CURRENT TRANSFORMER |
| 4 | | AT - AUXILIARY TRANSFORMER |
| 5 | | CCB - COUPLER CIRCUIT BREAKER |
| 6 | | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 | | PT - POTENTIAL TRANSFORMER |
| 8 | | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |

| CODE | DESCRIPTION |
|---|---|
| 51N | TIME-OVERCURRENT-GROUND |
| 63 64GD | RUNNING RAIL VOLTAGE MONITORING ENCLOSURE GROUND RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| ES | EARTH SWITCH (MANUALLY) |

NOTE:- TYPE "C" ASS

THIS IS THE MOST COMMON TYPE OF ASS FOR UNDERGROUND STATIONS HAVING ASS CUM TSS

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | AS PER PRE BID QUERIES | BS | AS | SP | SPS |
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

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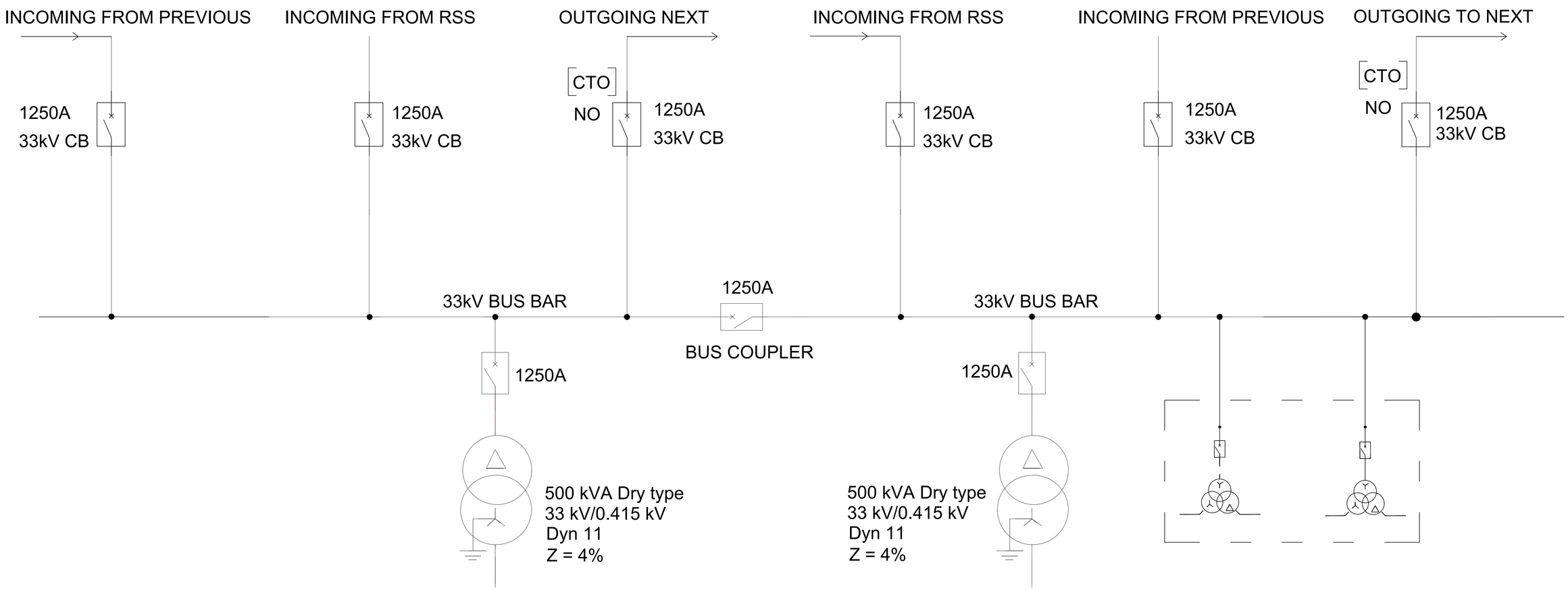
MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL KEY PROTECTION SLD OF UNDERGROUND ASS TYPE C |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ASSSLD1-00306 |
| REV | 1 |
| SCALE | NTS |
| DATE | December 2021 |
| STATUS | TENDER DRAWING |




NOTE : TYPE "D" ASS

This configuration is applicable to ASS, where incoming feed from intermediate RSS. CTO operation is to accommodate in this station to extend the feed in case of failure of any other RSS.

## LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | Auxiliary Transformer | |
| 2 | 33kV Circuit Breaker (ASS) | |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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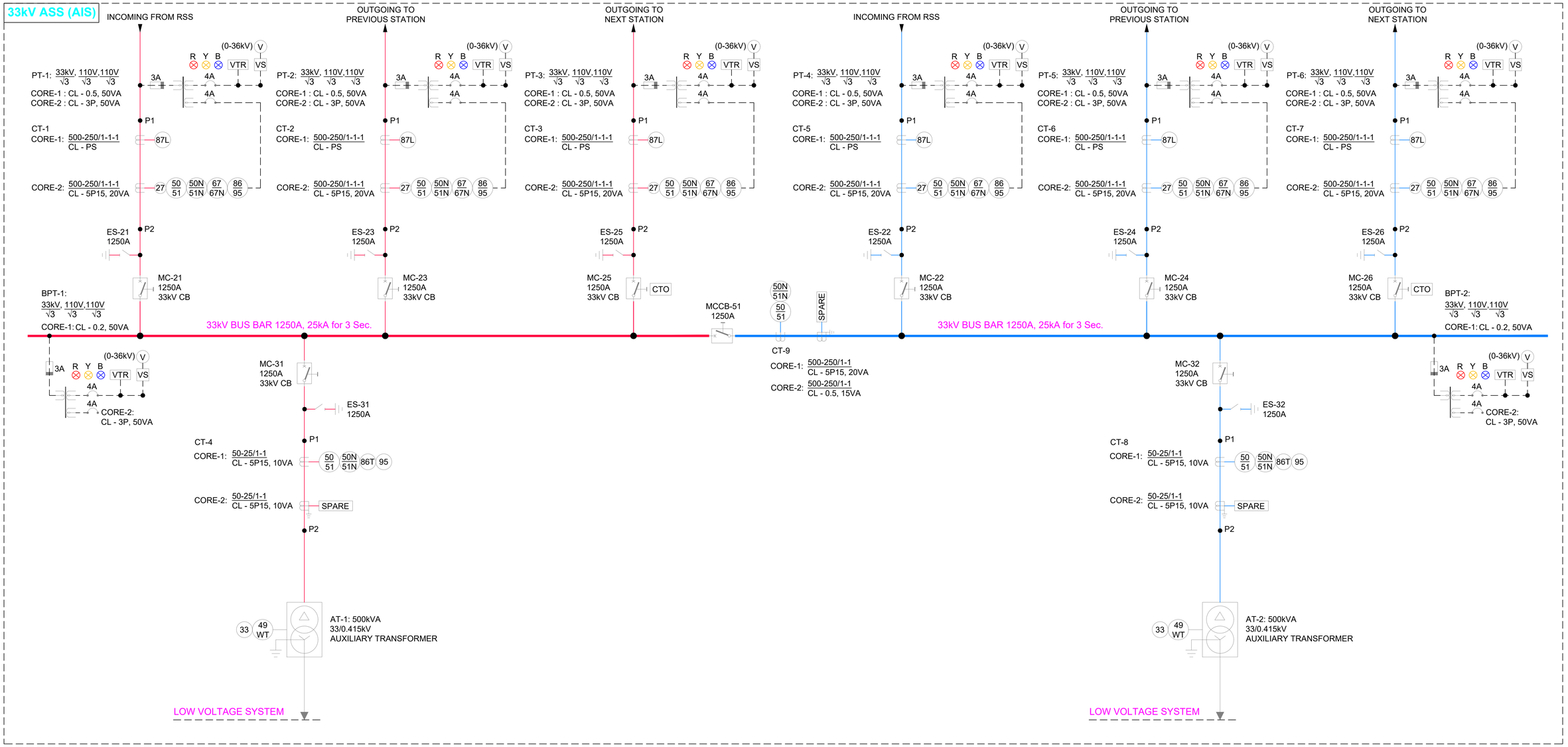
GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL SLD FOR TYPE D AUXILIARY SUBSTATION |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ASSSLD1-0030 □ |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

# TYPE - D




| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | | ES - EARTH SWITCH (MANUALLY) |
| 2 | | CB - CIRCUIT BREAKER |
| 3 | | CT - CURRENT TRANSFORMER |
| 4 | | AT - AUXILIARY TRANSFORMER |
| 5 | | CCB - COUPLER CIRCUIT BREAKER |
| 6 | | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 | | PT - POTENTIAL TRANSFORMER |
| 8 | | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |

| CODE | DESCRIPTION |
|---|---|
| 51N | TIME-OVERCURRENT-GROUND |
| 63 64GD | RUNNING RAIL VOLTAGE MONITORING ENCLOSURE GROUND RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| ES | EARTH SWITCH (MANUALLY) |

NOTE:- TYPE "D" ASS

THIS CONFIGURATION IS APPLICABLE TO ASS , WHERE INCOMING FEED FROM RSS. CTO OPERATION WILL ACCOMMODATE IN THIS STATION TO EXTEND THE FEED IN CASE OF FAILURE OF ANY OTHER RSS.

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

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MPMETRO

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

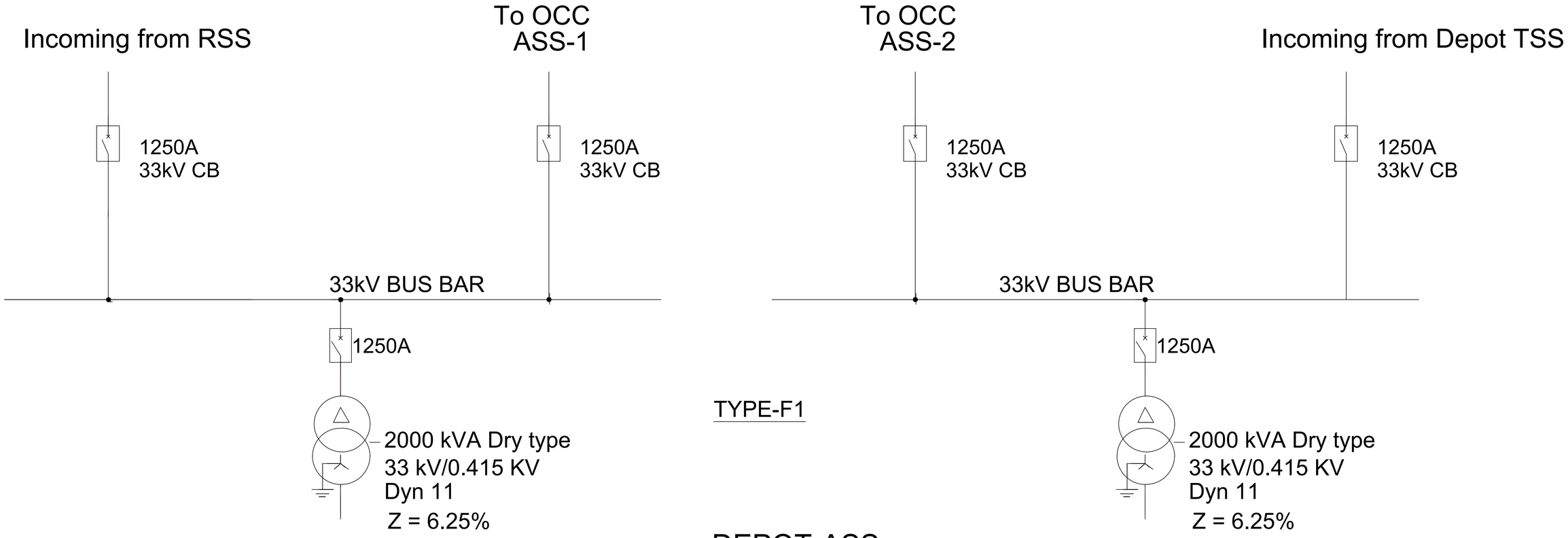
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF ELEVATED ASS TYPE D

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00308 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




TYPE-F1

# DEPOT-ASS

NOTE : TYPE "F" ASS

This configuration is applicable to the ASS at the Depot which are fed directly from the RSS.

## LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | Auxiliary Transformer | |
| 2 | 33kV Circuit Breaker (ASS) | |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| R1 | Dec. 2021 | | | | | |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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GURGAON,HARYANA, INDIA-122001

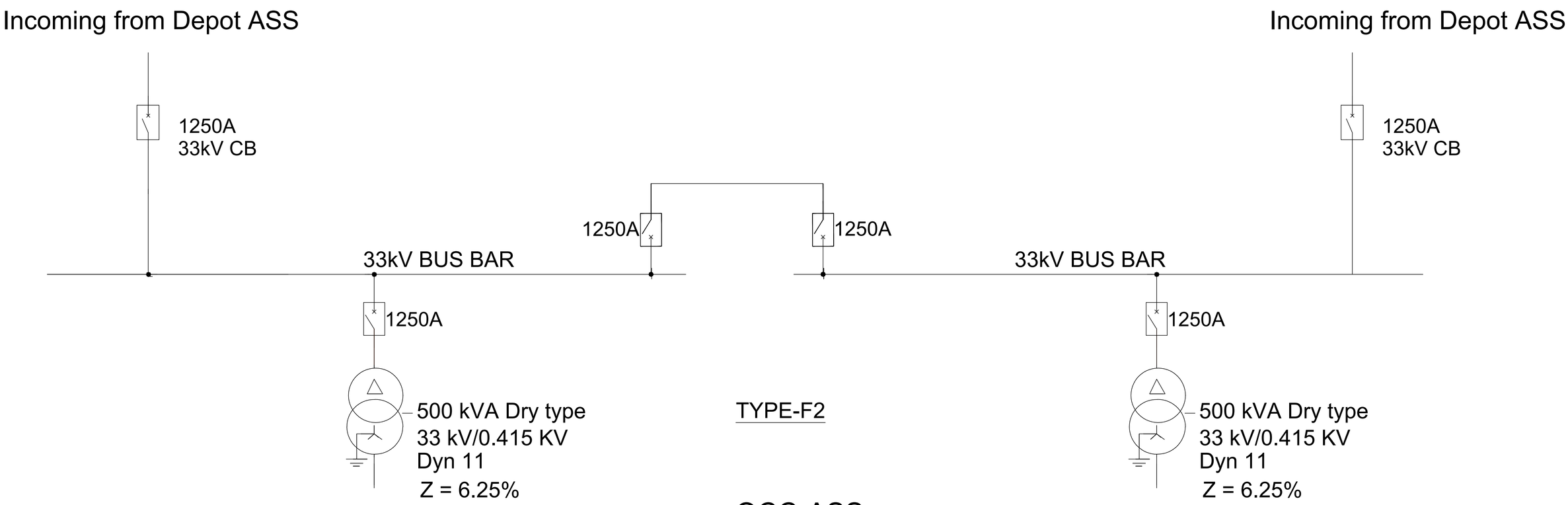
| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL SLD FOR TYPE F1 AUXILIARY SUBSTATION FOR DEPOT-ASS |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ASSSLD1-00311 |
| REV | R1 |
| SCALE | NTS |
| DATE | December 2021 |
| STATUS | TENDER DRAWING |




# OCC-ASS

## LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | Auxiliary Transformer | |
| 2 | 33kV Circuit Breaker (ASS) | |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| | | | | | | |
| | | | | | | |
| | | | | | | |
| R1 | Dec. 2021 | | | | | |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy

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258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

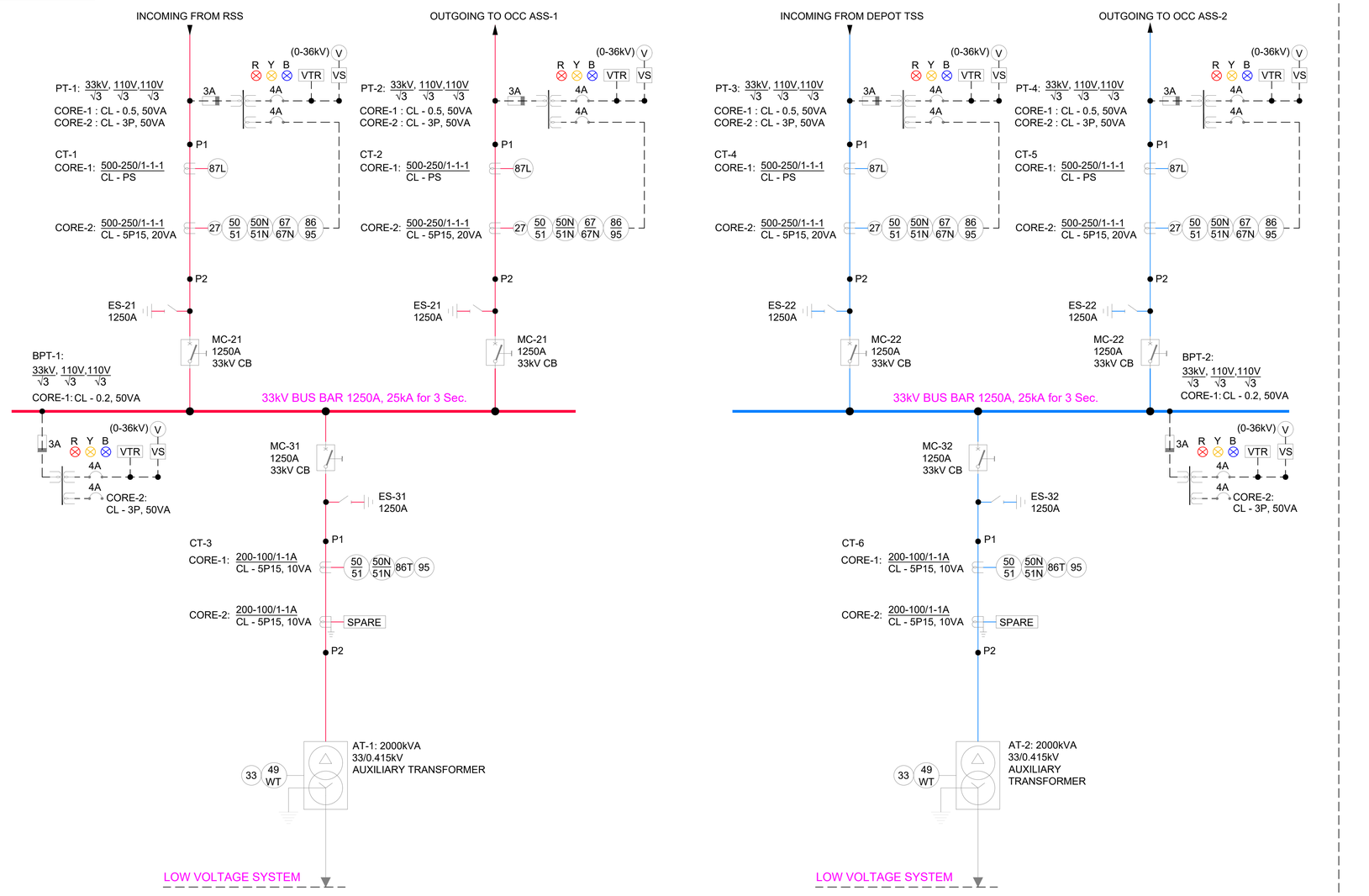
DRAWING TITLE: TYPICAL SLD FOR TYPE F2 AUXILIARY SUBSTATION FOR OCC-ASS

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00311-A | REV: R1

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING

# TYPE - F1

## 33kV ASS (AIS)




| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | | ES - EARTH SWITCH (MANUALLY) |
| 2 | | CB - CIRCUIT BREAKER |
| 3 | | CT - CURRENT TRANSFORMER |
| 4 | | AT - AUXILIARY TRANSFORMER |
| 5 | | CCB - COUPLER CIRCUIT BREAKER |
| 6 | | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 | | PT - POTENTIAL TRANSFORMER |
| 8 | | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49 WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |

| CODE | DESCRIPTION |
|---|---|
| 51N | TIME-OVERCURRENT-GROUND |
| 63 64GD | RUNNING RAIL VOLTAGE MONITORING ENCLOSURE GROUND RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| ES | EARTH SWITCH (MANUALLY) |

NOTE:- TYPE "F" ASS

THIS CONFIGURATION IS APPLICABLE TO THE ASS AT THE DEPOT WHICH ARE FEED DIRECTLY FROM THE RSS.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | AS PER PRE BID QUERIES | BS | AS | SP | SPS |
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
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GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09

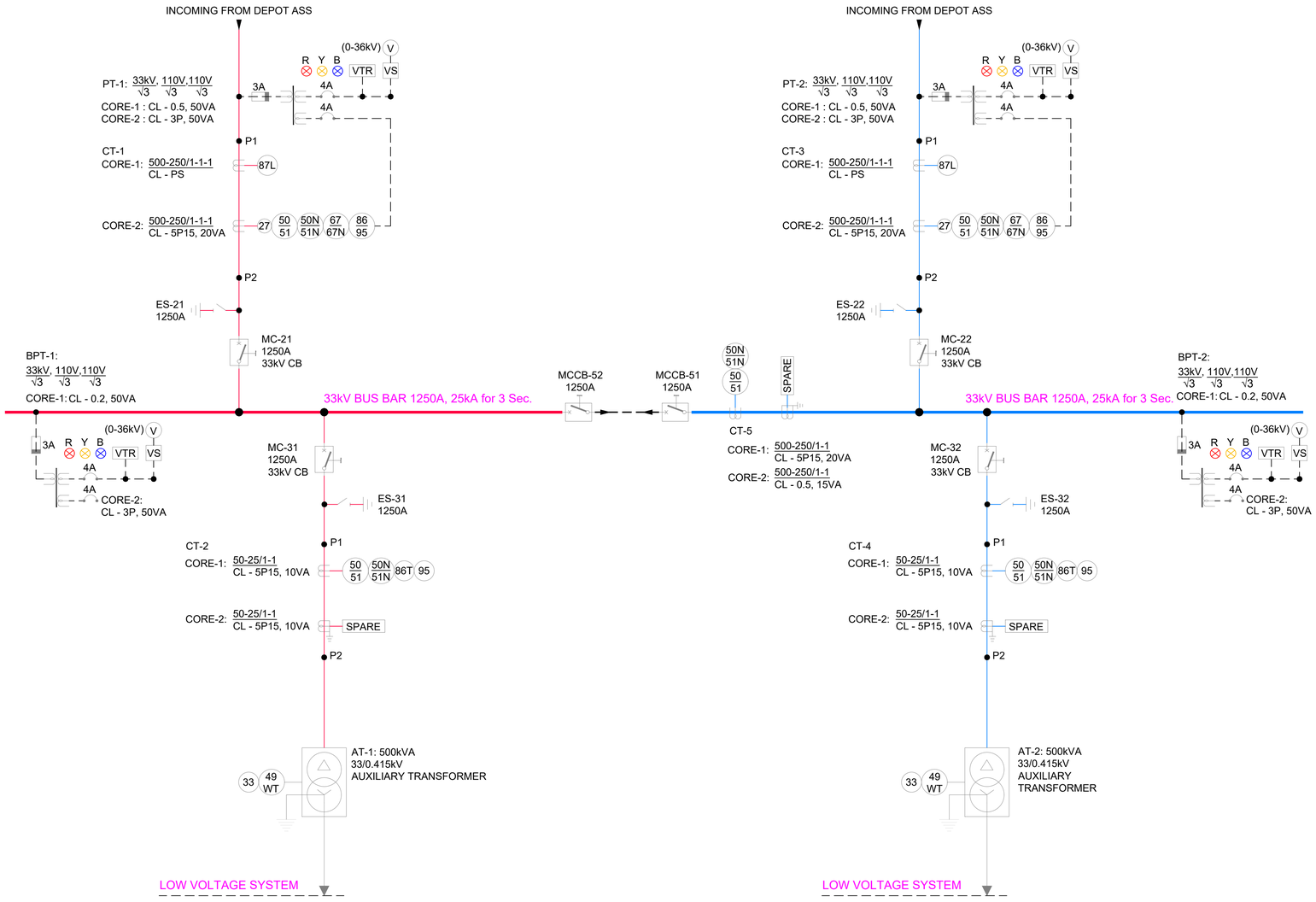
DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF DEPOT ASS TYPE - F1

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00312 | REV: 1

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING

# TYPE - F2

## 33kV ASS (AIS)




| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | | ES - EARTH SWITCH (MANUALLY) |
| 2 | | CB - CIRCUIT BREAKER |
| 3 | | CT - CURRENT TRANSFORMER |
| 4 | | AT - AUXILIARY TRANSFORMER |
| 5 | | CCB - COUPLER CIRCUIT BREAKER |
| 6 | | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 | | PT - POTENTIAL TRANSFORMER |
| 8 | | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49/WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |

| CODE | DESCRIPTION |
|---|---|
| 51N | TIME-OVERCURRENT-GROUND |
| 63/64GD | RUNNING RAIL VOLTAGE MONITORING ENCLOSURE GROUND RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| ES | EARTH SWITCH (MANUALLY) |

NOTE:- TYPE "F2" ASS
THIS CONFIGURATION IS APPLICABLE TO THE OCC ASS.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Dec.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

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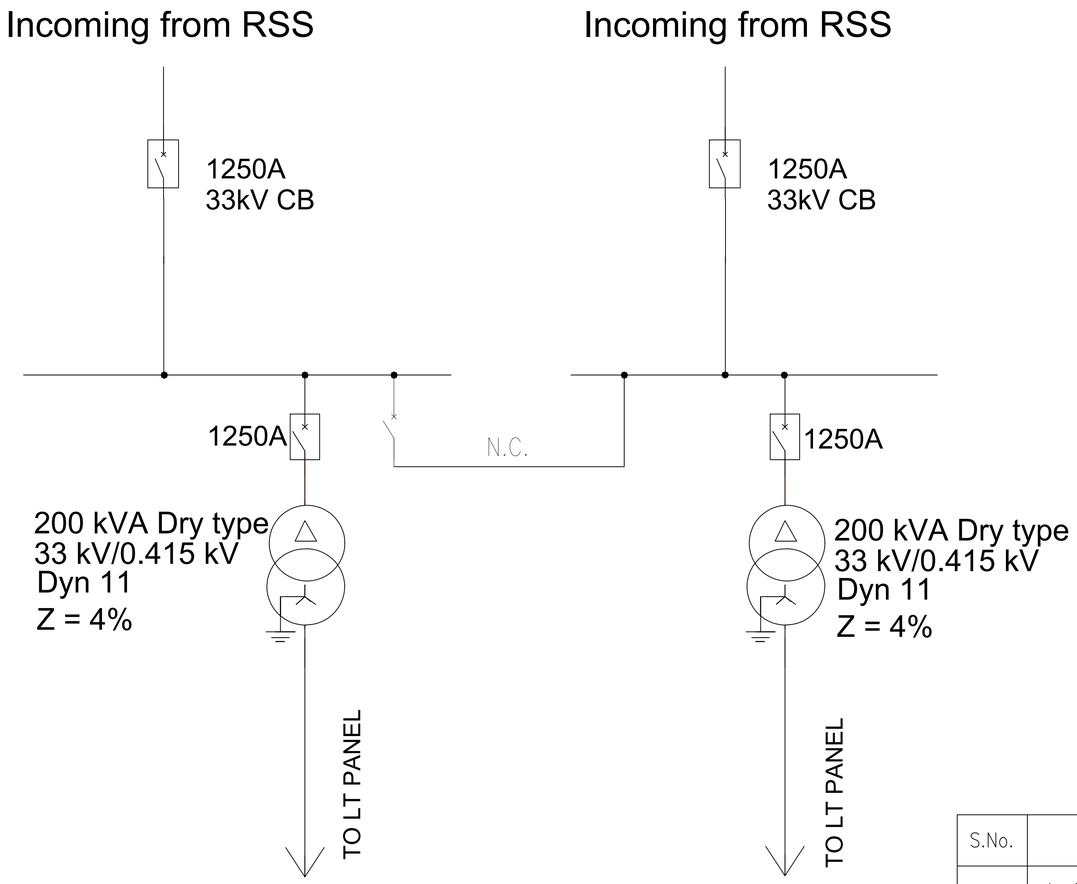
| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF OCC ASS TYPE - F2
DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00312A
REV: 0
SCALE: NTS
DATE: December 2021
STATUS: TENDER DRAWING




## LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | Auxiliary Transformer | |
| 2 | 33kV Circuit Breaker (ASS) | |

## NOTE : TYPE "I" ASS

This configuration is applicable to the ASS for RSS.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

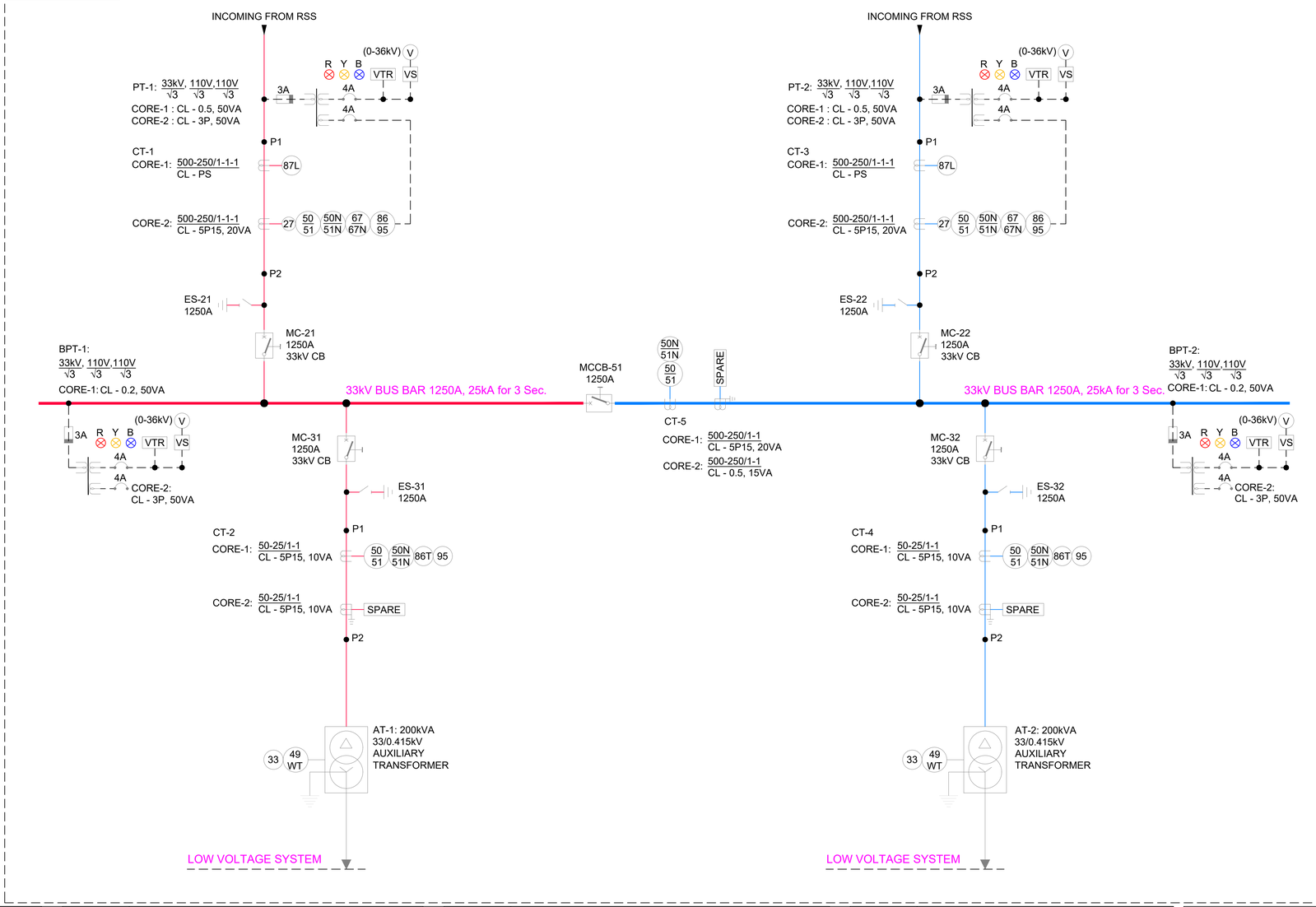
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL SLD FOR TYPE I AUXILIARY SUBSTATION
DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00317
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TYPE - I

## 33kV ASS (AIS)




| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | | ES - EARTH SWITCH (MANUALLY) |
| 2 | | CB - CIRCUIT BREAKER |
| 3 | | CT - CURRENT TRANSFORMER |
| 4 | | AT - AUXILIARY TRANSFORMER |
| 5 | | CCB - COUPLER CIRCUIT BREAKER |
| 6 | | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 | | PT - POTENTIAL TRANSFORMER |
| 8 | | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49/WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |

| CODE | DESCRIPTION |
|---|---|
| 51N | TIME-OVERCURRENT-GROUND |
| 63/64GD | RUNNING RAIL VOLTAGE MONITORING ENCLOSURE GROUND RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| ES | EARTH SWITCH (MANUALLY) |

NOTE:- TYPE "I" ASS

THIS CONFIGURATION IS APPLICABLE TO THE ASS FOR RSS.

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

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GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

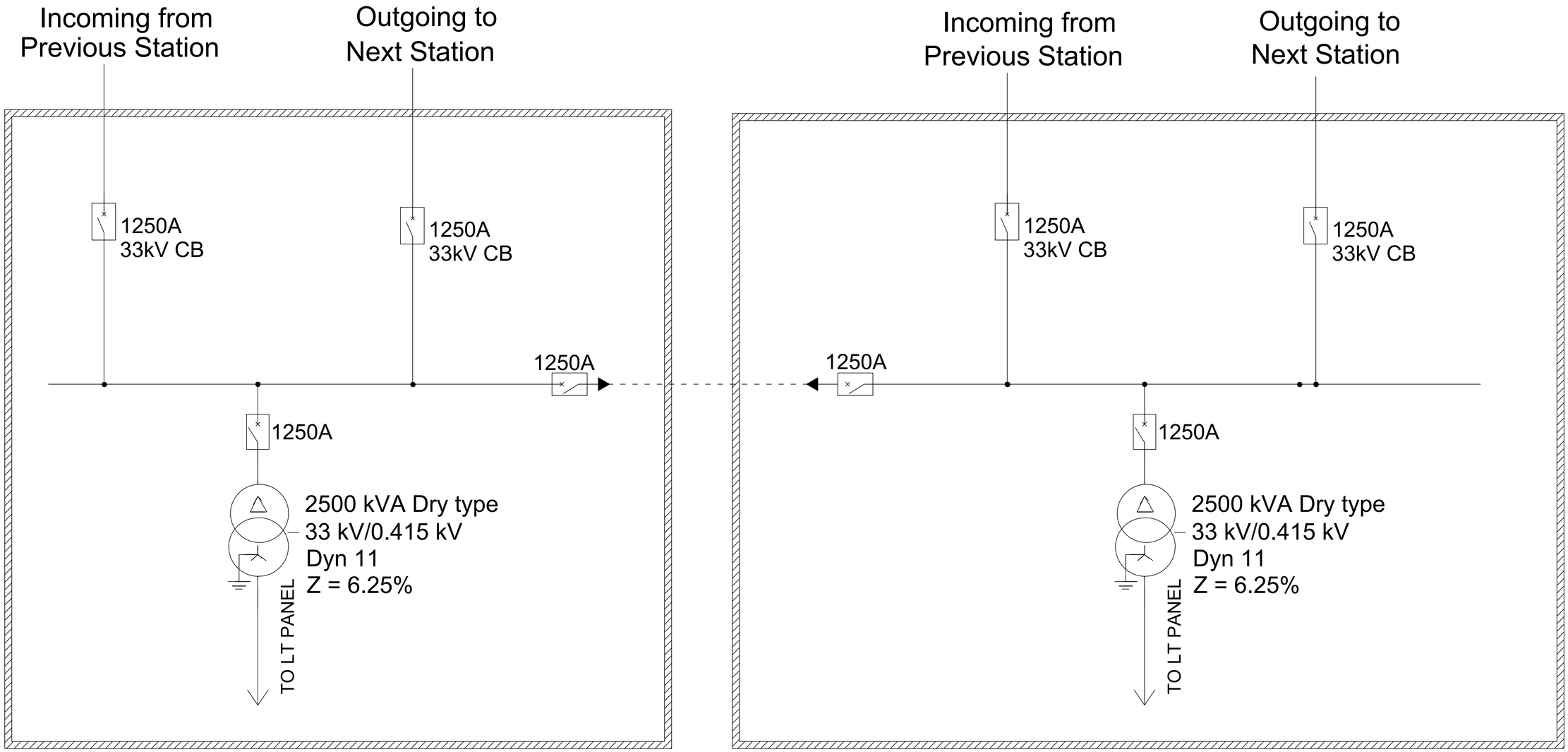
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF ELEVATED ASS
TYPE I

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00318 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




## LEGENDS

| S.No. | Description | Symbol |
|---|---|---|
| 1 | Auxiliary Transformer | |
| 2 | 33kV Circuit Breaker (ASS) | |

NOTE : TYPE "J" ASS

This configuration is applicable to the only ASS in underground stations.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

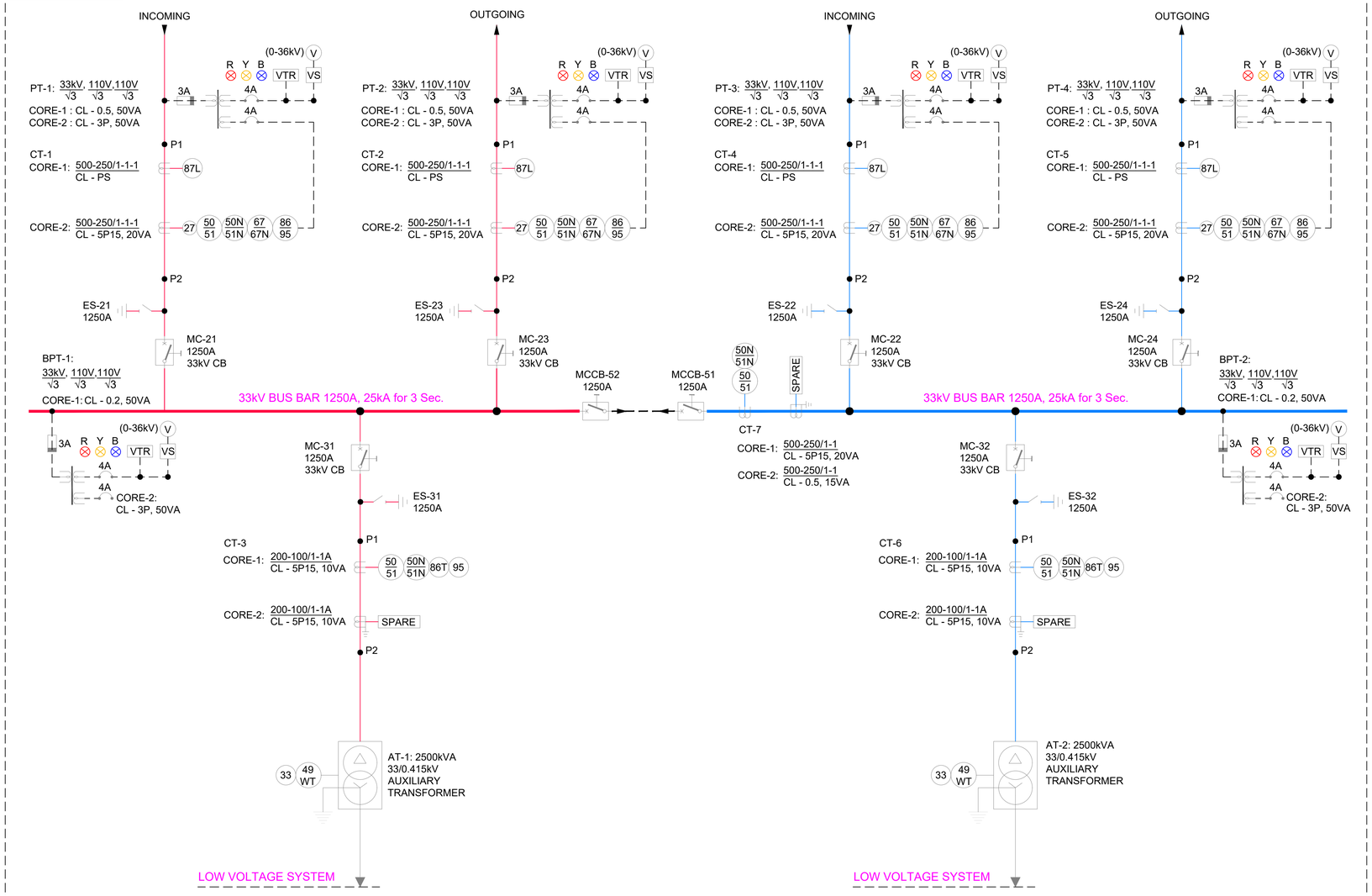
DRAWING TITLE: TYPICAL SLD FOR TYPE J AUXILIARY SUBSTATION

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00319 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING

# TYPE - J

## 33kV ASS (AIS)




| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | | ES - EARTH SWITCH (MANUALLY) |
| 2 | | CB - CIRCUIT BREAKER |
| 3 | | CT - CURRENT TRANSFORMER |
| 4 | | AT - AUXILIARY TRANSFORMER |
| 5 | | CCB - COUPLER CIRCUIT BREAKER |
| 6 | | PT - TWO CORE POTENTIAL TRANSFORMER |
| 7 | | PT - POTENTIAL TRANSFORMER |
| 8 | | 33kV CIRCUIT - 1<br>33kV CIRCUIT - 2 |

| CODE | DESCRIPTION |
|---|---|
| 02 | TIME DELAY RELAY 10 SEC |
| 27 | UNDER VOLTAGE RELAY |
| 33 | DOOR INTERLOCKING RELAY |
| 49/WT | WINDING HOT-SPOT TEMPERATURE DETECTOR |
| 50 | INSTANTANEOUS OVER CURRENT RELAY |
| 50N | INSTANTANEOUS EARTH FAULT RELAY |
| 51 | TIME Delay CURRENT RELAY |

| CODE | DESCRIPTION |
|---|---|
| 51N | TIME-OVERCURRENT-GROUND |
| 63<br>64GD | RUNNING RAIL VOLTAGE MONITORING<br>ENCLOSURE GROUND RELAY |
| 86 | MASTER TRIP RELAY/LOCKOUT RELAY |
| 86T | MASTER TRIP REALY (TRANSFORMER ) |
| 87L | DIFFERENTIAL PROTECTION |
| 95 | TRIP CIRCUIT SUPERVISION |
| 67 | DIRECTIONAL OVER CURRENT PROTECTION RELAY |
| 67N | DIRECTIONAL EARTH FAULT PROTECTION RELAY |

| CODE | DESCRIPTION |
|---|---|
| MC | 33 kV CIRCUIT BREAKER |
| MCCB | 33 kV BUS COUPLER |
| AT | AUXILIARY TRANSFORMER |
| PT | POTENTIAL TRANSFORMER |
| ES | EARTH SWITCH (MANUALLY) |

NOTE:- TYPE "J" ASS

THIS CONFIGURATION IS APPLICABLE TO THE ONLY ASS IN UNDERGROUND STATIONS.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AS | SP | SPS |

DETAILED DESIGN CONSULTANT

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ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

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RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

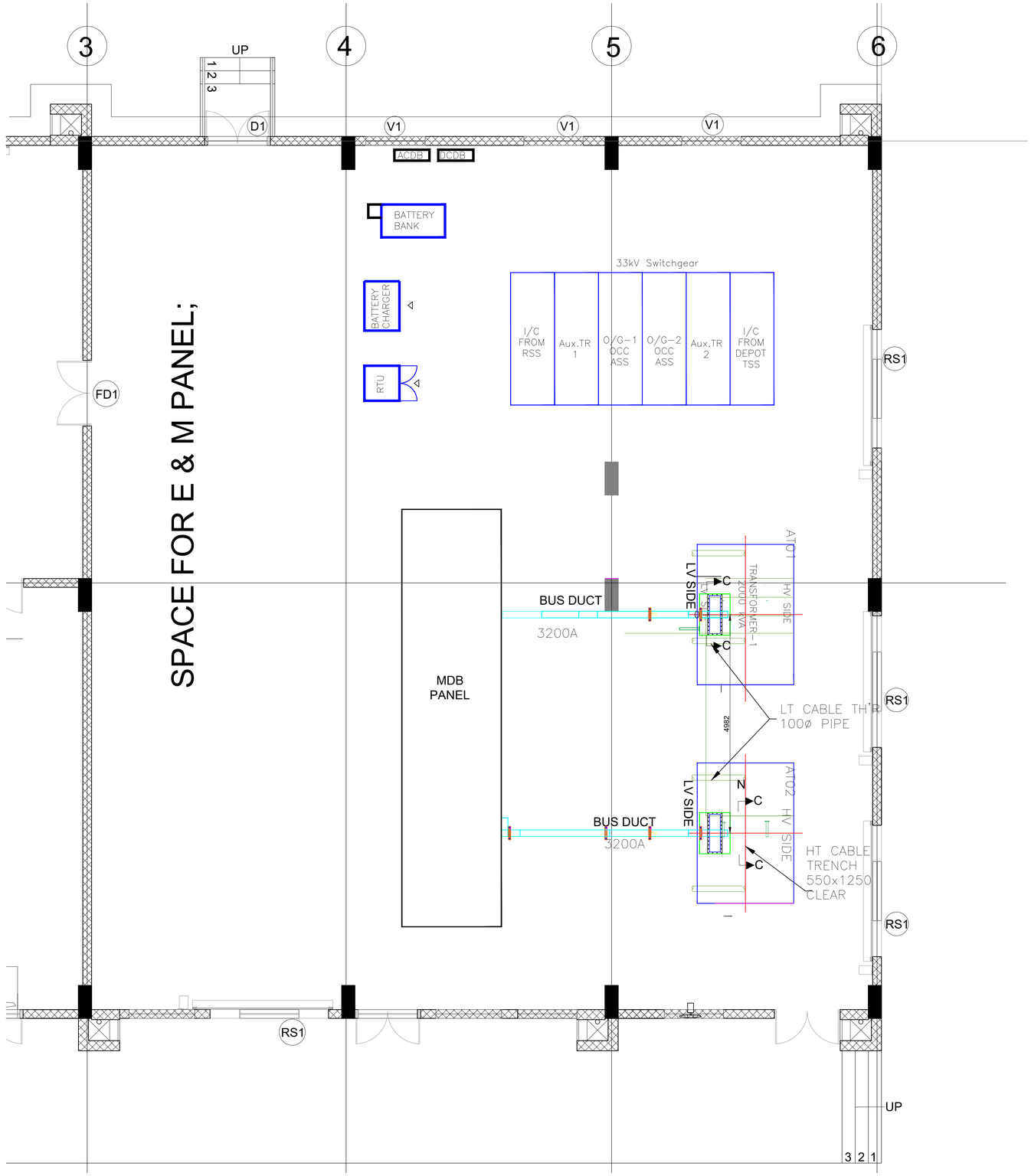
| BHUPENDER SINGH | AKHILESH SAINI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL KEY PROTECTION SLD OF UNDERGROUND ASS TYPE J
DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSSLD1-00320
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




1. All Dimensions are in mm and Elevations are in Meter Unless Otherwise Specified.
2. The provision of LV Bus duct is in the scope of E & M Contractor.

TYPICAL EQUIPMENT DETAILS FOR ASS: -

| SL NO | EQUIPMENT | L | W | H | QTY. | WEIGHT (Kg/Unit) |
|---|---|---|---|---|---|---|
| 1 | 2000kVA Auxiliary Dry type Transformer with enclosure | 2800 | 2400 | 3000 | 2 nos. | 7100 |
| 2 | 33KV Vacuum Circuit breaker panels for ASS | 2800 | 1000 | 2600 | 2 nos. | 1600 |
| 3 | 33KV Vacuum interrupter panels for ASS | 2800 | 1000 | 2600 | 4 nos. | 1600 |
| 4 | 415V, ACDB, TYPE-3 (Alternate Current Distribution Board) | 900 | 300 | 800 | 1 no. | 35 |
| 5 | 110V, DCDB TYPE-3 (Direct Current Distribution Board) | 700 | 300 | 700 | 1 no. | 30 |
| 6 | Remote Terminal Unit (RTU) TYPE-5 | 800 | 800 | 2000 | 1 no. | 275 |
| 7 | Battery Bank (183AH) Type-1 | 1975 | 700 | 1800 | 1 Set. | 2100 |
| 8 | Battery Charger (110V, 50A) [BC-1&2] Type-1 | 750 | 750 | 1600 | 2 nos. | 650 |
| 9 | Interrupting Junction Box (IJB) | 325 | 125 | 300 | 1 no. | 20 |
| 10 | Fire Fighting ( FF01-02) | | | | | 2 nos. |
| | UPS Power Socket ( PS01-02) | | | | | 2 nos. |
| 11 | Main Earth Terminal [MET 01] | | | | | 1 no. |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec.2021 | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

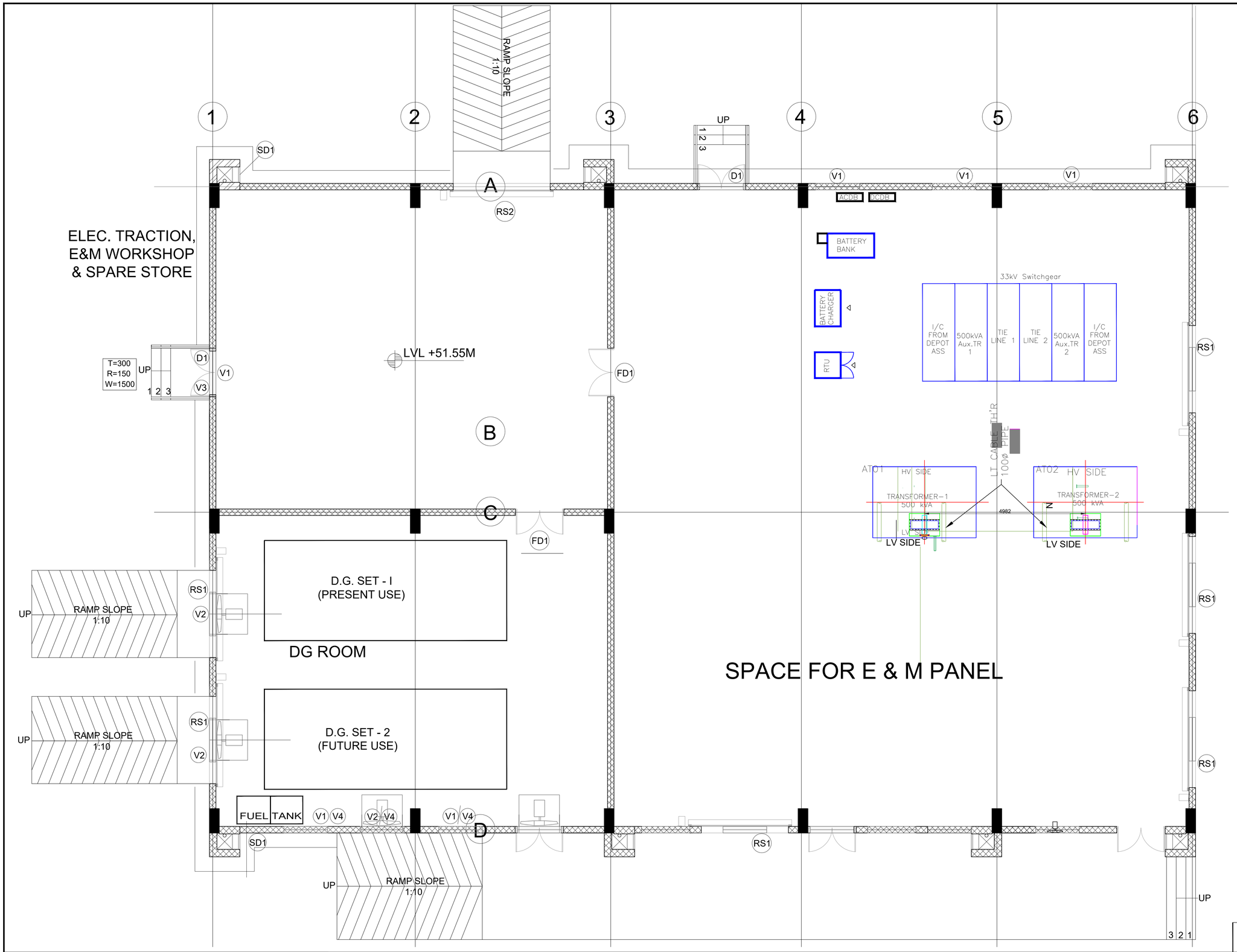
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL EQUIPMENT LAYOUT FOR DEPOT ASS

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSLYT1-00321 REV: R1

SCALE: NTS DATE: December 2021 STATUS: TENDER DRAWING

1. All Dimensions are in mm and Elevations are in Meter Unless Otherwise Specified.
2. The provision of LV cable from Auxiliary Transformer secondary terminal to MDB Panel is in the scope of E & M Contractor.




TYPICAL EQUIPMENT DETAILS FOR ASS: -

| SL NO | EQUIPMENT | L | W | H | QTY. | WEIGHT (Kg/Unit) |
|---|---|---|---|---|---|---|
| 1 | 2000kVA Auxiliary Dry type Transformer with enclosure | 2800 | 2400 | 3000 | 2 nos. | 7100 |
| 2 | 33KV Vacuum Circuit breaker panels for ASS | 2800 | 1000 | 2600 | 2 nos. | 1600 |
| 3 | 33KV Vacuum interrupter panels for ASS | 2800 | 1000 | 2600 | 4 nos. | 1600 |
| 4 | 415V, ACDB, TYPE-3 (Alternate Current Distribution Board) | 900 | 300 | 800 | 1 no. | 35 |
| 5 | 110V, DCDB TYPE-3 (Direct Current Distribution Board) | 700 | 300 | 700 | 1 no. | 30 |
| 6 | Remote Terminal Unit (RTU) TYPE-5 | 800 | 800 | 2000 | 1 no. | 275 |
| 7 | Battery Bank (183AH) Type-1 | 1975 | 700 | 1800 | 1 Set. | 2100 |
| 8 | Battery Charger (110V, 50A) (BC-1&2) Type-1 | 750 | 750 | 1600 | 2 nos. | 650 |
| 9 | Interrupting Junction Box (IJB) | 325 | 125 | 300 | 1 no. | 20 |
| 10 | Fire Fighting ( FF01-02) | | | | | 2 nos. |
| | UPS Power Socket ( PS01-02) | | | | | 2 nos. |
| 11 | Main Earth Terminal (MET 01) | | | | | 1 no. |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 1 | Dec. 2021 | | | | | |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

RITES LTD.
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

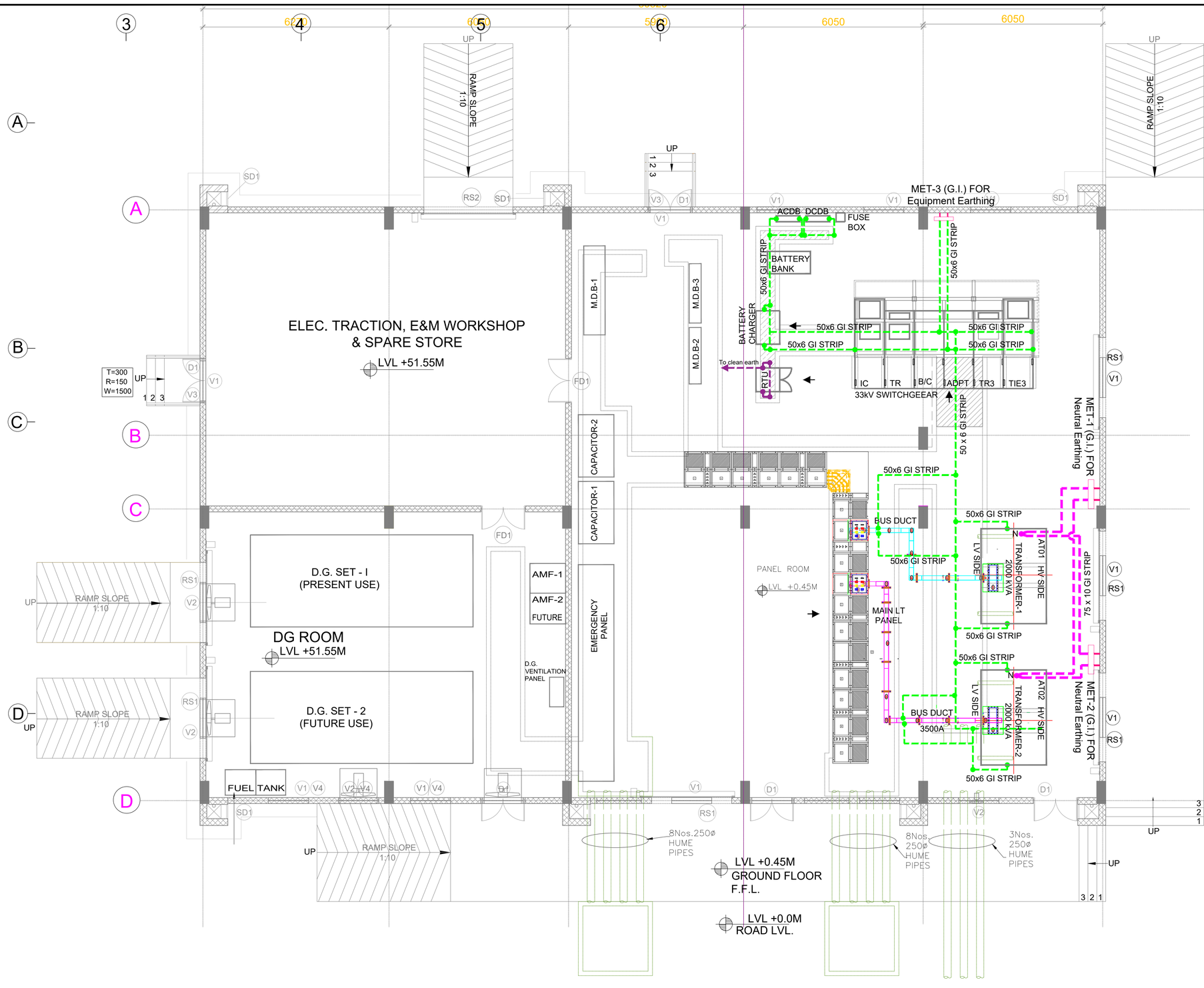
| PHOOL CHAND PREPARED BY | BRAJESH CHECKED BY | SURENDRA PAL SINGH APPROVED BY | SURENDRA PAL SINGH ISSUED BY |
|---|---|---|---|

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

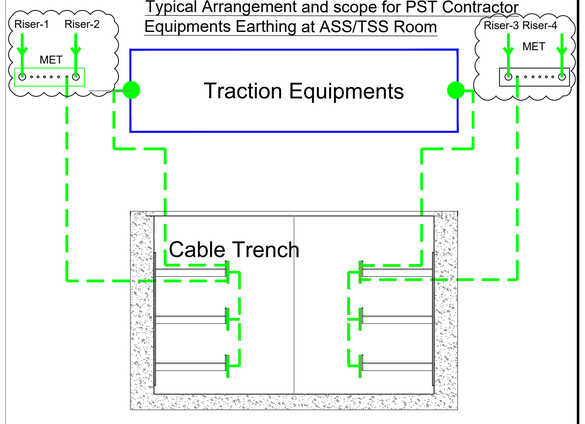
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL EQUIPMENT LAYOUT FOR OCC ASS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSLYT1-00322
REV: R1
SCALE: NTS
DATE: December 2021
STATUS: TENDER DRAWING




Notes :-

1. All Dimension are in mm and the levels shown here are in mtr.
2. GI earth strip of size 50mm x 6mm shall be laid in the cable tray by depot contractor.
3. For Trafo. neutral Earthing, GI strip of size 75mm x 10mm shall be laid on floor by PST Contractor.
4. Each MET will be connected with two nos different risers coming from earth grid are provided by depot contractor. Total 3nos. of MET for PST Contractor traction equipments are provided by depot contractor.
5. Galvanized earth flat to be treated by the zinc rich paint on cut edges immediately to avoid corrosion.
6. All 3nos MET Sizes are GI flat of 75x10mm thick 600mm long. shall be fixed 500mm above the FFL are provided by SBC.
7. Single run 50x6 GI strip shall be provided on the edge of the cable tray bracket, through out the cable route as a ring and shall be inter- connected to the tiers/branch and every change in direction.The ring earthing strip shall connected with two different MET (depot contractor).
8. The earthing layout is as per IS; 3043 (1987)
9. LV busduct external earthing further connected with Earth grid.
10. Cutout over cable trench covered chequrred plate for earthing strip entry from MET to Cable tray.
11. All MET shall be installed on 1.1 kV support insulator.

Typical Arrangement and scope for PST Contractor Equipments Earthing at ASS/TSS Room




| MET Details for DEPOT ASS | | | |
|---|---|---|---|
| Sr.No. | Equipment description | UNIT | QTY. |
| 1. | MET-1,MET-2 (For Aux. Transformer Neutral Earthing) | No | 2 |
| 2. | MET-3 (For Equipment Earthing CABLE TRAY) | No | 1 |

| Legends | | | |
|---|---|---|---|
| 1. | | 50x6 | Equipment Body Earthing GI |
| 2. | | 75x10 | Trafo Neutral Earthing GI |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
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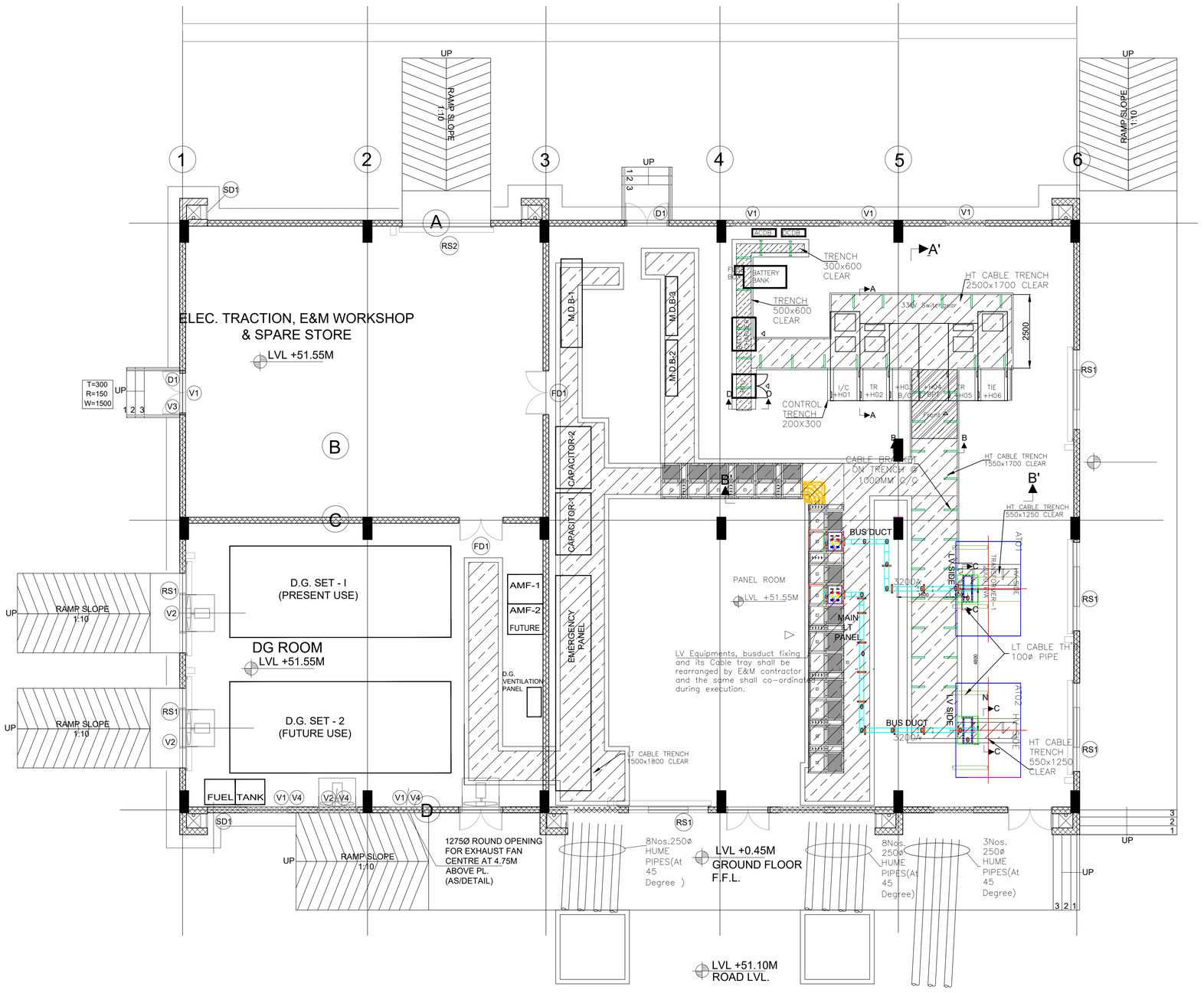
MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL EARTHING LAYOUT FOR DEPOT ASS |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ASSLYT1-00323 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




1. All Dimensions are in mm and Elevations are in Meter Unless Otherwise Specified.
2. This Drawing Should be Refereed only for Information of Cable trench.
3. Cable Support shall be Provided at every 1.0m Interval.
4. Power Cables shall be Generally laid in Bottom Tiers and Control Cable in top tiers.
5. Pipes shall be Securely fixed at both ends, either embedded in Concrete or Properly Clamped.
6. Control Cables and Power Cables shall be generally laid in separate pipes.
7. Earthling Conductor shall be welded on the cable supporting structure before installation of cables.
8. The purpose of Trench Layout Drawing is for use as follows;-
   -to be used as civil input for cable trenches.
   - for cable laying
9. Pipes should run straight from Equipment to trench however bend can be allowed in special cases (if any ).
10. Power Cable shall be laid on angle supports and all optical fiber Cables & Control Cable shall be laid in Cable trays in the trench.
11. After laying Cables the ends of pipes preferably be sealed to prevent ingress of water inside the pipe.
12. All Road Crossing should be through HDPE Pipes.

NOTES

1. Size of 33kV Cable will be as per table no.-13.3 and 13.4 of chapter 13 of Vol-IV (Technical Specification).
2. DC Cable size as per Table Number 15.18 of CH-15 of Vol-IV (Technical Specification).

REVISIONS

| REV. | DATE | DESCRIPTION | PC | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

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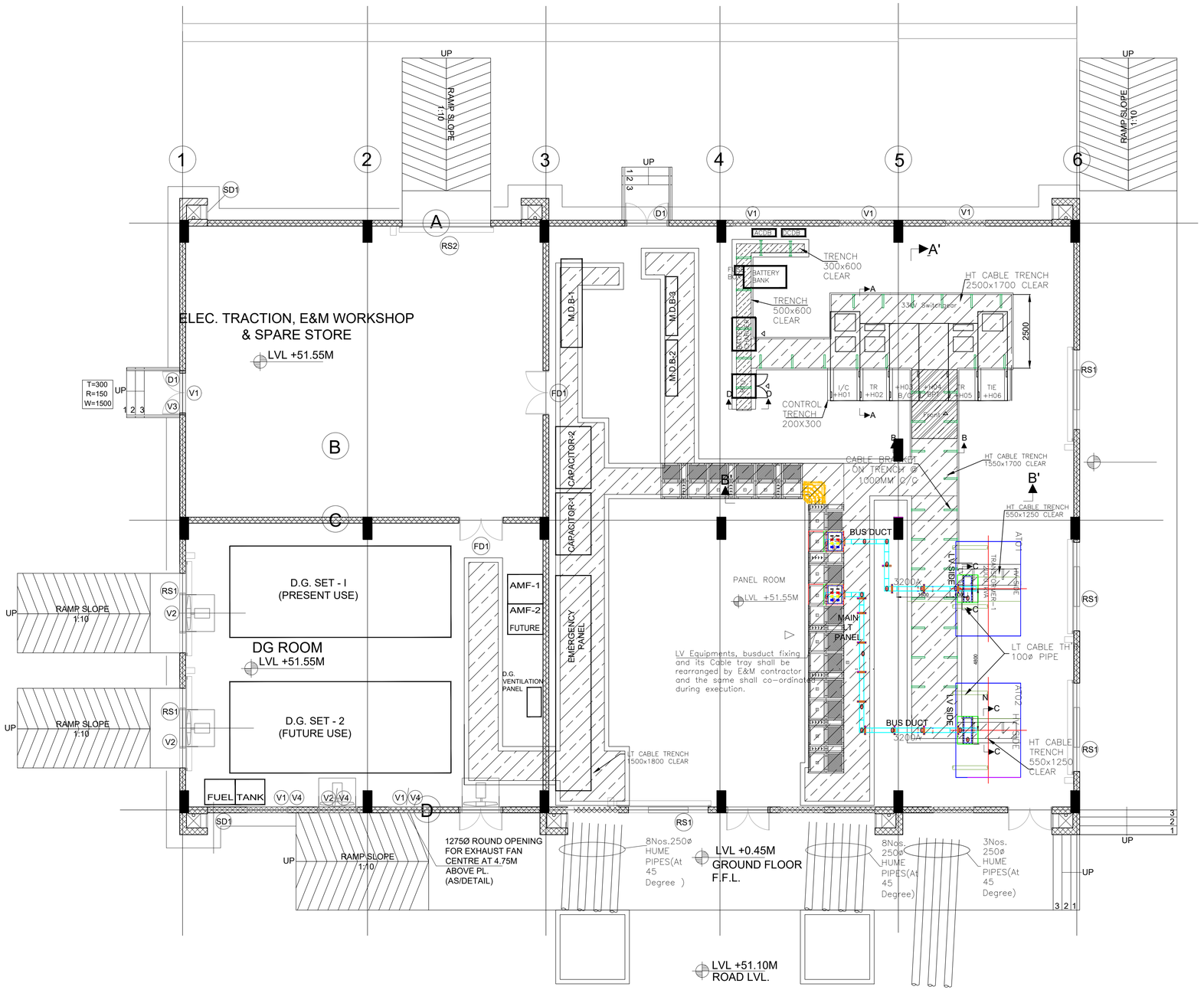
| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL CABLE TRENCH LAYOUT FOR DEPOT ASS (SHEET-01 OF 03) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ASSLYT1-00324 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




1. All Dimensions are in mm and Elevations are in Meter Unless Otherwise Specified.
2. This Drawing Should be Refereed only for Information of Cable trench.
3. Cable Support shall be Provided at every 1.0m Interval.
4. Power Cables shall be Generally laid in Bottom Tiers and Control Cable in top tiers.
5. Pipes shall be Securely fixed at both ends, either embedded in Concrete or Properly Clamped.
6. Control Cables and Power Cables shall be generally laid in separate pipes.
7. Earthling Conductor shall be welded on the cable supporting structure before installation of cables.
8. The purpose of Trench Layout Drawing is for use as follows;-
   -to be used as civil input for cable trenches.
   - for cable laying
9. Pipes should run straight from Equipment to trench however bend can be allowed in special cases (if any ).
10. Power Cable shall be laid on angle supports and all optical fiber Cables & Control Cable shall be laid in Cable trays in the trench.
11. After laying Cables the ends of pipes preferably be sealed to prevent ingress of water inside the pipe.
12. All Road Crossing should be through HDPE Pipes.

NOTES

1. Size of 33kV Cable will be as per table no.-13.3 and 13.4 of chapter 13 of Vol-IV (Technical Specification).
2. DC Cable size as per Table Number 15.18 of CH-15 of Vol-IV (Technical Specification).

REVISIONS

| REV. | DATE | DESCRIPTION | PC | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
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MPMETRO

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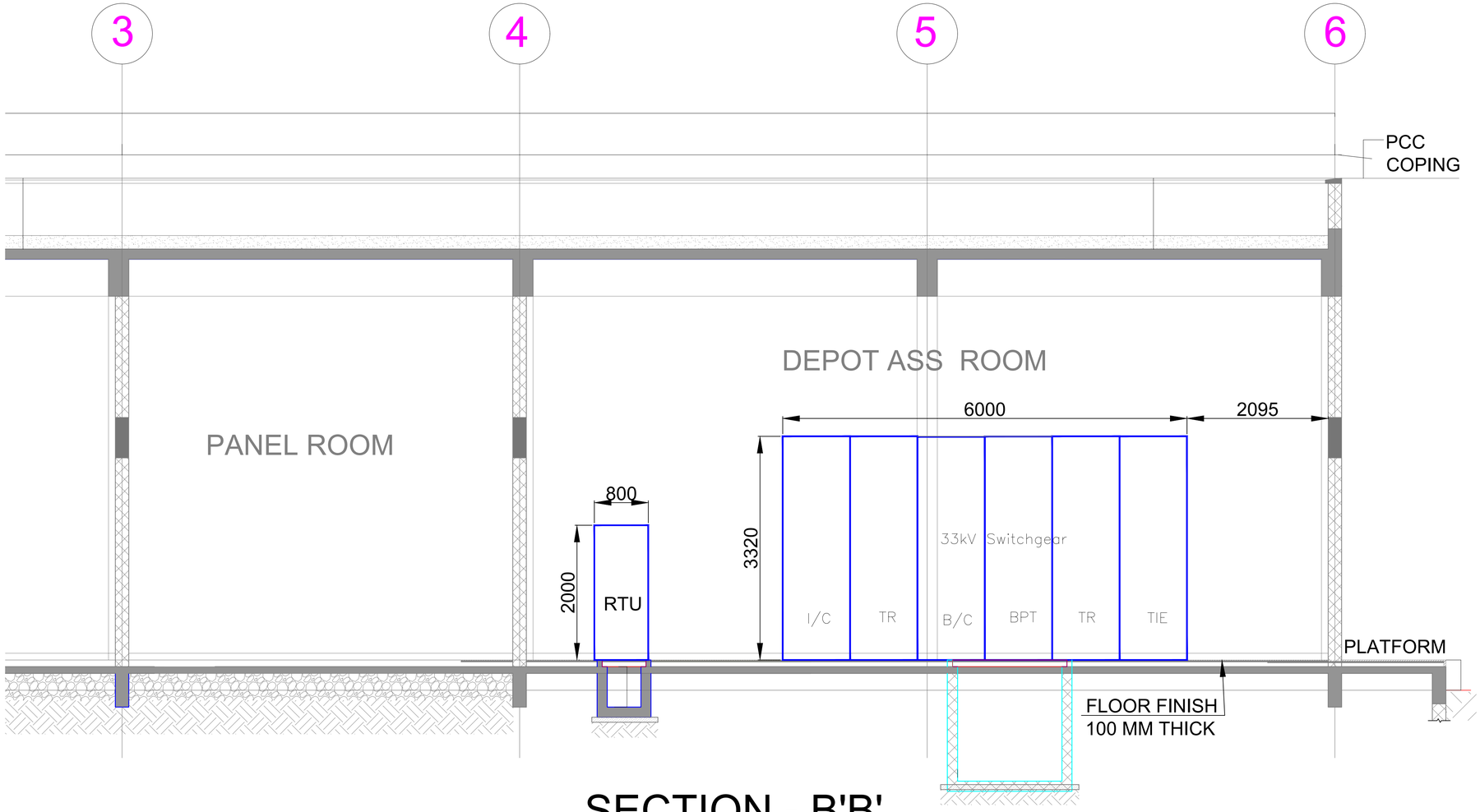
| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL CABLE TRENCH LAYOUT FOR DEPOT ASS (SHEET-01 OF 03) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-ASSLYT1-00324 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




# SECTION - B'B'

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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NOT TO BE USED FOR CONSTRUCTION

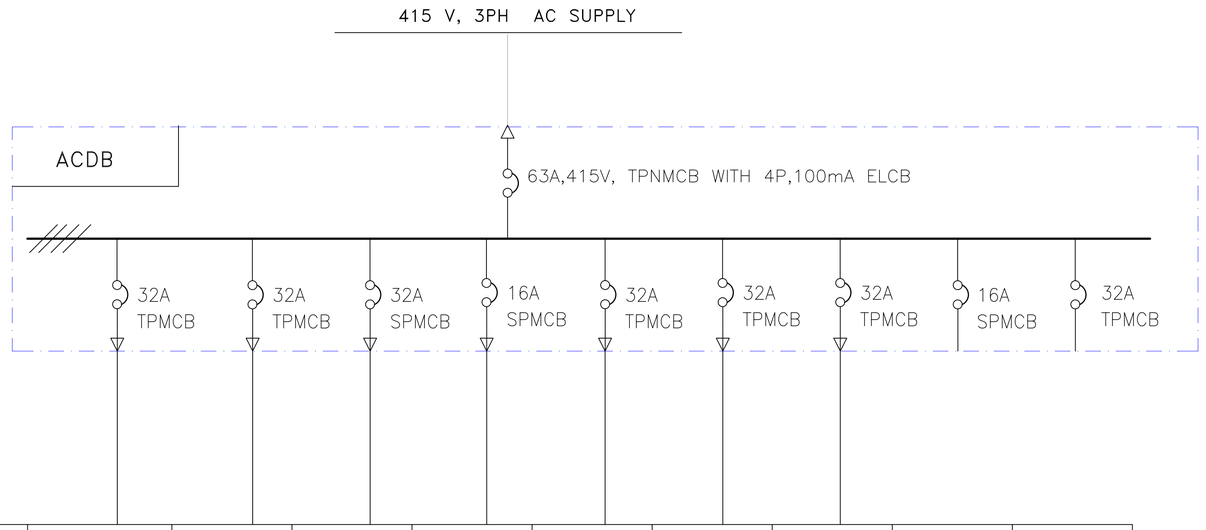
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

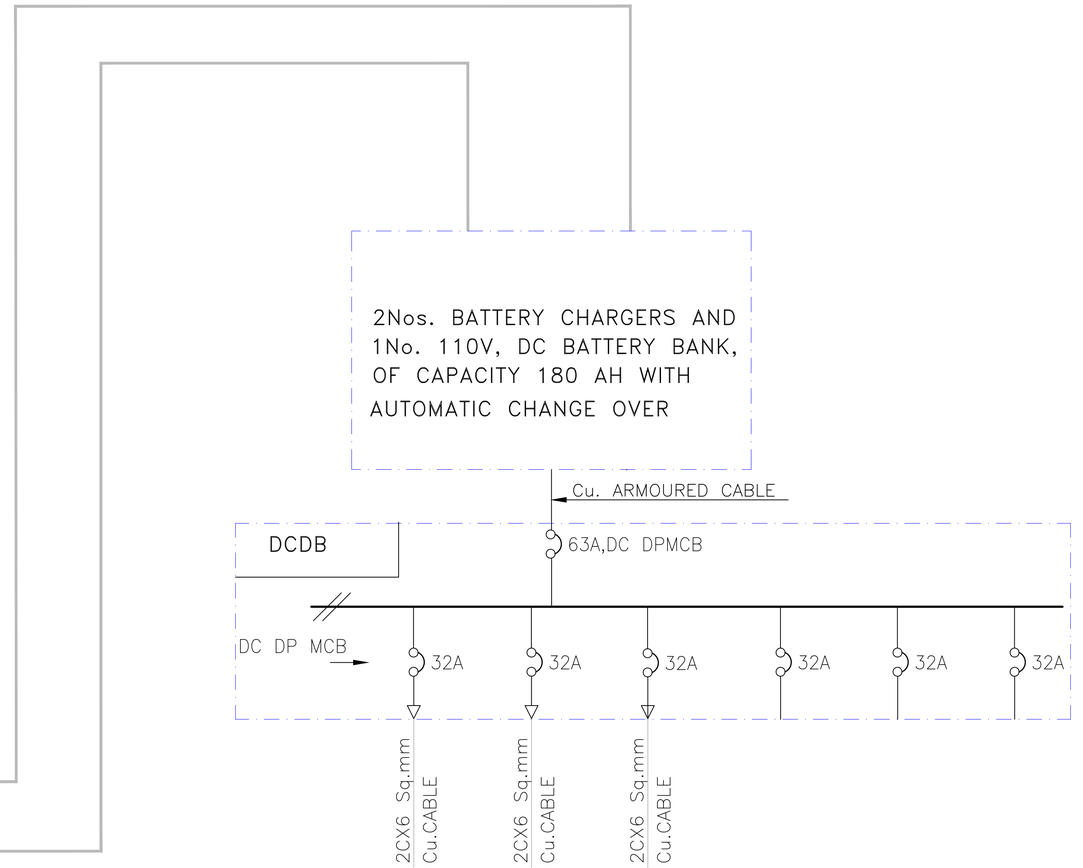
DRAWING TITLE: TYPICAL CABLE TRENCH LAYOUT FOR DEPOT ASS (SHEET-03 OF 03)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-ASSLYT1-00324 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 16A | 16A | 20A | 5A | 10A | 10A | 10A | – | – |
| FEEDER DESCRIPTION | BATTERY CHARGER–1 | BATTERY CHARGER–2 | 33kV BREAKER PANEL ASS | RTU | AUX. TRANSFORMER–1 | AUX. TRANSFORMER–2 | TRACK EARTH PANEL | SPARE | SPARE |




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| LOAD IN AMP. | 16A | 16A | 16A | – | – | – |
| FEEDER DESCRIPTION | RTU | 33kV BREAKER PANEL ASS 1 | 33kV BREAKER PANEL ASS 2 | SPARE | SPARE | SPARE |

LEGEND:–

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | —o— | MINIATURE CIRCUIT BREAKER (MCB) |
| 2 | —×— | MOULDED CASE CIRCUIT BREAKER (MCCB) |
| 3 | SP | SINGLE POLE |
| 4 | DP | DOUBLE POLE |
| 5 | TPN | THREE POLE WITH NEUTRAL |
| 6 | ACDB | AC DISTRIBUTION BOARD |
| 7 | DCDB | DC DISTRIBUTION BOARD |
| 8 | RTU | REMOTE TERMINAL UNIT |

TENDER DRAWING
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REVISIONS

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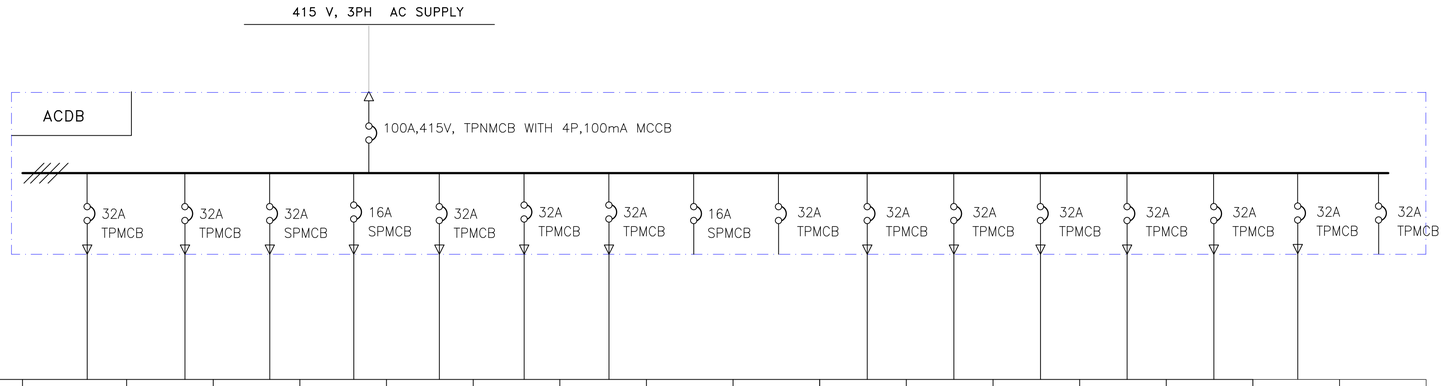
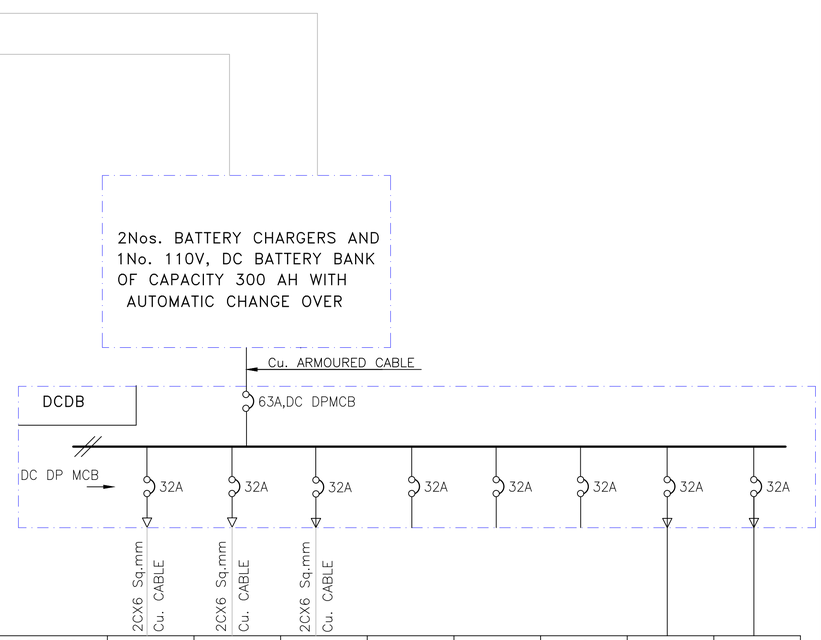
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SCHEME IN ACDB DCDB-TYPE-1
DRAWING NUMBER: I202-BIG-TRP-00-DWG-AUXSCH1-00325
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 16A | 16A | 20A | 5A | 10A | 10A | 10A | – | – | 20A | 20A | 20A | 20A | 10A | 10A | |
| FEEDER DESCRIPTION | BATTERY CHARGER–1 | BATTERY CHARGER–2 | 33kV BREAKER PANEL ASS | RTU | AUX. TRANSFORMER–1 | AUX. TRANSFORMER–2 | TRACK EARTH PANEL | SPARE | SPARE | 33KV BREAKER PANEL TSS | HSCB | RECTIFIER | RECTIFIER | RECTIFIER TRANFORMER | RECTIFIER TRANFORMER | SPARE |




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 |
|---|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 17A | 15A | 15A | – | – | – | 15A | 20A |
| FEEDER DESCRIPTION | RTU | 33kV BREAKER PANEL ASS 1 | 33kV BREAKER PANEL ASS 2 | SPARE | SPARE | SPARE | 33KV BREAKER PANEL TSS | HSCB |

LEGEND:–

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | —ᔓ— | MINIATURE CIRCUIT BREAKER (MCB) |
| 2 | —X— | MOULDED CASE CIRCUIT BREAKER (MCCB) |
| 3 | SP | SINGLE POLE |
| 4 | DP | DOUBLE POLE |
| 5 | TPN | THREE POLE WITH NEUTRAL |
| 6 | ACDB | AC DISTRIBUTION BOARD |
| 7 | DCDB | DC DISTRIBUTION BOARD |
| 8 | RTU | REMOTE TERMINAL UNIT |
| 9 | HSCB | DC SWITCHGEAR |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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DB GEODATA Louis Berger

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MPMETRO

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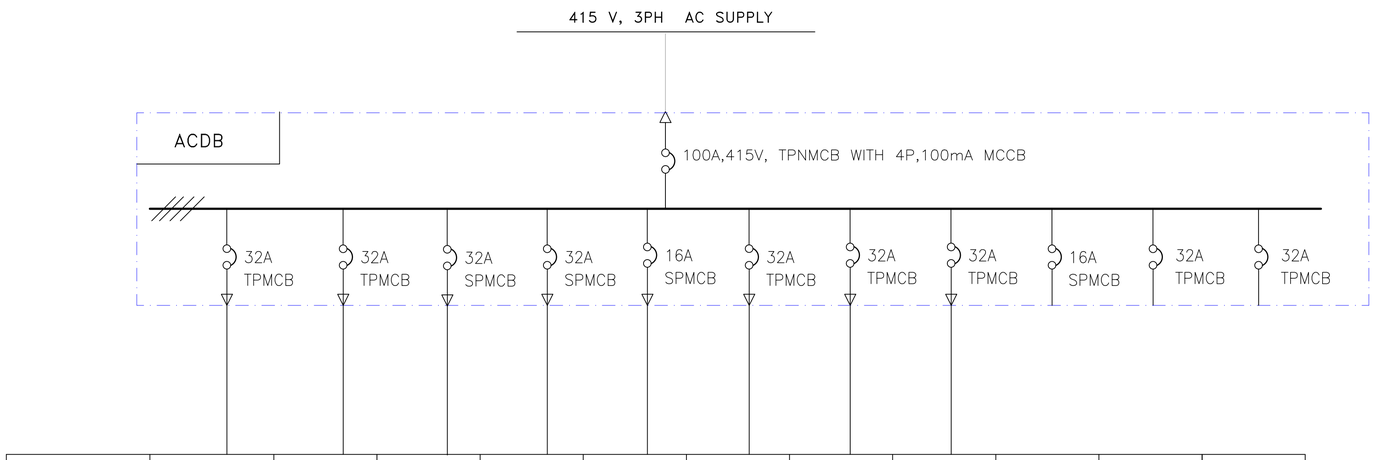
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

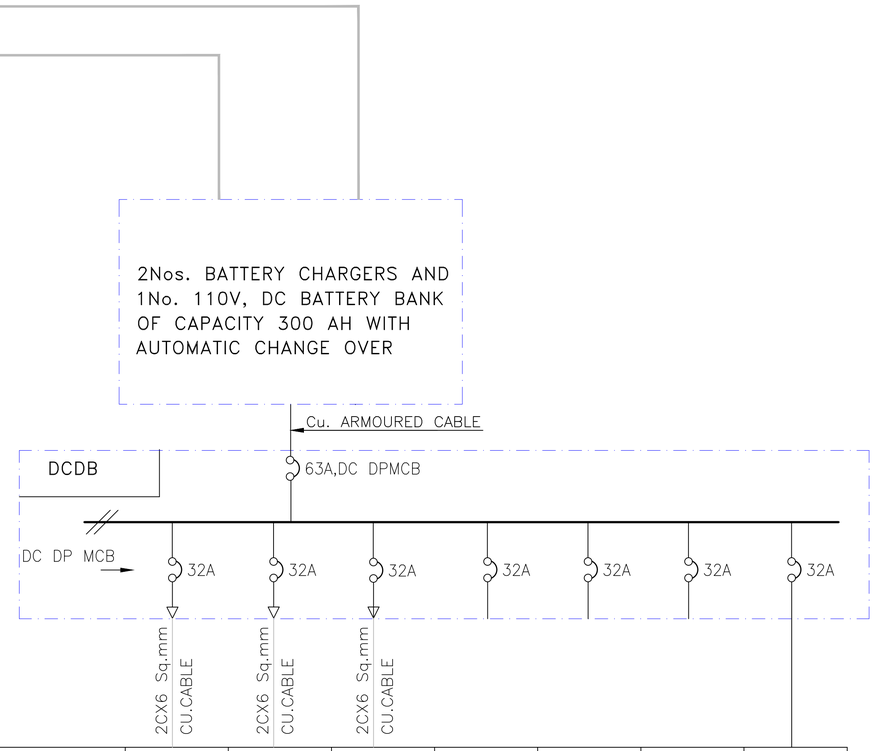
DRAWING TITLE: TYPICAL SCHEME IN ACDB DCDB-TYPE-2

DRAWING NUMBER: I202-BIG-TRP-00-DWG-AUXSCH1-00326 REV: 0

SCALE: NTS DATE: October 2021 STATUS: TENDER DRAWING




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 16 | 16A | 20A | 20A | 5A | 10A | 10A | 10A | – | – | |
| FEEDER DESCRIPTION | BATTERY CHARGER-1 | BATTERY CHARGER-2 | 33kV BREAKER PANEL ASS-1 | 33kV BREAKER PANEL ASS-2 | RTU | AUX. TRANSFORMER-1 | AUX. TRANSFORMER-2 | TRACK EARTH PANEL | SPARE | SPARE | SPARE |




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 16A | 16A | 16A | – | – | – | 16A |
| FEEDER DESCRIPTION | RTU | 33kV BREAKER PANEL ASS-1 | 33kV BREAKER PANEL ASS-2 | SPARE | SPARE | SPARE | 33kV BREAKER PANEL TSS |

LEGEND:–

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | —ᔓ— | MINIATURE CIRCUIT BREAKER (MCB) |
| 2 | —X— | MOULDED CASE CIRCUIT BREAKER (MCCB) |
| 3 | SP | SINGLE POLE |
| 4 | DP | DOUBLE POLE |
| 5 | TPN | THREE POLE WITH NEUTRAL |
| 6 | ACDB | AC DISTRIBUTION BOARD |
| 7 | DCDB | DC DISTRIBUTION BOARD |
| 8 | RTU | REMOTE TERMINAL UNIT |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
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GURGAON,HARYANA, INDIA-122001

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

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MPMETRO

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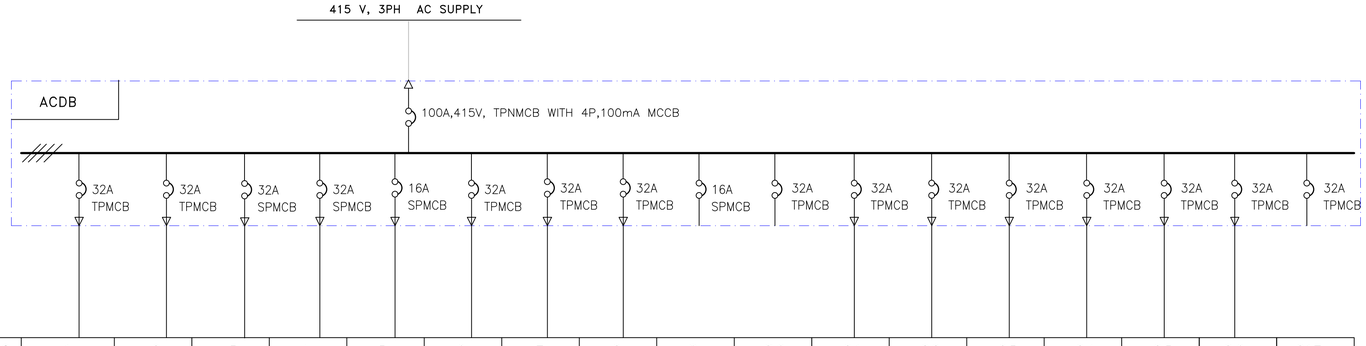
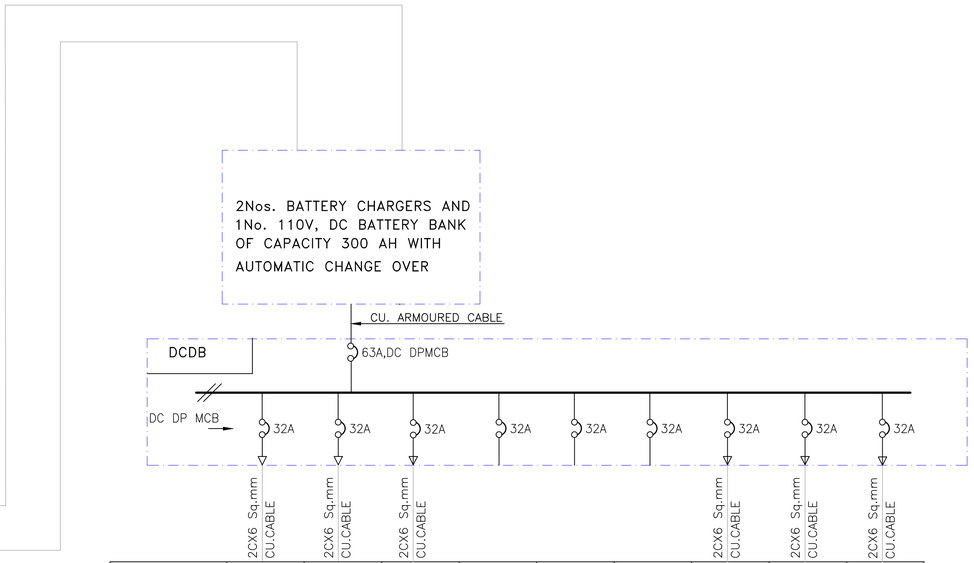
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SCHEME IN ACDB DCDB-TYPE-3
DRAWING NUMBER: I202-BIG-TRP-00-DWG-AUXSCH1-00327
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 16A | 16A | 20A | 20A | 5A | 10A | 10A | – | – | – | 20A | 20A | 20A | 20A | 10A | 10A | |
| FEEDER DESCRIPTION | BATTERY CHARGER–1 | BATTERY CHARGER–2 | 33kV BREAKER PANEL ASS–1 | 33kV BREAKER PANEL ASS–2 | RTU | AUX. TRANSFORMER–1 | AUX. TRANSFORMER–2 | TRACK EARTH PANEL | SPARE | SPARE | 33KV BREAKER PANEL TSS | HSCB | RECTIFIER | RECTIFIER | RECTIFIER TRANFORMER | RECTIFIER TRANFORMER | SPARE |




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 16A | 16A | 16A | – | – | – | 16A | 16A | 20A |
| FEEDER DESCRIPTION | RTU | 33kV BREAKER PANEL ASS–1 | 33kV BREAKER PANEL ASS–2 | SPARE | SPARE | SPARE | 33kV BREAKER | 33kV BREAKER PANEL TSS | HSCB |

LEGEND:–

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | —o— | MINIATURE CIRCUIT BREAKER (MCB) |
| 2 | —X— | MOULDED CASE CIRCUIT BREAKER (MCCB) |
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| 4 | DP | DOUBLE POLE |
| 5 | TPN | THREE POLE WITH NEUTRAL |
| 6 | ACDB | AC DISTRIBUTION BOARD |
| 7 | DCDB | DC DISTRIBUTION BOARD |
| 8 | RTU | REMOTE TERMINAL UNIT |
| 9 | HSCB | DC SWITCHGEAR |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

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258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

RITES
THE INFRASTRUCTURE PEOPLE
RITES LTD.
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

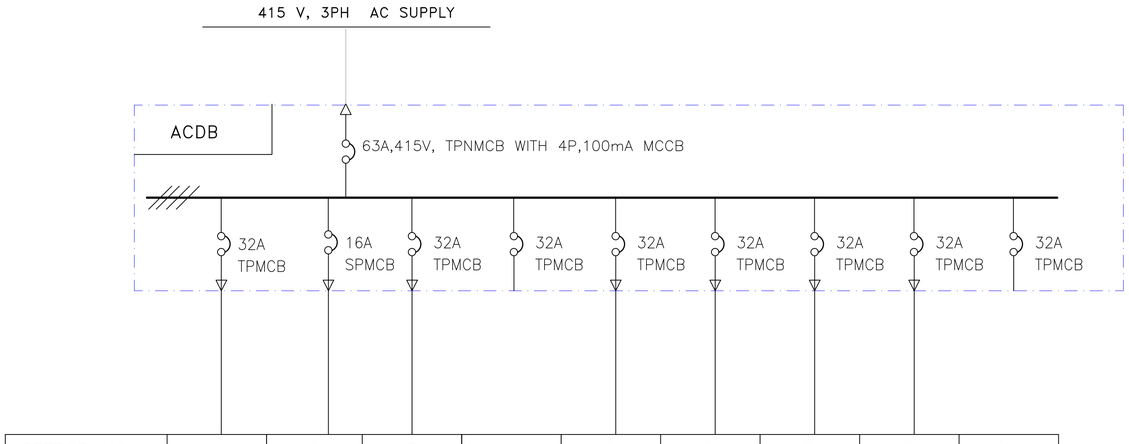
| PHOOL CHAND PREPARED BY | BRAJESH CHECKED BY | SURENDRA PAL SINGH APPROVED BY | SURENDRA PAL SINGH ISSUED BY |
|---|---|---|---|

GENERAL CONSULTANT

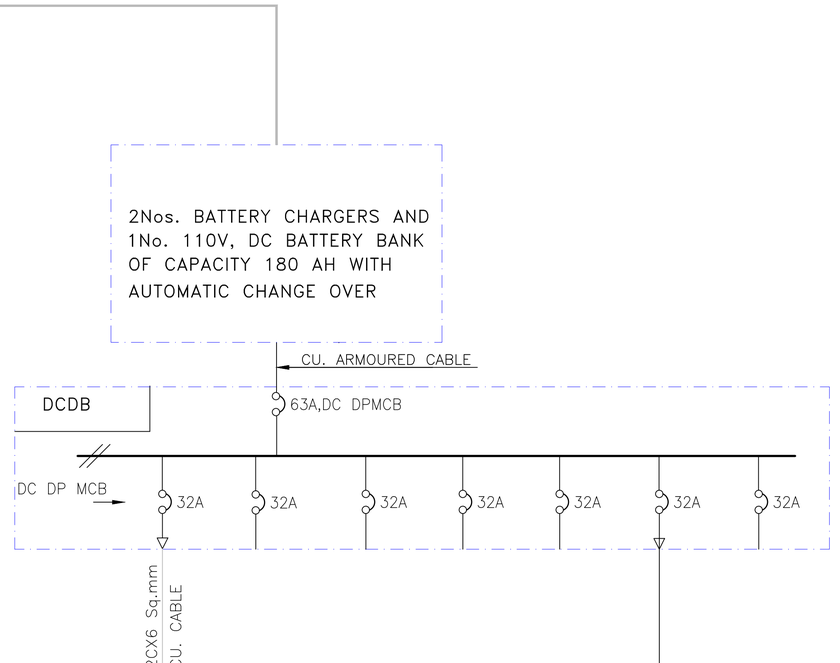
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SCHEME IN ACDB DCDB-TYPE-4
DRAWING NUMBER: I202-BIG-TRP-00-DWG-AUXSCH1-00328
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 16A | 5A | 10A | – | 20A | 20A | 20A | 10A | |
| FEEDER DESCRIPTION | BATTERY CHARGER | RTU | TRACK EARTH PANEL | SPARE | 33KV BREKER PANEL TSS | HSCB | RECTIFIER | RECTIFIER TRANFORMER | SPARE |




| FEEDER NO. | 1 | 2 | 3 | 4 | 5 | 6 | 7 |
|---|---|---|---|---|---|---|---|
| LOAD IN AMP. | 17A | – | – | – | – | – | – |
| FEEDER DESCRIPTION | RTU | SPARE | SPARE | SPARE | SPARE | 33KV BREAKER PANEL TSS | HSCB |

LEGEND:–

| S.NO. | SYMBOL | DESCRIPTION |
|---|---|---|
| 1 | —o— | MINIATURE CIRCUIT BREAKER (MCB) |
| 2 | —×— | MOULDED CASE CIRCUIT BREAKER (MCCB) |
| 3 | SP | SINGLE POLE |
| 4 | DP | DOUBLE POLE |
| 5 | TPN | THREE POLE WITH NEUTRAL |
| 6 | ACDB | AC DISTRIBUTION BOARD |
| 7 | DCDB | DC DISTRIBUTION BOARD |
| 8 | RTU | REMOTE TERMINAL UNIT |
| 9 | HSCB | DC SWITCHGEAR |

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy
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258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

RITES
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**RITES LTD.**
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND PREPARED BY | BRAJESH CHECKED BY | SURENDRA PAL SINGH APPROVED BY | SURENDRA PAL SINGH ISSUED BY |
|---|---|---|---|

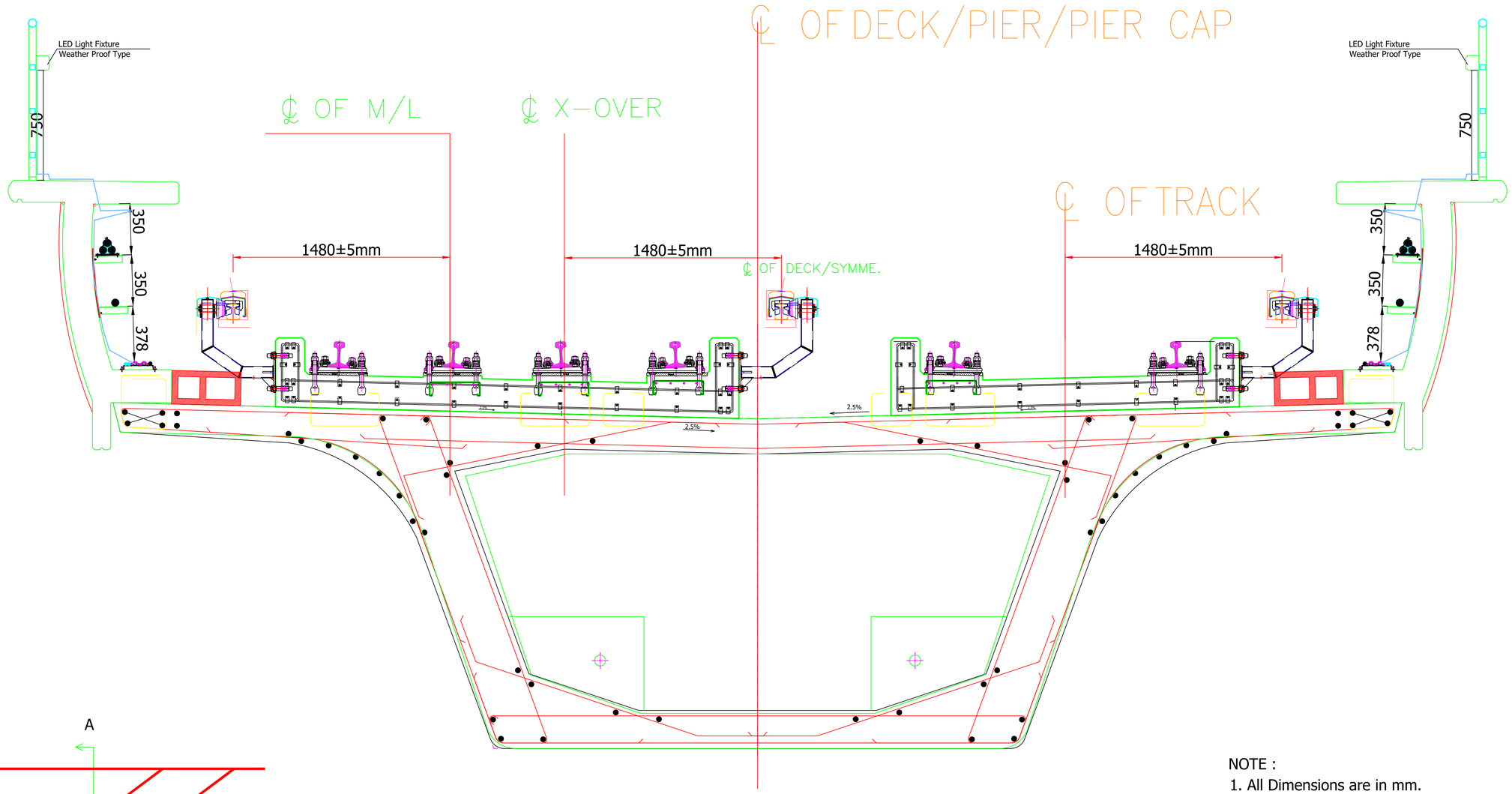
GENERAL CONSULTANT

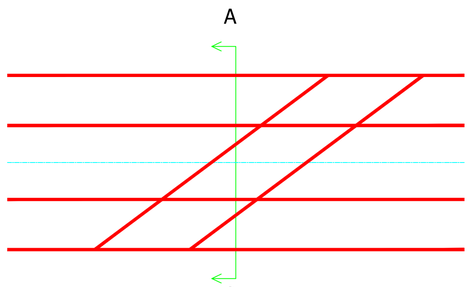
DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SCHEME IN ACDB DCDB-TYPE-5
DRAWING NUMBER: I202-BIG-TRP-00-DWG-AUXSCH1-00329
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# THIRD RAIL SYSTEM




Plan View

NOTE :

1. All Dimensions are in mm.
2. The third rail bracket arrangement and the track fastening system are indicative only.
3. The position of conductor rail and its mounting brackets with respect to track/rails is indicative only and will be subject to change as per final interface between Power Supply Contractor, Trackwork Contractor and Rolling Stock Contractor.
4. The Power supply contractor shall submit shop drawings duly showing the arrangement alongwith all dimensions.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

DETAILED DESIGN CONSULTANT

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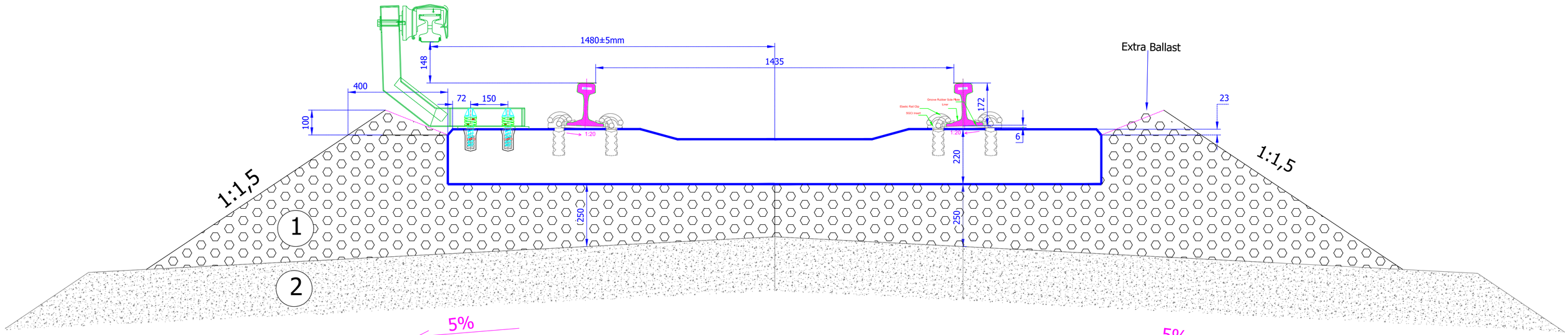
| PHOOL CHAND | FAHIM KHAN | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL THIRD RAIL INSTALLATION ARRANGEMENT ON VIADUCT - CROSSOVER LOCATONS |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-THRLYT1-00403 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




1- Ballast

2- Subgrade Protection Layer (Subballast, to be done by Civil Contractor- not less than 300mm)

Notes:

1. All Dimensions are in mm.
2. The third rail bracket arrangement and the track fastening system are indicative only.
3. The position of conductor rail and its mounting brackets with respect to track/rails is indicative only and will be subject to change as per final interface between Power Supply Contractor, Trackwork Contractor and Rolling Stock Contractor.
4. The Power Supply Contractor shall submit drawings duly showing the arrangement alongwith all dimensions
5. The conductor rail system shall be installed by Power Supply contractor.
6. The key parameters of the track/third rail system refer table.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

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MPMETRO

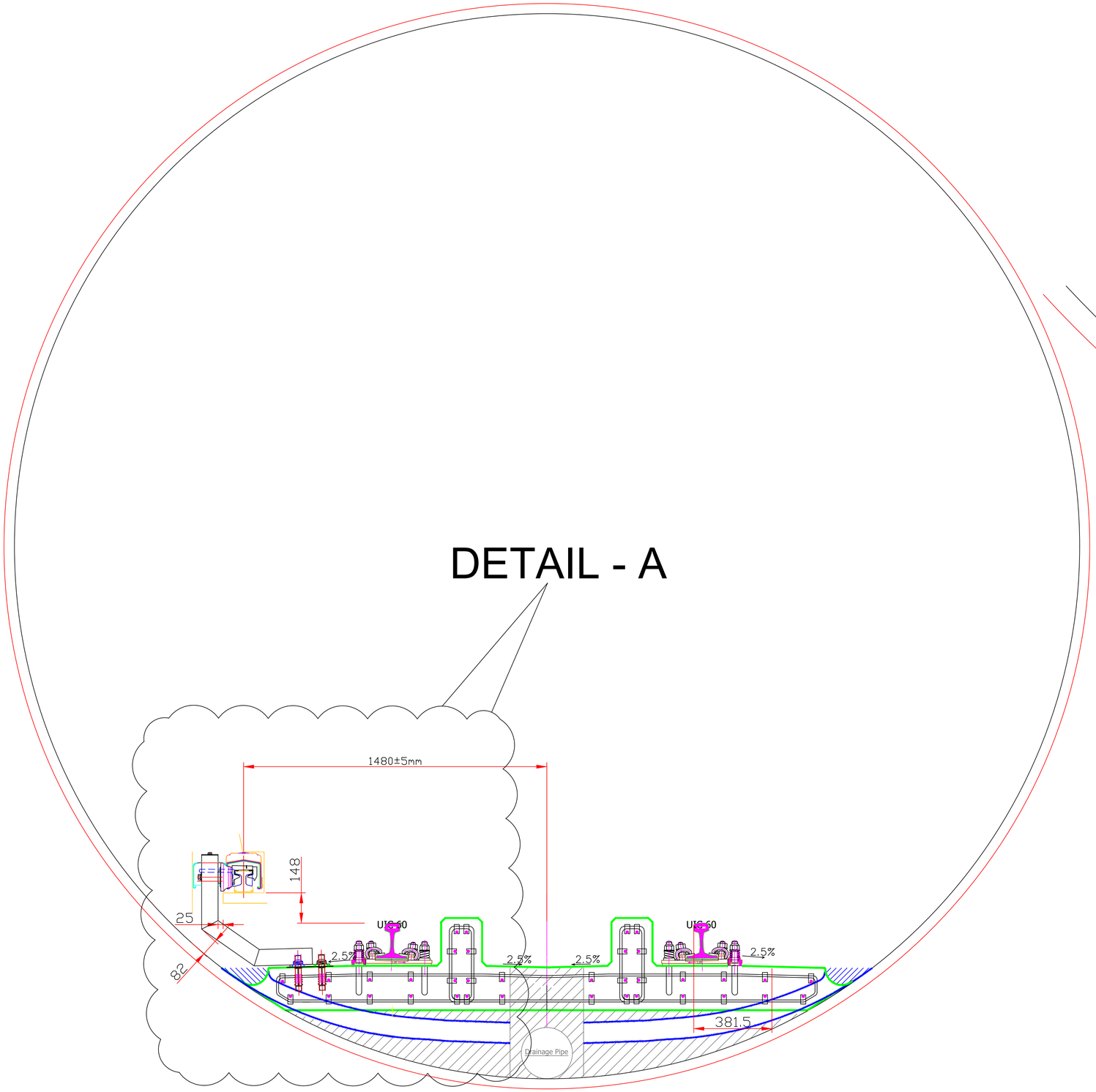
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

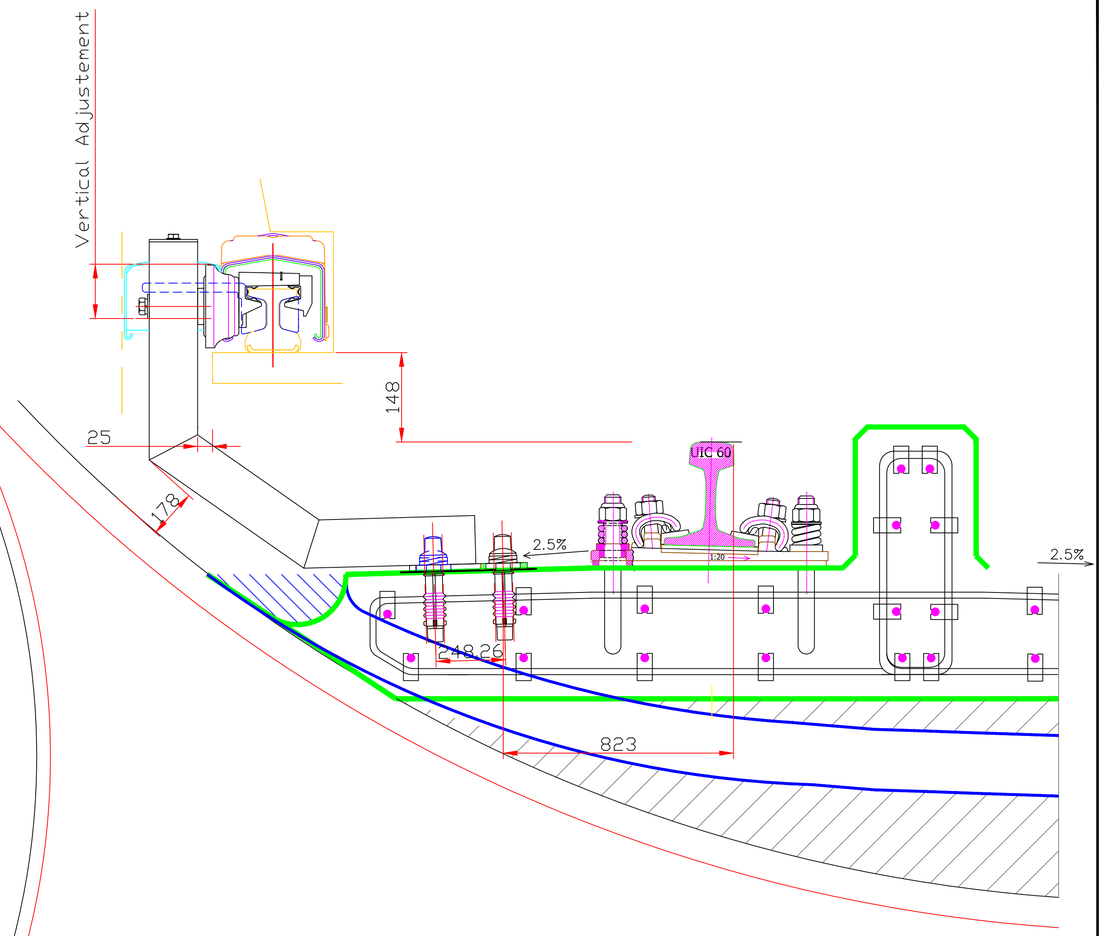
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL THIRD RAIL INSTALLATION ARRANGEMENT IN BALLASTED TRACKS (DEPOT)

DRAWING NUMBER: I202-BIG-TRP-00-DWG-THRLYT1-00404 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




# DETAIL - A

1. All Dimensions are in mm.
2. The third rail bracket arrangement and the track fastening system are indicative only.
3. The position of conductor rail and its mounting brackets with respect to track/rails is indicative only and will be subject to change as per final interface between Power Supply Contractor, Trackwork Contractor and Rolling Stock Contractor.
4. The Power supply contractor shall submit shop drawings duly showing the arrangement alongwith all dimensions.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

| DETAILED DESIGN CONSULTANT | | GENERAL CONSULTANT | |
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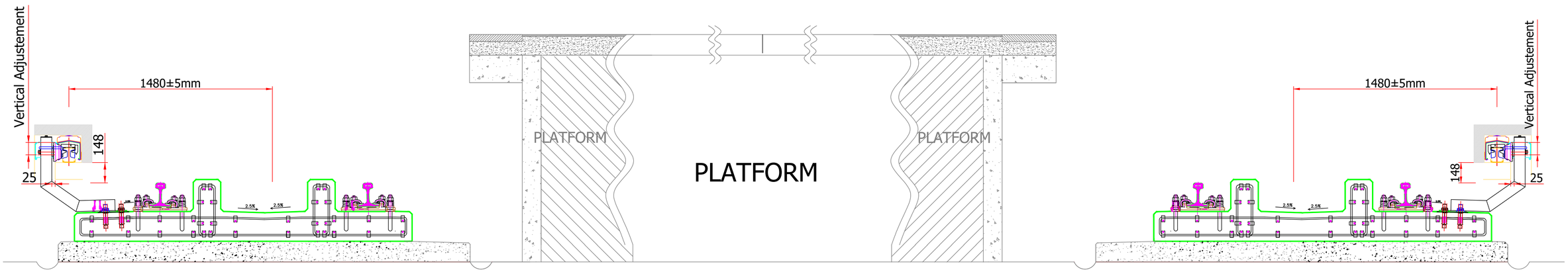
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |
|---|---|---|---|
| PHOOL CHAND | FAHIM KHAN | SURENDRA PAL SINGH | SURENDRA PAL SINGH |

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL THIRD RAIL INSTALLATION ARRANGEMENT IN TUNNELS |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-THRLYT1-00405 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




1. All Dimensions are in mm.
2. The third rail bracket arrangement and the track fastening system are indicative only.
3. The position of conductor rail and its mounting brackets with respect to track/rails is indicative only and will be subject to change as per final interface between Power Supply Contractor, Trackwork Contractor and Rolling Stock Contractor.
4. The Power supply contractor shall submit shop drawings duly showing the arrangement alongwith all dimensions.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

DETAILED DESIGN CONSULTANT

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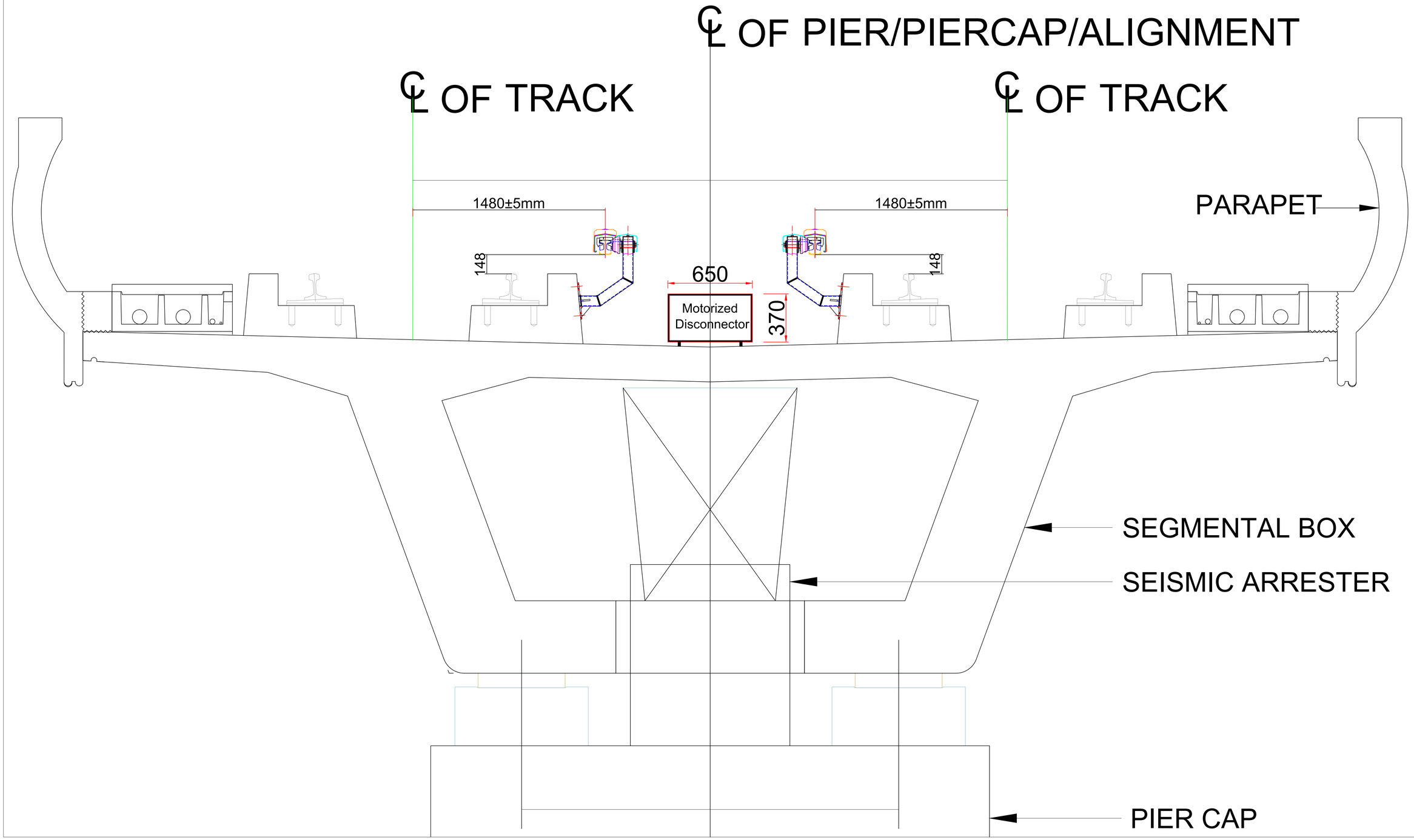
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL THIRD RAIL INSTALLATION ARRANGEMENT IN UNDERGROUND STATIONS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-THRLYT1-00406
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

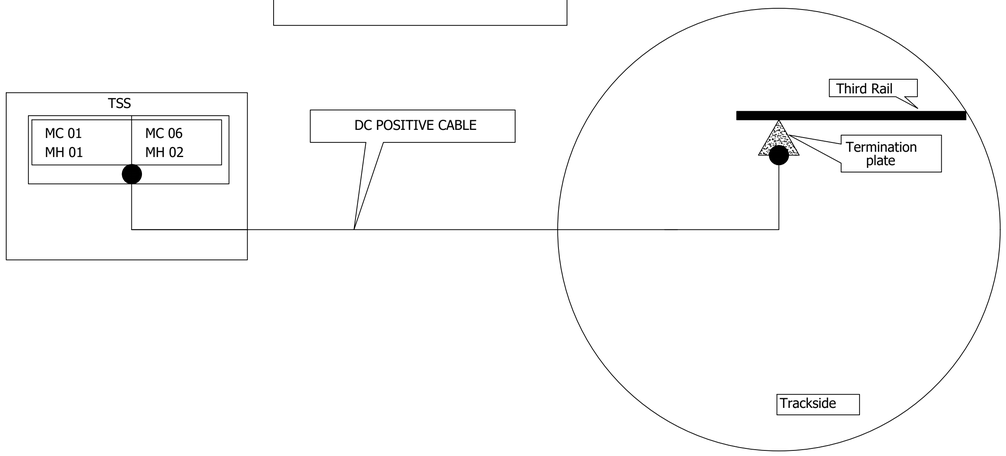
GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

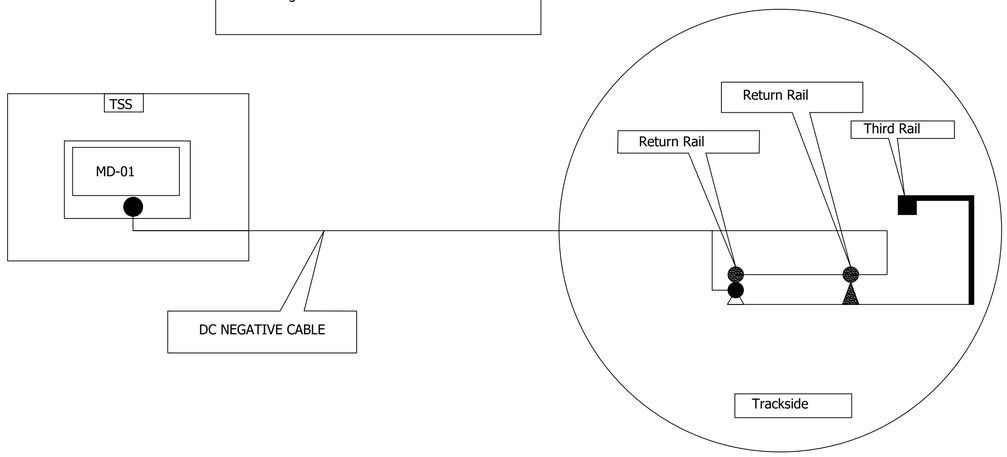
MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL DISCONNECTOR SWITCH LOCATIONS AT VIADUCTS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-THRLYT1-00407
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

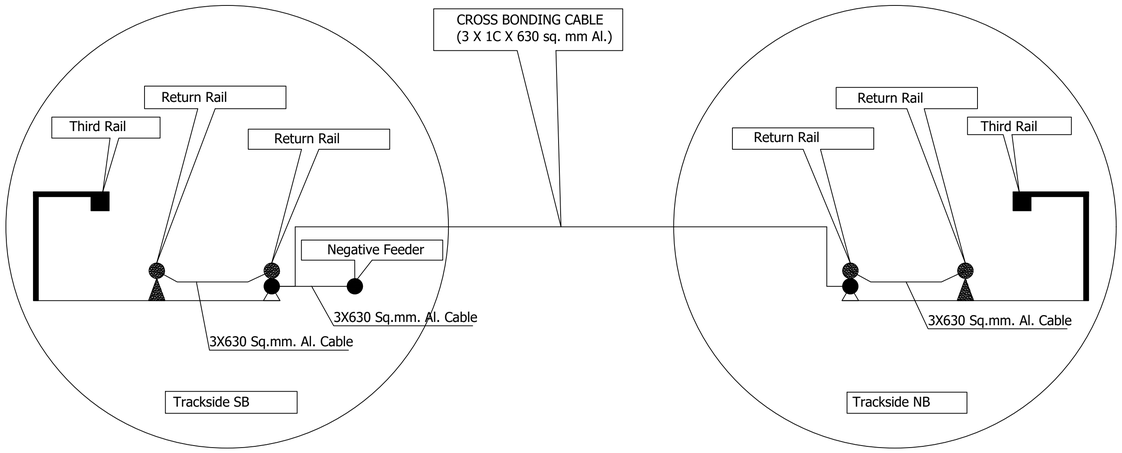
Typical main power feeder connection with 400sq. mm stranded cable to third rail in depot and main line



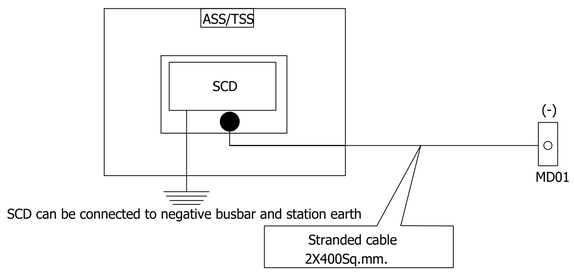

Typical negative return current connection with 400sq. mm stranded to running rail in main line




Typical track cross bonding connection with 630sq. mm Al. stranded cable and to running rail installation without TSS




Typical voltage limiting device connection




Note:

1. No. and run of DC positive, DC negative cables and additional return feeder shall be as per final DC simulation study report (No. ARDANUY-RITES/DDC-PST/IN/TPS/028 Rev.-02 Dated-13-09-2021) by considering 6 car, 5 minute headway.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

DETAILED DESIGN CONSULTANT

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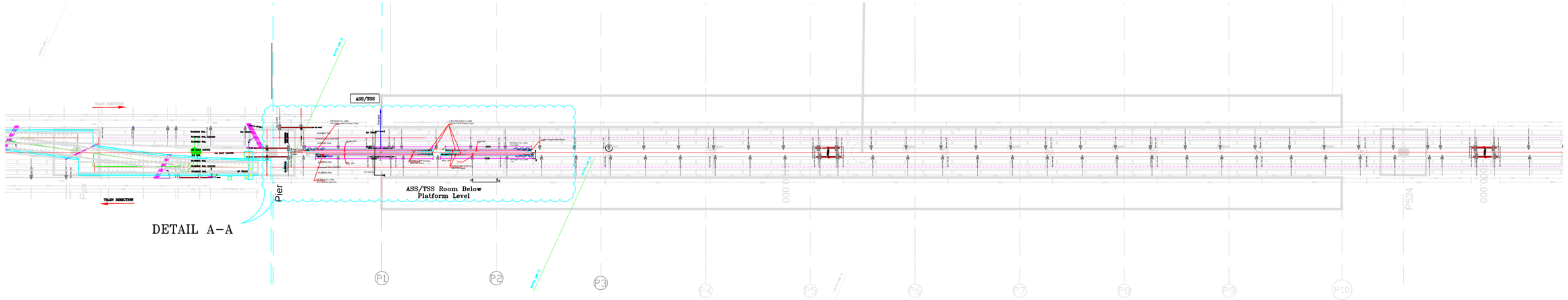
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

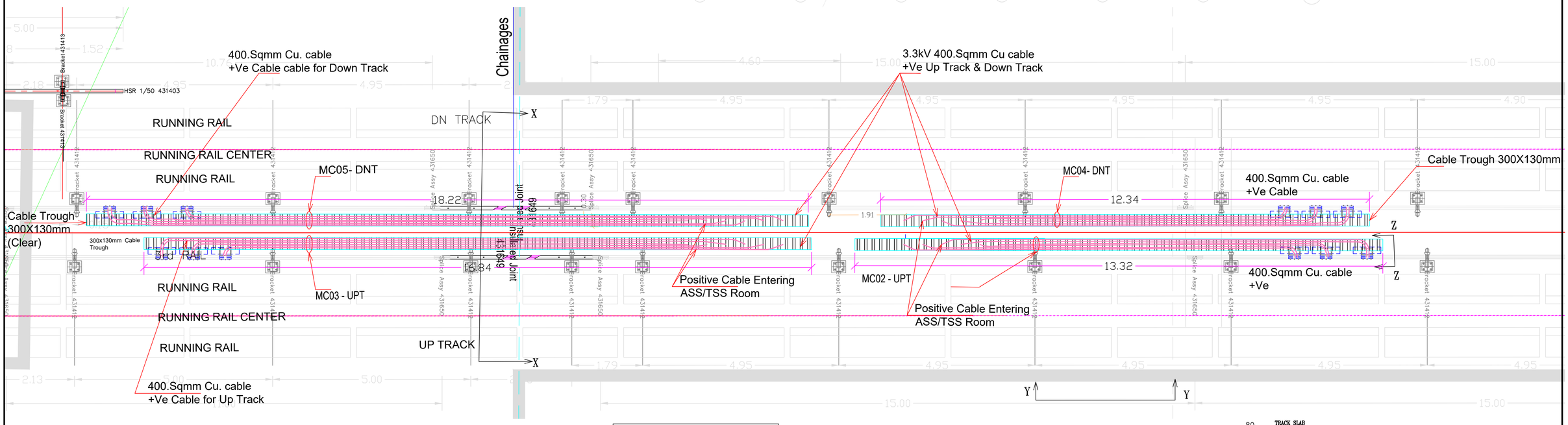
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

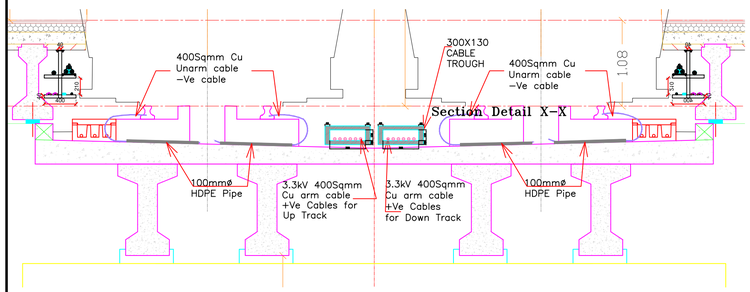
MPMETRO

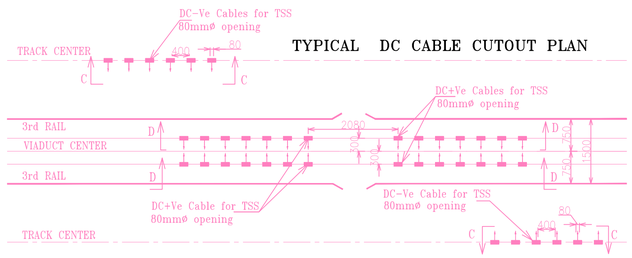
| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL TRACTION AND RETURN POWER CABLE CONNECTION ARRANGEMENT |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-THRLYT1-00408 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |



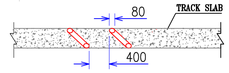

DETAIL A–A




| LEGEND | | |
|---|---|---|
| Sl.No. | Description | Symbol |
| 1. | RUNNING RAIL | |
| 2. | RUNNING RAIL CENTER | |
| 3. | 3rd RAIL | |
| 4. | VIA DUCT CENTER | |
| 5. | 400 Sq mm Cu CABLE | |
| 6. | CABLE TROUGH 300X130mm | |
| 7. | 100mmø HDPE PIPE | |
| 8. | POWER FEED FOR 400Sqmm | |




TYPICAL DC CABLES CUTOUT ARRANGEMENT OF STATION AREA (45 DEG. ANGLE)

NOTES:
1. The DC Cable arrangement is indicative only.
2. The various dimensions shown are indicative only and Power Supply Contractor shall submit shot drawings duly showing the arrangement alongwith all dimensions.
3. The cable ducts and cable clamps are indicative only and not necessarily reflect the final arrangement. The Power Supply Contractor shall interface with Station Contractors in this regard.
4. The Power supply contractor shall submit shop drawings duly showing the arrangement alongwith all dimensions.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

DETAILED DESIGN CONSULTANT
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DELHI, DELHI 110020

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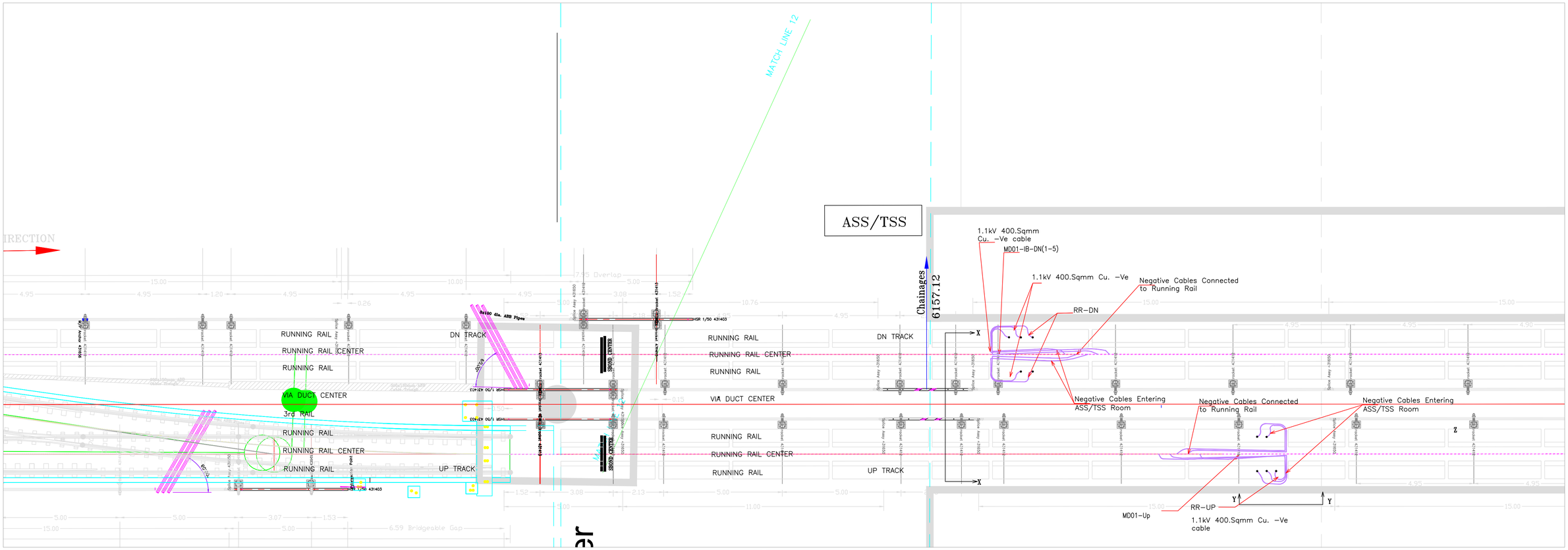
GURGAON,HARYANA, INDIA-122001

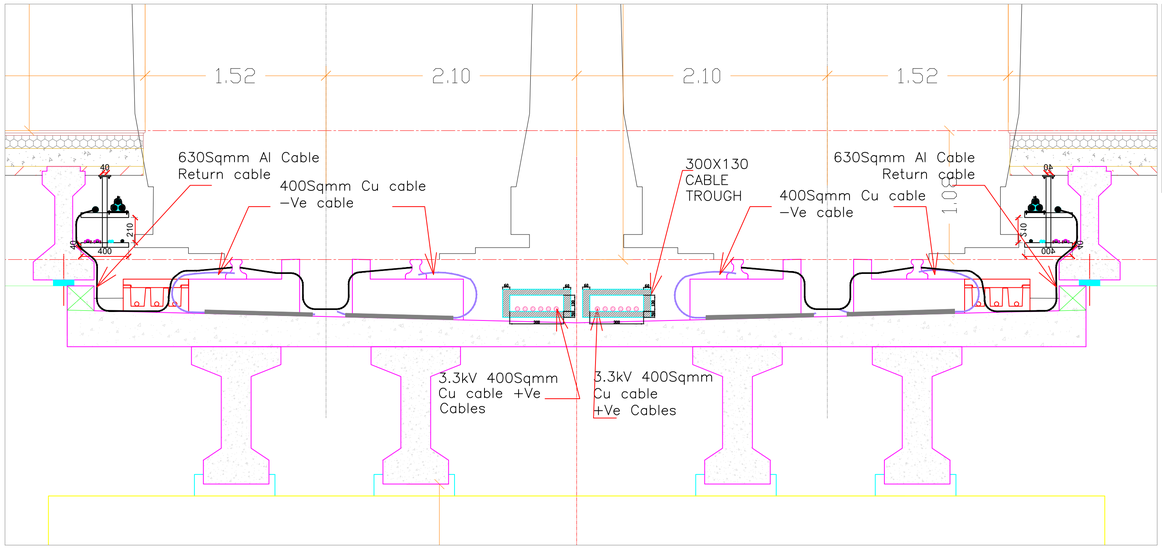
| PHOOL CHAND | FAHIM KHAN | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

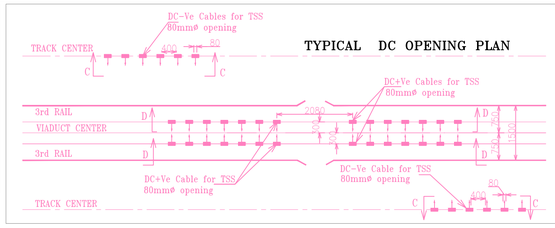
| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL DC FEEDER POWER CABLE ARRANGEMENT |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-THRLYT1-00409 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

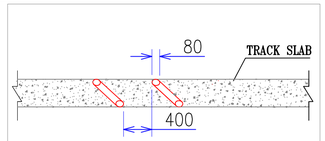



Section Detail X-X

| LEGEND | | |
|---|---|---|
| Sl.No. | Description | Symbol |
| 1. | RUNNING RAIL | |
| 2. | RUNNING RAIL CENTER | |
| 3. | 3rd RAIL | |
| 4. | VIADUCT CENTER | |
| 5. | 400 Sq mm Cu CABLE NEGATIVE | |




TYPICAL DC CABLES CUTOUT ARRANGEMENT OF STATION AREA (45 DEG. ANGLE)

NOTES:

1. The DC Return Cable arrangement is indicative only.
2. The various dimensions shown are indicative only and Power Supply Contractor shall submit shop drawings duly showing the arrangement alongwith all dimensions.
3. The cable ducts and cable straps are indicative only and not necessarily reflect the final arrangement. The Power Supply Contractor shall interface with Station & Trackwork Contractors in this regard.
4. In addition to return cables to negative busbar in TSS (NR Panel) rail-rail and track-track cross bonds shall be provided.
5. The cable installation detail is subject to interface coordination between Power Supply and S&T Contractor.
6. The Power supply contractor shall submit shop drawings duly showing the arrangement alongwith all dimensions.
7. If required Impedance Bond to be provided by Signaling Contractor.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
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DELHI, DELHI 110020

RITES LTD.
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

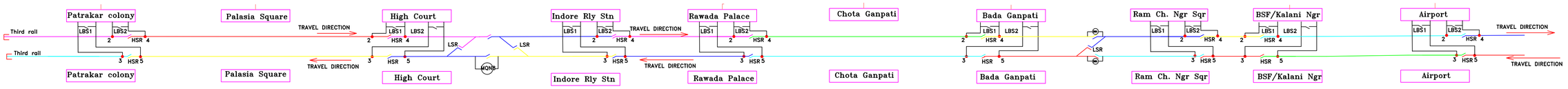
GENERAL CONSULTANT

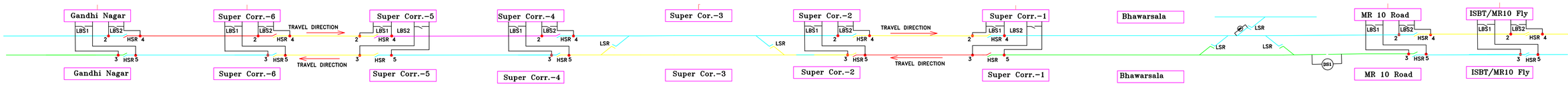
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

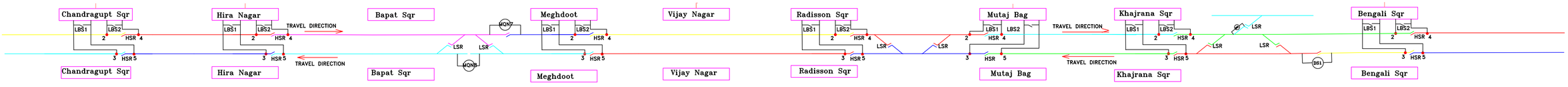
MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL DC RETURN POWER CABLE ARRANGEMENT
DRAWING NUMBER: I202-BIG-TRP-00-DWG-THRLYT1-00410
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# Yellow Line Sectioning Diagram




## Legend

2 - 5 : 750V DC Feeding point from HSCBs
LBS1 & LBS2 : 750V DC Load By-Pass Switch
HSR : High speed ramp
LSR : Low speed ramp
DS : Off load disconnection switch

NOTE

1. For Track plan, drawing number:-BI05-BIG-TRK-00-BHLP001-00002,referred(given in DPR)
2. The location of TSS has been shown as per DC simulation report no.
   ARDANUY-RITES/DDC-PST/IN/TPS/028 Rev.-02 Dated-13-09-2021 considering head ways 6 car scenario for 2054-2.5 minutes....
   head ways 6 car scenario for 2054-2.5 minutes. However, those TSS will come in future which are required for 2.5 minute, 6 car, 2054 scenario.

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

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MPMETRO

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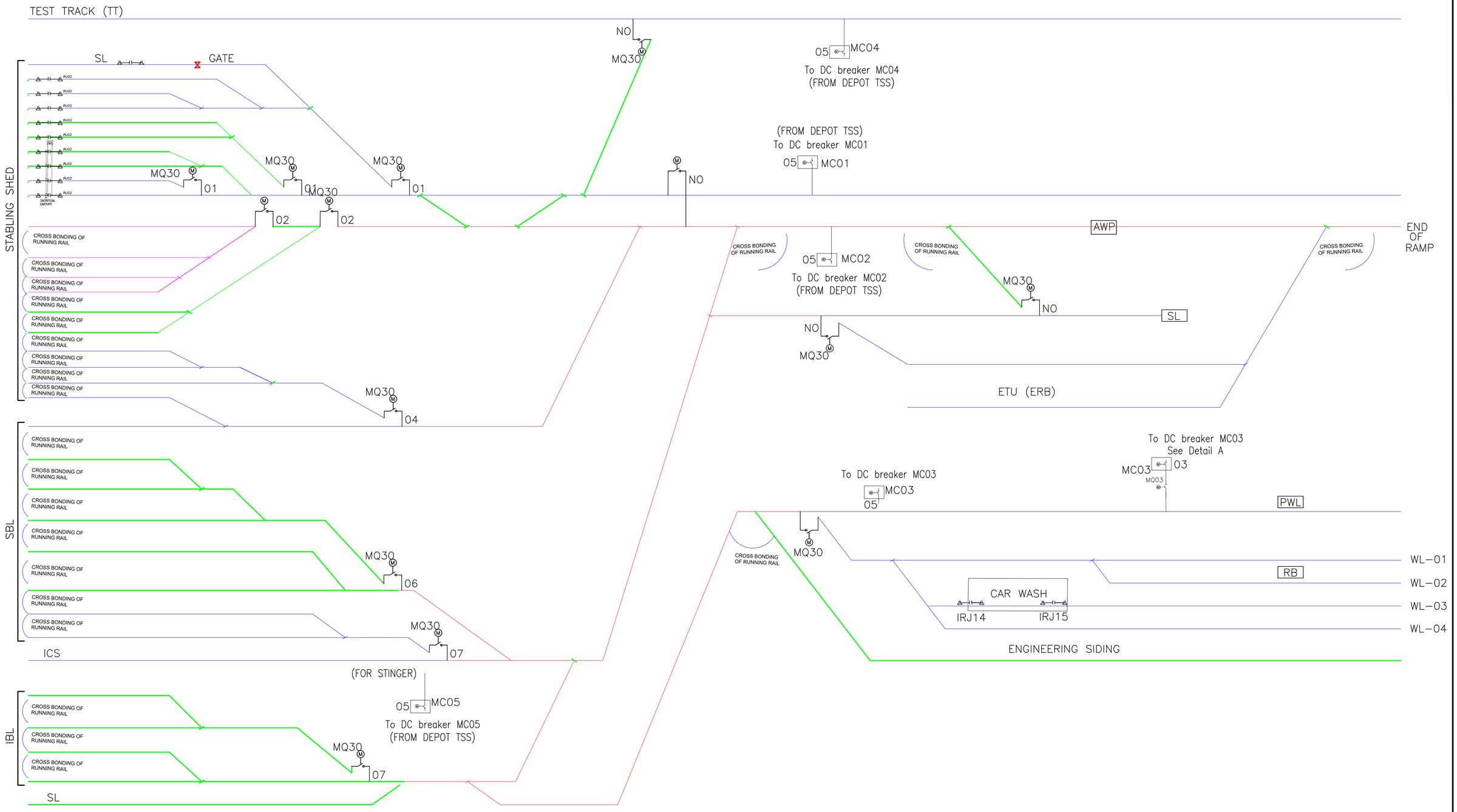
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL THIRD RAIL FEEDING SCHEMATIC FOR YELLOW LINE |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-THRLYT1-00411 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

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GENERAL CONSULTANT

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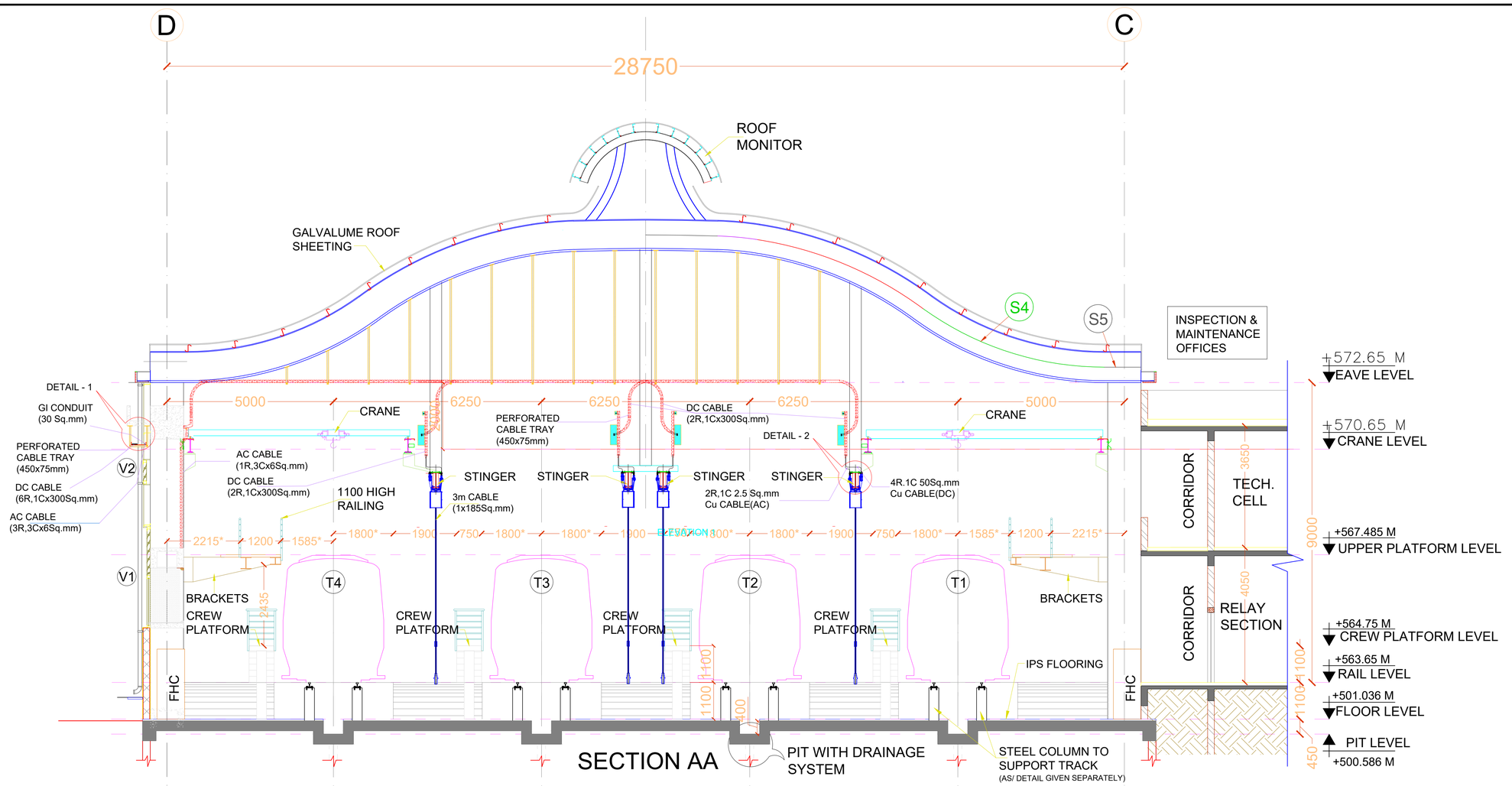
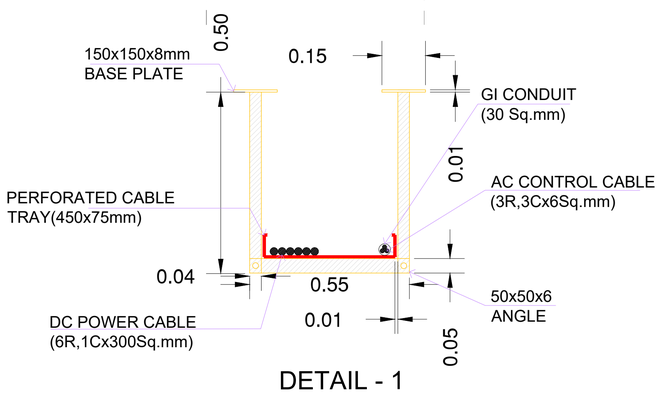
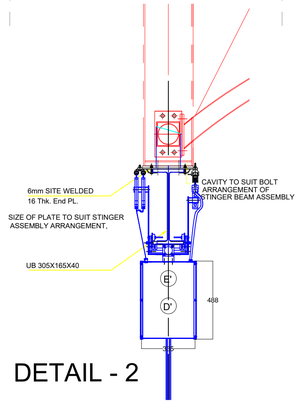
MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL THIRD RAIL FEEDING SCHEMATIC FOR GANDHI NAGAR DEPOT
DRAWING NUMBER: I202-BIG-TRP-00-DWG-THRINS1-00412
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




DETAIL - 1

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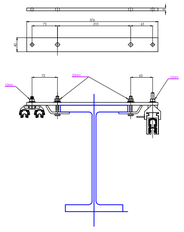

TYPICAL I-BEAM

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
| 0 | Oct. 2021 | FIRST SUBMISSION | PC | FK | FK | SPS |

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

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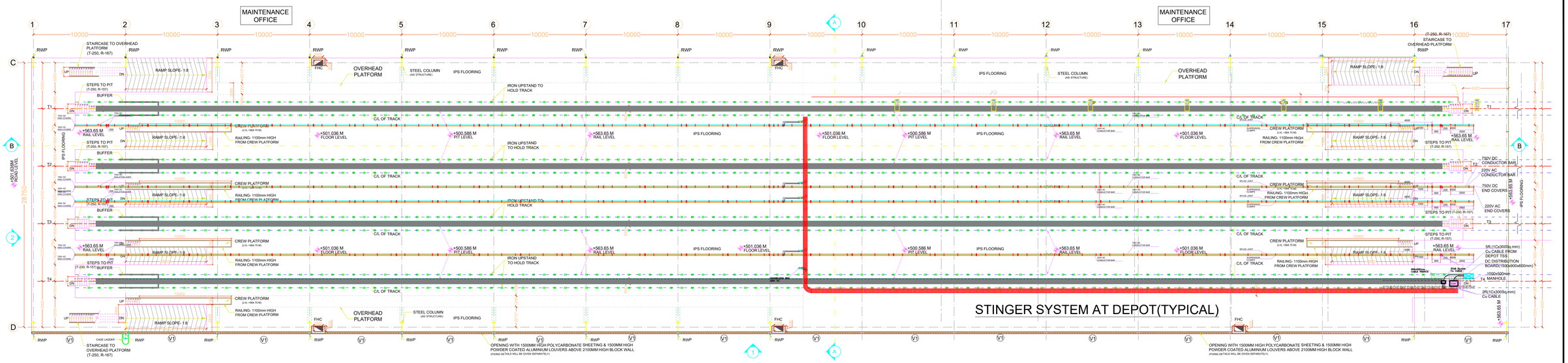
NOT TO BE USED FOR CONSTRUCTION

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL STINGER ARRANGEMENT AT INSPECTION BAY (SHEET 02 OF 02) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-THRINS1-00413 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




PLAN VIEW OF STINGER AND ASSOCIATED CABLES ARRANGEMENT AT INSPECTION BAY LINES

NOTES:

1. The arrangement of stringer supply is Typical & for general understanding. BH&IN 05 Contractor to develop the suitable scheme , stringer arrangement, feeding end submit for Engineers approval during detailed Engineering stage.
2. All the cable support infrastructure like trays,brackets, hangers etc., for DC positive, negative, control cables shall be under the scope of E&M Contractor. BH&IN 05 Contractor shall develop the cable routing drawings and accordingly interface with Depot E&M Contractor for incorporation in the CSD.
3. Supply, Erection, Testing and Commissioning of all DC cables and control cables is under the scope BH&IN 05 Contractor.
4. BH&IN 05 Contractor to interface with depot civil contractor for design of " I " beam for stringer by providing the weight calculation , sizing etc., of stringer trolley.
5. BH&IN 05 Contractor shall interface with Depot Civil/Depot E&M/ Depot track/Signaling Contractor and provide the requirement of cable crossing the tracks.
6. BH&IN 05 Contractor to interface with Depot Civil/E&M Contractor for core cutting requirement, trenches, ducts, pull-pits etc.,

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL STINGER ARRANGEMENT AT INSPECTION BAY (SHEET 01 OF 02)

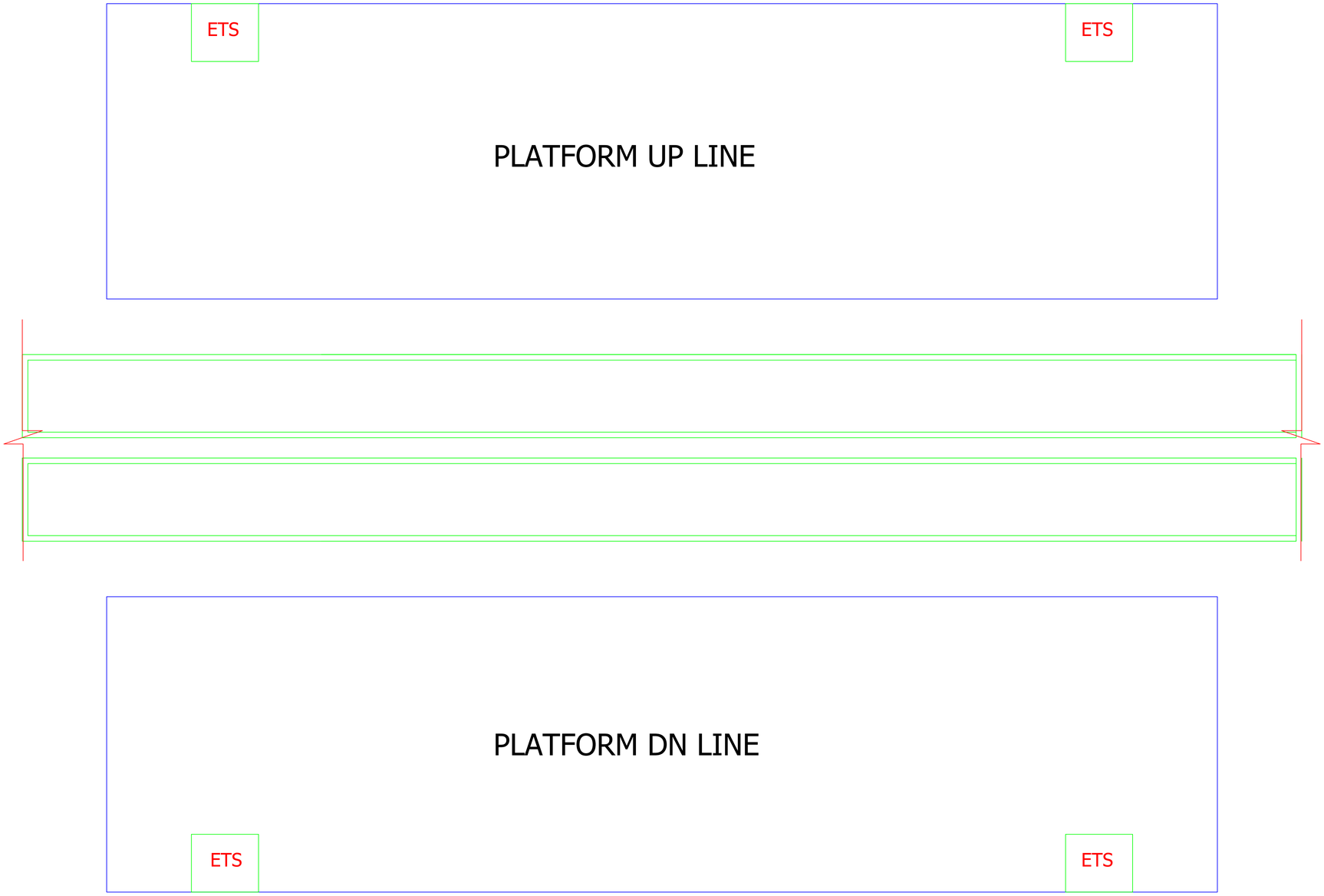
DRAWING NUMBER: I202-BIG-TRP-00-DWG-THRINS1-00413

REV: 0

SCALE: NTS

DATE: October 2021

STATUS: TENDER DRAWING




NOTES:-

1. 1 X 7C X 2.5 Sq.mm control cable will run from each ETS TO RTU Till ASS/TSS ROOM.
2. These cables are running in the E&M cable trays from platform level to the concourse level till the ASS/TSS Room
3. Cable tray connectivity at all the locations of ETS TO RTU provided by E&M Contractor.
4. There are totally 5 Nos. of ETS. Four on the either ends of the platform and one in station control room.
5. The cable entry is from bottom for the ETS Box.
6. 230v UPS Power supply is provided at all the locations of the ETS And wiring to the ETS is done by E&M Contractor.

REVISIONS

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|---|---|---|---|
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MPMETRO

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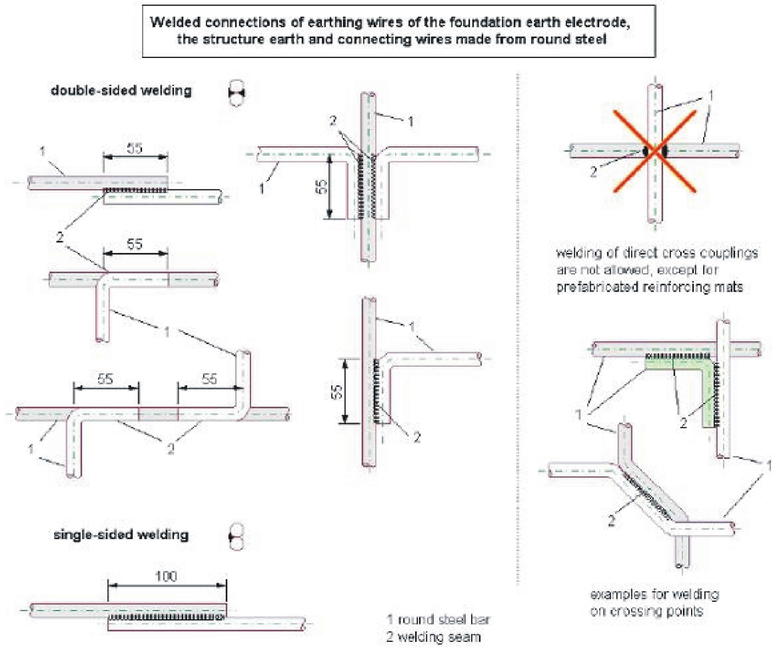
NOT TO BE USED FOR CONSTRUCTION

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL ETS ARRANGEMENT FOR ASS,ASS+TSS |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-THRINS1-00414 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

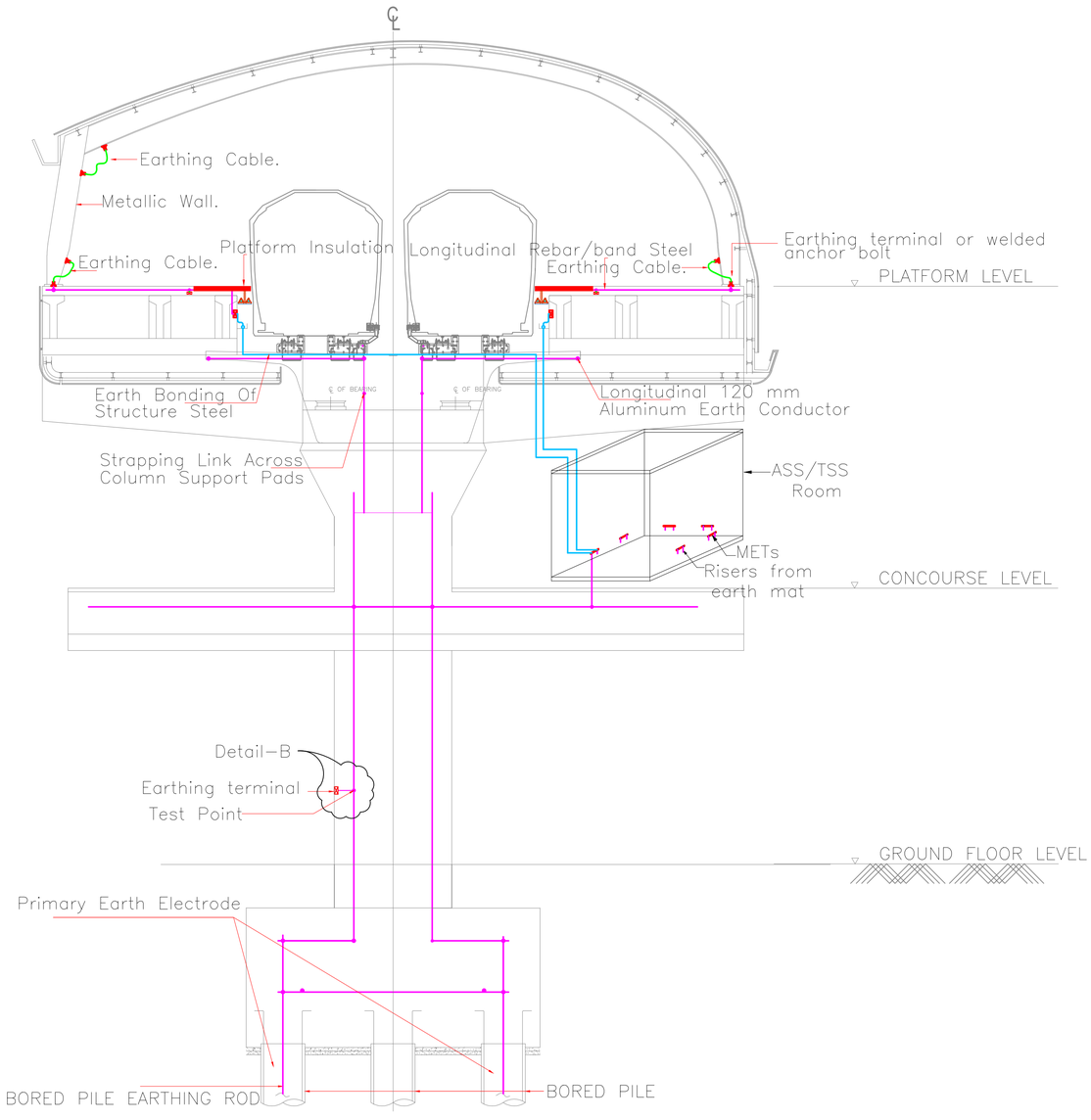
# EARTHING BONDING & STRAY CURRENT MANAGEMENT

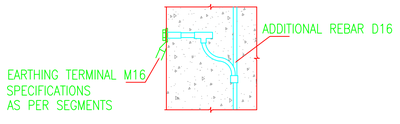



## Details "A"

**Elevated stations:-**
**Station Contractor Scope of Work**

1. In all structural parts such as platform structure, concourse structure etc.longitudinal rebar / band steel from end-to-end of platform / concourse slab on either side (i.e. total for concourse slab and each for each platform)
   a. Transverse rebars / band steel at the ends (about 10 m inside) of concourse / platform slabs
2. The band steel / nominated rebar shall be laid over the structural reinforcement and it should be ensured that it touches the reinforcement rebars adequately.
3. All the embedded earthing conductors shall be connected to the reinforcement at intervals not more than 40 cm by means of wire wrapping. In addition, the longitudinal band steel / rebars shall be welded to structural reinforcement every 10m to ensure electrical continuity of the reinforcement.
4. All embedded earthing conductors shall be covered by adequate concrete for corrosion protection.
5. The intersection of longitudinal / transverse rebars / band steel shall be welded connections.
6. Reinforcement of station viaduct piers and other station piers shall be interconnected to concourse slab's nominated rebar / band steel by welded connection (see welding details A for reference)
7. For each platform minimum two earthing terminals (indicative location--about 10 m inside the ends) shall be brought out for connection to structure earth cable. The earth terminals (refer to detail B) shall be brought out near the location of structure earth cables. In addition to this, the earth terminals are required, as a minimum, for the following connections:
   a. Connection of embedded conductors to other parts of the earthing system
   b. Connections between different parts of concrete structure (e.g. pre-fabricated parts, expansion joints)
   c. Connection from structure earth to steel works
   d. Connection from structure earth to large metallic parts (e.g. escalator guide rails, escalator housing, handrails, large E&M equipment like AFC ticket vending machine, access gates etc.)
8. For other structural elements (concourse slab etc.) minimum four terminals shall be brought out for connection to structure earth cable. The preferred location of earth terminals shall be equipment rooms (ASS, TSS, ESR, S&T room etc.), where main earth terminal (MET) will in any case be located and connection of structure reinforcement earth terminal to MET (and in turn to earth mat) will be easily facilitated.
9. In each ASS/TSS room, six numbers of METs (Cu bar of size 50mm x 10 mm, 1 m long) shall be mounted on the walls. The exact location and number / size of holes shall be interfaced between Station Contractor and Power Supply Contractor.
10. Each MET shall be connected to structure earth through minimum two independent connections. The different METs shall also be interconnected in ASS/TSS room. Adequate measures to mitigate against the bimetallic effect of Cu (MET) to MS (risers) connection shall be implemented.
11. METs shall also be provided in other equipment rooms (to be interfaced between station E&M Contractor and other respective designated contractors):
    a. Two in DG room
    b. Two in ESR room
    c. Two in S&T room
12. All other equipment in station (lift, escalator, AFC equipment etc.) shall be earthed suitably using the connection points available from band steel arrangement or other suitable means.
13. All station metallic structures (station metallic roof, its metallic columns etc.) shall be earthed likewise. 70 sq.mm or 95 sq. mm Aluminum cable may be used, wherever required for connection and continuity.
14. All other station furniture (like metallic railings, shall be earthed in a like manner.
15. At all structural expansion joints, the continuity of reinforcement / earthing shall be carried out through use of flexible 120 sq.mm size.
16. For validation of earthing installation embedded in the concrete of civil structures a declaration of conformity shall be handed over by Civil Works Contractor. It shall include for each civil structure the following, as a minimum:
    a. Photographic documentation showing all earthing conductors, earthing terminals and earthing welds for each structure segment before pouring the concrete
    b. Proof of completeness and accessibility of all earthing terminals per segment
    c. Electrical continuity test of all earthing terminals per segment
    d. Measurement of resistance to earth of earth mat (one MET / terminal can be nominated as reference terminal for this purpose)
17. For lightning protection of station buildings, down conductors should be erected from the roof to the earth in the outer walls of the building for connection of the air termination to the earth electrode. The detail designing of this system is under the scope of DDC/E&M or E&M Contractor.
18. Provision Earth Strips at Either Ends of Platform which is welded to platform structure rebar to be provided by E&M/Station Building Contractor. These earth strips should not infringe the rolling stock CCS. These will terminated to be subsequently connected through structure earth cable.




Details "B"

Legend :–
- 185 Sq.mm(ø16mm)rebar/band Steel
- Earthing Cable (120Sq.mm)Cu
- Structure Earth Cable (185 Sq.mm)Al.
- METs
- Welded Joint
- Earth Terminal

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| REVISIONS | | | | | | |
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| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

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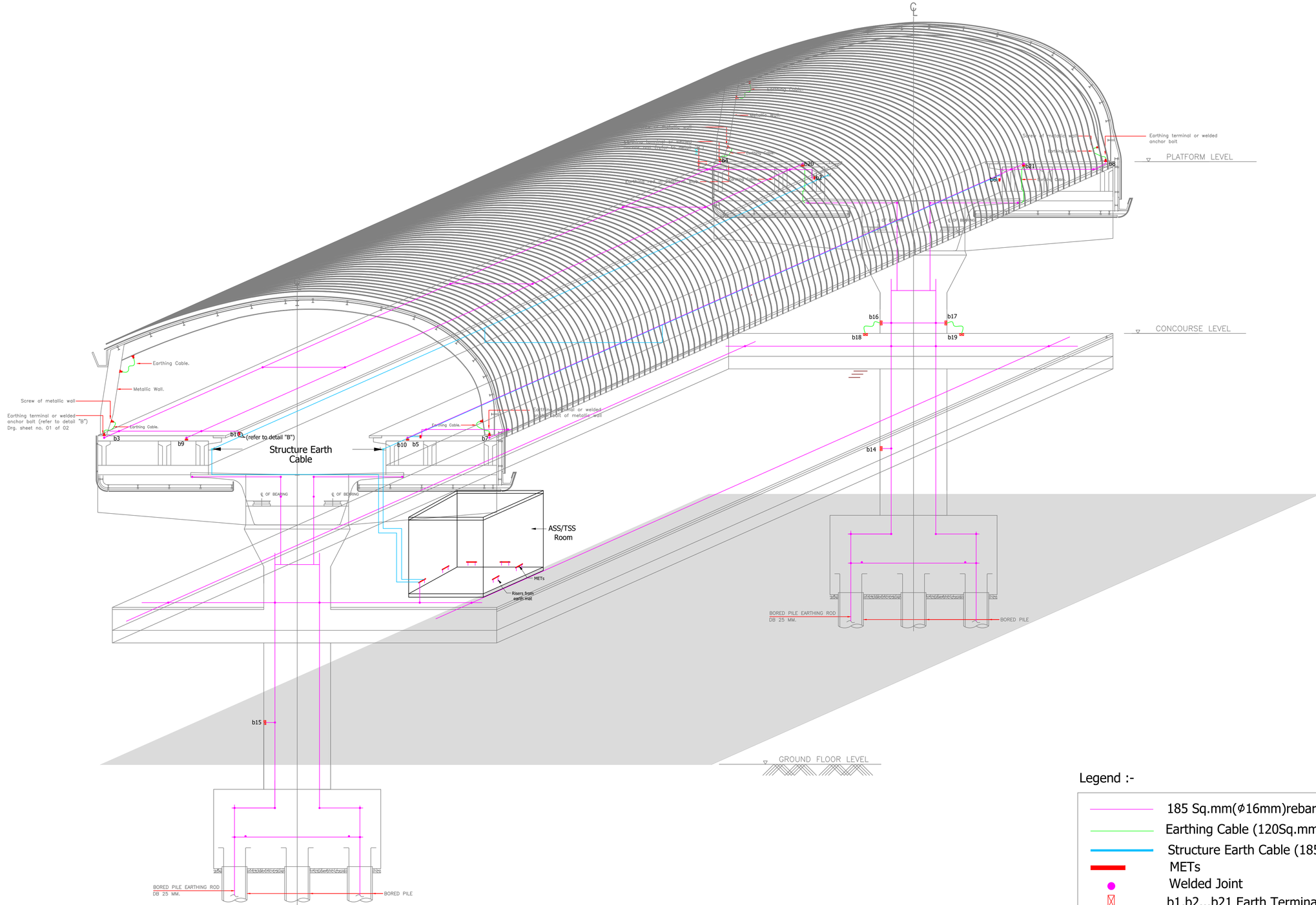
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SCHEMATIC OF STRUCTURE EARTHING FOR ELEVATED STATION (SHEET 1 OF 2)
DRAWING NUMBER: I202-BIG-TRP-00-DWG-EBSSCH1-00501
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




Legend :-

- 185 Sq.mm(ø16mm)rebar/band Steel
- Earthing Cable (120Sq.mm)Al.
- Structure Earth Cable (185 Sq.mm)Al.
- METs
- Welded Joint
- b1,b2...b21 Earth Terminal

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REVISIONS

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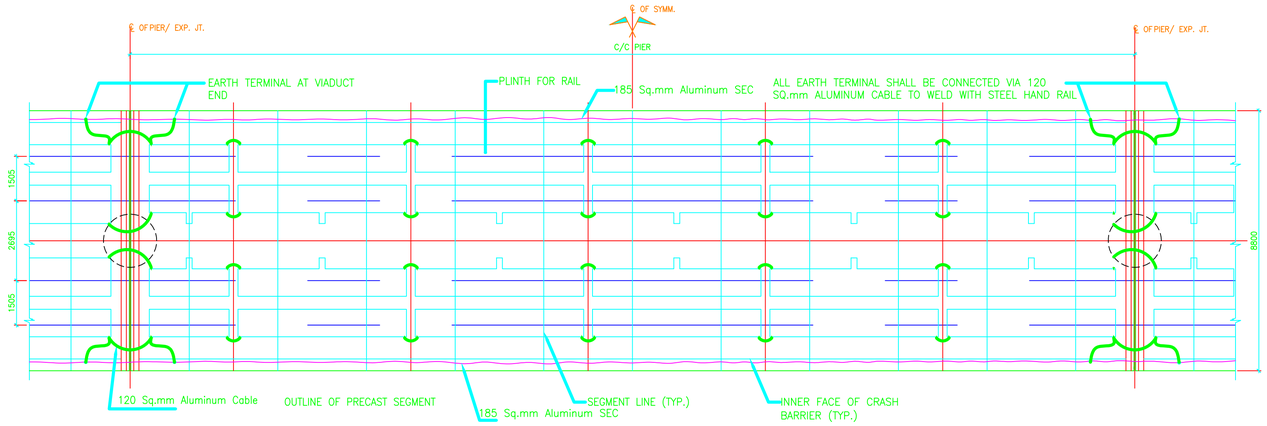
MPMETRO

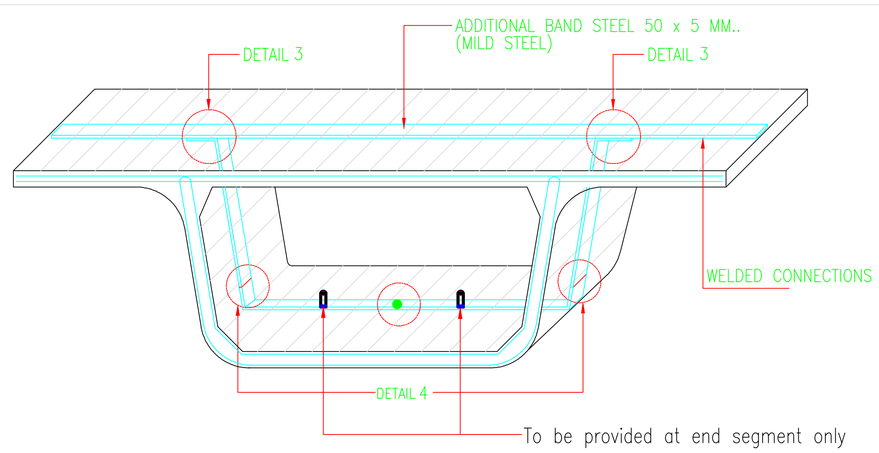
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: TYPICAL SCHEMATIC OF STRUCTURE EARTHING FOR ELEVATED STATION (SHEET 2 OF 2)
DRAWING NUMBER: I202-BIG-TRP-00-DWG-EBSSCH1-00501
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING




PLAN

## PLAN VIEW

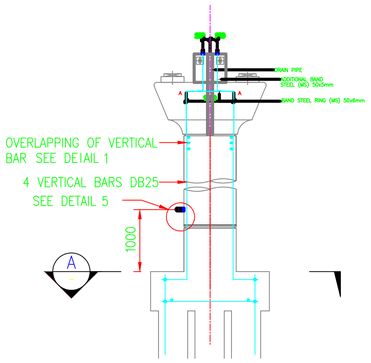
NOT TO SCALE



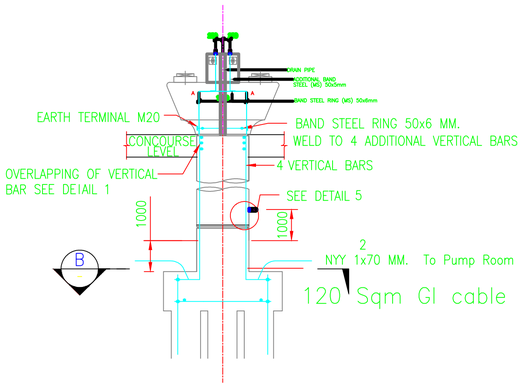

## TYPICAL DETAIL EARTHING SYSTEM OF VIADUCT SEGMENT

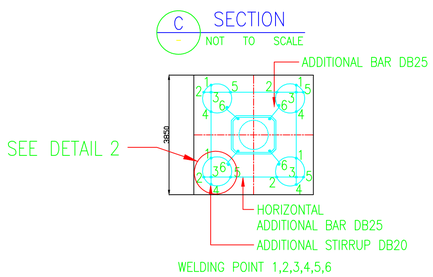
NOT TO SCALE

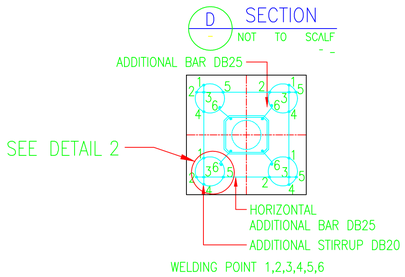
## TYPICAL DETAIL OF EARTHING SYSTEM ON PIER COLUMN FOR THE MAIN LINE




## TYPICAL DETAIL OF EARTHING SYSTEM ON PIER COLUMN FOR THE STATION






Notes:

1. Earthing plate from tinned copper of brass shall be welded to the rebars in track plinth and brought out at each end for bonding by 120 Sq.mm Al. cable.
2. The stirrup in the viaduct segment shall be properly welded to segment rebars and MS strip (connecting all rebars of the segment). The process shall be monitored and inspected by GC/MPMRCL Power experts and photographs shall be taken and shown as evidence of having followed the proper process.
3. The welding between stirrup and rebar of track plinth shall be adequate and in process photographs shall be shown as evidence of having followed the proper process.
4. The earth terminal (contact paint for connection to earth cable) shall be provided by viaduct contractor on the viaduct deck (contact point on parapet not preferred). Four such earth terminals shall be provided in four corners of a viaduct span.
5. A checklist/ procedure shall be prepared by GC/MPMRCL (Jointly structure & power group) for ensuring the above.

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE PHASE-3 RD, OKHLA PHASE III, NEW DELHI, DELHI 110020

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RITES BHAWAN, 1, SECTOR 29, GURGAON,HARYANA, INDIA-122001

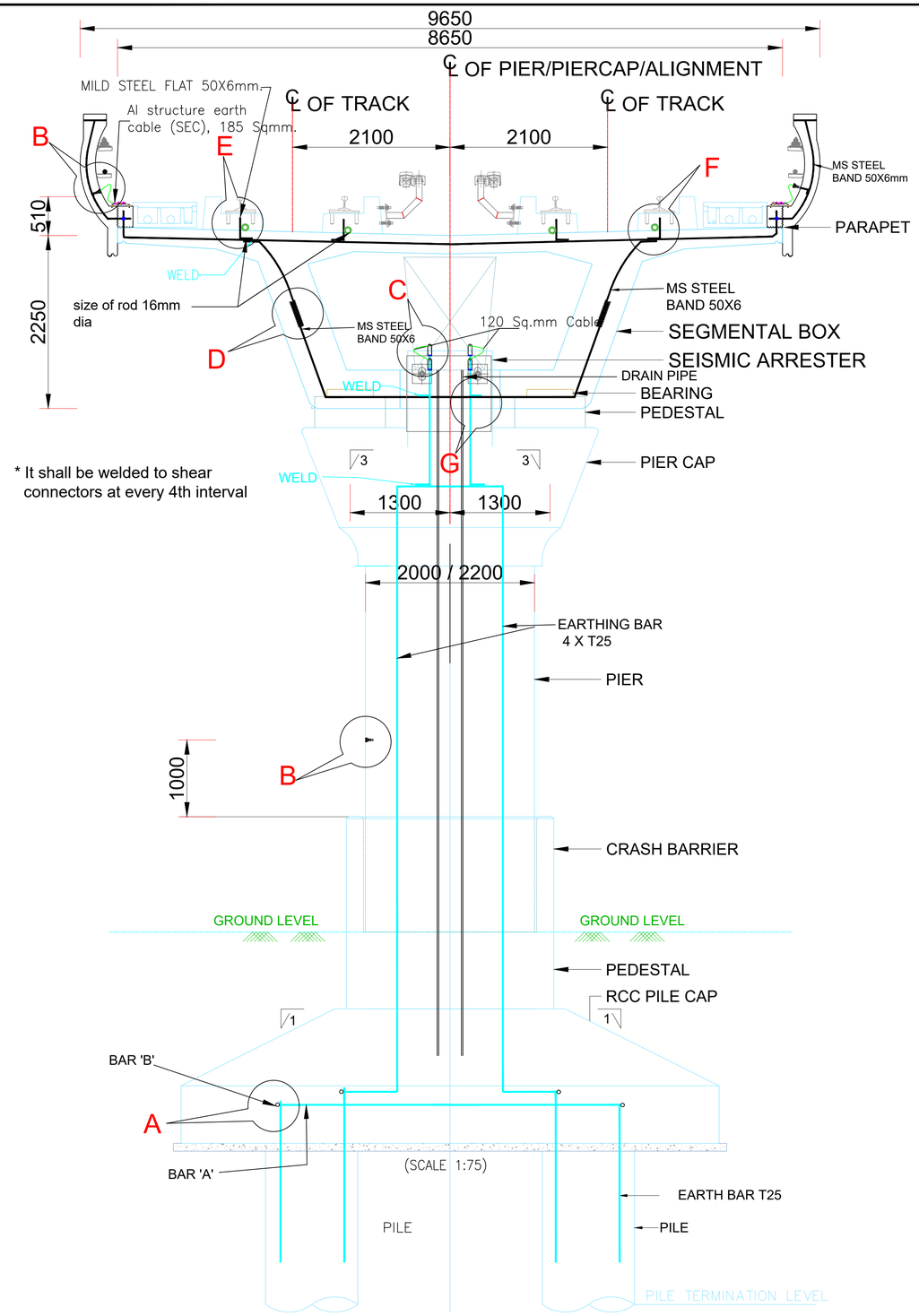
| PHOOL CHAND | VIKAS KUMAR HARIT | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

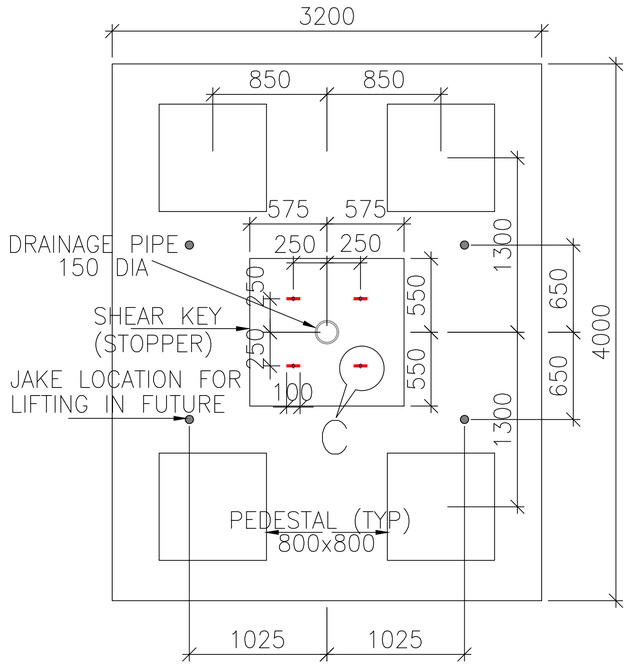
GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

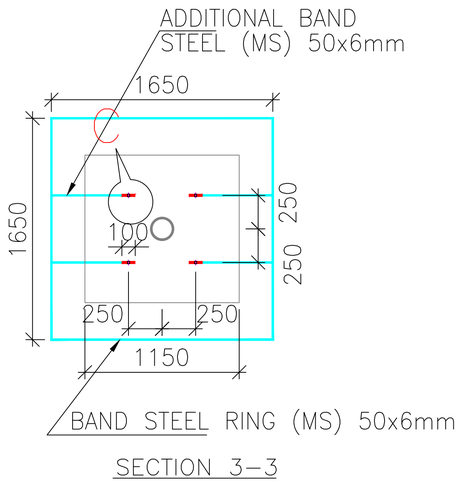
MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL EARTHING, BONDING AND STRAY CURRENT PROTECTION SCHEME FOR VIADUCT AND PIER |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-EBSSCH1-00502 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

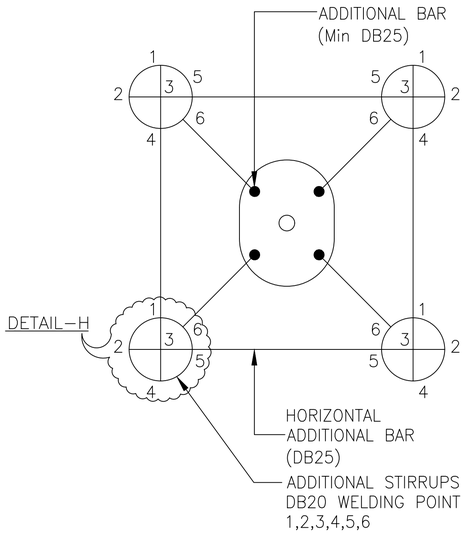



PIER CAP TOP PLAN




SECTION 3–3

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| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

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PHASE-3 RD, OKHLA PHASE III, NEW DELHI, DELHI 110020

RITES THE INFRASTRUCTURE PEOPLE

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

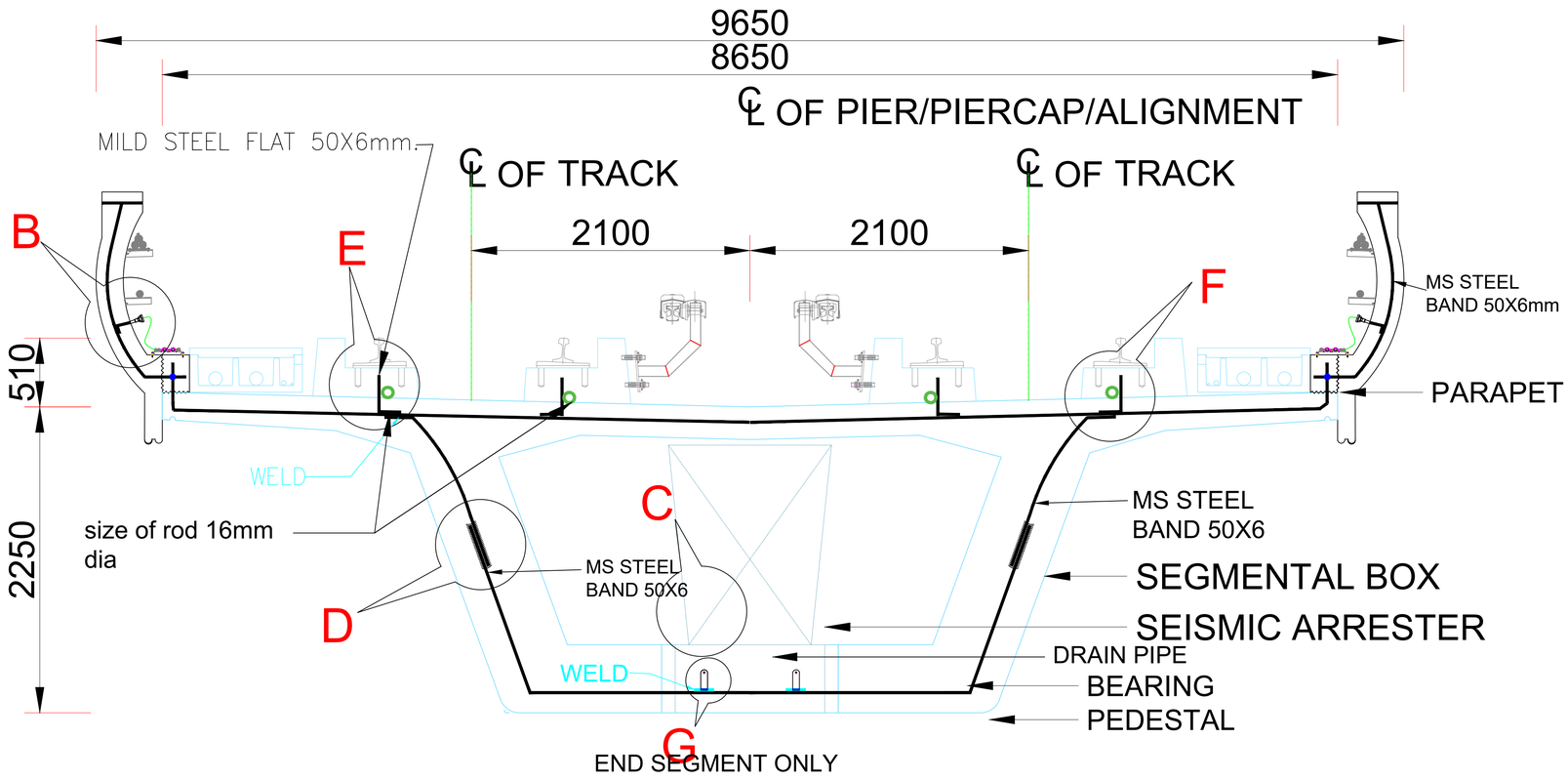
DB GEODATA Louis Berger

**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

**TENDER DRAWING**
NOT TO BE USED FOR CONSTRUCTION

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL EARTHING ARRANGEMENT FOR STANDARD PIER AND END SEGMENT (SHEET 1 OF 3) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-EBSSCH1-00503 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

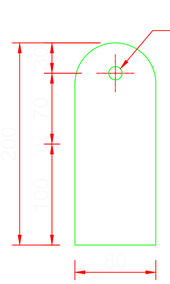



NOTE:

1. 50X6 MS flat terminal to be provided for track plinth earthing connection at each segment.
2. 16mm MS rod to be provided at each plinth to be welded with expose terminal as and every forth shear connector.

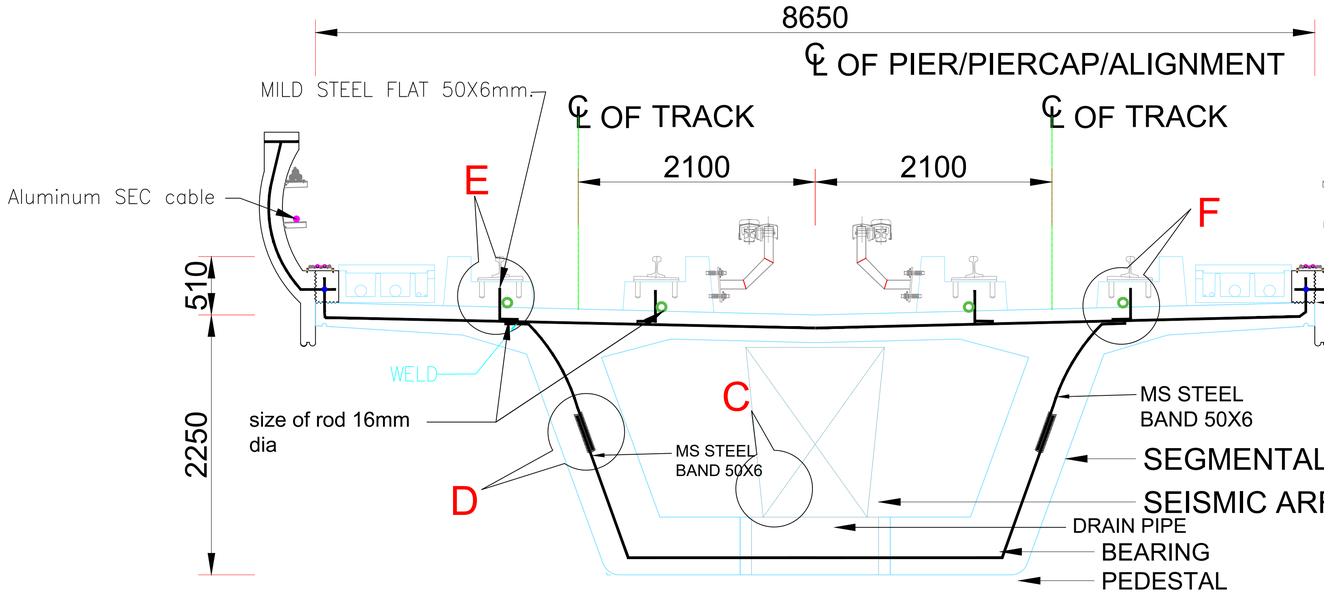
Legend :-

1. SEC cable denoted
2. 50X6 MS band denoted
3. 120 Sqm AL cable denoted
4. 16mm dia rod denoted

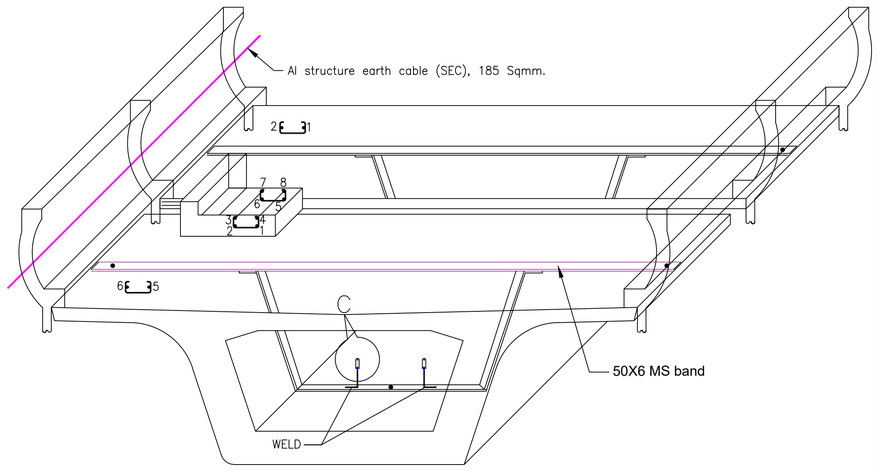



MATERIAL:- HOT DIP GALVANISED STEEL
(FACTORY MANUFACTURED)

DETAIL-G




INTERMEDIATE SEGMENT ONLY




ISOMETRIC BLOWUP VIEW `X'

| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

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GENERAL CONSULTANT

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MPMETRO

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NOT TO BE USED FOR CONSTRUCTION

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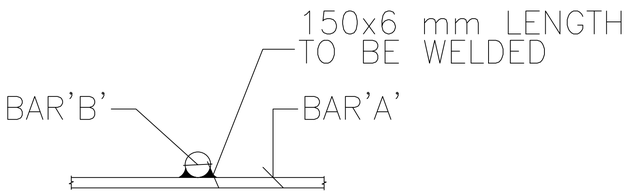
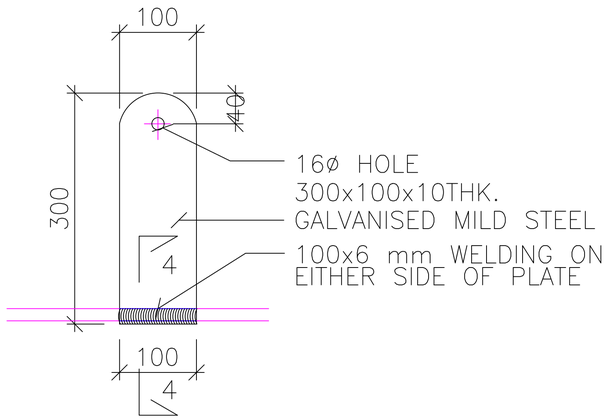
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL EARTHING ARRANGEMENT FOR<br>STANDARD PIER AND END SEGMENT (SHEET 2 OF 3) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-EBSSCH1-00503 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

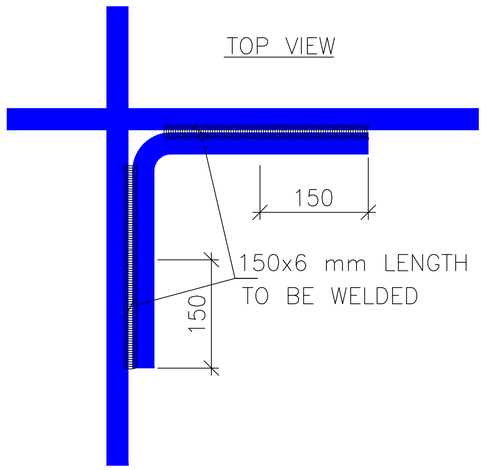
SECTIONAL VIEW

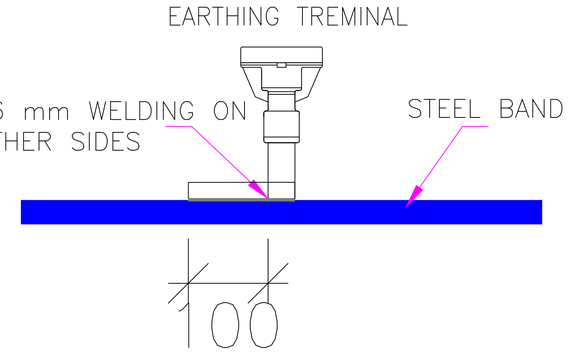



DETAIL–A

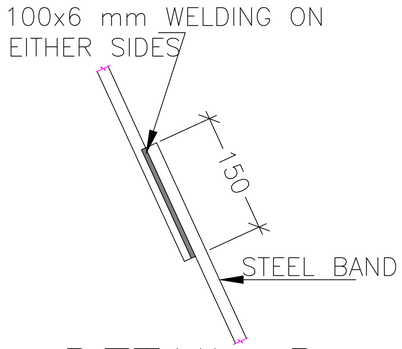



DETAIL–C

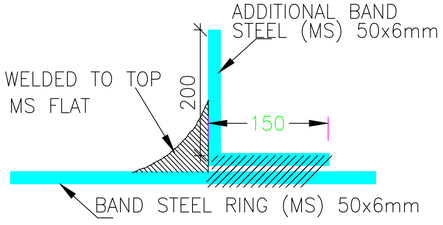



DETAIL–B

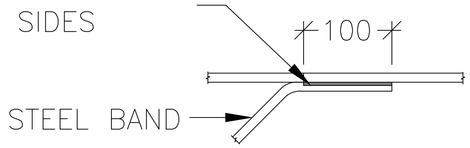



DETAIL–D

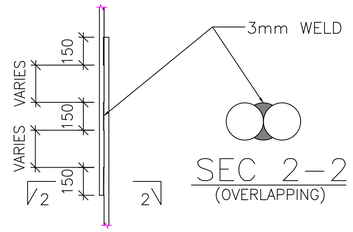



DETAIL–E

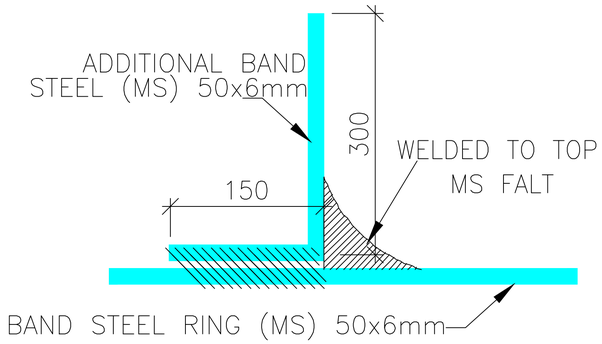
100x6 mm WELDING ON
EITHER SIDES



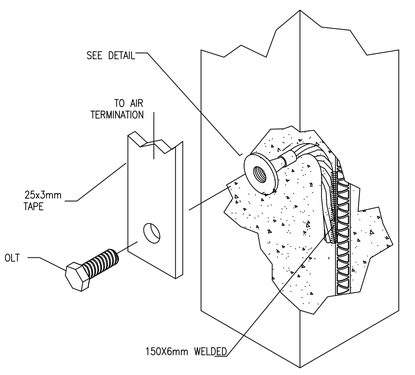

DETAIL–F




LAPPING DETAIL
(FOR ADDITIONAL BAR)

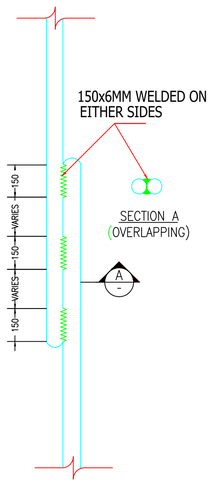



DETAIL–G




DETAIL–B

EARTH BRIDGE
CONNECTION DETAILS




LAPPING DETAIL
(FOR ADDITIONAL BAR)

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
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| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

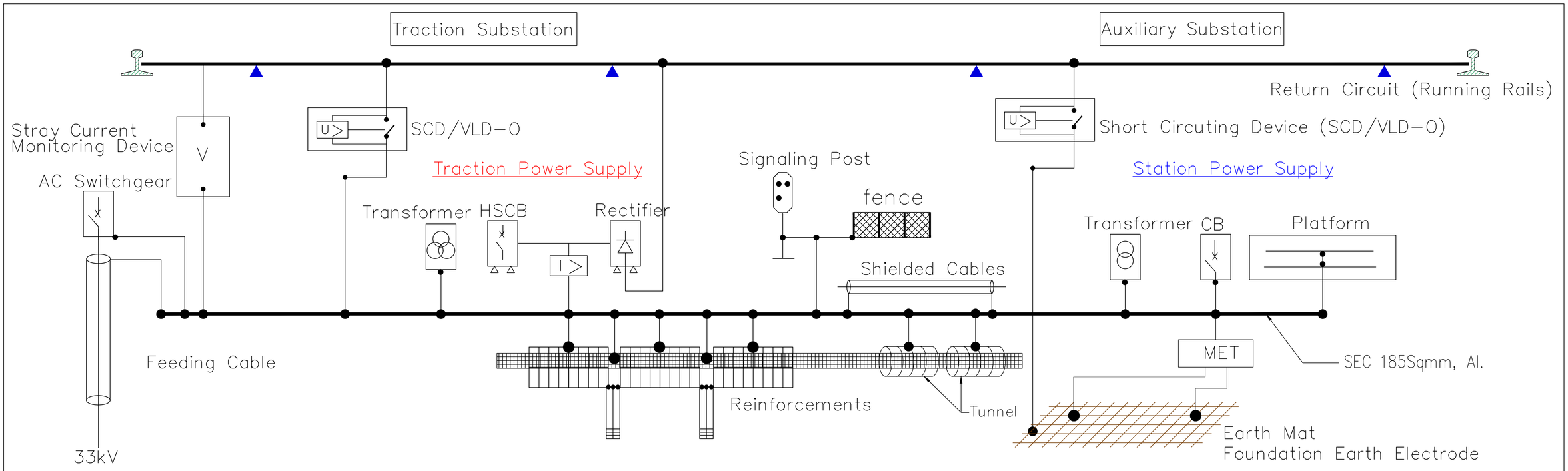
GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL EARTHING ARRANGEMENT FOR STANDARD PIER AND END SEGMENT (SHEET 3 OF 3)
DRAWING NUMBER: I202-BIG-TRP-00-DWG-EBSSCH1-00503
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TYPICAL INTEGRATED EARTHING SCHEME




## INTEGRATED EARTHING SCHEME

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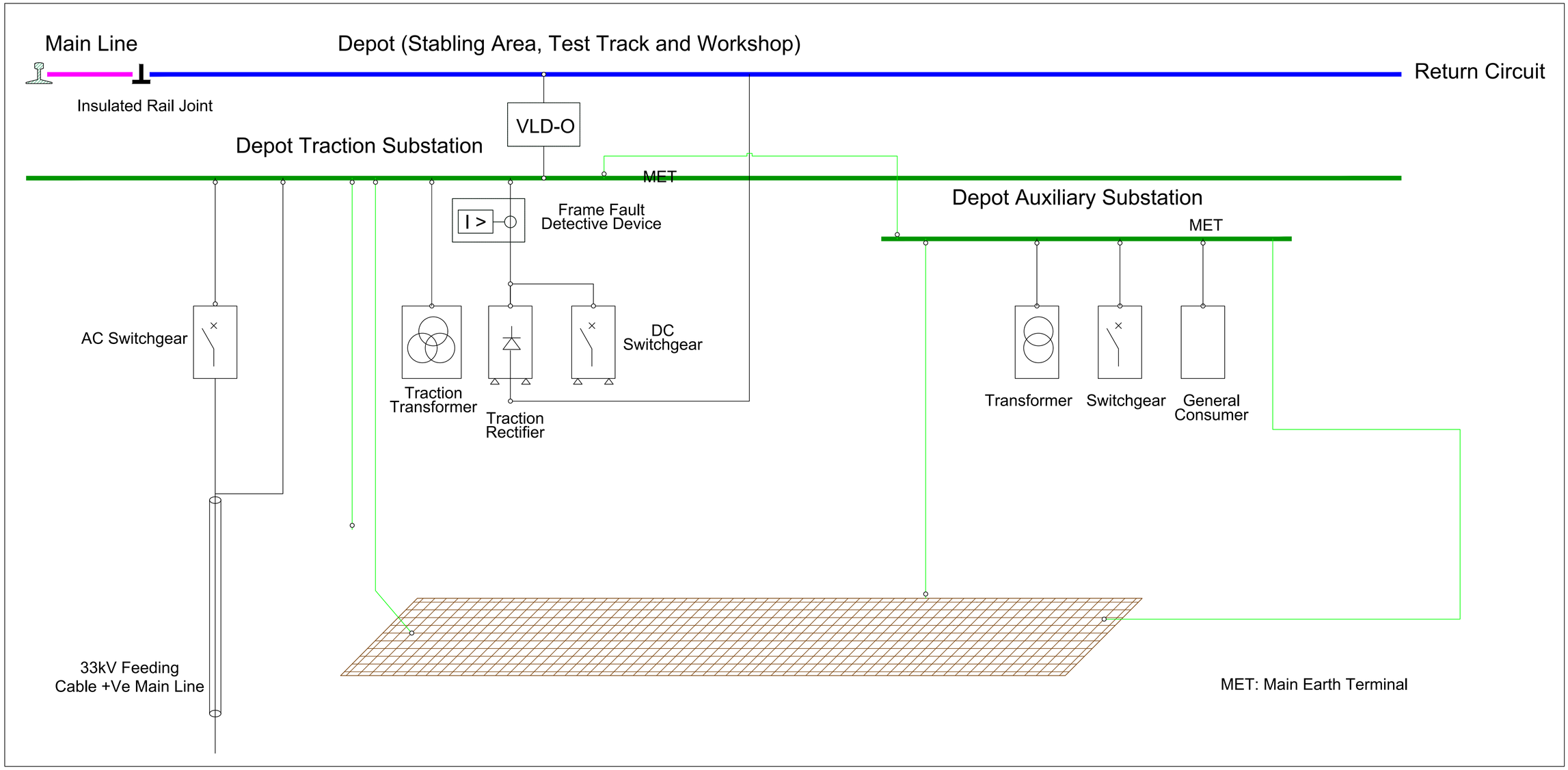
GENERAL CONSULTANT

DB GEODATA Louis Berger
DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL INTEGRATED EARTHING SCHEME
DRAWING NUMBER: I202-BIG-TRP-00-DWG-EBSSCH1-00504
REV: 0
SCALE: NTS
DATE: October 2021
STATUS: TENDER DRAWING

# TYPICAL EARTHING ARRANGEMENT FOR DEPOT ASS & DEPOT TSS

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL DEPOTS ASS & TSS EARTHING ARRANGEMENT

DRAWING NUMBER: I202-BIG-TRP-00-DWG-EBSSCH1-00505 REV: 0

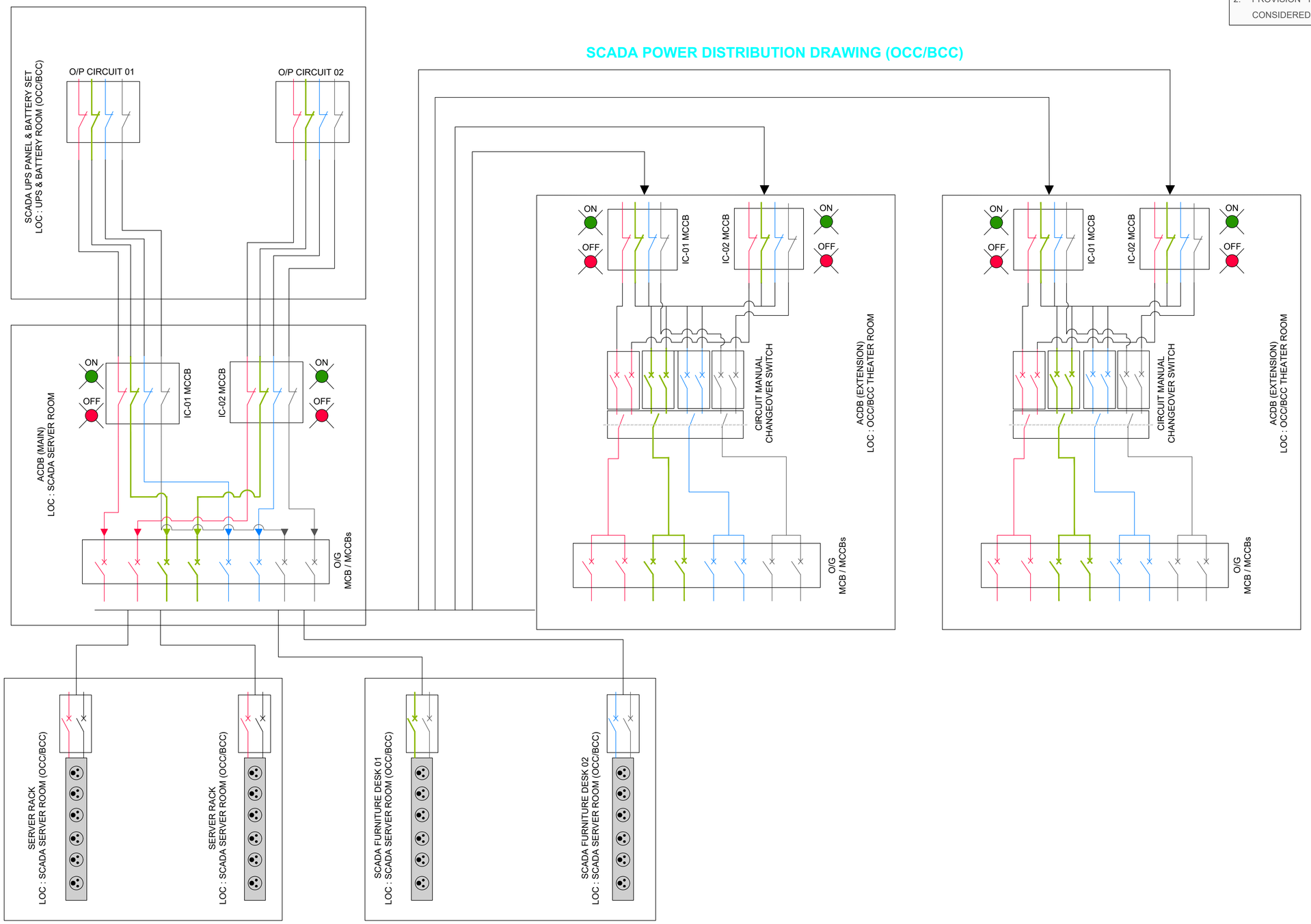
SCALE: NTS DATE: October 2021 STATUS: TENDER DRAWING

# SCADA SYSTEM

**GENERAL NOTES:**

1. THE ARCHITECTURE IS TENTATIVE, QUANTITIES OF EQUIPMENT MAY DIFFER AS SHOWN IN THE ARCHITECTURE. (NOT TO SCALE).
2. PROVISION FOR 2Nos. SPARE MCBs (SP/DP) SHALL BE CONSIDERED IN EACH ACDB.

# SCADA POWER DISTRIBUTION DRAWING (OCC/BCC)

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REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
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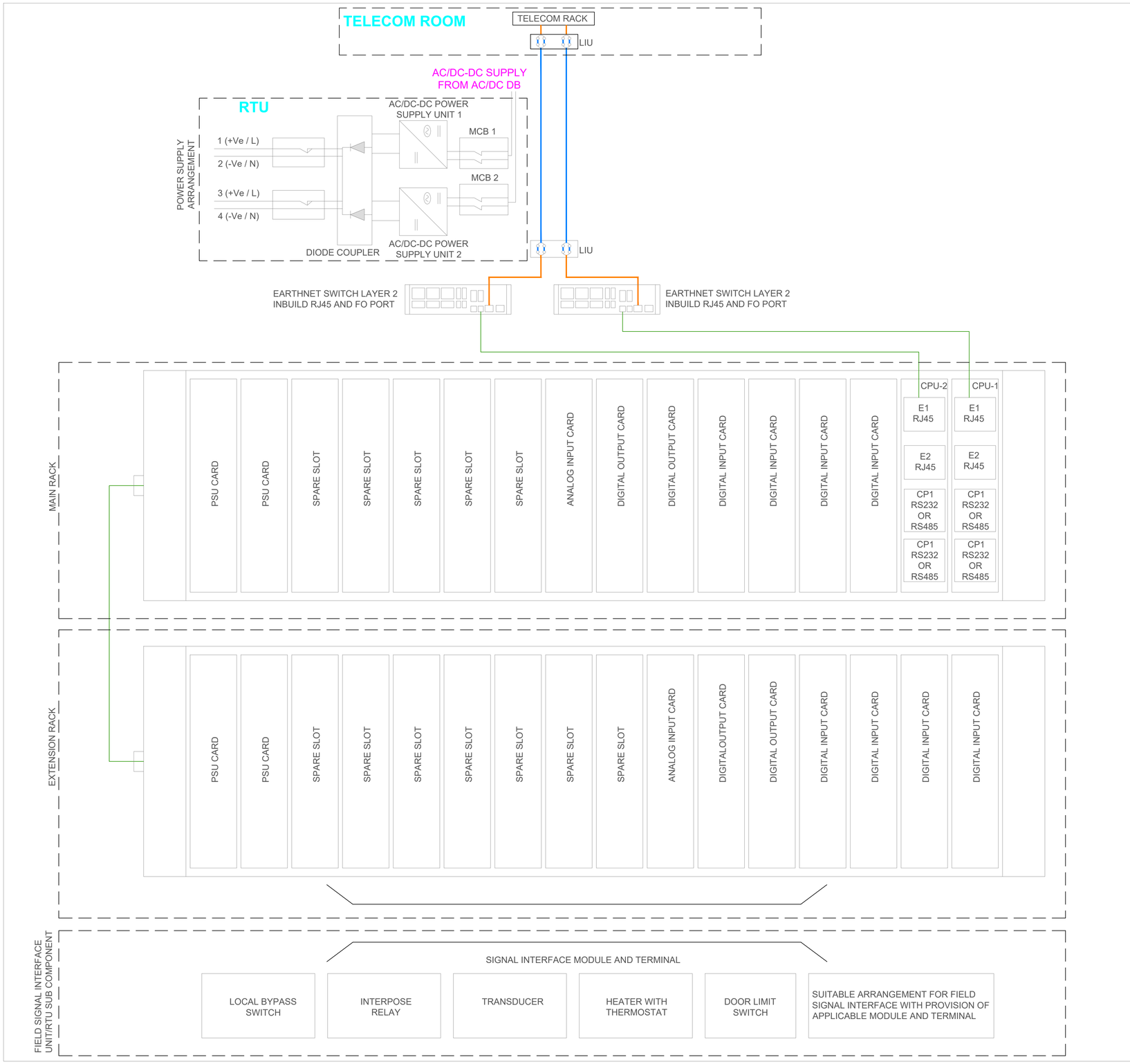
| BHUPENDER SINGH | AMNESH NEGI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | POWER SUPPLY DISTRIBUTION FOR SCADA AT OCC/BCC |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-SCDSLD1-00601 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |




**GENERAL NOTES:**

1. CPU RACK (MAIN RACK) CAN BE DUAL INDIVIDUAL OR INTEGRATED RACK, PROVIDED TO MEET THE PERFORMANCE, TECHNICAL AND FUNCTION REQUIREMENTS OF THE SCADA SPECIFICATION.
2. THIS IS INDICATIVE SCHEMATIC PRESENTATION ONLY. SUPPLIER/ CONTRACTOR SHALL CROSS REFER THE DETAIL TECHNICAL, FUNCTIONAL AND PERFORMANCE REQUIREMENT TO FULLY INTEGRATE THE SCADA SYSTEM AS APPLICABLE.
3. E1 & E2 ARE ETHERNET PORT TO INTERFACE WITH IEC 60870-5-104 IEC 61850 PROTOCOL.
4. CP1 & CP2 ARE RS232/RS485 PORT TO INTERFACE WITH IEC 60870-5-103 IEC 60870-5-101 & MOD BUS PROTOCOL.

| LEGEND | |
|---|---|
| | CAT 6E ETHERNET LAN CABLE |
| | ARMOURED FO CABLE |
| | FO PATCH CABLE |
| | POWER CABLE |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
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**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

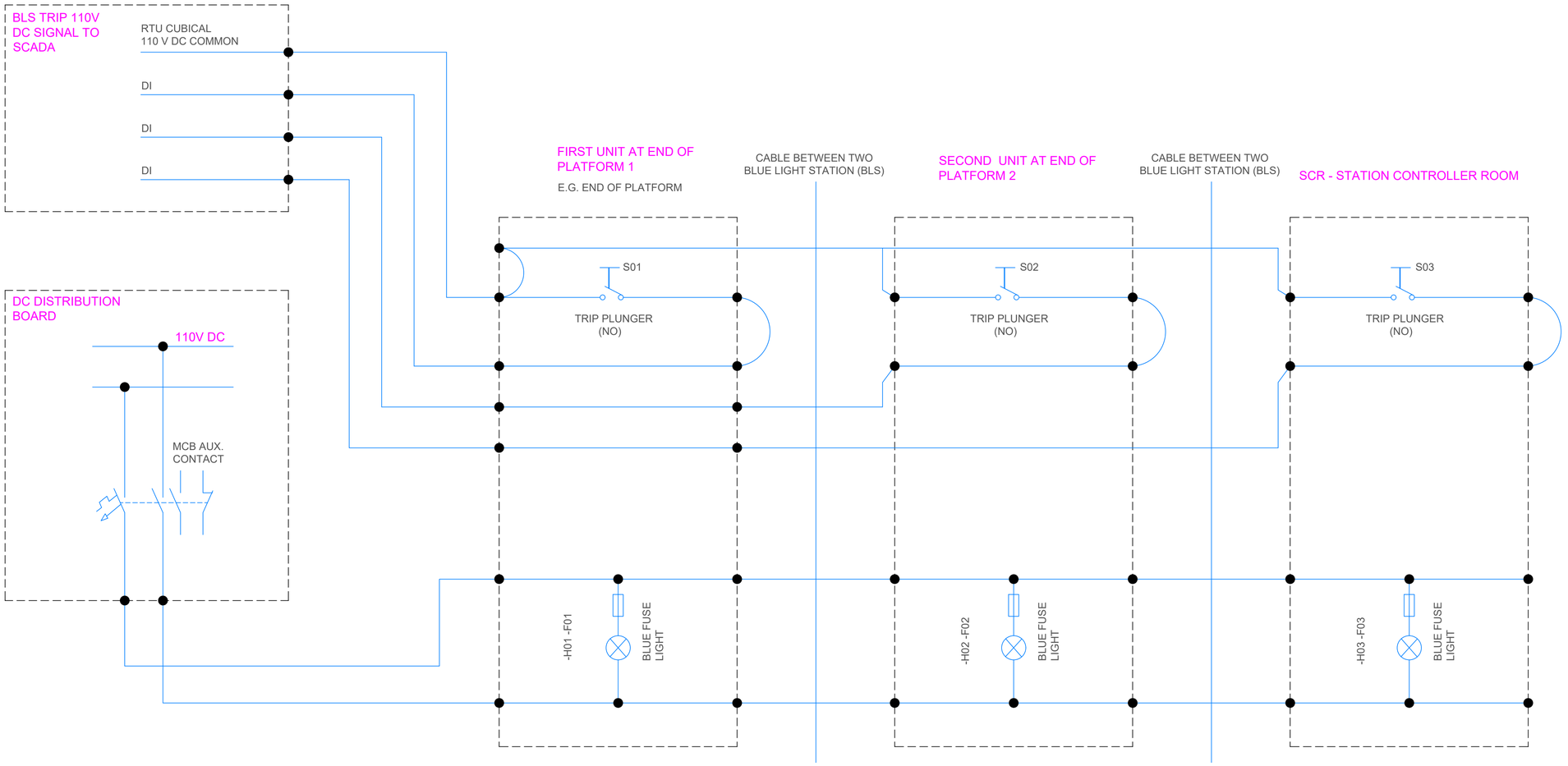
DRAWING TITLE: GENERAL RTU SCHEMATIC

DRAWING NUMBER: I202-BIG-TRP-00-DWG-SCDSCH1-00602 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING

**GENERAL NOTES:**

1. ONE BLUE LIGHT STATION (BLS) WIIL BE INSTALLED IN THE STATION CONTROL ROOM AND ONE AT BOTH THE ENDS OF EACH PLATFORM.
2. TOTAL FIVE BLUE LIGHT STATION (BLS) WILL BE INSTALLED IN ONE STATION AND TWO BLUE LIGHT STATION (BLS) WILL BE CONNECTED IN EACH LOOP.




TENDER DRAWING
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REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
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| 0 | Oct.2021 | FIRST SUBMISSION | BS | AN | SP | SPS |

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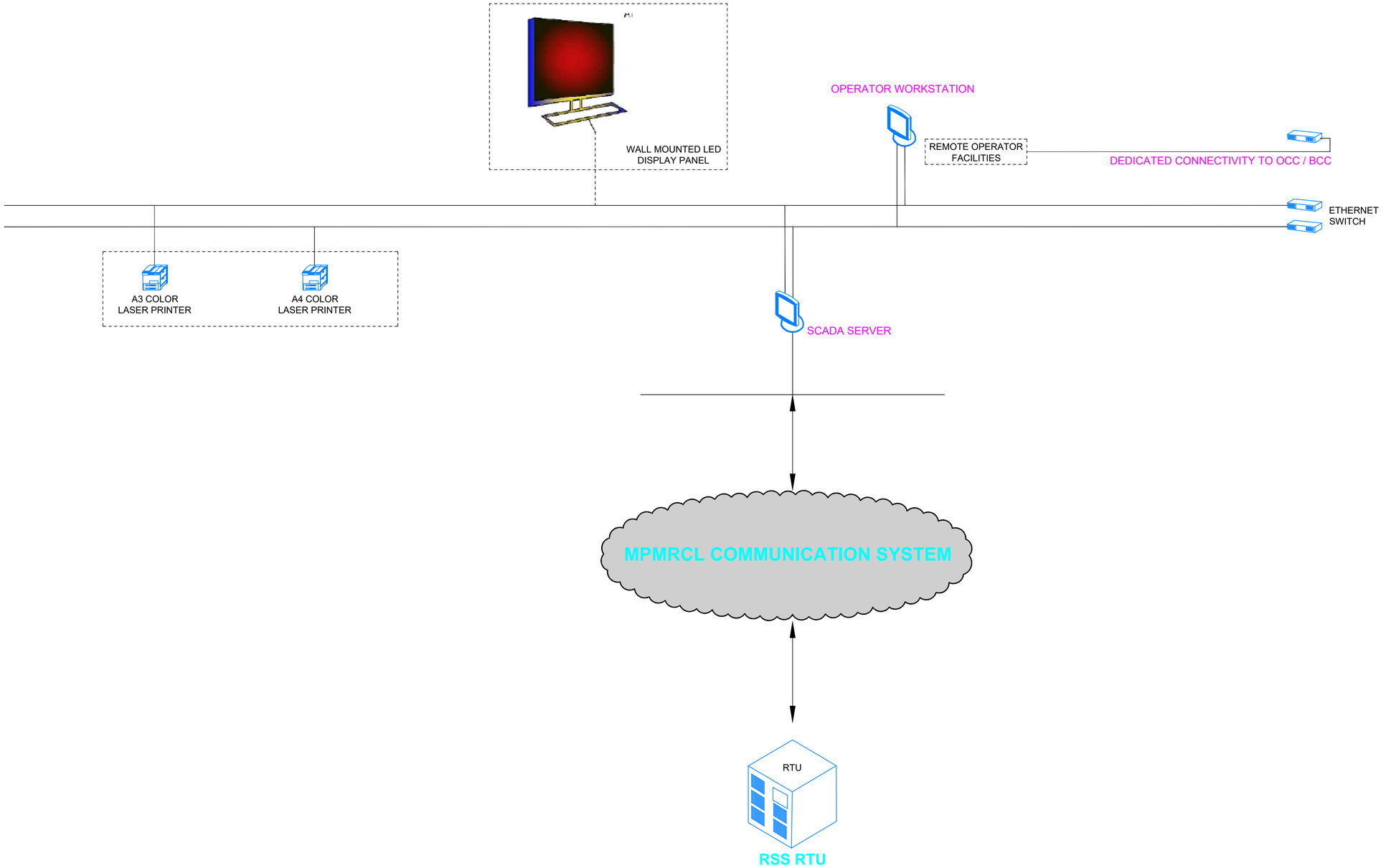
DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09
DRAWING TITLE: GENERAL ARRANGEMENT OF EMERGENCY TRIP SYSTEM – ETS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-SCDSCH1-00603 | REV: 0
SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING




TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AN | SP | SPS |

DETAILED DESIGN CONSULTANT

Ardanuy
ARDANUY INGENIERIA, S.A
258, OKHLA INDUSTRIAL ESTATE
PHASE-3 RD, OKHLA PHASE III, NEW
DELHI, DELHI 110020

RITES
THE INFRASTRUCTURE PEOPLE
**RITES LTD.**
RITES BHAWAN, 1, SECTOR 29,
GURGAON,HARYANA, INDIA-122001

| BHUPENDER SINGH | AMNESH NEGI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

GENERAL CONSULTANT

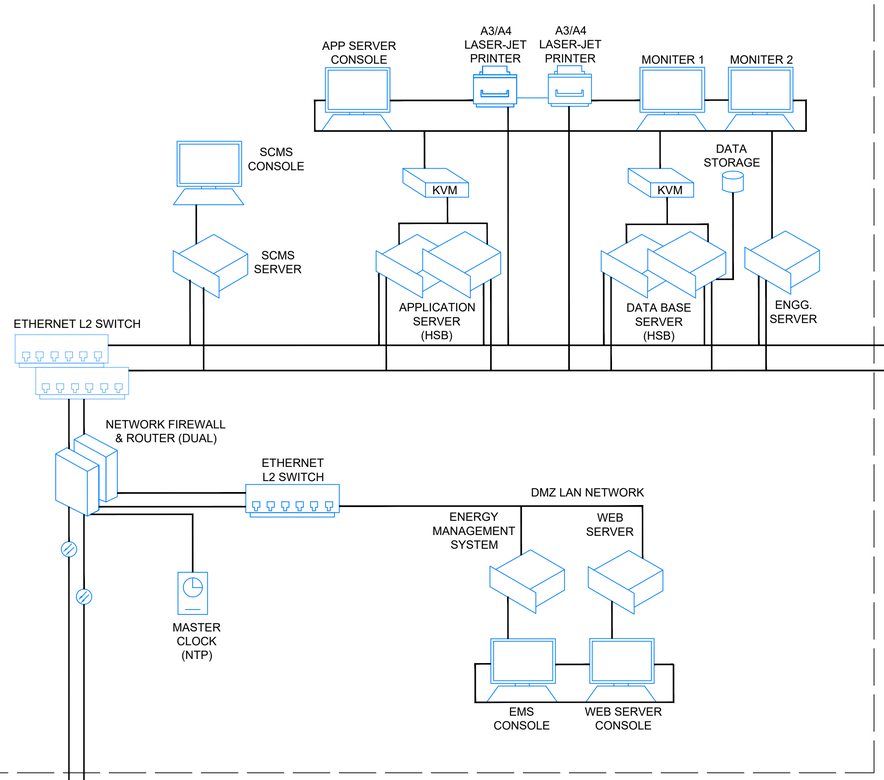
DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

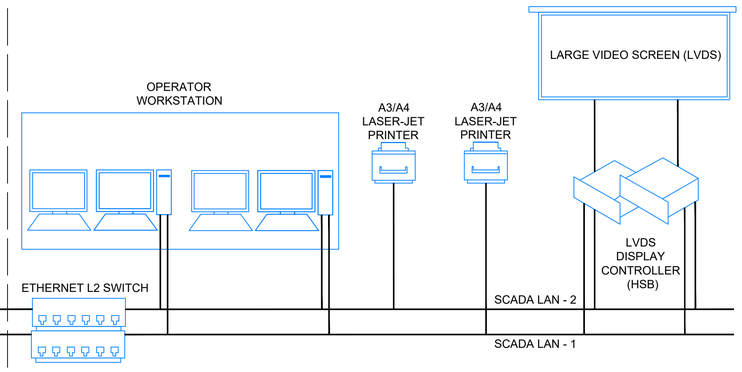
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.
PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09
DRAWING TITLE: TYPICAL CONFIGURATION FOR SCADA SYSTEM AT RSS
DRAWING NUMBER: I202-BIG-TRP-00-DWG-SCDLYT1-00604 REV: 0
SCALE: NTS DATE: October 2021 STATUS: TENDER DRAWING

# SCADA CONTROL CENTER ARCHITECTURE (OCC/BCC)

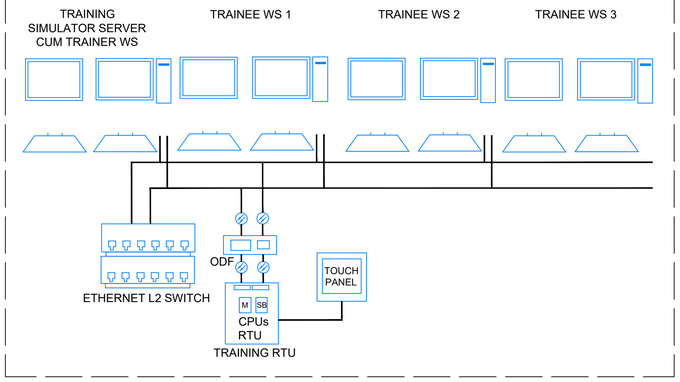
## OCC SCADA ROOM



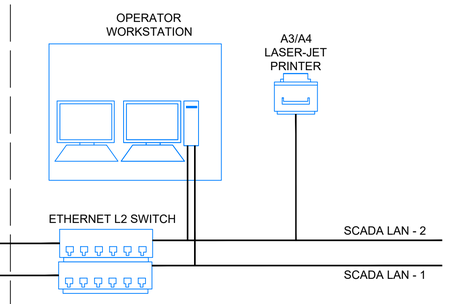

## THEATER ROOM-OCC



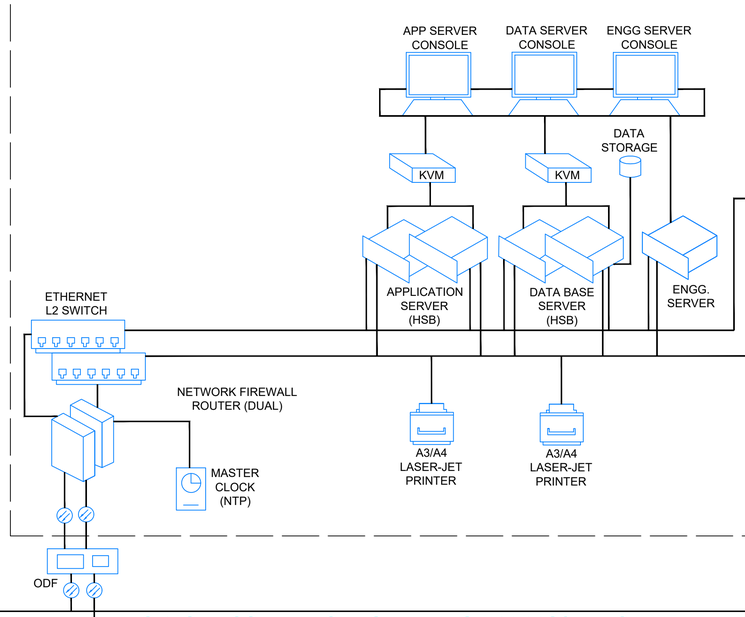

## TRAINING SIMULATOR



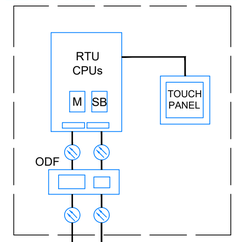

## CONTROL ROOM BCC



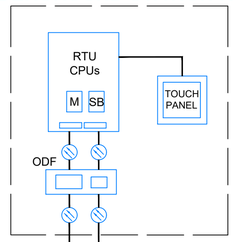

## SERVER ROOM-BCC

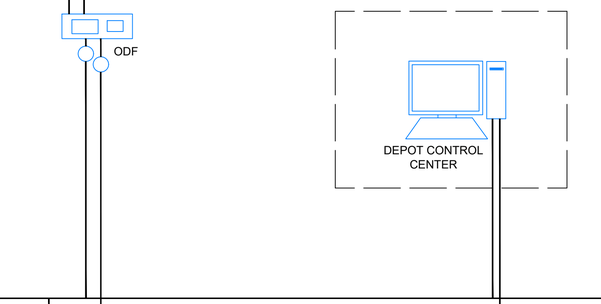



## ELEVATED STATION RTU



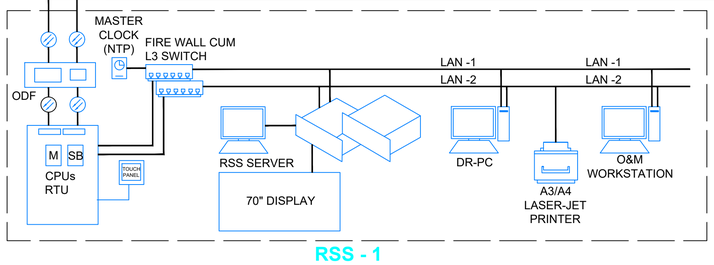

## UNDERGROUND STATION RTU




BACKBONE COMMUNICATION NETWORK (BY S&T) IEC 60870-5-104

## RSS - 1

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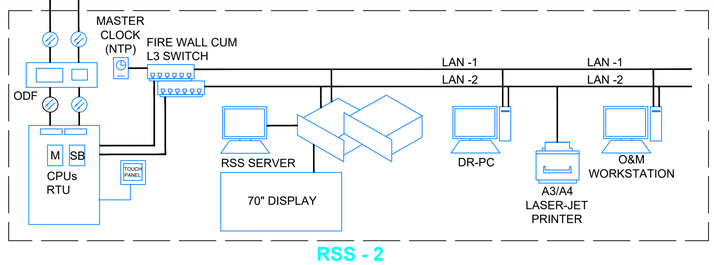
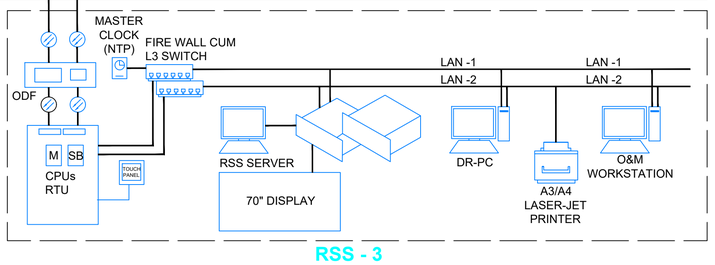



## RSS - 3




TENDER DRAWING
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REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Oct.2021 | FIRST SUBMISSION | BS | AN | SP | SPS |

DETAILED DESIGN CONSULTANT

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| BHUPENDER SINGH | AMNESH NEGI | SIVA POLAMARASETTI | SURENDRA PAL SINGH |
|---|---|---|---|

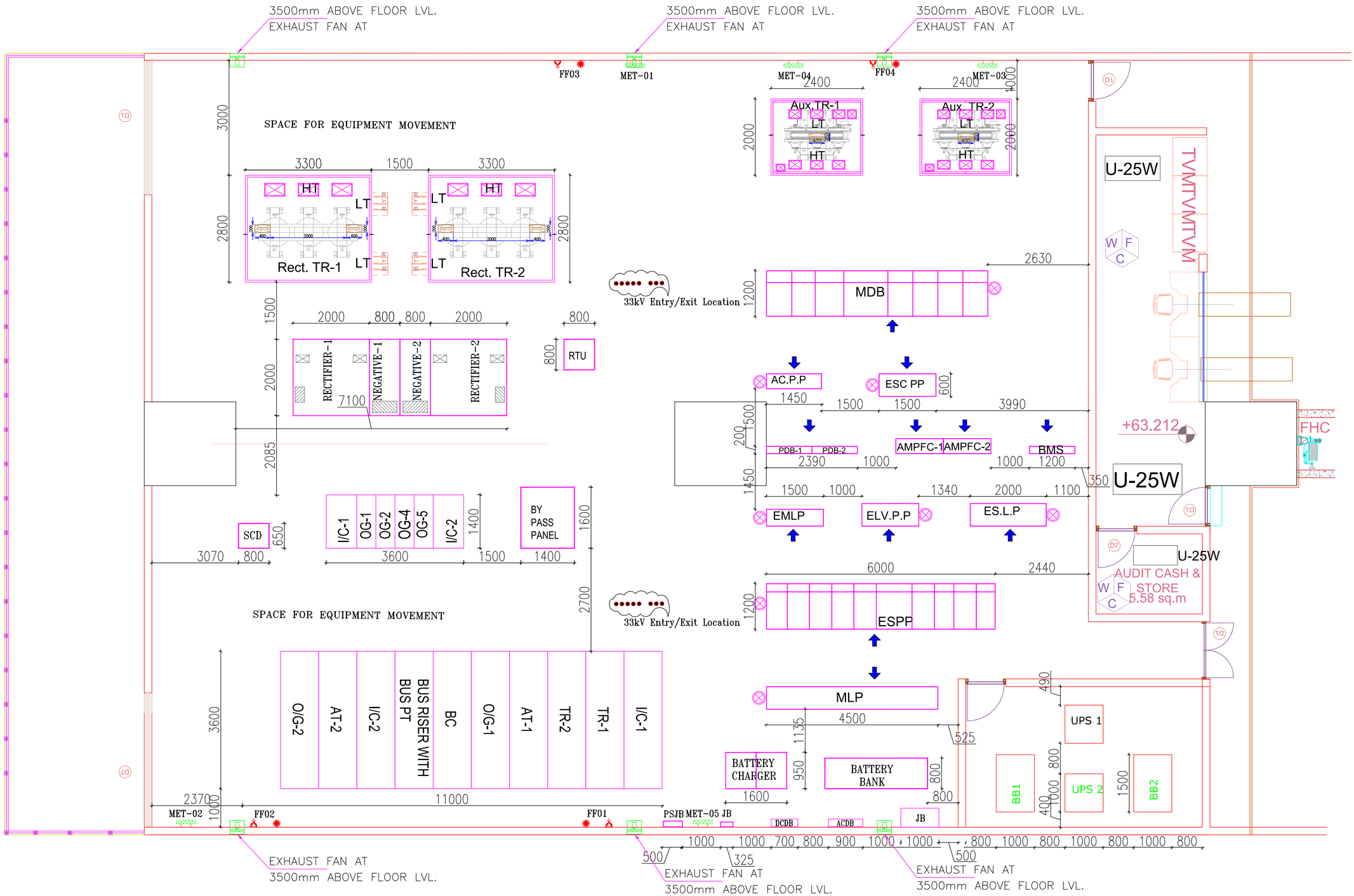
GENERAL CONSULTANT

DB GEODATA Louis Berger
**DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS**

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT<br>PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL SCADA CONTROL CENTRE -ARCHITECTURE (OCC/BCC) |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-SCDLYT1-00605 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

# MISCALLENEOUS




| REVISIONS | | | | | | |
|---|---|---|---|---|---|---|
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| | | | | | | |
| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

DETAILED DESIGN CONSULTANT

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

TENDER DRAWING
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CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: VENTILATION RE□UIREMENT LAYOUT FOR TYPICAL ASS, ASS□TSS

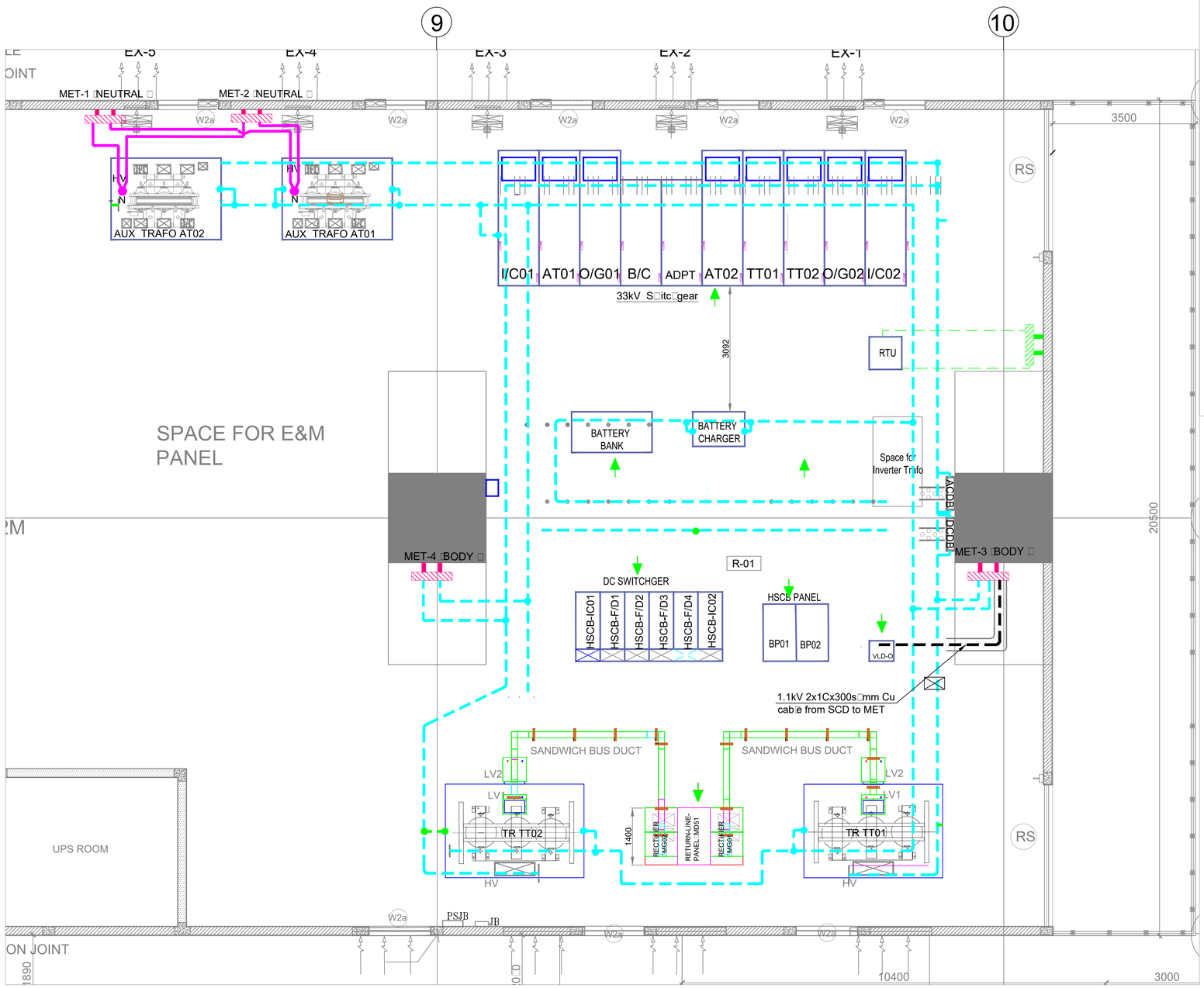
DRAWING NUMBER: I202-BIG-TRP-00-DWG-MISINS1-00□01

REV: 0

SCALE: NTS

DATE: October 2021

STATUS: TENDER DRAWING




Notes :-

1. All Dimension are in mm and the levels shown here are in mtr.
2. Galvanized earth flat to be treated by the zinc rich paint on cut edges immediately to avoid corrosion.
3. All MET Sizes are GI flat of 50x50x6mm thick 600mm long. shall be fixed 500mm above the FFL are provided by station building contractor.
4. Single run 50x6 GI strip shall be provided on the edge of the cable tray, through out the cable route as a ring and shall be inter-connected to the tiers/branch and every change in direction. The ring earthing strip shall connected with two different MET (station building contractor-scope).
5. The earthing layout is as per IS; 3043 Latest edition.

MET Details for ASS-TSS STATION

| Sr.No. | Equipment description | UNIT | QTY. |
|---|---|---|---|
| 1. | MET-1,MET-2 (For Aux. Transformer Neutral Earthing) | No | 2 |
| 2. | MET-3, MET-4 (For Equipment Earthing CABLE TRAY) | No | 2 |

Legends

| | | | |
|---|---|---|---|
| 1. | | 50x6 | Equipment Body Earthing |
| 2. | | 2Rx1Cx300sqmm 1.1KV | SCD TO MET |
| 3. | | 50x6 | Trafo Neutral Earthing |
| 4. | | 25x3 | Clean earth |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

TENDER DRAWING
NOT TO BE USED FOR CONSTRUCTION

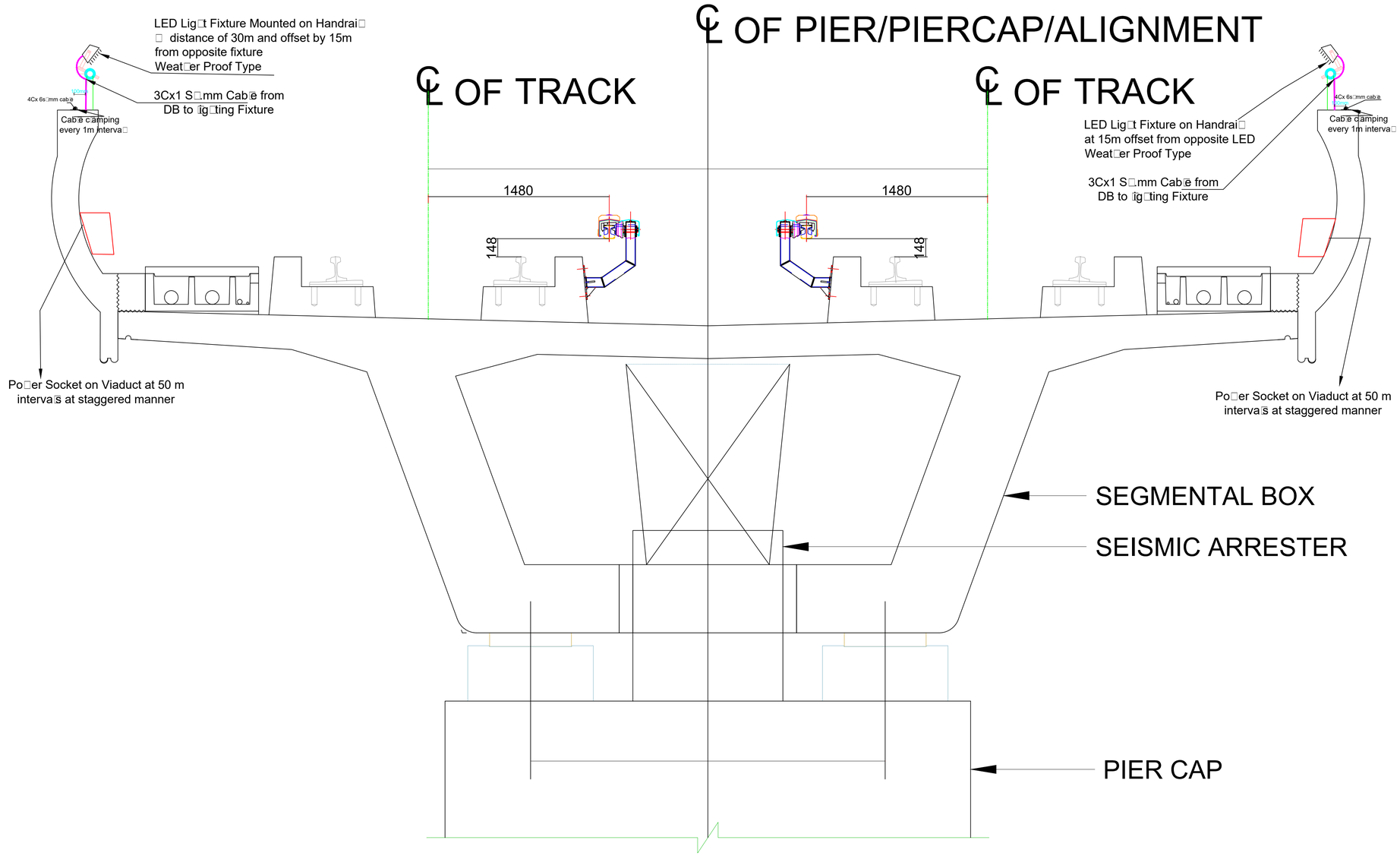
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT PACKAGE IN-09

DRAWING TITLE: TYPICAL EARTHING ARRANGEMENT AT ASS/TSS

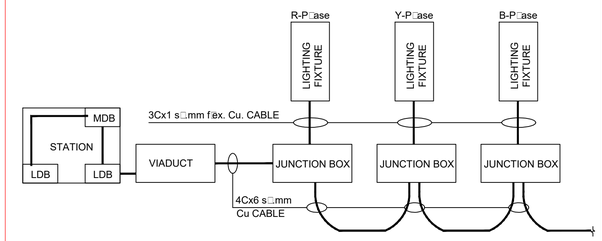
DRAWING NUMBER: I202-BIG-TRP-00-DWG-MISINS1-00□02 | REV: 0

SCALE: NTS | DATE: October 2021 | STATUS: TENDER DRAWING

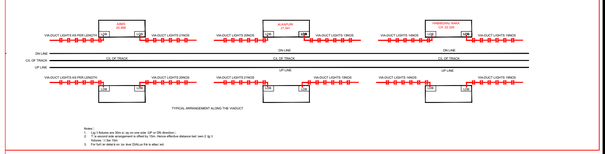


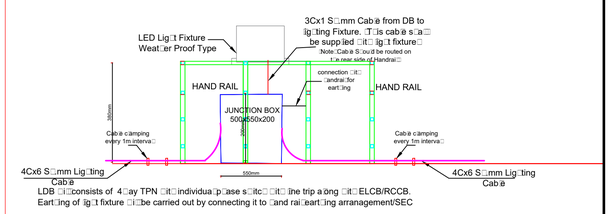

Note□

1.Po□er Socket on Viaduct at 50 m interva□s at staggered manner on bot□ UP and DN side
2. T□e Lig□ting fixture s□a□□be connected to t□e Structure eart□ cab□e t□roug□ 1.5 s□mm cab□e.
3.T□e Dra□ing contains deta□s of viaduct □g□ting on□y.Remaining a□deta□s are indicative.
4.T□e po□er supp□y contractor s□a□submit s□op dra□ings du□y s□o□ing t□e arrangement a□ong □it□ a□□dimensions
5.Cab□e c□mping every 1m interva□
6. A□□Dimesions are in mm.



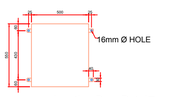

Connection Deta□s



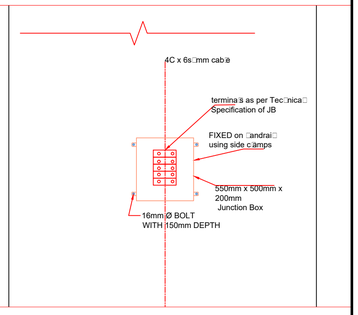



LDB □□consists of 4□ay TPN □it□ individua□p□ase s□itc□ □it□ □he trip a□ong □it□ ELCB/RCCB.
Eart□ing of □g□t fixture □□be carried out by connecting it to □and rai□ eart□ing arranagement/SEC

Fixing Deta□s on Handrai□




Junction Box Deta□s

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| 0 | Oct.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |
| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |

DETAILED DESIGN CONSULTANT

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DELHI, DELHI 110020

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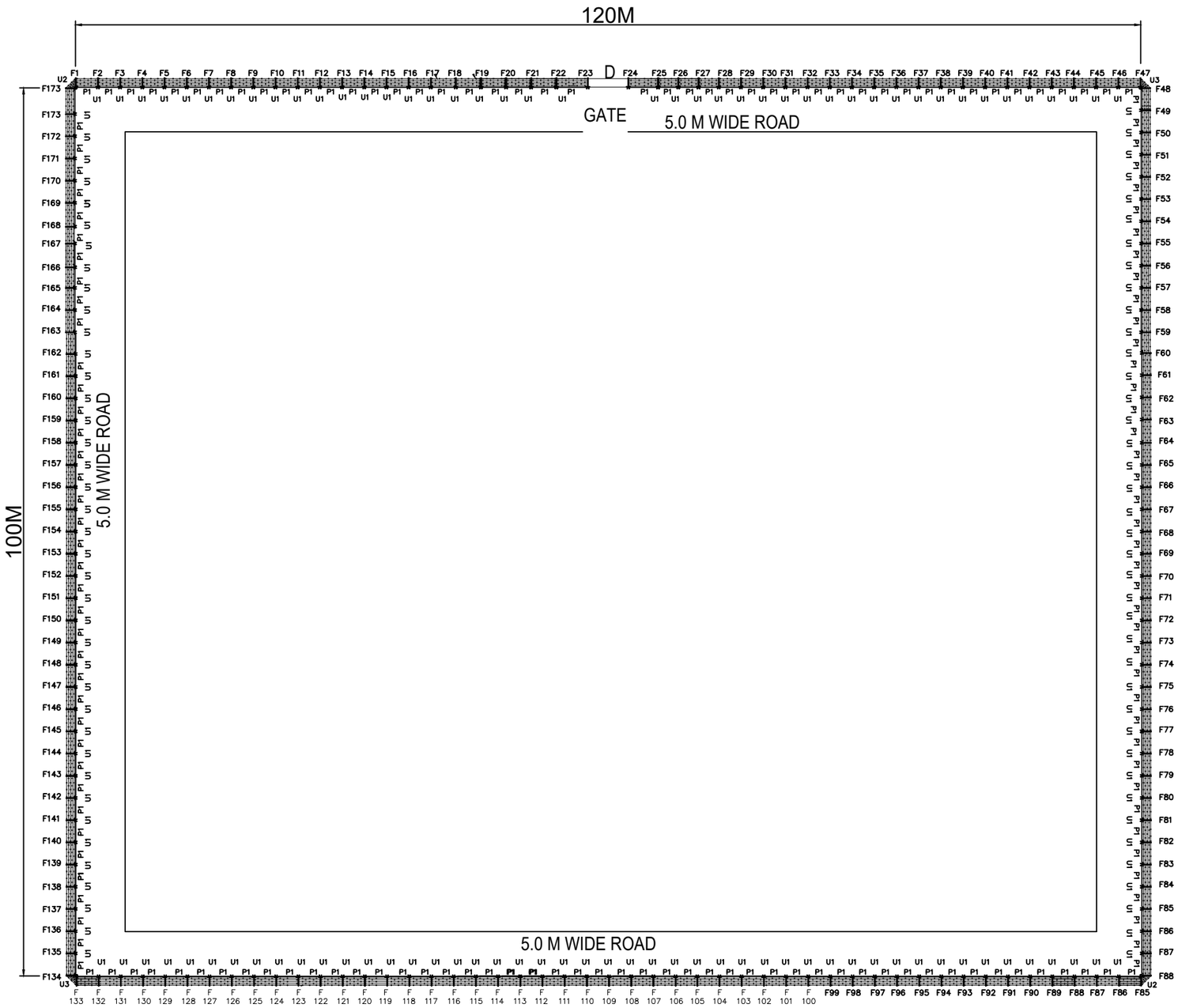
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

| | |
|---|---|
| CLIENT | MADHYA PRADESH METRO RAIL CORP. LTD. |
| PROJECT | INDORE METRO RAIL PROJECT PACKAGE IN-09 |
| DRAWING TITLE | TYPICAL ARRANGEMENT FOR VIADUCT LIGHTING |
| DRAWING NUMBER | I202-BIG-TRP-00-DWG-MISINS1-00□03 |
| REV | 0 |
| SCALE | NTS |
| DATE | October 2021 |
| STATUS | TENDER DRAWING |

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REVISIONS

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| 0 | Dec.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

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OKHLA PHASE III, NEW DELHI, DELHI 110020

**RITES LTD.**
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GURGAON,HARYANA, INDIA-122001

| PHOOL CHAND | BRAJESH | SURENDRA PAL SINGH | SURENDRA PAL SINGH |
|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

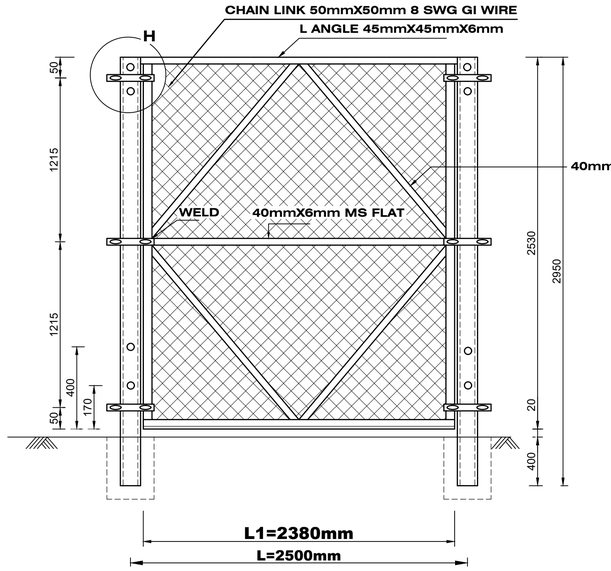
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

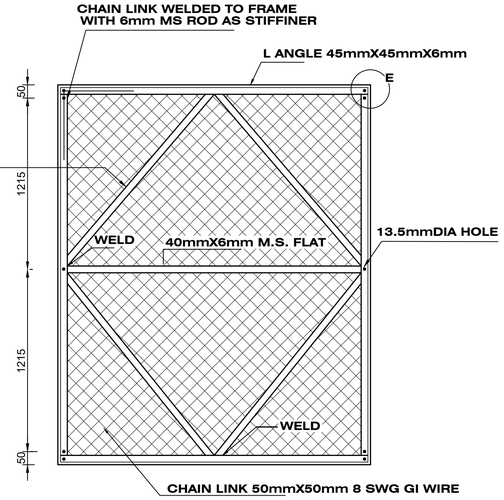
DRAWING TITLE: TYPICAL ARRANGEMENT OF GATE & FENCING OF SWITCHYARD

DRAWING NUMBER: I202-BIG-TRP-00-DWG-MISINS1-00704(SH 1 OF 2) REV: 0

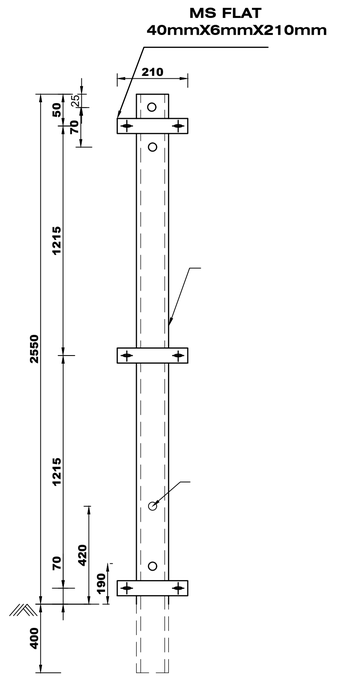
SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING



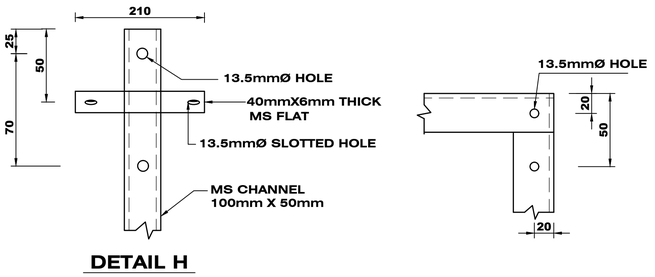

FRONT ELEVATION OF FENCING ARRANGEMENT



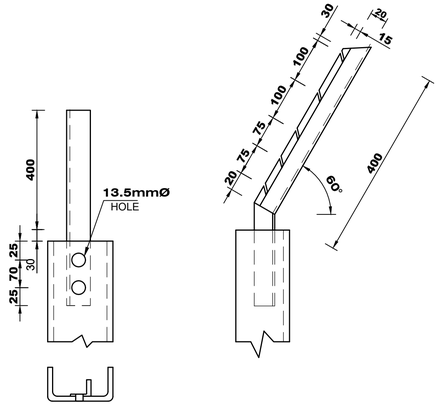

BACK SIDE VIEW

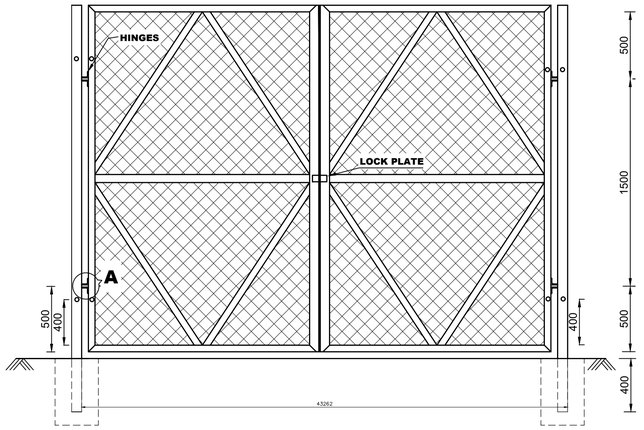



U1
FENCING UPRIGHT




DETAIL H




TYPICAL ARRANGEMENT OF GATE

TENDER DRAWING
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REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
|---|---|---|---|---|---|---|
| 0 | Dec.2021 | FIRST SUBMISSION | PC | BR | BR | SPS |

DETAILED DESIGN CONSULTANT

ARDANUY INGENIERIA, S.A
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GURGAON,HARYANA, INDIA-122001

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|---|---|---|---|
| PREPARED BY | CHECKED BY | APPROVED BY | ISSUED BY |

GENERAL CONSULTANT

DB Engineering & Consulting GmbH - GEODATA Engineering S.p.A - Louis Berger SAS

MPMETRO

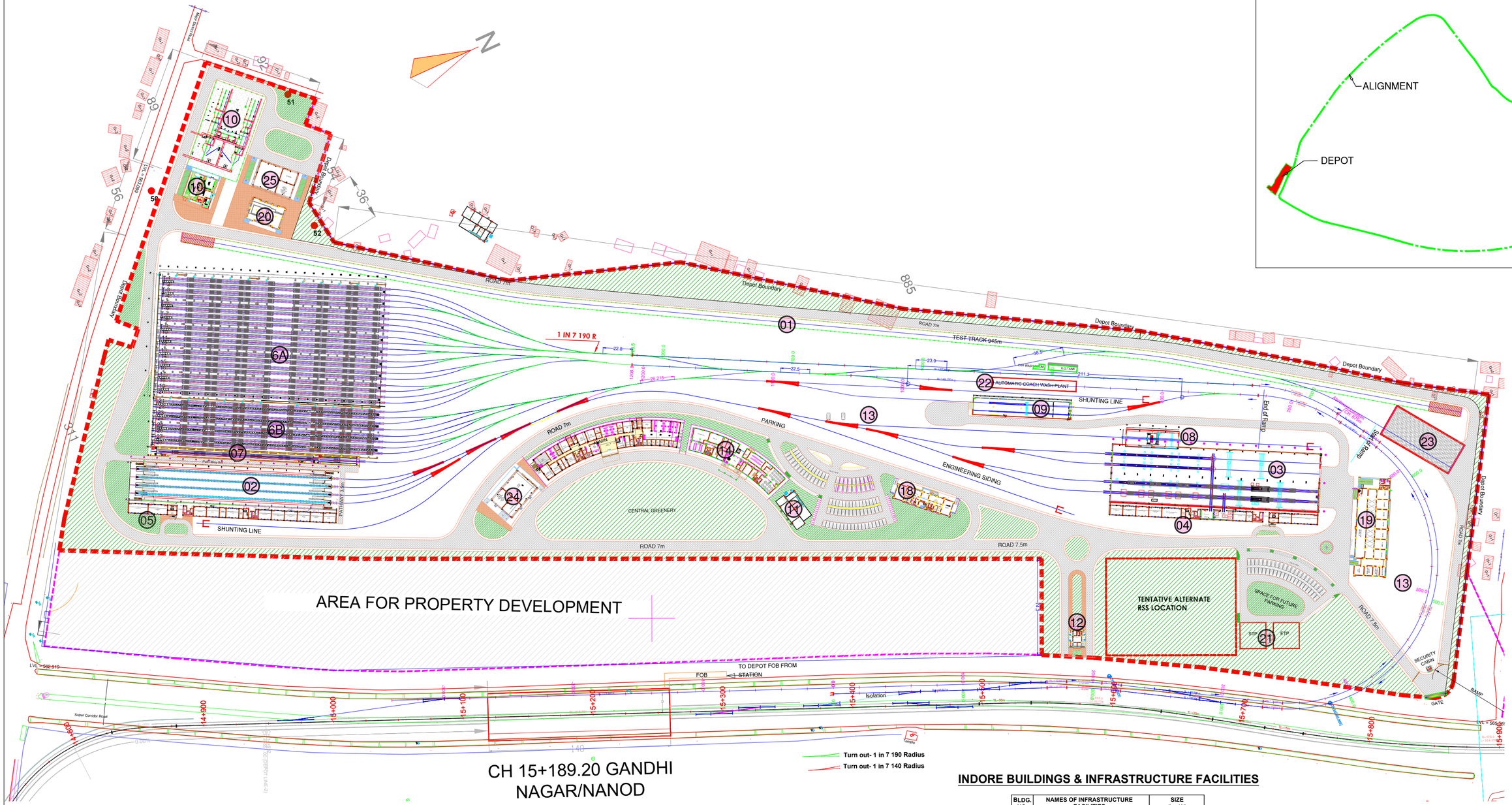
CLIENT: MADHYA PRADESH METRO RAIL CORP. LTD.

PROJECT: INDORE METRO RAIL PROJECT
PACKAGE IN-09

DRAWING TITLE: TYPICAL ARRANGEMENT OF GATE & FENCING OF SWITCHYARD

DRAWING NUMBER: I202-BIG-TRP-00-DWG-MISINS1-00704(SH 2 OF 2) | REV: 0

SCALE: NTS | DATE: December 2021 | STATUS: TENDER DRAWING




## INDORE BUILDINGS & INFRASTRUCTURE FACILITIES

| BLDG. NO. | NAMES OF INFRASTRUCTURE FACILITIES | SIZE (L x W) |
|---|---|---|
| 1 | TEST TRACK | 945 M |
| 2 | INSPECTION BAYS | 160.4 X 29.9 |
| 3 | REPAIR BAYS | 161.8 X 44.5 |
| 4 | REPAIR OFFICES | 160.2 X 9.9 |
| 5 | INSPECTION OFFICE | 160.2 X 9.9 |
| 6A | STABLING SHED-20 LINES | 174.4 X 133.8 |
| 6B | STABLING SHED-08 LINES | |
| 7 | INTERNAL CLEANING SHED | 160.9 X 7.2 |
| 8 | PIT WHEEL LATHE | 40.8 X 13.4 |
| 9 | E.T.U. CUM EMERGENCY RERAILING BUILDING | 75.8 X 13.2 |
| 10 | ELECTRIC SUBSTATION : RSS | -- |
| 11 | PUMP ROOM (U.G. WATER TANK) | -- |
| 12 | TIME & SECURITY OFFICE | 12.8 X 13.3 |
| 13 | CAR/CYCLE/SCOOTER SHEDS | -- |
| 14 | TRAINING CENTER & CANTEEN | 76.0 X 19.5 |
| 15 | O.H.TANK | -- |
| 16 | ADMINISTRATIVE BLOCK, OCC & DCC | 112.0 X 21.5 |
| 17 | BCC | -- |
| 18 | P.WAY & E&M OFFICE | 46.6 X 11.7 |
| 19 | DEPOT STORE | 76.5 X 24.3 |
| 20 | TSS BUILDING | 27.3 X 17.3 |
| 21 | ETP & STP | -- |
| 22 | AUTOMATIC CAR WASH | 65.0 X 8.0 |
| 23 | ENGINEERING SIDING CUM MATERIAL SIDING & LOADING UNLOADING | 60.0 X 25.0 |
| 24 | ASS BUILDING-1 | 30.5 X 21.5 |
| 25 | ASS BUILDING-2 | 30.5 X 21.5 |

REVISIONS

| REV. | DATE | DESCRIPTION | Drawn | Checked | Reviewed | Approved |
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DETAILED DESIGN CONSULTANT

RITES LTD. Ardanuy

GENERAL CONSULTANT

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CLIENT: MADHYA PRADESH METRO RAIL CO. LTD.

PROJECT: CONSTRUCTION OF ROLLING STOCK DEPOT CUM WORKSHOP AT GANDHINAGAR FOR INDORE METRO RAIL PROJECT (PACKAGE : IN-07)

DRAWING TITLE : DEPOT LAYOUT

DRAWING NUMBER: G - ID - L - 01 | REV R0

SCALE: 1:1000 | DATE : 09.06.2021 | STATUS : Tender Drawing