General Bid Bulletin No. 16
23 July 2021

THE MALOLOS-CLARK RAILWAY PROJECT AND THE NORTH-SOUTH RAILWAY PROJECT SOUTH LINE COMMUTER PACKAGE CP NS-01: PROCUREMENT OF ELECTRICAL AND MECHANICAL SYSTEMS AND TRACK WORKS (IFB No: 21-040-3)

TO ALL PROSPECTIVE BIDDERS:

This General Bid Bulletin is issued to amend/clarify certain provisions in the Bidding Documents for the above-mentioned Project. Please refer to the attached Annexes of this General Bid Bulletin for details:

1. **Annex "A"** — Clarification to the Bidding Documents
2. **Annex "B"** — Addendum to the Bidding Documents with "**Attachment 1**"
3. **Annex "C"** — Not Applicable

All other portions of the Bidding Documents not affected by these revisions, amendments and/or clarifications shall remain unchanged.

Revisions/amendments/clarifications made herein shall be conserved as an integral part of the Bidding Documents of this Project.

For your guidance and information.

For the Bids and Awards Committee

SIGNATURE REDACTED

ENGR. JAIME M. NAVARRETE, JR
Chairperson

Annex A

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1	Part 2 Section VI, 619, 7.1.1.8 Scope of Works, The AFC Central Computer (AFC-CC) of MCRP section shall act as Master Central Computer for MCRP, NSCR and NSRP-South line for collection of revenue, traffic and diagnostics transactions. The AFC-CC of MCRP section will present the total NSCR Line AFC reports to the O&M concessionaire at IOCC. The AFC-CC of NSRP South shall be installed at Banlic depot temporarily and will be migrated to Malabacat Depot after Integrated OCC is commissioned. Similarly for the AFC-CC of NSCR installed at Malanday depot. The Contractor shall perform the necessary interface works for Sectional Completion and migration works once Civil works for Integrated OCC is completed.	We assume that AFC Central Computers will be built in total of 3 different locations under 2 separate contracts for CP NS-01 E&M and CP04 E&M in NSCR project as follows. AFC under CP NS-01 E&M scope (Clark-Calamba) ・Master OCC at Mabalacat Depot ・Backup OCC at Banlic Depot AFC under CP04 E&M scope (Malolos-Solis) ・OCC at Malanday depot There are 2 points for clarifications from contractor side. Please kindly confirm our queries. 1) Once the AFC central computer for temporary backup OCC at Banlic depot is migrated to the one built at master OCC in Mabalacat depot, the first one built in Banlic depot will be decommissioned and be no more used? Please confirm.		The Contractor may propose however the Operator/Employer will make the final decision on the AFC system equipment in Banlic Depot. The AFC system equipment in Malanday Depot will be subject to further interface coordination with CP04 and the Employer.

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		2) Once the AFC central computer under CP04 E&M scope for OCC at Malanday depot is migrated to the one built at master OCC in Mabalacat depot, the first one built in Malanday depot will be decommissioned and be no more used? or It will physically remain for operation and maintenance, as it is built by a separate package of contractor? Please confirm.		
2	Part 2 Section VI, 619, 7.2.1.2 Limited Express Ticket System, The AFC system shall cover the Limited Express Service however unlike the commuter services, the passengers for Limited Express shall be required to validate their SJT and SVC prior to boarding. Ticket validator shall be mounted on Limited Express Platform Screen doors, or any other location proposed by the Contractor, and approved by the Engineer. This validator will ensure that SJT's are valid tickets being used on the Limited Express whilst in the case of	We assume that the Limited Express Train Service will connect the Metro Manila and Clark International Airport with stops at Alabang and Buendia. As per RFP specification, the passengers for Limited Express shall be required to validate their SJT and SVC at the mounted validators on platform screen doors prior to boarding for the specified stops at CIA, Alabang and Buendia under Limited Express Train Service. In consideration of the operational requirement, does the Contractor need to supply and install the physical automatic gate for entry and exit purpose? Please confirm.		The supply, installation and testing and commissioning of AFC automatic gates and APG/PSD is under the scope of NS01 Contractor.

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	SVC's the validator will deduct the fare for taking the Limited Express service.			
3	Part 2 Section VI, 619, 7.2.1.3 Limited Express Ticket System, The system performance shall conform to the AFC National Standard	Please kindly provide the definition of the "AFC National Standard".		The AFC National Standard is the standard which consists of the Business Rules and requirements for transit card and transit card reader in which the Contractor needs to comply with.
4	Part 2 Section VI, 624, 7.4.1.7 Software, Software a) The Contractor shall supply the following software for AFC system including but not limited to: i. Development system software ii. Application software and firmware licenses iii. Operating system software iv. Application Programming Interface (API) software v. Software source code vi. Simulator software vii. Antivirus software viii. CSM initialization and personalization software	The Contractor assume that the following operation is currently managed by Central Clearing House Operator. Please confirm that the following is still part of contractor's scope. viii. CSM initialization and personalization software ix. Key management software x. SAM initialization and personalization software		The Bidder's understanding is correct. The 3 items are still under the Contractor's scope.

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	ix. Key management software x. SAM initialization and personalization software			
5	Part 2 Section VI, 637, 7.7.9.1 QR Code Payment , The AFC system shall include a QR code payment system. The QR code system provisions shall include, but shall not be limited to, the following facilities: a) AFC gates are able to scan and validate QR codes on paper and mobile applications. b) Provide customer service room equipment to scan and validate QR codes on paper and mobile applications. c) AFC Central Computer shall capture all QR transaction records generated in the AFC equipment which shall be forwarded to CCHS for clearing and settlement. Transaction reversal and refund records shall also be captured.	Under the RFP document, the Contractor cannot find where the paper QR code tickets will be physically generated from. Does the TVM or POS need to generate the paper QR code ticket for single journey? Please kindly confirm.		The NS01 Contractor shall provide a AFC System that is compatible and interoperable with QR code tickets/application to be developed by the CP106 contractor.

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6	Part 2 Section VI, 637, 7.7.9.3 QR Code Payment , Mobile based ticketing shall be used by commuters to book their tickets via mobile phone application. Mobile based tickets shall be based on secure QR code technology & NFC. The mobile application shall be integrated with a mobile walled linked to the pre-paid account. The Contractor shall provide necessary software and interface to meet this requirement.	The Contractor's scope of work is to only interface with the legacy mobile QR code backend system provided by the DOTr. So the Contractor does not need to newly develop the mobile QR code application system? Please kindly confirm.		The NS01 Contractor shall provide a AFC System that is compatible and interoperable with QR code tickets/application to be developed by the CP106 contractor. The Contractor is also required to comply with the AFC National Standard in which the QR code standard for all transit lines are included.
7	Part 2 Section VI, 644, 7.8.1.9 Power Supply and Grounding, a) Power supply is 60Hz, 230V AC single phase or 400V three phase. Voltage varies ±5% b) The contractor shall provide a UPS in the AFC-UPS room and guarantee the operation of station level equipment for at least 3 hours against power failure. c) The contractor shall consider preventive measures against data	The Contractor assume to provide a UPS in the AFC-UPS room in each station. These UPS system can be 1-phase or 3-phase UPS in AFC-UPS room to cover station AFC equipment. In that case, can we assume that dedicated UPS for each POS terminal and each station computer is not necessary to provide? If so, individual UPS for POS terminal and SCS will not be required. Please kindly confirm our approach.		The Contractor shall propose a suitable design subject to the review and approval of the Engineer.

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	loss or power failure for station level equipment. d) AGs, TVMs and POS terminals in stations shall not start shutting down unless power failure is ≥ 1 minute. e) The contractor shall consider the same design requirements as listed above for depot level AFC equipment.			
8	Volume II of IV, ERT-109 and 117, 2.12.7 and 2.15.1, 2.12.7 The On-board ATP equipment shall have a fault tolerant equipment design using redundancies or other design features to ensure that a high level of train service is maintained in the presence of single point failure and also ensure achievement of availability as specified 2.15.1 The ATP on-board equipment shall manage and control both two cabs (the front cab and the rear cab).	Kindly confirm that one ATP on-board equipment can be installed for each vehicle as long as the overall SIG system availability performances are respected?		Please refer to ERT 100 clause 2.10.1.
9	Part 1 Section III. Evaluation and Qualification Criteria, EQC - 14, 2.2	The Bidder would like to get a clarification on the definition of “Engineer”.		The Bidder’s understanding is correct, however, for clarity, Engineering in this

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	Proposed Key Personnel, 5. Track Works Engineer 6. Signalling Engineer 7. Telecommunications/SCADA Engineer 8. Electrical Power/Overhead Contract System Engineer	The Bidder understands that the key positions no 5, 6, 7, and 8 are to be held by technical engineering profiles (and not a Project Manager). Please confirm.		contect is referring to the personnel that is technically qualified with relevant experience in the specified field of work.
10	Vol.3, Part 2, Section VI d), drawings, page 248, MCRP-DWG-DEP-PDS-0017, - page 249, MCRP-DWG-DEP-PDS-0018, - page 250, MCRP-DWG-DEP-PDS-0019, - page 251, MCRP-DWG-DEP-PDS-0020, - page 267, NSRP-DWG-DEP-PDS-0015, - page 268, NSRP-DWG-DEP-PDS-0016, - page 269, NSRP-DWG-DEP-PDS-0017, - page 270, NSRP-DWG-DEP-PDS-0018,	We understand that concrete troughs and buried pipes shown on mentioned drawings are in the Civil Contractor scope. Please kindly confirm.		The Bidder's understanding is incorrect. This work is in the scope of works for the NS-01 contractor.. Please refer to Clause 5.1.2/5.1.3/5.3 (ERT 498/502/510) and Clause 5.1.2/5.1.3/ 5.3 (ERT 460/464/470)

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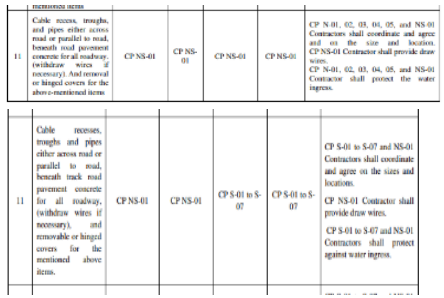
	- page 271, NSRP-DWG-DEP-PDS-0019, - page 272, NSRP-DWG-DEP-PDS-0020.			
11	Vol.3, Part 2, Section VI d), page 197, drawing MCRP-DWG-DEP-PSP-3102	We understand that OCS ducts for cables between substations and the Viaduct are in the Civil Contractor scope. Please kindly confirm.		The ducts through the viaduct segment are provided as part of the civil works. All other cable containment is by the Contractor. Please refer to Annex B.
12	Vol.3, Part 2, Section VI b), ANNEX 1, A2.2, No. 11, page ERG-137 and ANNEX 2, A2.2, No. 11, page ERG-153: 	Please kindly confirm if the different split of scope between Civil Contractors and NS-01 contractor is intended.		The Bidder's understanding is correct. The Contractor shall comply with the Employer's Requirements.

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13	Vol.3, Part 2, Section VI b), Annexes 1-4	We understand that we may apply the general rule, as it is widely used in similar projects, that any cable containment within the buildings, but outside of technical rooms will be provided by the Civil Contractor. Please kindly confirm.		Where cable containment in the buildings is provided by others they can be used and shared subject to detailed coordination with the other party. All other cable containment shall be provided by the NS-01 contractor.
14	Section V1. Employer's Requirements Technical Requirements – Signaling, ERT, GBB5, In GBB5 (Item No. 7), the Employer replied that "The requirement is redundant EVC of OBU."	Bidder understands that one EVC (2oo3 redundancy) per train with DMI at both ends can be installed for each vehicle as long as the overall SIG system availability & performances are respected. Please confirm		Please refer to ERT 100 clause 2.10.1.
15	Section V1. Employer's Requirements Technical Requirements – Signaling, ERT, GBB5, In GBB5 (Item No. 31), the Employer replied that "Please refer to Annex B." and the below was amended: Contractor shall supply diesel locomotives (2 units) along with one flat car suitable for mainline operations having	In ERT-941, it is mention "Quantity: One (1) set". This is contradictory to the addendum changes. Please confirm if Signalling & COM equipment are needed on both units (two diesel locomotives) Or Signalling & COM equipment are enough in one unit and the other unit will be coupled to the unit with Signalling & COM equipment.		The Bidder's understanding is incorrect. As per ERT 941, item N41.02, Quantity to be supplied is One (1) set which as per clause 2.2 of the ERT consists of two units of Diesel locomotives and one flat car. The Locomotives should be able to work in both single and in multiple mode as a consist of two locomotives as per the operational requirement. As such each Locomotive shall have Signalling and Telecommunication equipment.

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	maximum 2.95m wide, to recover failed train, 270t, on 3.5% downgrade. Locomotives should be able to work in both single and in multiple mode as a consist of two locomotives as per the operational requirement.			
16	Section V1. Employer's Requirements Technical Requirements – Signaling, ERT-196, Table 2.6, RS Contractors shall provide for necessary hardware interface, display for on-board PA/PIS system inside the cars	Bidder assumes that all buttons, lamps and switches on the driver desk/cab shall be provided by RS contractor. Please confirm.		The Bidders understanding is correct. All buttons, lamps and switches on the driver desk/cab shall be provided by RS contractor. Only the Radio Equipment and its associated peripherals will be supplied to the RS by the NS01 Contractor.
17	The Malolos – Clark Railway Project and the North South Railway Project-South Line (Commuter) CP NS-01: E&M Systems and Track Works, 4.4.5. SIL Specification, ESMP-24, 9 SCADA (Safety Functions) SIL 2	Bidder understand that SIL -2 (Safety functions) requirement applicable only for Software functions not for product level. Please confirm.		The Bidder's understanding is incorrect. The SIL 2 requirement is applicable to the safety function of SCADA which might include both hardware and software as per the bidder's proposed design. Refer IEC 61508 or IEC 62279 or EN50128 or EN 50129 or equivalent standards for details on SIL allocation.

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18	The Malolos – Clark Railway Project and the North South Railway Project-South Line (Commuter) CP NS-01: E&M Systems and Track Works, 12.2 Software Framework, ERG- 59, 12.2.2.1 The quality framework requirements for safety integrity level 2 and above are supplementary to the requirements of IEC62279 or EN 50128.	Bidder understand that Standards IEC62279 or EN 50128 provided in General requirement is only for SCADA software. Please confirm.		The Bidder's understanding is incorrect. Standards IEC 62279 or EN 50128 provided in General requirement (clause 12.2.1) is applicable to all the softwares which has SIL 2 or above requirement.
19	Section V1. Employer's Requirements Technical Requirements – Signaling, ERT, GBB9, In GBB9 (Item No. 25), the Employer replied that "Please refer to Annex B for the Civil Depot layout drawing of Mabalacat and Banlic depot."	In the depot layout drawing, there is no legend (in the foot of the page) on Level Crossing. The Legend is only on Staff Crossings. Please confirm that the Staff crossing is to be considered as Level Crossing in both the depots.		The Bidder's understanding is correct. Staff walkways can be considered as level crossing. Please refer to ERT 1.21.3.
20	Volume IV of IV PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS Volume II of IV - PART 2 Employer's	Key dates KD 4-7 and KD 4-11 indicates achievement at NTP+ 41 . To complete the Training, South Depot Facilities equipment (cf. Appendix 8.1: South Depot page ERT-955) shall be previously installed, tested and		The Bidder's understanding is incorrect. Reference to the Section VIII Particular Conditions (PC) Part A - Contract Data subclause 1.1.3.7 and 1.1.5.6, the Defects Notification Period is "Two (2) Years per

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	Requirements, PC-16 and PC-17 ERT - 955, Section 4: Section between Blumentritt station (exclusive) and Calamba station (inclusive) and the South Depot of the North South Railway Project-South Line (Commuter) (NSRP-South). Approximate length of 54.6 km and 18 stations including the South Depot, KD4-7 Achievement: Substantial Completion of all essential workshop equipment, rolling stock equipment, rescue equipment and other equipment, apparatus, etc. required for to commencing Integrated Testing and Commissioning using Rolling Stock and Test Running at the South Depot and Mainline. a)for Partial Operation: Month No.41 b)for Full Operation: Month No.75 KD4-11 Achievement: Completion	commissioned. Thus, for respecting both key dates, South Depot Facilities should be handed-over at NTP+ 41 and the Defect Notification Period start at NTP+42. DORTr is kindly requested to confirm our understanding is correct.		Section / Sub-section. Please refer to the Table: Summary of Sections for detail of the Section description and its Time for Completion.

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	of Training and delivery of contractual spare parts, consumables, tools and jigs, as-built documents, and operation and maintenance manuals. Month No.: 41			
21	Volume IV of IV PART 3 – CONDITIONS OF CONTRACT AND CONTRACT FORMS , PC-16 , Section 4: Section between Blumentritt station (exclusive) and Calamba station (inclusive) and the South Depot of the North South Railway Project-South Line (Commuter) (NSRP-South). Approximate length of 54.6 km and 18 stations including the South Depot, KD 4-6 Achievement: Substantial Completion of sufficient Track Works and related E&M System works in the South Depot to allow CP NS-02 and NS-03 Contractor(s) to stable the Rolling Stock and to carry out Testing and	The South Depot's building and the access tracks shall be finished and handed-over for starting Depot Equipment (cf. Appendix 8.1: South Depot page ERT-955) installation at NTP+37. DOTr is kindly requested to confirm our understanding is correct.		The Bidder's understanding is correct. The South depot and access tracks shall be completed by Month 37 for access by CP NS-01 Contractor to commence track and E&M installation works.

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	Commissioning of Rolling Stock at the South Depot. Month No.37			
22	Section 5 - Request for Information, 5.1 RFI 1: EDMS Platform, , As per General Bid Bulletin No. 5 Annex A, Item 21, the contractor shall adopt the Aconex EDMS platform.	Kindly clarify if the contractor shall have own EDMS platform/database for own scope and give access right to Employer/Engineer at the contractor's cost.		The contractor shall use Aconex as the EDMS platform when dealing with Engineer and Employer. The contractor is free to use its own system for internal use.
23	Section 5 - Request for Information, 5.2 RFI 2: Coordination and Federated Model, , As per General Bid Bulletin No. 5 Annex A, Item 28, contractor shall provide input into a federated model managed by the Engineer.	Kindly clarify the frequency of providing inputs to the Engineer for maintaining the Federated Model and confirm that the Engineer is responsible to perform the BIM coordination between the models of the different entities?		The Contractor shall propose the suitable frequency for providing inputs after coordinating with the related interfacing parties, subject to the approval of the Engineer.
24	Section 5 - Request for Information, 5.3 RFI 3: EIR, , As per BIM Information Management Flow section 11.11, Project BIM uses are defined in the Sections 1.3.1 to 1.3.4 of the EIR document 270235_REP_0010_D9_Info Mgt Plan.	Kindly provide the EIR document 270235_REP_0010_D9_Info Mgt Plan.		The Bidder's request is rejected. The document will be provided upon project commencement.

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25	Section 5 - Request for Information, 5.4 RFI 4: Data Handover, , General Bid Bulletin No. 5 Annex A, Item 34, and BIM Information Management Flow section 6, 10 and 12, defines the submission requirements and strategy for information delivery at each stage of the project.	Data handover requirements are not clear, kindly provide clear guidelines on final approval and Data Handover Strategy to the Employer.		The Contractor shall coordinate with the Engineer and Civil Contractor during Design Stage on the Data handover requirements.
26	Section 5 - Request for Information, 5.5 RFI 5: 4D Construction Sequencing, , BIM Information Management Flow, Project Specific Procedures Appendix H, section 1.2 describes 4D BIM modelling and linking of Primavera data with the BIM models to facilitate analysis of progress.	Extent of 4D BIM scope is not clear, please provide clarity		The Contractor shall perform the necessary coordination and interface works with the related interfacing parties with regards to the 4D BIM scope, subject to the approval of the Engineer.
27	GBB No. 9 Item No. 11, Page 5 of 43, , VAT in STEP ratio	The treatment of VAT in STEP ratio calculation for NS-01/NS-03 is different from NS-02, while it is governed by the same loan. For NS-02, Bidder can include 7.41% General Admin Expenses (GAE) towards Total Amount including VAT, while for NS-01/NS-03, Bidder		The Bidder's request is rejected. The bid conditions shall prevail.

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		can include 7.41% GAE towards Total Amount excluding VAT. Kindly revise the Form SCJ to make it consistent with CP NS-02		
28	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements - Telecommunications, ERT 269, , 3) The creation of a 10 Km. Buffer Zone measured 5 Kms away from the 100-meter corridor. • This will be the spatial separation of both networks as interference protection. • No Smart Base Station within this zone should use the frequency band of 875- 880 MHz • Smart to reconfigure their Base Stations to transmit the 5Mhz LTE band of 870- 875 MHz only	Bidder's understanding is the ETCS data and voice communication will use functions. Hence amend the clause accordingly and remove LTE requirements.		The Bidder's understanding is incorrect. LTE is not a requirement.
29	Part 2 – Employer's Requirements Section V1. Employer's	Bidder's understanding is DMO is not applicable to GSMR.		The Bidders understanding is incorrect. DMO is not available in GSM-R, but

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	Requirements Technical Requirements - Telecommunications, ERT 272, , 6) Backup Mode Operation In case a base station is not available, or the radios are out of reach of a base station, the radios shall support a backup mode of operation such as Direct Mode of Operation (DMO) or Roaming on commercial networks.	Please amend the clause accordingly.		Roaming however is. Amendment of the requirements is unnecessary.
30	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements - Telecommunications, ERT 285, 3.5.5, 10) O&M Call The call shall be set up through the radio MMI in a common Talk Group or using DMO without the intervention of the MMI to allow the train driver to communicate with other personnel using hand-portable radio.	Bidder's understanding is DMO is not applicable to GSMR. Please amend the clause accordingly		The Bidders understanding is incorrect. DMO is not available in GSM-R, but Group Calls shall be possible. Amendment of the requirements is unnecessary.
31	Part 2 – Employer's Requirements Section V1. Employer's	Bidder's understanding is RCE application is based upon LINUX platform to interface with		Windows or Linux Operating system is acceptable. Please refer to Annex B.

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	Requirements Technical Requirements - Telecommunications, ERT 299, 4.6.5, RCW Servers The Contractor shall provide a flexible and structured RCW system that operates on the server network using a Windows operating system. The duplicated RCW Servers shall be located in OCC.	GSMR system. Please amend the clause accordingly.		
32	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements - Telecommunications, ERT 301, 4.8.2, Radio Base Station Communications System The Contractor shall provide fallback operation for radio base stations to operate in local site operation and maintenance, in the event of failure within the system	Bidder's understanding is local site operation is not a standard feature of GMSR network. Please amend the clause accordingly.		Amendment of the requirements is unnecessary. The coverage of GSM-R shall be such that the loss of one Base Station will not result in loss of communication. Please refer to ERT 272 - 6) Backup Mode Operation: In case a base station is not available, or the radios are out of reach of a base station, the radios shall support a backup mode of operation such as Direct Mode of Operation (DMO) or Roaming on commercial networks.
33	Part 2 – Employer's Requirements Section V1. Employer's	Bidder understand that ISP(Internet) and PSTN Lines (Telephone) will be arranged and paid by		The Bidder's understanding is incorrect. The Contractor shall assist on behalf of the

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	Requirements Technical Requirements - Telecommunications, ERT-313, 1.2, Incoming lines from Land Line (Telephone) and ISP (Internet) shall be received and integrated at the OCC and distributed to each station via the above backbone system	customer for initial and recurring cost. Please confirm		O&M concessionaire for the application and installation arrangement of the ISP and PSTN lines and pay for the initial cost. The recurring cost shall be paid by the O&M concessionaire.
34	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements - Training, ERT 323, 2.2.2(1), Smoke and Fire detection shall be provided as an early or secondary means of recognition to remote, unmanned equipment rooms with high or significant value, or sensitive equipment	The bidder understand that CCTV System will be interfaced with Fire alarm System for Smoke and Fire detection. MEP Contractor will provide Smoke and Fire detector System in each location and will interface with CCTV System either Hardwired or IP based, to provide trigger to nearest CCTV Camera. Please confirm		MEP Contractor will provide a Smoke and Fire detection System in each location and will interface with CCTV System either Hardwired or IP-based, to provide a trigger to the nearest CCTV Camera. At the same time, there is a separate function of the CCTV cameras as part of Video Analytics in some areas provided in Section 2.2.2 of the CCTV Systems under Section 15 d that has smoke and fire detection software functionality and reports alarms to the fire alarm system.
35	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical	The bidder understand that Primary NVR server will be provided at local station and redundant NVR Server will be installed at OCC-CER location		The Bidder understanding is correct. A single NVR shall be provided at the stations.

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	Requirements - Telecommunications, ERT 327, 2.2.2 (16), Video Recording and Retrieving The Network Video Recording System (NVRS) shall provide cost-effective local recording, storage, and retrieval facilities at the stations. Moreover, regarding the local recording system, the main CER shall also have a redundant NVRS for recording any video signals monitored in the OCC	for all stations. Please confirm.		A redundant NVR server shall be installed in the OCC-CER.
36	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements - Telecommunications, ERT 329, 2.2.2 (15), (b) Intrusion Detection It should be possible to detect and alert when a person enters a protected zone or station area outside of hours. The video analytics system shall be capable of detecting loitering	Refer to S. No. 125 of General Bulletin No. 4 Annexure A, the bidder understand that images need to be captured in event of intrusion or loitering outside of operational hours and to be stored in CCTV System database for 30 days only. Also, bidder understand that additional database images and database server for interfacing with CCTV System will be provided by customer. Please confirm.		The Bidders understanding is correct.

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	activities and shall have face recognition functionality.			
37	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements - Telecommunications, ERT-337, 2.2, The PA control consoles located in the station control rooms shall also incorporate industry-standard input sockets and controls to enable music to be fed into the PA system from proprietary audio equipment. This input shall be capable of being permanently selected to allow continuous broadcasting.	Bidder understand that industry input sockets are required to be provided in PA System control equipment located in Telecom Equipment room. Please confirm.		The Bidders understanding is correct.
38	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements - Telecommunications, ERT-339, 2.2, Speakers located in internal zones shall be compliant with IP54. The	Internal zones are assumed to be indoors under shelter. IP rated speakers are not required. The frequency response over the range of 100Hz-15kHz is a very wide range and are not available with PAS OEM. Bidder request to amend the requirement of Speaker Frequency response rage as 200Hz - 13kHz.		The Bid conditions prevails

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	frequency response shall be over the range of 100 Hz-15 kHz.			
39	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements - Telecommunications, ERT-1070, 12.2, Scope of Works (related to Telecommunication System)	Bidder understand that at IOCC, central control of the line from the IOCC at Mabalacat is only required for PA & PIDS System, GSM-R System, Telephone System and Disaster Management System. There is no requirement of CCTV System central control of line from IOCC. Please confirm.		The Bidders understanding is incorrect. There is also a requirement of central control of the CCTV system in the IOCC.
40	Part 2 – Employer's Requirements , ERT-162, Chapters 2.26.7 Train Control/Platform Screen Door (PSD) Interface, The point of Physical interface between PSD and Signalling is PSD Control panel/termination box in PSD Room of each stations. All required cables and cabling infrastructure (support, trays, and conduit) from Signalling equipment room to PSD room at each station will be provided by the Contractor. A voltage limiting device shall be	Bidder understands that these VLDs correspond to usual surge arrestors to be put on the auxiliary power supply of such subsystems. Please confirm our understanding.		The Contractor shall propose suitable design at Design Stage, subject to the approval of the Engineer.

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	provided to prevent the occurrence of any over-voltages.			
41	Volume 4 Part 3 Conditions of Contracts and Contract Forms. Section VIII Attachment 2, PC-19, Access Date and Site (Works Area), All temporary opening above/below trackway closed, temporary drainage system provided, walkway & access provided, surface access routes provided, all duct and cable route complete etc. for allowing CP NS-01 Contractor to commence and continue E&M Systems and Track Works	Please confirm that Civil contractors will provide temporary scaffold for access to the viaducts, bridges, U-shaped structure and elevated stations. The inspection, maintenance and repair of scaffold is under Civil contractor's scope of work.		There is no provision for the civil works contractor to provide scaffoldings to the viaducts, bridges, stations for the beneficial use of CP NS-01 contractor. Reference to the Section VI Employer's Requirements - General Requirements clause 3 Temporary Facilities for the Contractor, the Contractor shall provide (provision and maintenance) necessary temporary facilities to during implementation of the works. Reference to the Section VI Employer's Requirements - General Requirements clause 20.9 Construction Interfaces and Co-ordination, the Contractor shall also coordinate with the interface contractor during project implementation.
42	Volume 2 Part 2, ERG – 9, 3.10 Additional land for Construction Purposes. Detours, Plant and Other Uses, Before entering the working site, the Contractor shall give written notice to the Engineer.	Please provide the list of owner / occupier or authority having charge over the working sites. Please confirm that access will not unreasonably be declined.		The Contractor shall be responsible to identify the owner, interface parties or authorities for the addtional working site (which beyond the Right of Way (ROW)) that the Contractor intended to acquire/occupy.

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	The Contractor shall give separate notices for each owner and occupier or authority having charge over the working sites.			The Contractor shall comply with the conditions/rules which agreed with the owner/occupier/authorities. The Engineer shall make a fair determination in accordance with the Contract, taking due regard of all relevant circumstances.
43	Volume 2 Part 2, ERG – 40, 6.3 Format of Deliverables, The format and exchange of all deliverables shall be in accordance with the "BIM Information Management Flow" which shall be issued by the Engineer.	Please provide the "BIM Information Management Flow" stated in the clause.		Please refer to the BIM Information Management Flow in GBB5.
44	Volume 2 Part 2, ERG – 43, Clause 6.10.8 Design Submission and Review Procedure, The Contractor shall use the EDMS selected by the Engineer during the whole project life cycle. All costs associated with licenses and/or tokens required for the EDMS shall be borne by the Contractor.	Please confirm which EDMS system will be selected during the project life cycle. Please confirm the licences to be provided by the Contractor are for the requirements of the contractor and do not include any other parties.		The Contractor shall use Aconex as the EDMS platform when dealing with Engineer and Employer. The Bidder's understanding is correct. Please refer to the Section VI Employer's Requirement, General Requirement clause 6.10.8.

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45	Vol. II Part 2, Section VI (c) Technical Requirements (ERT), ERT-562, Environmental Conditions, For the CIA tunnel section, the design shall take into account the maximum velocity of air being blown by the tunnel fans.	Please confirm the maximum velocity of air being blown by the tunnel fans.		The normal speed of the tunnel fans is 1 m/s and during emergency mode, is 2 m/s. (GBB No. 2 : Item 142)
46	Vol. II Part 2, Section VI (c) Technical Requirements (ERT), ERT-565, System Requirements, Maximum voltage less than 1850 V (in regenerating).	Please provide rolling stocks characteristics.		The required information are yet to be made available as the characteristic for the maximum regenerative braking will be provided by the CP NS-02, CP NS-03, CP 03 and CP 107 contractor during the design stage via interface.
47	Vol. II Part 2, Section VI (c) Technical Requirements (ERT), ERT-613, 6.8 Overhead Line Inspection Vehicle, 9) Operating Equipment b) The vehicle shall have couplers provided by the CP NS-02 contractor. These couplers once received from the CP NS-02 contractor shall be installed on the maintenance vehicles at their place	Please confirm the coupler height provided by CP NS-02.		The coupler height measured from the center of the coupler to the top of rails, shall be within 880mm +10/-15mm.

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	of manufacture. The coupler height shall match the CP NS-02 coupler height.			
48	Vol. II Part 2, Section VI (c) Technical Requirements (ERT), ERT-47, 1.23 Walkway, 2) The walkway shall be compatible with the walkway design being adopted on other sections of the NSCR project and shall have a design life of 50 years.	Please provide the details of the walkway design being adopted on other sections of the NSCR in order to ensure that Contractor design is compatible.		The Contractor shall Interface with other contractor of NSCR regarding design compatibility of walkway. The requirements stated in ERT 1.23 shall be followed.
49	Part 1 – Bidding Procedures. Section IV. Bidding Forms, BF-255 & BF-256, Table A: Local Currency (LC) Table B: Foreign Currency (FC),	Please explain the difference between "Equipment" and "Material"		Please refer to Section VII General Conditions article 1.1.5.1, 1.1.5.3 and 1.1.5.5 for its definitions.
50	Part 1 – Bidding Procedures. Section IV. Bidding Forms, BF-256, Table B: Foreign Currency (FC), *2 Cost index or reference prices applicable to the relevant cost element of Equipment shall be proposed by the Bidder and in accordance with ITB 20.3(b) *3 Cost index or reference prices applicable to the relevant cost	Please confirm the same index can be proposed for Equipment/Materials		The Bidder's understanding is incorrect. Bidder shall refer to Philippine Statistics Authority (PSA) for the respective indexes.

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	element of Materials shall be proposed by the Bidder and in accordance with ITB 20.3(b)			
51	GBB9 Item No 40, , , "The bidder's understanding is incorrect. Each separate sections, N2 and SC, like N1, each should have a main and a back up GSMR equipment in their respective OCC until they will be integrated into one system in IOCC in Clark. Please refer to Section 12 - IOCC and DCC.	The bidder understands 2 GSM core for N2 section and 2 GSM core for SC section must be provided. Please confirm.		The Bidder's understanding is correct.
52	Part 1 – Bidding Procedures Section III. Evaluation and Qualification Criteria, EQC 6, 3.1, The audited balance sheets or, if not required by the laws of the Bidder's country, other financial statements acceptable to the Employer, for the last five (5) years shall be submitted and must demonstrate the current soundness of the Bidder's financial position and indicate its prospective long-term profitability. As the	We understand that as a minimum requirement, a Bidder's net worth needs to be positive in any one (1) year out of last five (5) years. Kindly confirm.		The Bidder's understanding is incorrect. The Bidder must demonstrate the current soundness of the Bidder's financial position.

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	minimum requirement, a Bidder's net worth calculated as the difference between total assets and total liabilities should be positive			
53	Volume II Section VI, ERT-13, 1.6.1, The following criteria shall be used for the project: 1) Cars per train - 8 (To be upgraded to 10 cars in the future), Total Length 160m (200m in the future); 2) Design speed ・ Main Line : 160 km/h and 120km/h (Based on location); ・ Depot Access Line : 45 km/h; ・ Depot Area : 25 km/h; 3) Maximum axle load : 160 kN; 4) Maximum distance between axle centers of one bogie: 2,100 mm; 5) Maximum distance between bogie centers: 13,800 mm; 6) Maximum applied cant : 180 mm; 7) Maximum cant deficiency : 70 mm;	Bidder could not find the minimum horizontal curve radius to be used in Mainline and Depot. Please inform what should be the minimum horizontal curve radius to be adopted and to be used.		Minimum Horizontal Radius for Mainline and Depot Access Track Over 120 km/h section : 1800m or more Under 120km/h section : 300m or more (turnout incidental curves are excluded) Minimum Horizontal Radius for Depot : 100m or more Please refer to Annex B.

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	8) Environmental conditions: Maximum air temperature: 40℃; 9) Environmental conditions: Minimum air temperature: 20℃; 10) Distance of Track center : 4,000mm (Main line, station) 11) Rail inclination: 1:40 12) Track gauge shall be Standard 1,435 mm			
54	Volume II Section VI, ERT-13, 1.6.1, - do -	Bidder could not find the maximum vertical gradient to be used in Mainline. Please inform what should be the maximum vertical gradient to be adopted and to be used.		Vertical Gradient In Mainline Over 120 km/h section : 15/1000 (1.5%) Under 120km/h section : 25/1000 (2.5%) (if unavoidable, the gradient shall be 35/1000 (3.5%) or less Please refer to Annex B.
55	, ERT-13, 1.6.1, - do -	Bidder could not find the minimum vertical curve radius to be used in Mainline. Please inform what should be the minimum vertical curve radius to be adopted and to be used.		Vertical Curve Radius in Mainline Over 120km/h section : 5000m Under 120km/h section : 3000m (4,000m where horizontal curve radius is less than 800m) Please refer to Annex B.

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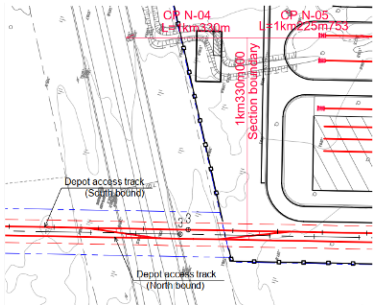
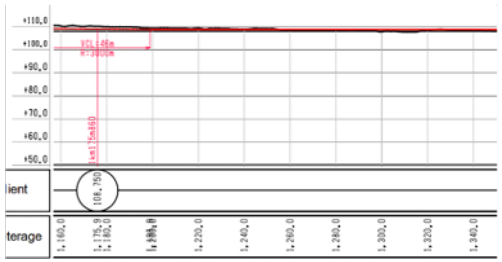
56	Volume III Section VI, 5b_Page 136 of 315, MCRP-DWG-ALT04-PL-0015,	Depot access line is at grade and it is seeming to be crossing an existing road just before entry to the North depot. We would like to understand if the road shall be reprofiled or a change in track alignment vertically is anticipated.  		Please refer to Volume III Part 2 - Employer Requirements Drawing C page 236 of 485 (MCRP-DWG-ATG-ST-0013) for the proposed underground road structure (underpass).

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57	Volume III Section VI, 5b_Page 147 and 148 of 315, MCRP-DWG-ALT05-PL-0002 and 0003,	Final Adjustment tracks, Shop in/out tracks, and Light repair tracks do not seem to have Buffer stops proposed at their track ends. Bidder would like to understand if the alternative solutions are anticipated at the end of these tracks to avoid overrun of trains. Bidder understands no any action is required and leave the end of these tracks without any stops. Please clarify.		The Bidder understanding is incorrect. The contractor shall provide appropriate buffer stops on all depot track ends. Please refer on ERT 1.19.2)
58	Volume III Section VI, 5b_Page 147 and 148 of 315, MCRP-DWG-ALT05-PL-0002 and 0003,	The worst curves designed within depot are of radius 105 m and only mainline close to 250 m. Typically, such curves would require lateral resistance plates to provide more resistance to movement of track laterally during operation. In the Europe, these are used where curves are sharper than 500 m on mainline.		This is a Design and Build Contract. The Contractor shall propose subject to Engineer's approval
59	Volume III Section VI, 5a_Page 65 of 321, MCRP-DWG-GEN-TK-0213,	The type of clip used in the fastening system for ballasted track is not specified. It does not look like e1883 used in ballastless track. Bidder would like to propose to use e-2007 for the ballasted track. Please confirm.		This is a Design and Build Contract. The Contractor shall propose subject to Engineer's approval

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60	Volume III Section VI, 5a_Page 38 of 321, MCRP-DWG-GEN-TK-0120,	Rail inclination in Car Wash is shown as flat. It might need twisted rails on either side of the car washing area to transition into 1 in 40 inclination inside the depot. Transition zone will be area where the rail inclination occurred from 1 in 40 to the flat. Bidder would like to propose the rail without twisted rail in the transition area.		This is a Design And Build Contract. The Contractor shall propose subject to Engineer's approval
61	Volume III Section VI, 5a_Page 98 of 321, NSCR-GCR-NS01-ZWE-DWG-TK-000001,	What is the minimum clearance allowed between two passing trains? Please inform. 68 mm shown in the drawing is less as per standards across the globe (100 mm is standard acceptable). Is 68 mm as shown in drawing is acceptable?		The minimum clearance between trains shall be 300mm when the following conditions are taken into consideration for rolling stock gauge. In this case, the minimum track center distance is 3400mm. (1) Straight line section. (2) In the case of a curved section, the effect of curve widening and canting, and slack shall be considered separately. (3)The train body must be of a construction that prevents passengers from exposing any part of their body to the outside of the train. (4) Separate consideration shall be given to

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				wind pressure between trains passing each other. The track center spacing for both the main line and DEPOT is set at 4,000 mm, taking into account the above effects and allowances. The spacing of 68mm for the construction gauge presented in the question is a result of the layout of the relevant curve, and does not have any special meaning. Even if the construction gauges of adjacent tracks overlap each other, there is no problem as long as there is enough margin for the rolling stock gauge.
62	Volume II Section VI, ERT 14, Cl 1.7.1, 3) Rails on curves of radius less than 200m - 7 years 4) Rails on straight track in Main line - 20 years 5) Rails on straight track in Depot - 30 years	Bidder could not able to find the design life for the rail where Radius is >200 and < straight (Simply the curve section) in mainline and turnout. Please give us the detail information.		The Contractor shall specify during the design stage taken into consideration the wear the rails my develop. Please refer to ERT 1.7.1 7) for the turnout design life

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63	Volume II Section VI, ERG 40, Cl. 6.3.2, Drawing and CAD Standards. Reports, calculations, specifications, technical data, and similar documents shall be provided in A4 format, and one of the copies shall be ring bound to facilitate photocopying. A3 size drawings included in documents shall be folded to A4 size.	At detail design stage, it is essential to provide track alignment drawings at a considerably larger scale to provide clear and concise details. Typically, these drawings are produced in 1 in 500 scale and are fit into an A1 or an A0 sized drawing of 1 km alignment. We would like this to be considered and agreed that it will be provided in detail design stage.		The contractor shall adhere ERG 40, Cl. 6.3.2 with regards to drawings to be submitted to the Engineer
64	Volume II Section VI, ERT 15, CL. 1.8.1., 1) For the viaduct section, the track structure shall be comprised of continuously welded rails supported on mono-block precast concrete sleepers using resilient fasteners spaced at 625 to 714 mm centers. The standard value is 666 mm. The mono-block precast concrete is mounted on elastic pads in turn supported on the cast-in-situ track bed with a maximum length of 8m. Gaps of 100 mm shall be	For similar climate conditions, Bidder experienced to use the maximum track bed length as 5 m. We would like to understand the basis for increasing such restriction to 8 m as the longer the track bed, higher the risk for track structural failure due to thermal variations. Can we propose to use variable length upto 8m for the track bed?		As part of the Design and Build contract, The contractor can propose variable length of track bed up to 8m and subject to Engineers approval.

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	provided between concrete bed units/slabs.			
65	Volume III Section VI, 5b_Page 11 of 315, MCRP-DWG-ALT01-SK-0002,	The #6 turnouts used to access maintenance track have been indicated as temporary. Bidder would like to understand the reason behind their 'temporary' status from a track bed design perspective.		#6 turnouts indicated temporary were to be used for maintenance vehicles access only, however the mainline track of the turnout shall be for revenue with continuous rail design.
66	Volume II Section VI, ERT 24 and 25, 1.12.11, The rail must work as a conductor to return electricity to the substation after driving the train in electric railway. The conductor electric resistance of the rail per one meter shall be as follows. ・ 50kg rail : 31.6μΩ/m ・ 60kg rail : 26.2μΩ/m	The measurement method/code for the electric resistance for the rail is not specified. According to vendor information, 21.1-23.7 μΩ.cm and is measured according to Japanese Standard and would like to propose accordingly. Please confirm our proposal.		The Contractor shall propose the method/codes and subject to Engineer's approval.
67	Volume II Section VI, ERT 29, 1.13.5, 3) In order to confirm the security of the anchor system, the Contractor shall carry out a series of pull-out tests on the anchor bolts/screws. This testing shall comprise applying gradually an upward axial load to each bolts/screw selected for	Bidder would like to understand the type of load given as 50 kN. Please confirm if it is either 1. Destructive/failure/ultimate load 2. Serviceable/Guarantee load		It is confirmed that it will be Serviceable/Guarantee load

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	testing. The minimum axial load shall be 50kN and shall be sustained for a period of not less than 1 minute. Bolt, concrete or grout-bond failure by slippage or cracking, meaning the anchor system failed the test, shall require remedial work, the extent of which shall be satisfactory compliance.			
68	Volume II Section VI, ERT 30, 1.13.8, 3) In order to confirm the security of the anchor system, the Contractor shall carry out a series of pull-out tests on the anchor bolts/screws. This testing shall comprise applying gradually an upward axial load to each bolts/screw selected for testing. The minimum axial load shall be 50kN and shall be sustained for a period of not less than 1 minute. Bolt, concrete or grout-bond failure by slippage or cracking, meaning the anchor system failed the test, shall	ZLR fasteners are not generally needed with this fastener (e-1883) as it is already providing low clamping force which renders ZLR unnecessary. Please confirm.		ERT 1.13.8 2) shall prevail.

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	require remedial work, the extent of which shall be satisfactory compliance.			
69	Vol 2, Section V1. Employer's Requirements, ERT-59, 1.27.14 Refueling Facility for Maintenance Car, b) Diesel oil injection capacity shall be approximately 400 liters/minute	Based on the Bidder's experience, the injection capacity of 400 litters/minute is very high-speed requirement, and the potential suppliers decline due to this high-performance requirement. Bidder thinks it is typo error and injection capacity should read as 40 litters /minute, then Bidder request to reduce the required injection capacity based on the market availability of this facility, please confirm Bidder proposal. In case Employer knows which Supplier is able to meet 400 liters/minute capacity requirement, please advise.		Please refer to Annex B.
70	Volume III Part 2 d) ERD, , Drawing MCRP-DWG-C/C-PSS-2014 SECTIONING POST CONNECTION,	We understood that the purpose of Sectioning Post (@83km438) is back-up power supply to Depot access line and Depot TSS when Depot TSS fails. Please confirm our understanding.		The Bidder's understanding is incorrect. The sectioning post function is to parallel of the overhead line of the up and down tracks of the double track section.

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71	Volume III Part 2 d) ERD, , MCRP-DWG-PSS-1001,	In the reference drawing, power supply to future line is shown in MCRP SS No.21. We understood that DC feeders for future line in SS No.21 shall be installed by NS01 Contractor to avoid train operation interruption after commercial operation. Please confirm scope of NS01 contract and our understanding the above.		The Bidder's understanding is correct.
72	Volume III Part 2 d) ERD, , NSRP-DWG-PSS-0000,	In the reference drawing, power supply to MMSP line is shown in MSRP SS No.S5. We understood that one DC feeders for MMSP in SS No.S5 shall be installed by NS01 Contractor and feeder from DC Switchgear to OCS shall be installed by others. Please confirm scope of NS01 contract and our understanding the above.		Two (2) DC Feeder HSCB for MMSP shall be installed by NS01 contractor. Cable termination from DC Switchgear to OCS shall be by others.
73	Volume III Part 2 d) ERD, , MCRP-DWG-C/M-PSS-2001 to MCRP-DWG-C/M-PSS-2013,	As per the reference drawings, operation transformer capacity shows 50kVA for supply from rectifier transformer secondary and 100kVA for 6.6kV busbar. Please clarify design and operation concept of three operation transformers, such that one transformer shall cover all LV loads.		The operation transformer at 6.6kV busbar is the main transformer to support all substation loads including the MEPF/building facilities equipment loads whilst the operation transformer at the rectifier tertiary winding is backup once the main operation transformer fails. The final capacity shall be determined by the

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				contractor during the detailed design phase.
74	Volume II Part 2 C) ERT, , "4.4.2 Rectifiers and Rectifier Transformers (1)General (2)", "Each rectifier transformer and rectifier set combination shall provide linear inherent DC voltage regulation of not less than 6% of the full load voltage, from light transition load (approximately 1%) to 100% full load, and shall be as linear as technically feasible up to the 300% full load current. The inherent voltage regulation at 300% full load shall ensure that the voltage at the rectifier load terminals shall not be less than 1150 VDC."	As per standard requirement in Japanese railways system, linear DC voltage regulation is starting from approximately 10-15% of light transition load. This is proven design and character in term of train performance and operation. We would like to propose the rectifier having the performance of linear DC voltage regulation starting from approximately 10-15% of light transition load. Please confirm our proposal.		The Bid condition shall prevail.
75	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements – Signaling,	As there is not any ATP backup system, the interlocking should not be required to interface with any ATP system except the RBC and ATS		The Bid condition shall prevail.

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	ERT 118, 2.16 Computer Based Interlocking, It shall interface with the RBC, ATP and ATS systems.	systems. Would it be possible to remove ATP from previous requirement for clarity?		
76	Vol I, Part I, Section I , Bidding Forms , BF 228-232, Payment Milestones, Schedule 1.4	Clarification requested: Payment Milestones for the CMMS are listed in pages BF 228-231 but in the summary page for Section 1.4 the CMMS is marked as N/A. Clarification is requested if a detailed price breakdown for CMMS in Section 4 is required or not.		The detail for the Schedule 1.4-12 is required to be submitted by the Bidder as part of the Price Schedule. Please refer to the Annex B for the amendment.
77	Volume II Section VI, ERT-385 ERT-435, 4.4.6 (1) (7) (l) 4.4.5 (1) (7) (l), In the event of malfunctions of equipment in the substation room equipment, there shall be alarmed at a Local Annunciator Panel, and designated alarms shall be transmitted to the OCC via Power SCADA. The Local annunciator panel shall be of the solid-state type with illuminated and audible alarm indications. The contractor shall provide	Please clarify "equipment in the substation room equipment". 1) Applicable equipment for monitoring malfunction alarm can be referred to items listed in ERT-386, (6), 3)? 2) In case of TSS, outdoor equipment such as rectifier/transformer, GIS is also applicable? 3) Alarms from building facilities such as fire alarm, security, air-conditioning system is not included in this local annunciator panel?		For item 1, the contractor shall develop the list of applicable alarm of equipment malfunction/failure during the design phase for approval by the Engineer. For Item 2 & 3, the Bidder's understanding is correct.

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Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
	proposal for the approval of engineer the intended local alarm requirements.			
78	Volume II Section VI, ERT-432, 4.4.3 (2) (3) (c) , c. Neutral grounding method: Directly earthing for high voltage winding and low voltage winding according to neutral earthing mode of the distribution system	We understood from this requirements that the required vector group of transformer shall be Yy0. However, it is not common practice from suppressing harmonics and earthing system at high voltage side (69/115kV) should be according to the Power utility company earthing system. Please clarify earthing design philosophy including power utility company requirement for proper selection of transformer wining and earthing system.		It is the contractor's responsibility to develop its own strategy for earthing, bonding, lightning protection and corrosion control in accordance with the applicable standards as specified in clause 4.1.3 of ERT 365 & 416.
79	Volume II Section VI, ERT-433, 4.4.3 (3) (3) (c) , c. Neutral grounding method: Directly earthing for high voltage winding and low voltage winding according to neutral earthing mode of the distribution system	We understood from these requirements that the required vector group of transformer shall be Yy0. However, it is not common practice from suppressing harmonics. In case of 6.6kV line, as per 4.4.3(2)(3)(c), both neutral points of distribution transformer secondary at 6.6kV and operation transformer primary at 6.6kV shall be directly earthed. This makes multi-neutral earthing in the 6.6kV network. Please clarify earthing design philosophy for		It is the contractor's responsibility to develop its own strategy for earthing, bonding, lightning protection and corrosion control in accordance with the applicable standards as specified in clause 4.1.3 of ERT 365 & 416.

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Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
		proper selection of transformer wining and earthing system.		
80	Volume II Section VI, , , Operation transformer 750kVA 6.6kV/400-230-110V	(1) Capacity Please clarify the capacity of 750kVA is correct. Operation transformer is used to derive control source for equipment in substation and operation transformer in other substations is up to around 100kVA and 750kVA looks too big. (2) Voltage 110V is not specified in 4.4.3(3)(3)(c). Please clarify the necessity of 110V.		For item 1, Capacity is based on initial calculation. Final capacity shall be determined by the contractor during design stage in coordination with the interfacing parties. For item 2, 110V AC may or may not be required depending on the substation equipment design to be proposed by Contractors during the design stage.
81	Volume II and III Section VI, 5b_Page 235 of 315 & ERT 13, NSRP-SW-ALT-SK-D-0003 & 1.6.1 7), 1.6.1. 7) Maximum cant deficiency: 70 mm NSRP-SW-ALT-SK-D-0003	Bidder found that the reference drawing provided is not complying with ITB requirement itself and would like to clarify which document shall prevail. For example, in the ITB drawing, Cd designed for IP72, IPS72 and IP N72 is more than 70 mm which is deviating to the requirement in ERT 1.6.1.7). Bidder did the preliminary assessment and calculation and found cant deficiency can be brought less than 70 mm only by reducing Ca to		The maximum cant deficiency on NSRP was set to 90 mm. The difference of the maximum cant deficiency of MCRP is due to the difference in maximum design speed. In MCRP, the specification about maximum cant deficiency is set to 70 mm for high-speed operation. Please refer to Annex B

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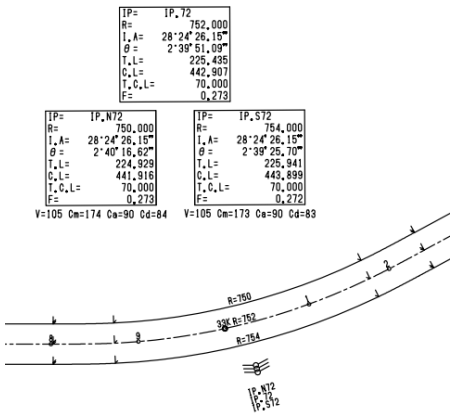
Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
		70 mm and Speed to 95 kph. There are several points inside the ITB drawing, where such deviations are found and would like to clarify which document shall prevail for the design. It is also to be noted that, speed could not able to follow as ITB requirement where such condition cannot be fulfilled. Please clarify.		
82	Volume II and III Section VI, 5b_Page 12 of 315, MCRP-DWG-ALT01-SK-0003, MCRP-DWG-ALT01-SK-0003	There are some curves in MCRP packages where the transition length and applied cant is not sufficient for rate of change of cant to be less than 29 mm/s. (Referring to the Technical Regulatory Standards on Japanese Railways (Civil Engineering)) <As an example, IP45, IP45S and IP 45N will have compliant to the rate of change of cant only when min. TCL = 111 m, Ca = 70 mm and 105 Kmph as speed (In ITB drawing, TCL =110 m, Ca=110mm, Speed =110KmpH).		Rate of change of can't to be less than 29 mm/s. (Referring to the Technical Regulatory Standards on Japanese Railways (Civil Engineering)) is based on the assumption that it will be applied to Ordinary Railways in Japan. And this sentence is a Reference. The original calculated gauge for this Rate is 1067mm in Japan. And MCRP is 1435mm gauge. The applicable calculation formula differs depending on the gauge.

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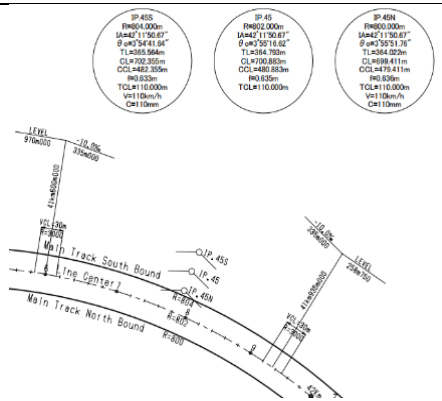
Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
		Bidder found that if such ITB requirement to be followed with given speed, shift of geometry (Transverse direction) around 12 mm is expected. > Bidder would like to propose; such horizontal shift in track alignment. If such shift shall not consider, a reduction of speed, modification of cant will be expected. Bidder expects such deviation may found in several locations. Please confirm that this methodology is acceptable. It is to be noted that either compromising to the shift or reduction of speed is expected. Bidder believes that the Civil construction work has already been finished and if any deviation to the current provided alignment may affect to the civil structure.		Note that in the calculation of Cant and Transition curve length for MCRP, the gauge value is calculated as 1500mm, which is the safe side.
83	Volume II Section VI and GBB No. 8, ERT-48	Bidder reinvestigated to the ITB requirement and found that, if we follow the walkway width of 1200 mm, there will be clash between rolling		Based on the preliminary investigation the walkway width can vary in width between approximately 1085mm to 1299mm. The

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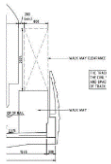
Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
	Page 11 of 28, Cl.1.23 12) Item No. 24, **Clarification Request** / **Proposed Revised Text** (if any) / **Response** The width of walkway in Clause 1.23 12) is to be set as 1200mm, however in the ITB drawing, the width of walkway is around 900mm only. Bidder understands to follow drawing (to adopt 900 mm). Please confirm.  The Bidder should comply with requirements of ERT Clause 1.23 12).	stock and walkway either in straight section or in curve section where cant is provided. Therefore, Bidder would like to propose to use 900 mm and expected a clear clearance between rolling stock and walkway. The detail assessment is still required in the detail design stage for such requirement. Please understand and confirm.		walkway width shall be determined during the detailed design stage to minimize the stepping distance between the train and the walkway. Please refer to Annex B

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Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
84	Volume II Section VI , ERT-47, Cl. 1.21 Staff Walkway in Depot,	Bidder found the staff walkway is in Bidder scope of work, however Bidder consider the work below the ballast section is of Civil Contractor Scope of work. Therefore, Bidder understanding is any work below the ballast level including foundation required and others are Civil Contractor scope of work. Please confirm. Furthermore, with Bidder experience with other project, Staff walkway in Depot shall be in Civil Contractor scope of work and requested to shift the Scope of work for staff walkway in Depot to the Civil Contractor. Please confirm the proposal.		a) The Bidder's understanding is incorrect. All works associated with the Staff Walkway including under the ballast are on the scope of the Bidder. b) The Bidder's proposal is rejected.
85	Volume II Section VI and GBB No. 8, ERT-23 Page 6 of 28, Cl.1.12.5 16, End hardened rail shall be	Is it required for welded connection joint for radius>=800m? Bidder understands the jointed section that ITB is referring for Fishplate joint (EH may require) but in the mainline for Radius >800 m will be used as CWR (EJ may not require). Please reconfirm the requirement		End hardened rail if require based on the Contractor detailed design shall follow the ERT requirement. It is the Contractors responsibility as part of the Design and Build contract to decide if the End hardened rail is needed.

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	compliant to JISE1123 or equivalent. End hardened rail shall be used for jointed section in the mainline with a radius larger than or equal to 800 meters.	In addition, Bidder understand that for Standard rail (Radius >800m), specification shall be according to EN13674-1 and for the End hardened rail is JIS E 1123 (End side will be hardened around 100 mm according to Code). There will be mix code of within a rail if we consider such End hardened requirement with JIS and would like to confirm whether it is acceptable of mixing two codes in one rail. Please confirm. Furthermore, it is requested to provide EN code for the End hardened rail so that no any code mix will be found?		

Annex B

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ITEM NO.	REFERENCE/CLAUSE/ SECTION	REVISIONS / AMENDMENTS
		Volume I Part 1 – Bidding Procedures
1	Section IV Bidding Forms Schedule 1.3-12 Schedule 1.4-12 Total for Schedule 1.4 Page BF-170 to BF-173 Page BF-228 to BF-231 Page BF-232	Schedule 1.3-12, Schedule 1.4-12 and Total for Schedule 1.4 was amended to reflect the price schedule for Computerized Maintenance Management System, please refer to the attachment for detail amendment.
		Volume II Part 2 – Employer's Requirements
2	ERT 13 Clause 1.6.1 Additional Clause 1.6.1 3) 1.6.1 4) 1.6.1 5) 1.6.1 6)	3) Minimum horizontal radius for Mainline and Depot Access Track · Over 120 km/h section) : 1800m or more · Under 120km/h section : 300m or more (Turnout incidental curves are excluded) 4) Minimum horizontal radius for Depot : 100m or more 5) Vertical Gradient in Mainline · Over 120km/h section : 15/1000 (1.5%) · Under 120km/h section : 25/1000 (2.5%) (if unavoidable, the gradient shall be 35/1000 (3.5%) or less) 6)Vertical Curve Radius in Mainline · Over 120km/h section : 5000m · Under 120km/h section : 3000m (4000m where horizontal curve radius is less than 800m)

3	ERT 60 updated Clause 1.27.14 3) b)	b) Diesel oil injection capacity shall be approximately 150 liters/minute
4	ERT 49 Clause 1.23 12)	The width of the walkway shall be typically in the range of 1085mm to 1299mm. The walkway width shall be determined during the detailed design stage to minimize the stepping distance between the train and the walkway.
5	ERT 13 Clause 1.6.1 11)	11) Maximum cant deficiency : 70 mm for MCRP; 90 mm for NSRP
6	ERT 20 Clause 1.10.4	1.10.4 Cant Cant shall be applied by rotation around the head of the lower rail. Maximum actual cant on the main line shall be 180 mm. Maximum cant deficiency 70 mm for MCRP and 90 mm for NSRP.
7	ERT-459, Clause 5.1.1 (Paragraph no.2)	Inserted: "power supply and OCS equipment, AFC, PSD, trackwork, CMMS, other system"
8	ERT-461, Clause 5.1.2 (2) ERT-462, Clause 5.1.2 (3) ERT-462, Clause 5.1.2 (5)	Added new clause: 8.) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.
9	ERT-462, Clause 5.1.2 (6)	Added new clause: 5.) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment in substations, battery post and ancillary buildings, etc.
10	ERT-463, Clause 5.1.2 (7)	Added new clause: 5.) Low Voltage distribution board with single or three phase LV power required.
11	ERT-463, Clause 5.1.2 (8)	Added new clause:

		4.) Low Voltage distribution board with single or three phase LV power required.
12	ERT-467, Table 5.1.1: Distribution Transformer Capacity of Station	Updated Distribution Transformer Capacity of Station Deleted text '(oil)' on the last row. Added Notes: 1.) The represented capacity shown above is for reference only. The final rated capacity shall be determined by the Contractor as part of its design of works. 2.) The Contractor shall coordinate with other Interface Contractors and other subsystem to obtain the power consumption requirements necessary for the identification of the equipment capacity with design calculation.
13	ERT-497, Clause 5.1.1 (Paragraph no.2)	Inserted: "power supply and OCS equipment, AFC, PSD, trackwork, CMMS, other system"
14	ERT-499, Clause 5.1.2 (2) ERT-499, Clause 5.1.2 (3) ERT-500, Clause 5.1.2 (5)	Added new clause: 8.) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.
15	ERT-500, Clause 5.1.2 (6)	Added new clause: 5.) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment in substations, battery post and ancillary buildings, etc.
16	ERT-501, Clause 5.1.2 (7)	Added new clause: 5.) Low Voltage distribution board with single or three phase LV power required.
17	ERT-501, Clause 5.1.2 (8)	Added new clause: 4.) Low Voltage distribution board with single or three phase LV power required.

18	ERT-507, Table 5.1.2: Distribution Transformer Capacity of Station	Deleted text '(oil)' on the last row. Added Notes: 1.) The represented capacity shown above is for reference only. The final rated capacity shall be determined by the Contractor as part of its design of works. 2.) The Contractor shall coordinate with other Interface Contractors and other subsystem to obtain the power consumption requirements necessary for the identification of the equipment capacity with design calculation.
19	ERT-299-SECTION 4.6.5-RCW Servers	Updated Statement to include Linux Operating System. "The Contractor shall provide a flexible and structured RCW system that operates on the server network using either Windows or Linux Operating system. The duplicated RCW Servers shall be located in OCC."
20	ERG-81 Section 20.2	**2nd paragraph amended as below:** The Contractor shall develop and submit for approval by the Engineer an Interface Control Document for each sub-system and Other Works Contractor. The Interface Control Document shall be a "live" common document between each sub-system and other Contractors and external parties, which will be revised and re-submitted by the Contractor to ensure that it remains current, and at other times as directed by the Engineer. It shall be signed off by the Contractor, his sub-contractors, and the interfacing Contractors, prior to submission. The submission date of each Interface Control Document shall be coordinated with that of the respective other parties. The Interface Control Document shall cover the contents of the following as minimum:
21	ERG-81 Section 20.2	**Items below added to Section 20.2, second paragraph:** h) Interface Matrix that defines the interface and its requirements, responsibilities of each interfacing parties and due dates. i) Interface Solution Register (ISR) reference that records the agreed solution to each interface. The ISR shall describe in detail how the interface is solved and what

		methods are agreed to verify the requirement of the interface. Template of the ISR will be provided by Engineer. j) Demarcation Drawings to define the responsibilities of each interfacing party. k) Information Exchange Log (IEL) l) Coordinated Installation Programme (CIP)
22	ERG-85 Section 20.10	**<u>Item 4.5 added to table 20.1:</u>** Interface Management Process The contractor shall produce the following documents that will form part of the interface management process as minimum, these documents are live documents and shall be updated regularly. - Interface Matrix - Interface Solution Register (ISR) - Interface Exchange Log (IEL) - Coordinated Design Interface Programme - Interface Control Documents (ICD) The contractor shall specify the use of ComplyPro to manage the interface requirements and information exchange with the interfacing contractors.
Volume III Part 2 – Employer's Requirements d) Employer's Drawings		
23	NSCR-GCR-NS01-SBT-DWG-TK-000001 GBB 5, page 53	SBT Drawing issued in GBB 5 is replaced by NSCR-GCR-NS01-SBT-DWG-TK-000001 Rev. 01

24	NSCR-GCR-NS01-ZWE-DWG-DS-000002 GBB 4, page 351	Lightning Arrester Detail issued in GBB 4 is replaced by NSCR-GCR-NS01-ZWE-DWG-DS-000002 Rev. 01
25	NSRP-South-DWG-X/X-OCS-0002 Rev. 04 GBB 12, page 239	Revised the drawing issued in GBB12 with drawing “NSRP-South-DWG-X/X-OCS-0002 Rev. 06”
26	MCRP-DWG-X/X-OCS-0002 Rev. 04 GBB 12, page 237	Revised the drawing issued in GBB12 with drawing “MCRP-DWG-X/X-OCS-0002 Rev. 05”

Annex B – Attachment 1

Schedule 1.3-12: Computerized Maintenance Management System

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
1201	**Design**						
1201.1	Preparation and submission of the design submission program and obtaining acceptance thereof from the Engineer.	sum	1				
1201.2	Preparation and submission of the preliminary, pre-final, and final design and obtaining Notice of No Objection thereof from the Engineer.	sum	1				
1201.3	Preparation and submission of the construction and installation drawings and documents for the Computerized Maintenance Management System, and obtaining acceptance thereof from the Engineer.	sum	1				
1201.4	Compilation, submission of the as-built documents and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment for Milestones 1201.1 to 1201.4 will be made upon completion of each.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1201						
1202	**Manufacture, Transportation, Delivery and Storage**						
1202.1	Manufacture of the Computerized Maintenance Management System.	sum	1				

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
	(Payment will be made when the last batch of Computerized Maintenance Management System has been loaded for shipment to the Philippines.)	-	-	-	-	-	-
1202.2	Transportation of Computerized Maintenance Management System from the place of manufacture to the Philippines.	sum	1				
	(Payment will be made when the last batch of Computerized Maintenance Management System has arrived safely at the port of unloading in the Philippines.)	-	-	-	-	-	-
1202.3	Delivery to the Contractor's secure storage of Computerized Maintenance Management System.	sum	1				
	(Payment will be made after all Computerized Maintenance Management System have been delivered and accepted by the Engineer.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1202						
1203	**Installation and Testing**						
	Delivery to the Site, installation, and testing (including pre-installation tests, post-installation tests and partial acceptance tests) of all the Computerized Maintenance Management System, and obtaining	sum	1				

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
	acceptance thereof from the Engineer.						
	(Payment for the above Milestone will be made upon completion of all required tests and commissioning.)	-	-	-	-	-	-
1204	**System Acceptance Tests, Integrated Testing and Commissioning**						
	Conducting, and obtaining the Engineer's acceptance of, the System Acceptance Tests, Integrated Testing and Commissioning.	sum	1				
	(Payment for the above Milestone will be made upon completion of all required tests and commissioning.)	-	-	-	-	-	-
1205	**Spare Parts, Special Tools, Testing Equipment**						
	Delivery to the Site of spare parts, consumables, special tools, testing equipment and measurement instruments, including drawings and catalogue in English (original plus 5 hard copies), and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment will be made upon completion of the delivery of all spare parts to the Site.)	-	-	-	-	-	-
1206	**Training and Operation and Maintenance Manuals**						
1206.1	Preparing and delivering Operating Manuals and Maintenance Manuals together with record	sum	1				

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
	drawings/catalogues in English (original plus 5 hard copies and 2 copies in electronic (soft) format), and obtaining acceptance thereof from the Engineer.						
	(Payment will be made upon completion of the delivery of all the above documentation and data.)	-	-	-	-	-	-
1206.2	Conducting operation and maintenance training and obtaining acceptance thereof from the Engineer, comprising: - Operating Staff Training; - Maintenance Staff Training; and - Engineering Staff Training.	sum	1				
	(Payment will be made upon completion of all the above training.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1206						
1207	Other obligations with regard to the Computerized Maintenance Management System that are considered necessary to comply with the Contract but which are not covered in other Schedules and the above Milestone items.	sum	1				
	Note: The Bidder may the above Milestones and/or add appropriate proposed Milestones.	-	-	-	-	-	-
					Total for Schedule 1.3-12 **(Carried forward to Total for Schedule 1.3)**	_____	_____

Schedule 1.4-12: Computerized Maintenance Management System

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
1201	**Design**						
1201.1	Preparation and submission of the design submission program and obtaining acceptance thereof from the Engineer.	sum	1				
1201.2	Preparation and submission of the preliminary, pre-final, and final design and obtaining Notice of No Objection thereof from the Engineer.	sum	1				
1201.3	Preparation and submission of the construction and installation drawings and documents for the Computerized Maintenance Management System, and obtaining acceptance thereof from the Engineer.	sum	1				
1201.4	Compilation, submission of the as-built documents and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment for Milestones 1201.1 to 1201.4 will be made upon completion of each.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1201						
1202	**Manufacture, Transportation, Delivery and Storage**						
1202.1	Manufacture of the Computerized Maintenance Management System.	sum	1				

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
	(Payment will be made when the last batch of Computerized Maintenance Management System has been loaded for shipment to the Philippines.)	-	-	-	-	-	-
1202.2	Transportation of Computerized Maintenance Management System from the place of manufacture to the Philippines.	sum	1				
	(Payment will be made when the last batch of Computerized Maintenance Management System has arrived safely at the port of unloading in the Philippines.)	-	-	-	-	-	-
1202.3	Delivery to the Contractor's secure storage of Computerized Maintenance Management System.	sum	1				
	(Payment will be made after all Computerized Maintenance Management System have been delivered to the training facility and accepted by the Engineer.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1202						
1203	**Installation and Testing**						
	Delivery to the Site, installation, and testing (including pre-installation tests, post-installation tests and partial acceptance tests) of all the Computerized Maintenance Management System, and obtaining	sum	1				

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
	acceptance thereof from the Engineer.						
	(Payment for the above Milestone will be made upon completion of all required tests and commissioning.)	-	-	-	-	-	-
1204	**System Acceptance Tests, Integrated Testing and Commissioning**						
	Conducting, and obtaining the Engineer's acceptance of, the System Acceptance Tests, Integrated Testing and Commissioning.	sum	1				
	(Payment for the above Milestone will be made upon completion of all required tests and commissioning.)	-	-	-	-	-	-
1205	**Spare Parts, Special Tools, Testing Equipment**						
	Delivery to the Site of spare parts, consumables, special tools, testing equipment and measurement instruments, including drawings and catalogue in English (original plus 5 hard copies), and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment will be made upon completion of the delivery of all spare parts to the Site.)	-	-	-	-	-	-
1206	**Training and Operation and Maintenance Manuals**						
1206.1	Preparing and delivering Operating Manuals and Maintenance Manuals together with record	sum	1				

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
	drawings/catalogues in English (original plus 5 hard copies and 2 copies in electronic (soft) format), and obtaining acceptance thereof from the Engineer.						
	(Payment will be made upon completion of the delivery of all the above documentation and data.)	-	-	-	-	-	-
1206.2	Conducting operation and maintenance training and obtaining acceptance thereof from the Engineer, comprising: - Operating Staff Training; - Maintenance Staff Training; and - Engineering Staff Training.	sum	1				
	(Payment will be made upon completion of all the above training.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1206						
1207	Other obligations with regard to the Computerized Maintenance Management System that are considered necessary to comply with the Contract but which are not covered in other Schedules and the above Milestone items.	sum	1				
	Note: The Bidder may the above Milestones and/or add appropriate proposed Milestones.	-	-	-	-	-	-
					Total for Schedule 1.4-12 **(Carried forward to Total for Schedule 1.4)**	_____	_____

Total for Schedule 1.4

Schedules	Page	Amount	
		Local	Foreign
Schedule 1.4 -1: General Items			
Schedule 1.4-2: Track Works			
Schedule 1.4-3: Signaling System			
Schedule 1.4-4: Telecommunications			
Schedule 1.4-5: Power Supply System			
Schedule 1.4-6: Power Distribution System			
Schedule 1.4-7: Overhead Contact Line System			
Schedule 1.4-8: Automatic Fare Collection System			
Schedule 1.4-9: Depot Facility			
Schedule 1.4-10: Not used		N/A	N/A
Schedule 1.4-11: Platform Screen Doors			
Schedule 1.4-12: Computerized Maintenance Management System			
Total Amount of Schedule 1.4 (Carried forward to Grand Summary)			

Note: In case of more than one foreign currency, the Bidder shall split the column Foreign Currency in two.

Bidder's Signature _____

Schedule 1.3-12: Computerized Maintenance Management System

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
1201	**Design**						
1201.1	Preparation and submission of the design submission program and obtaining acceptance thereof from the Engineer.	sum	1				
1201.2	Preparation and submission of the preliminary, pre-final, and final design ~~details of the equipment and facilities required for the training center~~ and obtaining Notice of No Objection ~~acceptance~~ thereof from the Engineer.	sum	1				
1201.3	Preparation and submission of the construction and installation drawings and documents for the Computerized Maintenance Management System~~training equipment and facilities required~~, and obtaining acceptance thereof from the Engineer.	sum	1				
1201.4	Compilation, submission of the as-built documents and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment for Milestones 1201.1 to 1201.4 will be made upon completion of each.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1201						
1202	**Manufacture, Transportation, Delivery and Storage**						

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
1202.1	Manufacture of the Computerized Maintenance Management System~~training equipment and facilities~~.	sum	1				
	(Payment will be made when the last batch of Computerized Maintenance Management System ~~depot and training equipment and facilities~~ has been loaded for shipment to the Philippines.)	-	-	-	-	-	-
1202.2	Transportation of Computerized Maintenance Management System~~training equipment and facilities~~ from the place of manufacture to the Philippines.	sum	1				
	(Payment will be made when the last batch of Computerized Maintenance Management System~~training equipment and facilities~~ has arrived safely at the port of unloading in the Philippines.)	-	-	-	-	-	-
1202.3	Delivery to the Contractor's secure storage of Computerized Maintenance Management System~~training equipment and facilities~~.	sum	1				
	(Payment will be made after all Computerized Maintenance Management System~~training equipment and facilities~~ have been delivered ~~to the training facility~~ and accepted by the Engineer.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1202						

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
1203	**Installation and Testing**						
	Delivery to the ~~training facility~~Site, installation, and testing (including pre-installation tests, post-installation tests and partial acceptance tests) of all the Computerized Maintenance Management System~~training equipment and facilities~~, and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment for the above Milestone will be made upon completion of all required tests and commissioning.)	-	-	-	-	-	-
1204	**System Acceptance Tests, Integrated Testing and Commissioning**						
	Conducting, and obtaining the Engineer's acceptance of, the System Acceptance Tests, Integrated Testing and Commissioning.	sum	1				
	(Payment for the above Milestone will be made upon completion of all required tests and commissioning.)	-	-	-	-	-	-

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
~~1204~~12 05	**Spare Parts, Special Tools, Testing Equipment**						
	Delivery to the Site of spare parts, consumables, special tools, testing equipment and measurement instruments, including drawings and catalogue in English (original plus 5 hard copies), and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment will be made upon completion of the delivery of all spare parts to the Site.)	-	-	-	-	-	-
~~1205~~12 06	**Training and Operation and Maintenance Manuals**						
~~1205~~12 06.1	Preparing and delivering Operating Manuals and Maintenance Manuals together with record drawings/catalogues in English (original plus 5 hard copies and 2 copies in electronic (soft) format), and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment will be made upon completion of the delivery of all the above documentation and data.)	-	-	-	-	-	-
~~1205~~12 06.2	Conducting operation and maintenance training and obtaining acceptance thereof from the Engineer, comprising: - Operating Staff Training; - Maintenance Staff Training; and - Engineering Staff Training.	sum	1				

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
	(Payment will be made upon completion of all the above training.)	-	-	-	-	-	-
	Sub-total for Milestone No. ~~1205~~1206						
~~1206~~1207	Other obligations with regard to the Computerized Maintenance Management System~~Training Facility~~ that are considered necessary to comply with the Contract but which are not covered in other Schedules and the above Milestone items.	sum	1				
	Note: The Bidder may the above Milestones and/or add appropriate proposed Milestones.	-	-	-	-	-	-
					Total for Schedule 1.3-12 **(Carried forward to Total for Schedule 1.3)**	_____	_____

Schedule 1.4-12: Computerized Maintenance Management System

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
1201	**Design**						
1201.1	Preparation and submission of the design submission program and obtaining acceptance thereof from the Engineer.	sum	1				
1201.2	Preparation and submission of the preliminary, pre-final, and final design~~details of the equipment and facilities required for the training center~~ and obtaining Notice of No Objection ~~acceptance~~ thereof from the Engineer.	sum	1				
1201.3	Preparation and submission of the construction and installation drawings and documents for the Computerized Maintenance Management System~~training equipment and facilities required~~, and obtaining acceptance thereof from the Engineer.	sum	1				
1201.4	Compilation, submission of the as-built documents and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment for Milestones 1201.1 to 1201.4 will be made upon completion of each.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1201						
1202	**Manufacture, Transportation, Delivery and Storage**						

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
1202.1	Manufacture of the Computerized Maintenance Management System~~training equipment and facilities~~.	sum	1				
	(Payment will be made when the last batch of Computerized Maintenance Management System~~depot and training equipment and facilities~~ has been loaded for shipment to the Philippines.)	-	-	-	-	-	-
1202.2	Transportation of Computerized Maintenance Management System~~training equipment and facilities~~ from the place of manufacture to the Philippines.	sum	1				
	(Payment will be made when the last batch of Computerized Maintenance Management System~~training equipment and facilities~~ has arrived safely at the port of unloading in the Philippines.)	-	-	-	-	-	-
1202.3	Delivery to the Contractor's secure storage of Computerized Maintenance Management System~~training equipment and facilities~~.	sum	1				
	(Payment will be made after all Computerized Maintenance Management System~~training equipment and facilities~~ have been delivered to the training facility and accepted by the Engineer.)	-	-	-	-	-	-
	Sub-total for Milestone No. 1202						

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
1203	**Installation and Testing**						
	Delivery to the ~~training facility~~Site, installation, and testing (including pre-installation tests, post-installation tests and partial acceptance tests) of all the Computerized Maintenance Management System~~training equipment and facilities~~, and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment for the above Milestone will be made upon completion of all required tests and commissioning.)	-	-	-	-	-	-
1204	**System Acceptance Tests, Integrated Testing and Commissioning**						
	Conducting, and obtaining the Engineer's acceptance of, the System Acceptance Tests, Integrated Testing and Commissioning.	sum	1				
	(Payment for the above Milestone will be made upon completion of all required tests and commissioning.)	-	-	-	-	-	-

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
~~1204~~12 05	**Spare Parts, Special Tools, Testing Equipment**						
	Delivery to the Site of spare parts, consumables, special tools, testing equipment and measurement instruments, including drawings and catalogue in English (original plus 5 hard copies), and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment will be made upon completion of the delivery of all spare parts to the Site.)	-	-	-	-	-	-
~~1205~~12 06	**Training and Operation and Maintenance Manuals**						
~~1205~~12 06.1	Preparing and delivering Operating Manuals and Maintenance Manuals together with record drawings/catalogues in English (original plus 5 hard copies and 2 copies in electronic (soft) format), and obtaining acceptance thereof from the Engineer.	sum	1				
	(Payment will be made upon completion of the delivery of all the above documentation and data.)	-	-	-	-	-	-
~~1205~~12 06.2	Conducting operation and maintenance training and obtaining acceptance thereof from the Engineer, comprising: - Operating Staff Training; - Maintenance Staff Training; and - Engineering Staff Training.	sum	1				

Milestone No.	Work Description (Milestone)	Unit	Quantity	Unit Rate/Price		Amount	
				Local	Foreign	Local	Foreign
	(Payment will be made upon completion of all the above training.)	-	-	-	-	-	-
	Sub-total for Milestone No. ~~1205~~1206						
~~1206~~1207	Other obligations with regard to the Computerized Maintenance Management System~~Training Facility~~ that are considered necessary to comply with the Contract but which are not covered in other Schedules and the above Milestone items.	sum	1				
	Note: The Bidder may the above Milestones and/or add appropriate proposed Milestones.	-	-	-	-	-	-
					Total for Schedule 1.4-12 **(Carried forward to Total for Schedule 1.4)**	_____	_____

Total for Schedule 1.4

Schedules	Page	Amount	
		Local	Foreign
Schedule 1.4 -1: General Items			
Schedule 1.4-2: Track Works			
Schedule 1.4-3: Signaling System			
Schedule 1.4-4: Telecommunications			
Schedule 1.4-5: Power Supply System			
Schedule 1.4-6: Power Distribution System			
Schedule 1.4-7: Overhead Contact Line System			
Schedule 1.4-8: Automatic Fare Collection System			
Schedule 1.4-9: Depot Facility			
Schedule 1.4-10: Not used		N/A	N/A
Schedule 1.4-11: Platform Screen Doors			
Schedule 1.4-12: Computerized Maintenance Management System		~~N/A~~	~~N/A~~
Total Amount of Schedule 1.4 (Carried forward to Grand Summary)			

Note: In case of more than one foreign currency, the Bidder shall split the column Foreign Currency in two.

Bidder's Signature _____

1.6 Operational Criteria

1.6.1 Criteria

The following criteria shall be used for the project:

1) Cars per train - 8 (To be upgraded to 10 cars in the future), Total Length 160m (200m in the future);

2) Nominal Maximum Operational Speed.

・Main Line : 160 km/h and 120km/h (Based on location);

The maxim design speed shall take into account margins set for warning and braking of the signaling system.

・Depot Access Line : 45 km/h;

・Depot Area : 25 km/h;

3) Minimum horizontal radius for Mainline and Depot Access Track

- Over 120 km/h section) : 1800m or more
- Under 120km/h section : 300m or more

(turnout incidental curves are excluded)

4) Minimum horizontal radius for Depot : 100m or more

5) Vertical Gradient in Mainline

- Over 120km/h section : 15/1000 (1.5%)
- Under 120km/h section : 25/1000 (2.5%)

(if unavoidable, the gradient shall be 35/1000 (3.5%) or less)

6)Vertical Curve Radius in Mainline

- Over 120km/h section : 5000m
- Under 120km/h section : 3000m

(4000m where horizontal curve radius is less than 800m)

7) Maximum axle load : 160 kN;

8) Maximum distance between axle centers of one bogie: 2,100 mm;

9) Maximum distance between bogie centers: 13,800 mm;

10) Maximum applied cant : 180 mm;

11) Maximum cant deficiency : 70 mm;

12) Environmental conditions: Maximum air temperature: 40℃;

13) Environmental conditions: Minimum air temperature: 20℃;

13) Distance of Track center : 4,000mm (Main line, station)

14) Rail inclination: 1:40

15) Track gauge shall be Standard 1,435 mm

16) The track support system shall be resiliently mounted to reduce impact loads on the structure and wheels and axle boxes of the rolling stocks.

1.6 Operational Criteria

1.6.1 Criteria

The following criteria shall be used for the project:

1) Cars per train - 8 (To be upgraded to 10 cars in the future), Total Length 160m (200m in the future);

2) Nominal Maximum Operational Speed.

・Main Line : 160 km/h and 120km/h (Based on location);

The maxim design speed shall take into account margins set for warning and braking of the signaling system.

・Depot Access Line : 45 km/h;

・Depot Area : 25 km/h;

3) Minimum horizontal radius for Mainline and Depot Access Track

- Over 120 km/h section) : 1800m or more
- Under 120km/h section : 300m or more

(turnout incidental curves are excluded)

4) Minimum horizontal radius for Depot : 100m or more

5) Vertical Gradient in Mainline

- Over 120km/h section : 15/1000 (1.5%)
- Under 120km/h section : 25/1000 (2.5%)

(if unavoidable, the gradient shall be 35/1000 (3.5%) or less)

6)Vertical Curve Radius in Mainline

- Over 120km/h section : 5000m
- Under 120km/h section : 3000m

(4000m where horizontal curve radius is less than 800m)

7~~3~~) Maximum axle load : 160 kN;

8~~4~~) Maximum distance between axle centers of one bogie: 2,100 mm;

9~~5~~) Maximum distance between bogie centers: 13,800 mm;

10~~6~~) Maximum applied cant : 180 mm;

11~~7~~) Maximum cant deficiency : 70 mm;

12~~8~~) Environmental conditions: Maximum air temperature: 40℃;

13~~9~~) Environmental conditions: Minimum air temperature: 20℃;

13~~10~~) Distance of Track center : 4,000mm (Main line, station)

14~~11~~) Rail inclination: 1:40

15~~12~~) Track gauge shall be Standard 1,435 mm

16~~13~~) The track support system shall be resiliently mounted to reduce impact loads on

1.27.12 Rail Tensor

1) Quantity: Four (4) Sets
2) Functional Requirements

   Rail tensor for field welding shall be supplied.
3) Design and Performance
   a) Stressing is operated hydraulically with hand pump.
   b) Required pulling force 70 ton, pushing force 40 ton.
   c) Suitable for EN60E1 or JIS60 rail or equivalent.

1.27.13 Weld Shear

1) Quantity: Four (4) Sets
2) Functional Requirements

   Weld shear for field welding shall be supplied.
3) Design and Performance
   a) Trimming of field welding unnecessary material.
   b) Suitable for EN60E1 or JIS60 rail or equivalent.

1.27.14 Refueling Facility for Maintenance Car

1) Quantity: Two (2) Sets
2) Functional Requirements

   Refueling Facility is a facility to refuel diesel oil for track maintenance vehicles.
3) Design and Performance
   a) Refueling for track maintenance cars at high speed.
   b) Diesel oil injection capacity shall be approximately 150 liters/minute
   c) Fuel tanks shall be installed on the ground in compliance with laws and regulations
   d) Capacity of tank shall be approximately 5000 liters

1.27.15 Small Tamping Machine (STM)

1) Quantity: One (1) Set
2) Functional Requirements:
   a) The vehicle shall be self-propelled;
   b) The small tamping machine shall be operated by a single ride on operator;
   c) Truck transportable.
3) Design and Performance:

   The Track tamping machine shall be equipped with min 4 tools of tamping heads with positioning and diagonal tamping configuration for maintenance of the plain track and turnouts in the depot. It combines the proven strengths of continuous action plain line tamping machines and the flexibility of turnout tamping machines:

1.27.12 Rail Tensor

1) Quantity: Four (4) Sets
2) Functional Requirements

   Rail tensor for field welding shall be supplied.
3) Design and Performance
   a) Stressing is operated hydraulically with hand pump.
   b) Required pulling force 70 ton, pushing force 40 ton.
   c) Suitable for EN60E1 or JIS60 rail or equivalent.

1.27.13 Weld Shear

1) Quantity: Four (4) Sets
2) Functional Requirements

   Weld shear for field welding shall be supplied.
3) Design and Performance
   a) Trimming of field welding unnecessary material.
   b) Suitable for EN60E1 or JIS60 rail or equivalent.

1.27.14 Refueling Facility for Maintenance Car

1) Quantity: Two (2) Sets
2) Functional Requirements

   Refueling Facility is a facility to refuel diesel oil for track maintenance vehicles.
3) Design and Performance
   a) Refueling for track maintenance cars at high speed.
   b) Diesel oil injection capacity shall be approximately 150 ~~400~~ liters/minute
   c) Fuel tanks shall be installed on the ground in compliance with laws and regulations
   d) Capacity of tank shall be approximately 5000 liters

1.27.15 Small Tamping Machine (STM)

1) Quantity: One (1) Set
2) Functional Requirements:
   a) The vehicle shall be self-propelled;
   b) The small tamping machine shall be operated by a single ride on operator;
   c) Truck transportable.
3) Design and Performance:

   The Track tamping machine shall be equipped with min 4 tools of tamping heads with positioning and diagonal tamping configuration for maintenance of the plain track and turnouts in the depot. It combines the proven strengths of continuous action plain line tamping machines and the flexibility of turnout tamping machines:

f) Cable containment; and

g) Provisions for drainage within the walkway

7) The contractor shall ensure that the walkway, in any condition shall not infringe the structure gauge for all tangent and curved tracks.

8) The walkway shall be designed to be independent of the viaduct parapet and shall be fabricated off site for assembly on site.

9) The walkway top surface level shall be set 150 mm below the train vehicle floor taking into account cant of the track.

10) The height and width of the walkway at outside curved sections shall be adjusted to keep the distance which shall be not more than 400mm from the train vehicle door.

11) The height and width of the walkway on curved sections shall be adjusted such that the separation between the construction gauge and the edge of the walkway is more than 100mm.

12) The width of the walkway shall be typically be in the range of 1085mm to 1299mm. The walkway width shall be determined during the detailed design stage to minimise the stepping distance between the train and the walkway. At OCS mast and telecommunication monopole locations the available usable width of the walkway will be reduced.

13) The Contractor shall provide suitable cable hangers underneath the station platform to support the cables.

14) The materials used in the fabrication and installation of the walkway shall be in accordance of the following;

a) The walkway frame and base plate to support the deck for walk surface shall be made of hot dipped galvanized steel according to ASTM A123/A123M and/or ASTM A153/A153M or an equivalent standard which has been given a Notice of No Objection by the Engineer. The frames shall have base plates which shall be fixed to the viaduct deck using chemically anchors.

b) The Anchor bolts shall meet the requirements of ASTM A307, or equivalent specification that has been given a Notice of No Objection by the Engineer. Any drilling to the viaduct deck shall be given a Notice of No Objection by the Engineer.

c) The walkway deck shall be made of material given a Notice of No Objection by the Engineer. If FRP is used for the deck it shall have high anti-slip rating, and safe for walking in wet surface conditions.

d) The handrail shall be made of hot dipped galvanized steel according to ASTM A123/A123M, aluminum or FRP materials proposed by the Contractor and given a Notice of No Objection by the Engineer.

e) The walking surface or coping shall be yellow or other high visibility color.

15) Where the emergency walkway changes from side to side the Contractor shall design and install pedestrian crossings. Down and up ramps are to be provided with a slope of 1:12 between the emergency walkway and Track crossing. The proposed ramp shall have an anti-slip surface. Walkways shall interface with the stations at platform ends.

d) Walkway earthing

e) Handrail

f) Cable containment; and

g) Provisions for drainage within the walkway

7) The contractor shall ensure that the walkway, in any condition shall not infringe the structure gauge for all tangent and curved tracks.

8) The walkway shall be designed to be independent of the viaduct parapet and shall be fabricated off site for assembly on site.

9) The walkway top surface level shall be set 150 mm below the train vehicle floor taking into account cant of the track.

10) The height and width of the walkway at outside curved sections shall be adjusted to keep the distance which shall be not more than 400mm from the train vehicle door.

11) The height and width of the walkway on curved sections shall be adjusted such that the separation between the construction gauge and the edge of the walkway is more than 100mm.

12) The width of the walkway shall be typically be in the range of 1085mm to 1299mm~~nominally 1200 mm at the tangent sections~~. The walkway width shall be determined during the detailed design stage to minimise the stepping distance between the train and the walkway. At OCS mast and telecommunication monopole locations the available usable width of the walkway will be reduced.

13) The Contractor shall provide suitable cable hangers underneath the station platform to support the cables.

14) The materials used in the fabrication and installation of the walkway shall be in accordance of the following;

a) The walkway frame and base plate to support the deck for walk surface shall be made of hot dipped galvanized steel according to ASTM A123/A123M and/or ASTM A153/A153M or an equivalent standard which has been given a Notice of No Objection by the Engineer. The frames shall have base plates which shall be fixed to the viaduct deck using chemically anchors.

b) The Anchor bolts shall meet the requirements of ASTM A307, or equivalent specification that has been given a Notice of No Objection by the Engineer. Any drilling to the viaduct deck shall be given a Notice of No Objection by the Engineer.

c) The walkway deck shall be made of material given a Notice of No Objection by the Engineer. If FRP is used for the deck it shall have high anti-slip rating, and safe for walking in wet surface conditions.

d) The handrail shall be made of hot dipped galvanized steel according to ASTM A123/A123M, aluminum or FRP materials proposed by the Contractor and given a Notice of No Objection by the Engineer.

e) The walking surface or coping shall be yellow or other high visibility color.

15) Where the emergency walkway changes from side to side the Contractor shall design and install pedestrian crossings. Down and up ramps are to be provided

1.6 Operational Criteria

1.6.1 Criteria

The following criteria shall be used for the project:

1) Cars per train - 8 (To be upgraded to 10 cars in the future), Total Length 160m (200m in the future);

2) Nominal Maximum Operational Speed.

・Main Line : 160 km/h and 120km/h (Based on location);

The maxim design speed shall take into account margins set for warning and braking of the signaling system.

・Depot Access Line : 45 km/h;

・Depot Area : 25 km/h;

3) Minimum horizontal radius for Mainline and Depot Access Track

- Over 120 km/h section) : 1800m or more
- Under 120km/h section : 300m or more

(Turnout incidental curves are excluded)

4) Minimum horizontal radius for Depot : 100m or more

5) Vertical Gradient in Mainline

- Over 120km/h section : 15/1000 (1.5%)
- Under 120km/h section : 25/1000 (2.5%)

(if unavoidable, the gradient shall be 35/1000 (3.5%) or less)

6)Vertical Curve Radius in Mainline

- Over 120km/h section : 5000m
- Under 120km/h section : 3000m

(4000m where horizontal curve radius is less than 800m)

7) Maximum axle load : 160 kN;

8) Maximum distance between axle centers of one bogie: 2,100 mm;

9) Maximum distance between bogie centers: 13,800 mm;

10) Maximum applied cant : 180 mm;

11) Maximum cant deficiency : 70 mm for MCRP; 90 mm for NSRP

12) Environmental conditions: Maximum air temperature: 40℃;

13) Environmental conditions: Minimum air temperature: 20℃;

14) Distance of Track center : 4,000mm (Main line, station)

15) Rail inclination: 1:40

16) Track gauge shall be Standard 1,435 mm

17) The track support system shall be resiliently mounted to reduce impact loads on the structure and wheels and axle boxes of the rolling stocks.

1.6 Operational Criteria

1.6.1 Criteria

The following criteria shall be used for the project:

1) Cars per train - 8 (To be upgraded to 10 cars in the future), Total Length 160m (200m in the future);

2) ~~Design speed~~ Nominal Maximum Operational Speed.

・Main Line : 160 km/h and 120km/h (Based on location);

The maxim design speed shall take into account margins set for warning and braking of the signaling system.

・Depot Access Line : 45 km/h;

・Depot Area : 25 km/h;

3) Minimum horizontal radius for Mainline and Depot Access Track

- Over 120 km/h section) : 1800m or more
- Under 120km/h section : 300m or more

(Turnout incidental curves are excluded)

4) Minimum horizontal radius for Depot : 100m or more

5) Vertical Gradient in Mainline

- Over 120km/h section : 15/1000 (1.5%)
- Under 120km/h section : 25/1000 (2.5%)

(if unavoidable, the gradient shall be 35/1000 (3.5%) or less)

6)Vertical Curve Radius in Mainline

- Over 120km/h section : 5000m
- Under 120km/h section : 3000m

(4000m where horizontal curve radius is less than 800m)

7~~3~~) Maximum axle load : 160 kN;

8~~4~~) Maximum distance between axle centers of one bogie: 2,100 mm;

9~~5~~) Maximum distance between bogie centers: 13,800 mm;

10~~6~~) Maximum applied cant : 180 mm;

11~~7~~) Maximum cant deficiency : 70 mm for MCRP; 90 mm for NSRP

12~~8~~) Environmental conditions: Maximum air temperature: 40℃;

13~~9~~) Environmental conditions: Minimum air temperature: 20℃;

14~~10~~) Distance of Track center : 4,000mm (Main line, station)

15~~11~~) Rail inclination: 1:40

16~~12~~) Track gauge shall be Standard 1,435 mm

17~~13~~) The track support system shall be resiliently mounted to reduce impact loads on the structure and wheels and axle boxes of the rolling stocks.

14) When each section of track bed concrete is completed, the rails shall be released from their fastenings to even out longitudinal stresses and refastened at a designated destressing temperature range when the concrete has assumed sufficient rigidity to carry the loads. The destressing temperature range shall be agreed with the Engineer before starting the process. The unfastening and refastening will overlap into the preceding section by not less than 50 m. Records of air temperature and rail temperature shall be taken at the beginning and end of each operation.

15) After destressing or stress equalization, the track shall be adjusted precisely to its design position and rail joints welded.

1.10.2 Depot

1) The safety guard device is not required in the depot area. It is required only for the depot access track and test track, only if the radius of the curve is less than 200m. In the depot area a cant will not be required. In the test track a cant will be required.

2) The minimum thickness in the ballast area shall be 200mm.

1.10.3 Track Components

1) Fastening assemblies shall be at nominal 666 mm or less centers for straight tracks, and 625 mm or less centers for curved tracks. They shall be perpendicular to the longitudinal track centerline.

2) Rail shall preferably be handled by mechanical means and shall not be dropped during unloading; dragging of rail shall be kept to a minimum with the Engineer Approving the methodology.

3) Prior to welding, all joints over which a construction train may pass shall be firmly clamped with fishplates and at least two clamps installed.

4) The rail gap shall not exceed 6 mm at neutral temperature and the speed of any construction train shall not exceed 10km/h.

5) All rail borne vehicles shall not pass over welded joints until trimming and rough grinding has been completed and the rail temperature is below 100°C. Speed shall be restricted to 10km/h until grinding has been performed to the specified final tolerances and the weld has been tested, inspected and accepted.

6) Rails shall be cut square and clean by means of either rail saws or abrasive cutting disks. Flame cutting shall not be permitted. Cuts shall be controlled using a purpose-made guide or template and shall be within 0.75 mm of the vertical axis of the rail measured over the overall height or within 0.50 mm of the transverse axis measured over the head width.

7) Records of rail temperature and air temperature shall be taken every one (1) hour as welding proceeds.

1.10.4 Cant

Cant shall be applied by rotation around the head of the lower rail. Maximum actual cant on the main line shall be 180 mm. Maximum cant deficiency 70 mm for MCRP and 90 mm for NSRP.

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14) When each section of track bed concrete is completed, the rails shall be released from their fastenings to even out longitudinal stresses and refastened at a designated destressing temperature range when the concrete has assumed sufficient rigidity to carry the loads. The destressing temperature range shall be agreed with the Engineer before starting the process. The unfastening and refastening will overlap into the preceding section by not less than 50 m. Records of air temperature and rail temperature shall be taken at the beginning and end of each operation.

15) After destressing or stress equalization, the track shall be adjusted precisely to its design position and rail joints welded.

1.10.2 Depot

1) The safety guard device is not required in the depot area. It is required only for the depot access track and test track, only if the radius of the curve is less than 200m. In the depot area a cant will not be required. In the test track a cant will be required.

2) The minimum thickness in the ballast area shall be 200mm.

1.10.3 Track Components

1) Fastening assemblies shall be at nominal 6667 mm or less centers for straight tracks, and 625 mm or less centers for curved tracks. They shall be perpendicular to the longitudinal track centerline.

2) Rail shall preferably be handled by mechanical means and shall not be dropped during unloading; dragging of rail shall be kept to a minimum with the Engineer Approving the methodology.

3) Prior to welding, all joints over which a construction train may pass shall be firmly clamped with fishplates and at least two clamps installed.

4) The rail gap shall not exceed 6 mm at neutral temperature and the speed of any construction train shall not exceed 10km/h.

5) All rail borne vehicles shall not pass over welded joints until trimming and rough grinding has been completed and the rail temperature is below 100°C. Speed shall be restricted to 10km/h until grinding has been performed to the specified final tolerances and the weld has been tested, inspected and accepted.

6) Rails shall be cut square and clean by means of either rail saws or abrasive cutting disks. Flame cutting shall not be permitted. Cuts shall be controlled using a purpose-made guide or template and shall be within 0.75 mm of the vertical axis of the rail measured over the overall height or within 0.50 mm of the transverse axis measured over the head width.

7) Records of rail temperature and air temperature shall be taken every one (1) hour as welding proceeds.

1.10.4 Cant

Cant shall be applied by rotation around the head of the lower rail. Maximum actual cant on the main line shall be 180 mm. Maximum cant deficiency 70 mm for MCRP and 90 mm for NSRP.

~~shall be 70 mm~~.

5 POWER DISTRIBUTION SYSTEM

I. The Malolos-Clark Railway Project (MCRP)

5.1 Scope of Works

5.1.1 General

These requirements cover for the design, manufacturing, factory test, packing, delivery, installation, training, testing, commissioning, and interfacing works for completing the power distribution system on the MCRP.

The power distribution system are facilities for supplying electricity to railway facilities that require power, such as the stations, the depot, signaling system and telecommunications facilities, power supply and OCS equipment, AFC, PSD, trackwork, CMMS, other system etc.

The power used by the stations, the depot, signaling system and telecommunications, etc. shall be supplied from the substation at high voltage (6.6 kV) and distributed via cables to each facility.

For the MCRP, it is necessary to supply distribution power to the line from the five power companies (MERALCO, PELCO III, SFELAPCO, AEC and CEDC) according to the Philippine franchise law. The Contractor shall apply to the power companies for all temporary and permanent supplies to be utilized on this project.

The purpose of this design is to construct a reliable power distribution system.

(1) The work shall include the following:

Main line

1) 6.6kV distribution cable network in the main line to stations.
2) Low voltage cabling to ancillary buildings and battery posts, etc.;
3) Low voltage cabling for maintenance outlet and signaling equipment on the on the main line;
4) Low voltage cabling for outdoor lighting;
5) Outdoor lighting (including control panels) on the viaduct;

Stations and Depot

1) 6.6kV distribution cable network in the Mabalacat Depot;
2) Railway Electrical Rooms (hereinafter referred to as RER) and High Voltage Receiving Room (hereinafter referred to as HRR) in the stations and High voltage Electrical Room (hereinafter referred to as HER) in the Mabalacat Depot;
3) Distribution boards in the Mabalacat Depot;
4) Emergency Generators at CIA and in the OCC building and Training Center in Mabalacat Depot.;

5 POWER DISTRIBUTION SYSTEM

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4) Low voltage cabling for outdoor lighting;
5) Outdoor lighting (including control panels) on the viaduct;

Stations and Depot

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2) Railway Electrical Rooms (hereinafter referred to as RER) and High Voltage Receiving Room (hereinafter referred to as HRR) in the stations and High voltage Electrical Room (hereinafter referred to as HER) in the Mabalacat Depot;
3) Distribution boards in the Mabalacat Depot;
4) Emergency Generators at CIA and in the OCC building and Training Center in Mabalacat Depot.;

regarding the provision of study and measures.

3) In the embankment sections the contractor shall install cable containment for the 6.6kV cables and other cables.

4) In the Mabalacat Depot, 6.6kV cables shall be installed in buried ducts, concrete troughs, and manholes. The Contractor shall coordinate with the relevant Contractors regarding the provision of cable routes and installation, including methods of mounting the cable containment systems to the Civil infrastructure.

5) Riser cables from the substations and other buildings on the pillars in elevated sections shall be protected by galvanized steel pipes and/or covered cable trays.

6) In the station area, 6.6kV cables shall be installed on cable trays on the wall and/or on the ceiling.

(2) Scope of works for HRR and RER in the stations.

The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract. This includes the following:

1) 6.6kV Switchgear.

2) 6.6kV transformers.

3) Low voltage cables between transformers and switchgear.

4) Main switchgear.

5) Battery chargers, DC battery cubicles, earthing terminals, 6.6kV cables, low voltage cables and connection works.

6) Main earthing system with earthing rods and protecting conduits for stations shall be provided and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminals.

8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(3) Scope of works for HER in the Mabalacat Depot

The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract. This includes the following

1) 6.6kV switchgear.

2) 6.6kV transformers.

3) Low voltage cables between transformers and switchgear.

4) Main LV Switchgear.

5) Battery chargers, DC battery cubicles, earthing terminals, 6.6kV cables, low voltage cables and connection works.

6) Main earthing system with earthing rods, and protecting conduits shall be provided

regarding the provision of study and measures.

3) In the embankment sections the contractor shall install cable containment for the 6.6kV cables and other cables.

4) In the Mabalacat Depot, 6.6kV cables shall be installed in buried ducts, concrete troughs, and manholes. The Contractor shall coordinate with the relevant Contractors regarding the provision of cable routes and installation, including methods of mounting the cable containment systems to the Civil infrastructure.

5) Riser cables from the substations and other buildings on the pillars in elevated sections shall be protected by galvanized steel pipes and/or covered cable trays.

6) In the station area, 6.6kV cables shall be installed on cable trays on the wall and/or on the ceiling.

(2) Scope of works for HRR and RER in the stations.

The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract. This includes the following:

1) 6.6kV Switchgear.

2) 6.6kV transformers.

3) Low voltage cables between transformers and switchgear.

4) Main switchgear.

5) Battery chargers, DC battery cubicles, earthing terminals, 6.6kV cables, low voltage cables and connection works.

6) Main earthing system with earthing rods and protecting conduits for stations shall be provided and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminals.

~~7)~~8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(3) Scope of works for HER in the Mabalacat Depot

The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract. This includes the following

1) 6.6kV switchgear.

2) 6.6kV transformers.

3) Low voltage cables between transformers and switchgear.

4) Main LV Switchgear.

5) Battery chargers, DC battery cubicles, earthing terminals, 6.6kV cables, low voltage cables and connection works.

6) Main earthing system with earthing rods, and protecting conduits shall be provided

and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminal in HER.

8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(4) Scope of works for Emergency Generator Room (hereinafter referred to as EGR)

1) The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract.

2) Low voltage generator works.

3) Control equipment, low voltage cables, control cables and attachments work.

(5) Scope of works for DB in the Mabalacat Depot

1) The Contractor shall provide all the equipment which enables work to be performed in accordance with the terms of this Contract.

2) 6.6kV switchgear.

3) 6.6kV transformer.

4) Main LV Switchgear.

5) Low voltage cables between transformers and low voltage switchboards.

6) Main earthing system with earthing rods, earthing wires and protecting conduits shall be provided and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminals in the DB.

8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(6) Scope of works for low voltage distribution in the main line

1) Low voltage cables in the main line shall be installed in cable containment provided by the contractor.

2) Low voltage cables work for outdoor lighting equipment, matching device box for track circuit (Signaling System equipment) and outlet for maintenance.

3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,

4) Protection devices for cable installation.

5) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment in substations, battery post and ancillary buildings, etc.

and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminal in HER.

~~7)~~8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(4) Scope of works for Emergency Generator Room (hereinafter referred to as EGR)

1) The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract.

2) Low voltage generator works.

3) Control equipment, low voltage cables, control cables and attachments work.

(5) Scope of works for DB in the Mabalacat Depot

1) The Contractor shall provide all the equipment which enables work to be performed in accordance with the terms of this Contract.

2) 6.6kV switchgear.

3) 6.6kV transformer.

4) Main LV Switchgear.

5) Low voltage cables between transformers and low voltage switchboards.

6) Main earthing system with earthing rods, earthing wires and protecting conduits shall be provided and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminals in the DB.

~~7)~~8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(6) Scope of works for low voltage distribution in the main line

1) Low voltage cables in the main line shall be installed in cable containment provided by the contractor.

2) Low voltage cables work for outdoor lighting equipment, matching device box for track circuit (Signaling System equipment) and outlet for maintenance.

3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,

4) Protection devices for cable installation.

~~4)~~5) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment in substations, battery post and ancillary buildings, etc.

(7) Scope of works for low voltage distribution in the Mabalacat Depot

1) Low voltage cables in the Mabalacat Depot shall be installed in buried ducts, concrete troughs, and manholes respectively.
2) Low voltage cables work for outdoor lighting equipment, outdoor mechanical equipment and all buildings which require electric power
3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,
4) Outdoor lighting fixtures shall be mounted on poles.
5) Low Voltage distribution board with single or three phase LV power required.

(8) Scope of works for outdoor lighting in the Mabalacat Depot

1) The Contractor shall provide outdoor lighting (including control panels) in the Mabalacat Depot yard for maintenance works.
2) Outdoor lighting fixtures in the Mabalacat Depot yard shall be mounted on the poles and beams of the OCS.
3) Outdoor lighting on the road in the Mabalacat Depot shall be mounted on poles.
4) Low Voltage distribution board with single or three phase LV power required.

(9) Scope of works for outlets for maintenance

1) The Contractor shall provide outlets for maintenance on the main line, the locations and quantity of which shall be proposed by the contractor and approved by the Engineer.
2) Outlets for maintenance shall be mounted on the wall in the main line.

(10) Scope of works for earthing system

1) The main earthing system shall be provided by Civil Contractors.
2) The Contractor shall provide the earthing terminals in the RER and HER.
3) Contractor shall provide earthing cables between the main earthing system and earthing terminals.

(11) Out of Scope of works

1) Building works for RER, HRR and EGR including internal lighting, outlets, air conditioners and other building services.
2) In the main line, Station electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in RER, REM and the LV panels in RER, REM.

(7) Scope of works for low voltage distribution in the Mabalacat Depot

1) Low voltage cables in the Mabalacat Depot shall be installed in buried ducts, concrete troughs, and manholes respectively.

2) Low voltage cables work for outdoor lighting equipment, outdoor mechanical equipment and all buildings which require electric power

3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,

4) Outdoor lighting fixtures shall be mounted on poles.

~~4)~~5) Low Voltage distribution board with single or three phase LV power required.

(8) Scope of works for outdoor lighting in the Mabalacat Depot

1) The Contractor shall provide outdoor lighting (including control panels) in the Mabalacat Depot yard for maintenance works.

2) Outdoor lighting fixtures in the Mabalacat Depot yard shall be mounted on the poles and beams of the OCS.

3) Outdoor lighting on the road in the Mabalacat Depot shall be mounted on poles.

~~3)~~4) Low Voltage distribution board with single or three phase LV power required.

(9) Scope of works for outlets for maintenance

1) The Contractor shall provide outlets for maintenance on the main line, the locations and quantity of which shall be proposed by the contractor and approved by the Engineer.

2) Outlets for maintenance shall be mounted on the wall in the main line.

(10) Scope of works for earthing system

1) The main earthing system shall be provided by Civil Contractors.

2) The Contractor shall provide the earthing terminals in the RER and HER.

3) Contractor shall provide earthing cables between the main earthing system and earthing terminals.

(11) Out of Scope of works

1) Building works for RER, HRR and EGR including internal lighting, outlets, air conditioners and other building services.

2) In the main line, Station electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in RER, REM and the LV panels in RER, REM.

Station Name	Station Transformer, Signaling & Telecommunication Transformer (kVA)	Q'ty	Remarks
			Telecommunications
CLARK	1,500	1	For Station Load
	200	1	For Signaling System and Telecommunications
CIA	4000	2	For Station Load
	200	1	For Signaling System and Telecommunications
MABALACAT DEPOT	3000	2	For Workshop
	3000	2	For OCC Building
	1000	1	For Light Repair Shop
	500	2	For DB
	750	1	For Training Center

Note:

1.) The represented capacity shown above is for reference only. The final rated capacity shall be determined by the Contractor as part of its design of works.

2.) Contractor shall coordinate with other Interface Contractors and other subsystem to obtain the power consumption requirements necessary for the identification of the equipment capacity with design calculation.

(5) Emergency Power Supplies

1) Low voltage emergency power supplies shall be installed in the stations, in the HER of the OCC building and the training center in Mabalacat Depot.

2) Low voltage emergency power supplies shall automatically start up in the event of absence of 6.6kV supplies to the emergency generator room for CIA, OCC building and Training Center. Emergency power supplies shall be capable of automatically delivering the vitally demanded power, up to the rated value, within 40 seconds of absence of voltage on both 6.6kV incoming feeders being verified.

3) In order to test the operation of the emergency power supply, the Contractor shall provide facilities to enable the emergency generators to be started and to be connected to necessary loads.

4) Changeover from power company power to emergency power shall be done automatically

Station Name	Station Transformer, Signaling & Telecommunication Transformer (kVA)	Q'ty	Remarks
			Telecommunications
CLARK	1,500	1	For Station Load
	200	1	For Signaling System and Telecommunications
CIA	40002,000	2	For Station Load
	200100	1	For Signaling System and Telecommunications
MABALACAT DEPOT	30002,000	2	For Workshop
	30002,000	2	For OCC Building
	1000750	1	For Light Repair Shop
	500	2	For DB (Oil)
	750500	1	For Training Center

Note:

1.) The represented capacity shown above is for reference only. The final rated capacity shall be determined by the Contractor as part of its design of works.

2.) Contractor shall coordinate with other Interface Contractors and other subsystem to obtain the power consumption requirements necessary for the identification of the equipment capacity with design calculation.

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1) Low voltage emergency power supplies shall be installed in the stations, in the HER of the OCC building and the training center in Mabalacat Depot.

2) Low voltage emergency power supplies shall automatically start up in the event of absence of 6.6kV supplies to the emergency generator room for CIA, OCC building and Training Center. Emergency power supplies shall be capable of automatically delivering the vitally demanded power, up to the rated value, within 40 seconds of absence of voltage on both 6.6kV incoming feeders being verified.

3) In order to test the operation of the emergency power supply, the Contractor shall provide facilities to enable the emergency generators to be started and to be connected to necessary loads.

II The North South Railway Project-South Line (Commuter) (NSRP-South)

5.1 Scope of Works

5.1.1 General

These requirements cover for the design, manufacturing, factory test, packing, delivery, installation, training, testing, commissioning, and interfacing works for completing the power distribution system on the NSRP-South.

The power distribution system are facilities for supplying electricity to railway facilities that require power, such as the stations, the depot, signaling system and telecommunications facilities, power supply and OCS equipment, AFC, PSD, trackwork, CMMS, other system etc.

The power used by the stations, the depot, signaling system and telecommunications, etc. shall be supplied from the substation at high voltage (6.6 kV) and distributed via cables to each facility.

For the NSRP-South, it is necessary to supply distribution power to the line from the one power company, MERALCO. The Contractor shall apply to the power company for all temporary and permanent supplies to be utilized on this project.

The purpose of this design is to construct a reliable power distribution system.

(1) The work shall include the following:

Main line

1) 6.6kV distribution cable network in the main line to stations.
2) Low voltage cabling to ancillary buildings and battery posts, etc.;
3) Low voltage cabling for maintenance outlet and signaling equipment on the on the main line;
4) Low voltage cabling for outdoor lighting;
5) Outdoor lighting (including control panels) on the viaduct;

Stations and Depot

1) 6.6kV distribution cable network in the Banlic Depot;
2) Railway Electrical Rooms (hereinafter referred to as RER) and High Voltage Receiving Room (hereinafter referred to as HRR) in the stations and High voltage Electrical Room (hereinafter referred to as HER) in the Banlic Depot;
3) Distribution boards in the Banlic Depot;
4) Emergency Generators in the OCC building in Banlic Depot.;
5) DC battery chargers and the battery cubicles for HRR in the station and HER in the OCC building and Training Center;
6) Low voltage cabling for outdoor lighting, outdoor mechanical equipment and

II The North South Railway Project-South Line (Commuter) (NSRP-South)

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These requirements cover for the design, manufacturing, factory test, packing, delivery, installation, training, testing, commissioning, and interfacing works for completing the power distribution system on the NSRP-South.

The power distribution system are facilities for supplying electricity to railway facilities that require power, such as the stations, the depot, signaling system and telecommunications facilities, power supply and OCS equipment, AFC, PSD, trackwork, CMMS, other system etc.

The power used by the stations, the depot, signaling system and telecommunications, etc. shall be supplied from the substation at high voltage (6.6 kV) and distributed via cables to each facility.

For the NSRP-South, it is necessary to supply distribution power to the line from the one power company, MERALCO. The Contractor shall apply to the power company for all temporary and permanent supplies to be utilized on this project.

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3) Distribution boards in the Banlic Depot;
4) Emergency Generators in the OCC building in Banlic Depot.;
5) DC battery chargers and the battery cubicles for HRR in the station and HER in the OCC building and Training Center;
6) Low voltage cabling for outdoor lighting, outdoor mechanical equipment and

6.6kV cables and other cables.

4) In the Banlic Depot, 6.6kV cables shall be installed in buried ducts, concrete troughs, and manholes. The Contractor shall coordinate with the relevant Contractors regarding the provision of cable routes and installation, including methods of mounting the cable containment systems to the Civil infrastructure.

5) Riser cables from the substations and other buildings on the pillars in elevated sections shall be protected by galvanized steel pipes and/or covered cable trays.

6) In the station area, 6.6kV cables shall be installed on cable trays on the wall and/or on the ceiling.

(2) Scope of works for HRR and RER in the stations.

The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract. This includes the following:

1) 6.6kV Switchgear.

2) 6.6kV transformers.

3) Low voltage cables between transformers and switchgear.

4) Main switchgear.

5) Battery chargers, DC battery cubicles, earthing terminals, 6.6kV cables, low voltage cables and connection works.

6) Main earthing system with earthing rods and protecting conduits for stations shall be provided and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminals.

8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(3) Scope of works for HER in the Banlic Depot

The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract. This includes the following

1) 6.6kV switchgear.

2) 6.6kV transformers.

3) Low voltage cables between transformers and switchgear.

4) Main LV Switchgear.

5) Battery chargers, DC battery cubicles, earthing terminals, 6.6kV cables, low voltage cables and connection works.

6) Main earthing system with earthing rods, and protecting conduits shall be provided and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminal in HER.

8) Low Voltage distribution board with single or three phase LV power required for

4) In the Banlic Depot, 6.6kV cables shall be installed in buried ducts, concrete troughs, and manholes. The Contractor shall coordinate with the relevant Contractors regarding the provision of cable routes and installation, including methods of mounting the cable containment systems to the Civil infrastructure.

5) Riser cables from the substations and other buildings on the pillars in elevated sections shall be protected by galvanized steel pipes and/or covered cable trays.

6) In the station area, 6.6kV cables shall be installed on cable trays on the wall and/or on the ceiling.

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2) 6.6kV transformers.

3) Low voltage cables between transformers and switchgear.

4) Main switchgear.

5) Battery chargers, DC battery cubicles, earthing terminals, 6.6kV cables, low voltage cables and connection works.

6) Main earthing system with earthing rods and protecting conduits for stations shall be provided and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminals.

8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(3) Scope of works for HER in the Banlic Depot

The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract. This includes the following

1) 6.6kV switchgear.

2) 6.6kV transformers.

3) Low voltage cables between transformers and switchgear.

4) Main LV Switchgear.

5) Battery chargers, DC battery cubicles, earthing terminals, 6.6kV cables, low voltage cables and connection works.

6) Main earthing system with earthing rods, and protecting conduits shall be provided and installed by the Civil Contractor.

7) Earthing cables between main earthing system and earthing terminal in HER.

~~7)~~8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

supplying power to the system's equipment.

(4) Scope of works for Emergency Generator Room (hereinafter referred to as EGR)

1) The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract.
2) Low voltage generator works.
3) Control equipment, low voltage cables, control cables and attachments work.

(5) Scope of works for DB in the Banlic Depot

1) The Contractor shall provide all the equipment which enables work to be performed in accordance with the terms of this Contract.
2) 6.6kV switchgear.
3) 6.6kV transformer.
4) Main LV Switchgear.
5) Low voltage cables between transformers and low voltage switchboards.
6) Main earthing system with earthing rods, earthing wires and protecting conduits shall be provided and installed by the Civil Contractor.
7) Earthing cables between main earthing system and earthing terminals in the DB.
8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(6) Scope of works for low voltage distribution in the main line

1) Low voltage cables in the main line shall be installed in cable containment provided by the contractor.
2) Low voltage cables work for outdoor lighting equipment, matching device box for track circuit (Signaling System equipment) and outlet for maintenance.
3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,
4) Protection devices for cable installation.
5) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment in substations, battery post and ancillary buildings, etc.

(7) Scope of works for low voltage distribution in the Banlic Depot

1) Low voltage cables in the Banlic Depot shall be installed in buried ducts, concrete

(4) Scope of works for Emergency Generator Room (hereinafter referred to as EGR)

1) The Contractor shall provide all the equipment which enables work to be performed in accordance with the requirements of the contract.
2) Low voltage generator works.
3) Control equipment, low voltage cables, control cables and attachments work.

(5) Scope of works for DB in the Banlic Depot

1) The Contractor shall provide all the equipment which enables work to be performed in accordance with the terms of this Contract.
2) 6.6kV switchgear.
3) 6.6kV transformer.
4) Main LV Switchgear.
5) Low voltage cables between transformers and low voltage switchboards.
6) Main earthing system with earthing rods, earthing wires and protecting conduits shall be provided and installed by the Civil Contractor.
7) Earthing cables between main earthing system and earthing terminals in the DB.
~~7)~~8) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment.

(6) Scope of works for low voltage distribution in the main line

1) Low voltage cables in the main line shall be installed in cable containment provided by the contractor.
2) Low voltage cables work for outdoor lighting equipment, matching device box for track circuit (Signaling System equipment) and outlet for maintenance.
3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,
4) Protection devices for cable installation.
~~4)~~5) Low Voltage distribution board with single or three phase LV power required for supplying power to the system's equipment in substations, battery post and ancillary buildings, etc.

(7) Scope of works for low voltage distribution in the Banlic Depot

1) Low voltage cables in the Banlic Depot shall be installed in buried ducts, concrete troughs, and manholes respectively.

2) Low voltage cables work for outdoor lighting equipment, outdoor mechanical equipment and all buildings which require electric power

3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,

4) Outdoor lighting fixtures shall be mounted on poles.

5) Low Voltage distribution board with single or three phase LV power required.

(8) Scope of works for outdoor lighting in the Banlic Depot

1) The Contractor shall provide outdoor lighting (including control panels) in the Banlic Depot yard for maintenance works.

2) Outdoor lighting fixtures in the Banlic Depot yard shall be mounted on the poles and beams of the OCS.

3) Outdoor lighting on the road in the Banlic Depot shall be mounted on poles.

4) Low Voltage distribution board with single or three phase LV power required.

(9) Scope of works for outlets for maintenance

1) The Contractor shall provide outlets for maintenance on the main line, the locations and quantity of which shall be proposed by the contractor and approved by the Engineer.

2) Outlets for maintenance shall be mounted on the wall in the main line.

(10) Scope of works for earthing system

1) The main earthing system shall be provided by Civil Contractors.

2) The Contractor shall provide the earthing terminals in the RER and HER.

3) Contractor shall provide earthing cables between the main earthing system and earthing terminals.

(11) Out of Scope of works

1) Building works for RER, HRR and EGR including internal lighting, outlets, air conditioners and other building services.

2) In the main line, Station electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in RER, REM and the LV panels in RER, REM.

3) In the Banlic Depot, Low voltage electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in HER and the LV panel in the low voltage electrical room.

4) The exhaust equipment in the exhaust stack shaft installed between the emergency

2) Low voltage cables work for outdoor lighting equipment, outdoor mechanical equipment and all buildings which require electric power

3) The Contractor shall provide outdoor lighting (including control panels) for emergency stairs etc.,

4) Outdoor lighting fixtures shall be mounted on poles.

~~4)~~5) Low Voltage distribution board with single or three phase LV power required.

(8) Scope of works for outdoor lighting in the Banlic Depot

1) The Contractor shall provide outdoor lighting (including control panels) in the Banlic Depot yard for maintenance works.

2) Outdoor lighting fixtures in the Banlic Depot yard shall be mounted on the poles and beams of the OCS.

3) Outdoor lighting on the road in the Banlic Depot shall be mounted on poles.

~~3)~~4) Low Voltage distribution board with single or three phase LV power required.

(9) Scope of works for outlets for maintenance

1) The Contractor shall provide outlets for maintenance on the main line, the locations and quantity of which shall be proposed by the contractor and approved by the Engineer.

2) Outlets for maintenance shall be mounted on the wall in the main line.

(10) Scope of works for earthing system

1) The main earthing system shall be provided by Civil Contractors.

2) The Contractor shall provide the earthing terminals in the RER and HER.

3) Contractor shall provide earthing cables between the main earthing system and earthing terminals.

(11) Out of Scope of works

1) Building works for RER, HRR and EGR including internal lighting, outlets, air conditioners and other building services.

2) In the main line, Station electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in RER, REM and the LV panels in RER, REM.

3) In the Banlic Depot, Low voltage electrical room equipment including cabling between the main LV Switchgear installed by the Contractor in HER and the LV panel in the low voltage electrical room.

4) The exhaust equipment in the exhaust stack shaft installed between the emergency

Station Name	Station Transformer, Signaling & Telecommunication Transformer (kVA)	Q'ty	Total Power (kVA)	Remarks
CALAMBA	1,000	1	1700	For Station Load
	500	1		For Tenant
	200	1		For Signaling System and Telecommunications
Banlic Depot	2,000	2	2,000 x2	For OCC Building
	750	1	750	For Light Repair Shop
	1,000	1	1,000	For DB

Note:

1.) The represented capacity shown above is for reference only. The final rated capacity shall be determined by the Contractor as part of its design of works.
2.) The Contractor shall coordinate with other Interface Contractors and other subsystem to obtain the power consumption requirements necessary for the identification of the equipment capacity with design calculation.

(5) Emergency Power Supplies

1) Low voltage emergency power supplies shall be installed in the the stations and in the HER of the OCC building in Banlic Depot.

2) Low voltage emergency power supplies shall automatically start up in the event of absence of 6.6kV supplies to the emergency generator room for CIA, OCC building and Training Center. Emergency power supplies shall be capable of automatically delivering the vitally demanded power, up to the rated value, within 40 seconds of absence of voltage on both 6.6kV incoming feeders being verified.

3) In order to test the operation of the emergency power supply, the Contractor shall provide facilities to enable the emergency generators to be started and to be connected to necessary loads.

4) Changeover from power company power to emergency power shall be done automatically through switching schemes.

5) Changeover from emergency power to power company power shall be done manually by means of a remote command entered into the Power SCADA system, and/or manual operation of circuit breakers. The interlocking schemes and Power SCADA programs shall be provided to ensure that emergency power is not fed out to the power company

Station Name	Station Transformer, Signaling & Telecommunication Transformer (kVA)	Q'ty	Total Power (kVA)	Remarks
BANLIC	1250	1	1450	For Station Load
	200	1		For Signaling System and Telecommunications
CALAMBA	1,000	1	1700	For Station Load
	500	1		For Tenant
	200	1		For Signaling System and Telecommunications
Banlic Depot	2,000	2	2,000 x2	For OCC Building
	750	1	750	For Light Repair Shop
	1,000	1	1,000	For DB ~~(Oil)~~

Note:

1.) The represented capacity shown above is for reference only. The final rated capacity shall be determined by the Contractor as part of its design of works.

2.) The Contractor shall coordinate with other Interface Contractors and other subsystem to obtain the power consumption requirements necessary for the identification of the equipment capacity with design calculation.

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3) In order to test the operation of the emergency power supply, the Contractor shall provide facilities to enable the emergency generators to be started and to be connected to necessary loads.

4) Changeover from power company power to emergency power shall be done automatically through switching schemes.

4.6.5 RCW Servers

The Contractor shall provide a flexible and structured RCW system that operates on the server network using either Windows or Linux Operating system. The duplicated RCW Servers shall be located in OCC.

The RCW Servers shall be in a fully redundant configuration with 'hot standby' features whereby recovery of a failed hardware or software component can proceed without interruption of operations. Moreover, there shall be one RCW server that will operate in the "master" state, processing network traffic while a second RCW standby server operates in the passive "standby" state. In the event of failure of the master RCW server the standby RCW server shall automatically assume master status and resumes processing network traffic. The clock timing of the RCW Servers shall synchronize with the NSCR master clock system.

4.6.6 RCW Hardware

The Control Center users shall be able to access the RCW server and the voice dispatch system from a single RCW and the RCWs shall be networked together via a redundant LAN/Ethernet.

Each RCW shall be equipped with the following as a minimum:

1) Keyboard;
2) Mouse or trackball as the pointing device;
3) Headset with microphone and loudspeaker;
4) Loudspeaker;
5) Desktop noise-canceling microphone with integrated PTT switch or gooseneck console mic with a separate PTT; and
6) Data interface socket.

All functionality accessible via the pointing device shall also be available through the keyboard via configurable (hot) keys and /or via keyboard macros.

All workstation displays shall support high-resolution (1280x1024) color graphics and shall be a minimum of a 21-inch color screen.

The RCW shall also include a set of dedicated function keys to enable OCC controllers to execute functions quickly without having to look at the screen.

The RCW server should be based upon a Windows operating system with an Ethernet card and TCP/IP communication protocol.

4.6.7 RCW Graphical User Interface (GUI)

The GUI shall be a WIMP (Windows, Icons, Menus, and a Pointing device) style of interface that allows Controllers to have easy control and expeditious response.

The GUI shall employ a combination of graphic presentations and pull-down menus. The GUI shall provide a consistent style of presentation shall be used across all of the different functions.

The Contractor shall detail the functionality and presentation of the system to meet all the specified requirements for Approval by the Engineer.

fault. Keying-in the "Cancel Alarm" command on the display shall stop the audible alarm and the alarm display shall change to steady. The alarm display shall disappear after the fault is rectified.

Incoming train voice and data calls shall be displayed in an incoming call window on the RCW of the Controller responsible for that track section with an audible ringing tone and indicate by color change of the Radio Base Station through which the calling train is currently working.

Incoming calls from hand-portables shall indicate the Caller ID, the location the person is operating from, and the call type.

Telephone interconnect (PSTN/PBX call) shall be provided and include patching between radio users and telephone landline users. The Controller shall be able to include a third party so that three parties can be included in a conference-type call. The Controller shall be able to leave the call, whereupon the call continues between the other two parties.

4.6.5 RCW Servers

The Contractor shall provide a flexible and structured RCW system that operates on the server network using ~~a~~ either Windows or Linux O~~o~~perating system. The duplicated RCW Servers shall be located in OCC.

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6) Data interface socket.

All functionality accessible via the pointing device shall also be available through the keyboard via configurable (hot) keys and /or via keyboard macros.

All workstation displays shall support high-resolution (1280x1024) color graphics and shall be a minimum of a 21-inch color screen.

The Contractor shall develop and submit for approval by the Engineer an Interface Control Document for each sub-system and Other Works Contractor. The Interface Control Document shall be a "live" common document between each sub-system and other Contractors and external parties, which will be revised and re-submitted by the Contractor to ensure that it remains current, and at other times as directed by the Engineer. It shall be signed off by the Contractor, his sub-contractors, and the interfacing Contractors, prior to submission. The submission date of each Interface Control Document shall be coordinated with that of the respective other parties. The Interface Control Document shall cover the contents of the following as minimum:

a) Clearly identify the demarcation between the sub-system, his subcontractors, and Other Works Contractors;
b) Describe detailed physical, electrical/ mechanical, and functional interfaces (such as protocols, software, and data structures) between the sub-system, his sub-contractors, and Other Works Contractors;
c) Identify the information to be exchanged between the sub-system, his sub-contractors, and Other Works Contractors with a timeline that complies with the overall Project program as well as the contracts of the respective parties;
d) Define Design, Manufacture, Supply, Installation, Testing, and Commissioning responsibilities;
e) Address the Design, Manufacture, Supply, Installation, Testing and Commissioning program of the interfaces to meet the key dates of each contract, and highlight any program risks requiring the Engineer's attention;
f) Specify the proposed method and schedule for verifying interface integrity along with any requirements, whether temporary or permanent, relating to the physical installation of each party's equipment or materials used for the Works; and
g) Include test procedures and a program to demonstrate the performance and integrity of the integrated systems.
h) Interface Matrix that defines the interface and its requirements, responsibilities of each interfacing parties and due dates.
i) Interface Solution Register (ISR) reference that records the agreed solution to each interface. The ISR shall describe in detail how the interface is solved and what methods are agreed to verify the requirement of the interface. Template of the ISR will be provided by Engineer.
j) Demarcation Drawings to define the responsibilities of each interfacing party.
k) Information Exchange Log (IEL)
l) Coordinated Installation Programme (CIP)

The Contractor shall communicate and co-operate with the Interface Contractors to identify and resolve potential interface problems.

The Contractor shall allow for the fact that many of the design activities of the Interface Contractors may proceed concurrently to the construction of this Contract. Specific dates for the delivery of this and other required information shall be confirmed between the Contractor and the Interface Contractors.

The Contractor's program shall allow for the timing of availability of necessary interface information from the interfacing parties.

20.3. Request for Information

All requests for information (RFI), acknowledgment of receipt of information, and any

The Contractor shall develop and submit for approval by the Engineer an Interface Control Document for each sub-system and Other Works Contractor. The Interface Control Document shall be a "live" common document between each sub-system and other Contractors and external parties, which will be revised and re-submitted by the Contractor to ensure that it remains current, and at other times as directed by the Engineer. It shall be signed off by the Contractor, his sub-contractors, and the interfacing Contractors, prior to submission. The submission date of each Interface Control Document shall be coordinated with that of the respective other parties. The Interface Control Document shall cover the contents of the following as minimum:

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b) Describe detailed physical, electrical/ mechanical, and functional interfaces (such as protocols, software, and data structures) between the sub-system, his sub-contractors, and Other Works Contractors;
c) Identify the information to be exchanged between the sub-system, his sub-contractors, and Other Works Contractors with a timeline that complies with the overall Project program as well as the contracts of the respective parties;
d) Define Design, Manufacture, Supply, Installation, Testing, and Commissioning responsibilities;
e) Address the Design, Manufacture, Supply, Installation, Testing and Commissioning program of the interfaces to meet the key dates of each contract, and highlight any program risks requiring the Engineer's attention;
f) Specify the proposed method and schedule for verifying interface integrity along with any requirements, whether temporary or permanent, relating to the physical installation of each party's equipment or materials used for the Works; and
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The Contractor shall allow for the fact that many of the design activities of the Interface Contractors may proceed concurrently to the construction of this Contract. Specific dates for the delivery of this and other required information shall be confirmed between the Contractor and the Interface Contractors.

The Contractor's program shall allow for the timing of availability of necessary interface information from the interfacing parties.

20.3. Request for Information

		Commissioning stage shall be addressed in this section
4.4	Quality Procedures	Contractor's internal quality procedures applicable for the interface management shall be listed here
4.5	Interface Management Process	The contractor shall produce the following documents that will form part of the interface management process as minimum, these documents are live documents and shall be updated regularly. - Interface Matrix - Interface Solution Register (ISR) - Interface Exchange Log (IEL) - Coordinated Design Interface Programme - Interface Control Documents (ICD) The contractor shall specify the use of ComplyPro to manage the interface requirements and information exchange with the interfacing contractors.
5	**Document Management**	
5.1	Reference Documents	All applicable reference documents shall be listed in this section
5.2	Structure of Reference Documents	The structure of reference documents shall be addressed in this section
5.3	Version Control of Interface Documents	Configuration management of interface documents shall be addressed in this section
6	**Communication**	
6.1	Terms of Reference of Interface Meetings	The terms of reference of interface meetings shall be addressed here
6.2	Exchange of Information between Contractors	The process for the exchange of information between the pair-wise contractors (Interface Contractors) shall be stated here
6.3	Submission to Engineer	The approach to be adopted by the pair-wise

	Interfaces	management of interface in the Testing and Commissioning stage shall be addressed in this section
4.4	Quality Procedures	Contractor's internal quality procedures applicable for the interface management shall be listed here
4.5	Interface Management Process	The contractor shall produce the following documents that will form part of the interface management process as minimum, these documents are live documents and shall be updated regularly. - Interface Matrix - Interface Solution Register (ISR) - Interface Exchange Log (IEL) - Coordinated Design Interface Programme - Interface Control Documents (ICD) The contractor shall specify the use of ComplyPro to manage the interface requirements and information exchange with the interfacing contractors.
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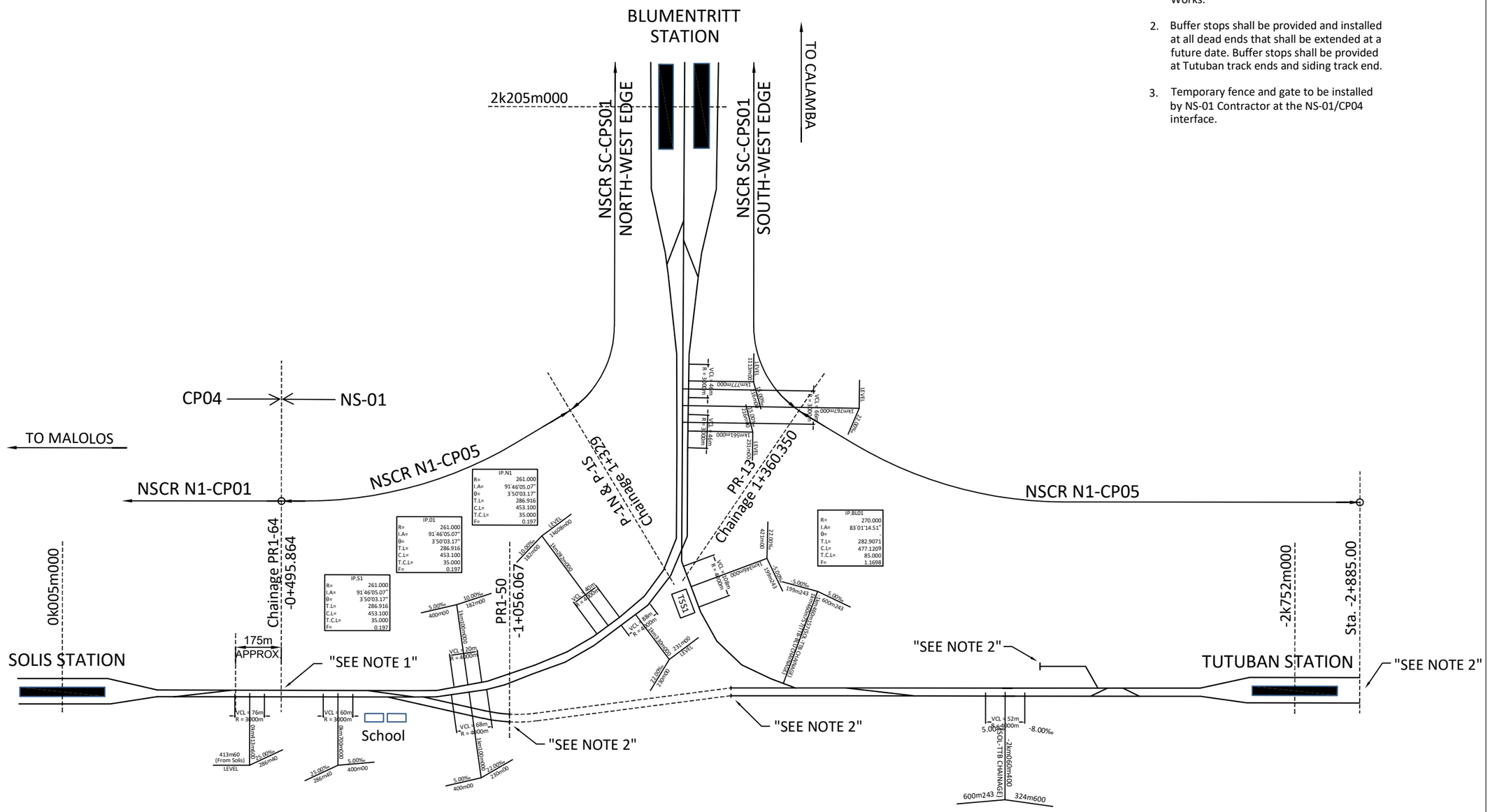
5.1	Reference Documents	All applicable reference documents shall be listed in this section
5.2	Structure of Reference Documents	The structure of reference documents shall be addressed in this section
5.3	Version Control of Interface Documents	Configuration management of interface documents shall be addressed in this section
6	**Communication**	
6.1	Terms of Reference of Interface Meetings	The terms of reference of interface meetings shall be addressed here
6.2	Exchange of Information between Contractors	The process for the exchange of information between the pair-wise contractors (Interface Contractors) shall be stated here

NOTE:
1. Temporary Buffer Stops shall be provided and installed by CP04 Contractor at Chainage -0+495.This Buffer Stops shall be removed by the NS-01 Contractor on connection of the Trackwork to the CP04 Works.
2. Buffer stops shall be provided and installed at all dead ends that shall be extended at a future date. Buffer stops shall be provided at Tutuban track ends and siding track end.
3. Temporary fence and gate to be installed by NS-01 Contractor at the NS-01/CP04 interface.



LEGEND:

---------- FUTURE CONNECTION

FOR REFERENCE ONLY

VERSIONS	DATE	DESCRIPTION
00	21 MAY 2021	ISSUED FOR REFERENCE
01	13 JULY 2021	REVISED NOTE 1

DEPARTMENT OF TRANSPORTATION (DOTr)

PHILIPPINE NATIONAL RAILWAYS

CONSULTANT

JICA DESIGN TEAM (JDT)

ORIENTAL CONSULTANTS GLOBAL CO.,LTD.

KATAHIRA & ENGINEERS INTERNATIONAL

PACIFIC CONSULTANTS CO.,LTD.

JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO.,LTD.

TONICHI ENGINEERING CONSULTANTS, INC.

Tokyo Metro Co.,Ltd.

TITLE	–	–
DESIGNER	A.AGUILAR	–
CHECK	R.ZARASPE	–
TEAM LEADER	P.SWIFT	–
P. MANAGER	Y.MAEDA	–

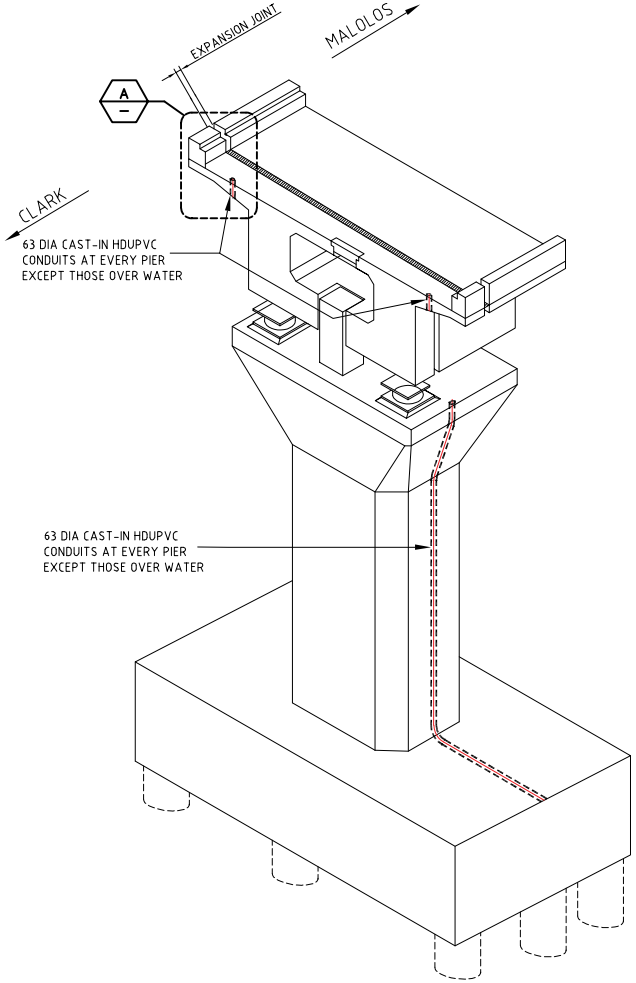
MALOLOS – CLARK RAILWAY PROJECT (MCRP)
NORTH SOUTH RAILWAY PROJECT–SOUTH (NSRP–SOUTH)

Package CP NS–01 : Bidding Documents

SOLIS, BLUMENTRITT AND TUTUBAN (SBT) LAYOUT

DATE	MAY 2021
SCALE	AS SHOWN
SHEET No.	1 of 1
DRG No.	NSCR–GCR–NS01–SBT–DWG–TK–000001
DRG S.	–
REV	01

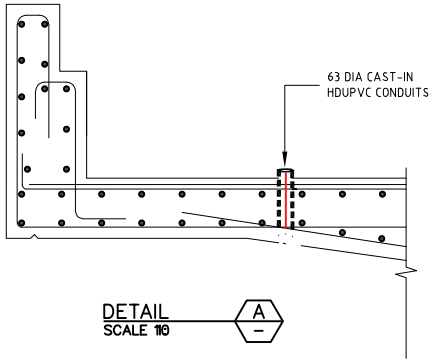
GBB No. 16



ISOMETRIC VIEW OF PIER
SCALE: NTS

NOTES

1. ALL CONDUCTORS AND EARTH RODS TO BE SUPPLIED AND INSTALLED BY CP NS-01 E&M CONTRACTOR.
2. ALL CONDUITS AND DUCTS TO BE PROVIDED WITH SUITABLE DRAW STRINGS.
3. EARTH RODS AND INSPECTION PITS PROVIDED BY THE CP NS-01 E&M CONTRACTOR SHALL BE EQUIPPED WITH SECURE LOCKABLE COVER.
4. THE ARRANGEMENT SHOWN ON THIS DRAWING IS INDICATIVE ONLY. THE CIVIL WORKS CONTRACTOR SHALL COORDINATE FURTHER DETAILS WITH CP NS-01 E&M CONTRACTOR PRIOR TO COMMENCEMENT OF THE RELEVANT CIVIL WORKS.



DETAIL A
SCALE 1:10

SCALE 1:10 0.1 0 0.1 0.2 0.3 0.4 0.5

VERSIONS	DATE	DESCRIPTION
00	04 MAY 2021	ISSUED FOR REFERENCE
01	19 JULY 2021	ISSUED FOR REFERENCE

DEPARTMENT OF TRANSPORTATION (DOTr)

PHILIPPINE NATIONAL RAILWAYS

CONSULTANT

JICA DESIGN TEAM (JDT)

ORIENTAL CONSULTANTS GLOBAL CO., LTD.
JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO., LTD.
KATAHIRA & ENGINEERS INTERNATIONAL
TONICHI ENGINEERING CONSULTANTS INC.
PACIFIC CONSULTANTS CO., LTD.
TOKYO METRO CO., LTD

TITLE	–	–
DESIGNER	K.HIGASHITSUJI	–
CHECK	R.ZARASPE	–
TEAM LEADER	P.SWIFT	–
P. MANAGER	Y.MAEDA	–

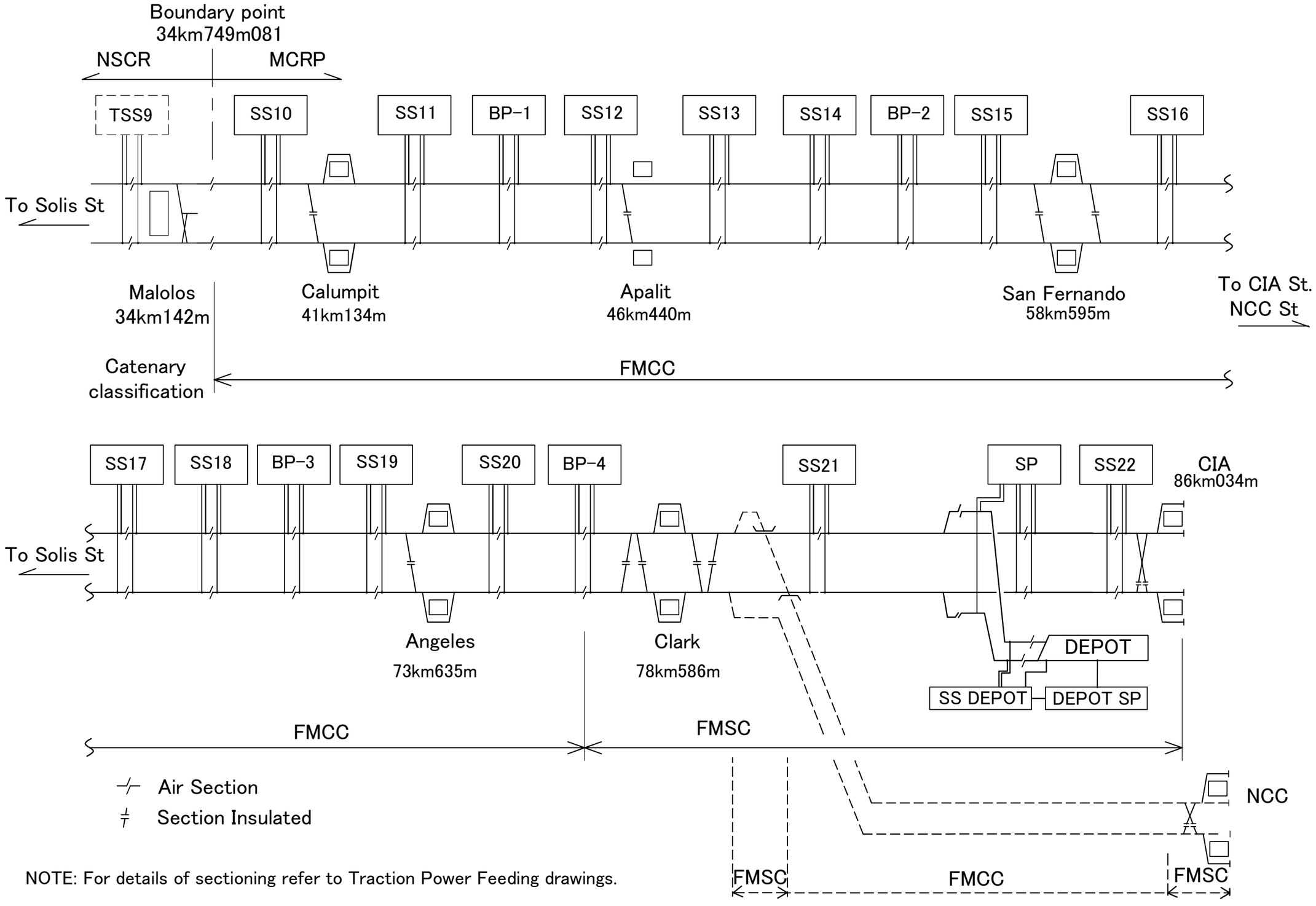
MALOLOS - CLARK RAILWAY PROJECT (MCRP)
NORTH SOUTH RAILWAY PROJECT-SOUTH (NSRP-SOUTH)

PACKAGE NS-01 : Bidding Documents

LIGHTNING ARRESTER DETAIL

DATE	MAY 2021
SCALE	AS SHOWN IN A1
SHEET No.	1 OF 1
DRG No.	NSCR-GCR-NS01-ZWE-DWG-DS-000002
DRG S.	REV 01

Last modified by USER / 18 Jun 2021
Filename: D:\GCR_Files\01Working\NSCR-Ex\3_MCRP\WORKING\Rev. Drawings\MCRP-DWG-VIA00-(R4)\VIA00 TYPICAL DWGs\MCRP-DWG-VIA00-ST-1901



NOTE: For details of sectioning refer to Traction Power Feeding drawings.

VERSIONS	DATE	DESCRIPTION
01	17 NOV 2020	APALIT CROSSOVER ADDED
02	26 FEB 2021	ADDITIONAL MAINTENANCE TRACK TURNOUTS
03	02 MAR 2021	ISSUED FOR REFERENCE
04	25 JUN 2021	ANGELES,CLARK & CIA STATION CHAINAGE REVISED
05	21 JUL 2021	NOTE ADDED

DEPARTMENT OF TRANSPORTATION (DOTr)

PHILIPPINE NATIONAL RAILWAYS

CONSULTANT

JICA DESIGN TEAM (JDT)

ORIENTAL CONSULTANTS GLOBAL CO.,LTD.

JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO.,LTD.

KATAHIRA & ENGINEERS INTERNATIONAL

TONICHI ENGINEERING CONSULTANTS, INC.

PACIFIC CONSULTANTS CO.,LTD.

Tokyo Metro Co.,Ltd.

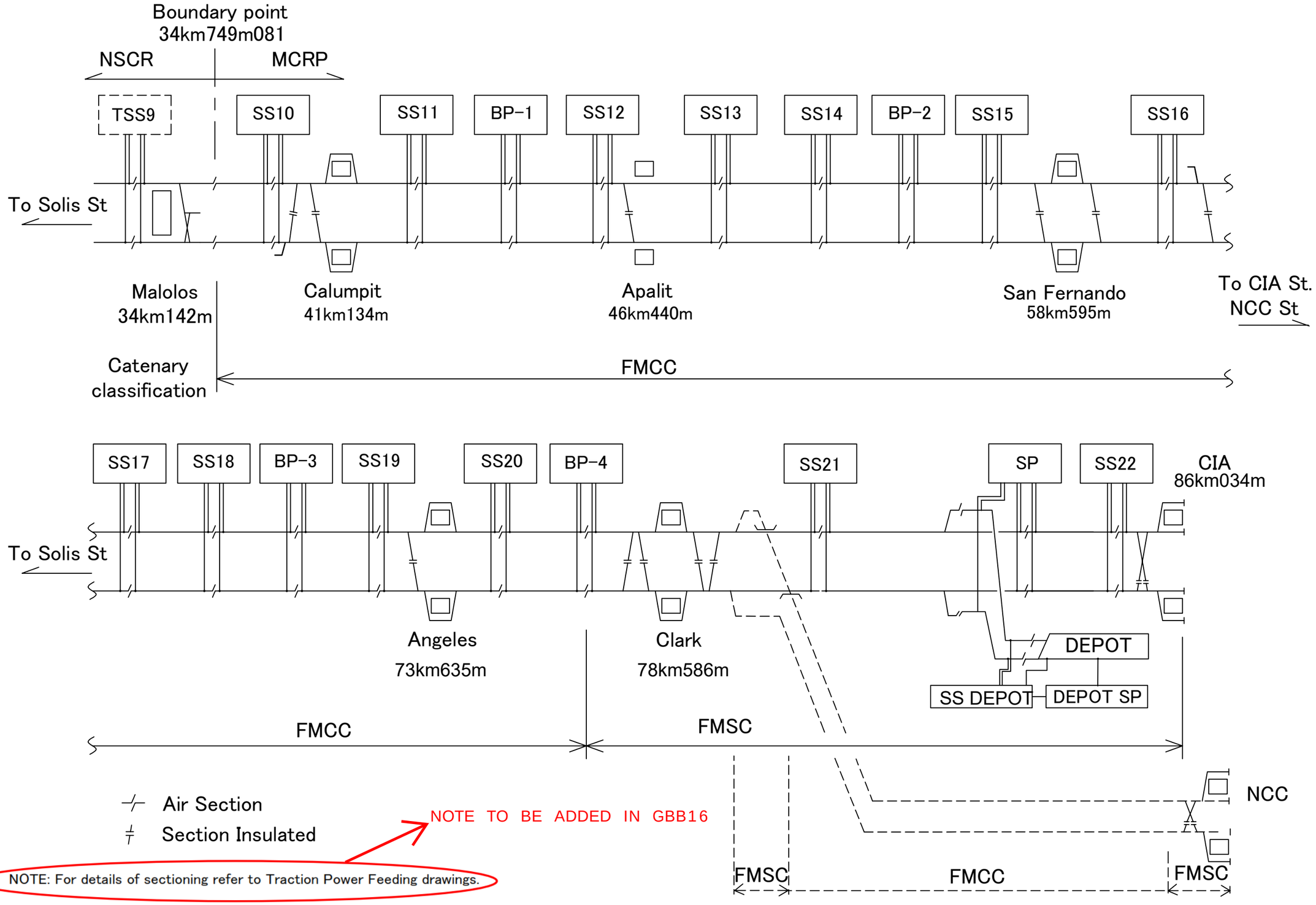
TITLE	JDT	SMEC
DESIGNER	R.SHIMIDA	–
CHECK	T.MATSUMOTO	–
TEAM LEADER	T.ISHIZUKA	–
P. MANAGER	N.KAWAI	–

MALOLOS – CLARK RAILWAY PROJECT (MCRP)
NORTH SOUTH RAILWAY PROJECT–SOUTH (NSRP–SOUTH)

Package CP NS–01 : Bidding Documents

OVERHEAD CONTACT SYSTEM
SCHEMATIC DIAGRAM INCLUDING
CATENARY CLASSIFICATION
AND SUBSTATION LOCATION

DATE	JANUARY 2019
SCALE	NON SCALE
SHEET No.	
DRG No.	MCRP–DWG–X/X–OCS–0002
DRG S.	–
REV	05



VERSIONS	DATE	DESCRIPTION
01	17 NOV 2020	APALIT CROSS OVER ADDED
02	26 FEB 2021	ADDITIONAL MAINTENANCE TRACK TURNOUTS
03	02 MAR 2021	ISSUED FOR REFERENCE
04	25 JUN 2021	ANGELES,CLARK & CIA STATION CHAINAGE REVISED

DEPARTMENT OF TRANSPORTATION (DOTr)

PHILIPPINE NATIONAL RAILWAYS

CONSULTANT

JICA DESIGN TEAM (JDT)

ORIENTAL CONSULTANTS GLOBAL CO.,LTD.

JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO.,LTD.

KATAHIRA & ENGINEERS INTERNATIONAL

TONICHI ENGINEERING CONSULTANTS, INC.

PACIFIC CONSULTANTS CO.,LTD.

Tokyo Metro Co.,Ltd.

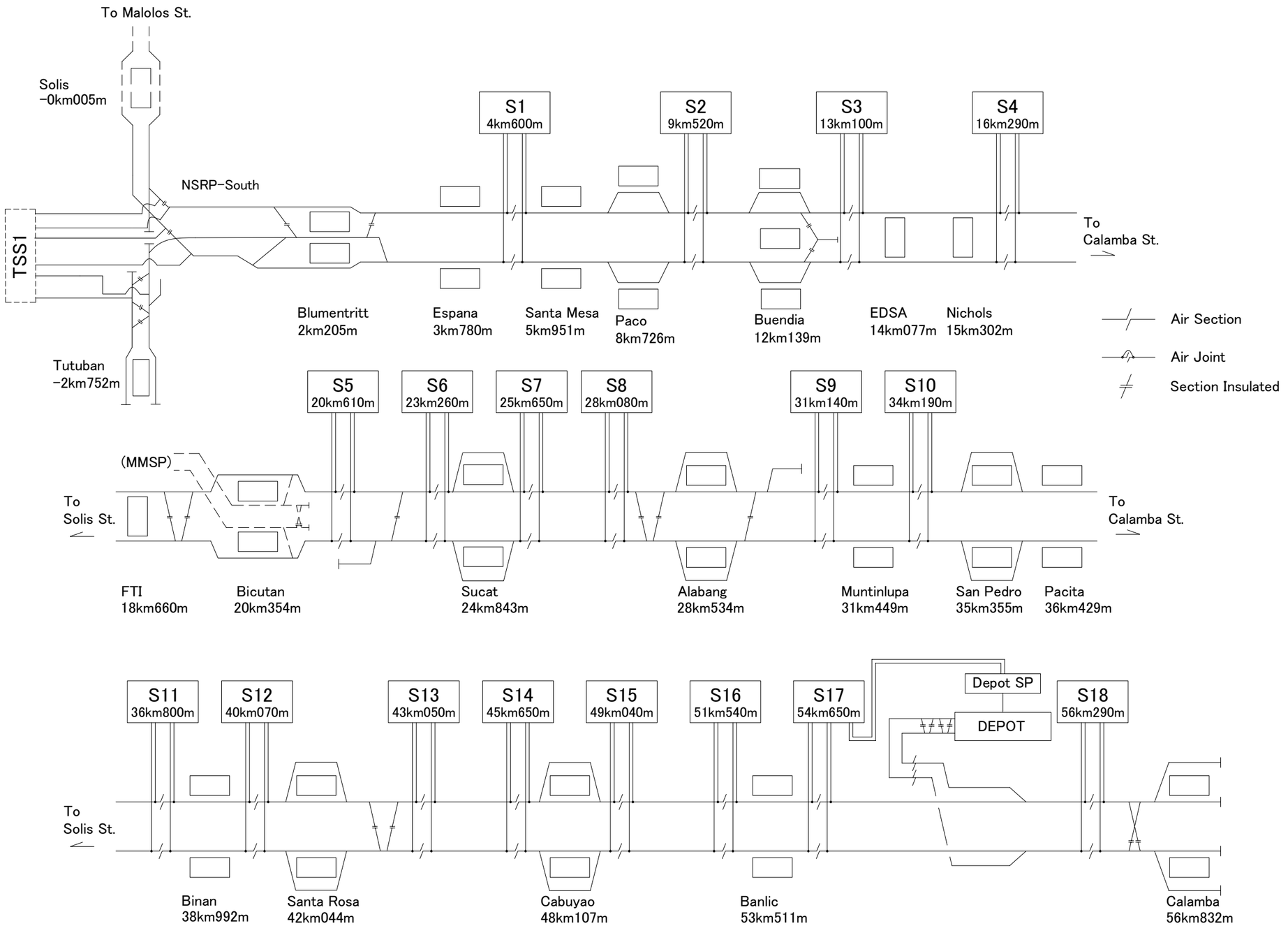
TITLE	JDT	SMEC
DESIGNER	R.S□.M.D□	□
CHECK	T.□M□TS□MOTO	□
TEAM LEADER	T.□S□.□.K□	□
P. MANAGER	□.K□.□ □□	□

MALOLOS – CLARK RAILWAY PROJECT (MCRP)
NORTH SOUTH RAILWAY PROJECT-SOUTH (NSRP-SOUTH)

Package CP NS-01 : Bidding Documents

OVERHEAD CONTACT SYSTEM
SCHEMATIC DIAGRAM INCLUDING
CATENARY CLASSIFICATION
AND SUBSTATION LOCATION

DATE	JANUARY 2019
SCALE	NON SCALE
SHEET No.	
DRG No.	MCRP-DWG-X/X-OCS-0002
DRG S.	REV 04



NOTE: For details of sectioning refer to Traction Power Feeding drawings.

VERSIONS	DATE	DESCRIPTION
02	02 MAR 2021	ISSUED FOR REFERENCE
03	16 JUN 2021	SUCAT,SANTA ROSA,BUENDIA AND TUTUBAN STATIONS MODIFIED
04	25 JUN 2021	SUCAT STATION CHAINAGE CHANGED
05	13 JUL 2021	CONNECTION AT BOUNDARY POINT REMOVED
06	21 JUL 2021	NOTE ADDED

DEPARTMENT OF TRANSPORTATION (DOTr)

PHILIPPINE NATIONAL RAILWAYS

CONSULTANT

JICA DESIGN TEAM (JDT)

ORIENTAL CONSULTANTS GLOBAL CO.,LTD.

JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO.,LTD.

KATAHIRA & ENGINEER INTERNATIONAL

TONICHI ENGINEERING CONSULTANTS, INC.

PACIFIC CONSULTANTS CO.,LTD.

Tokyo Metro Co.,Ltd.

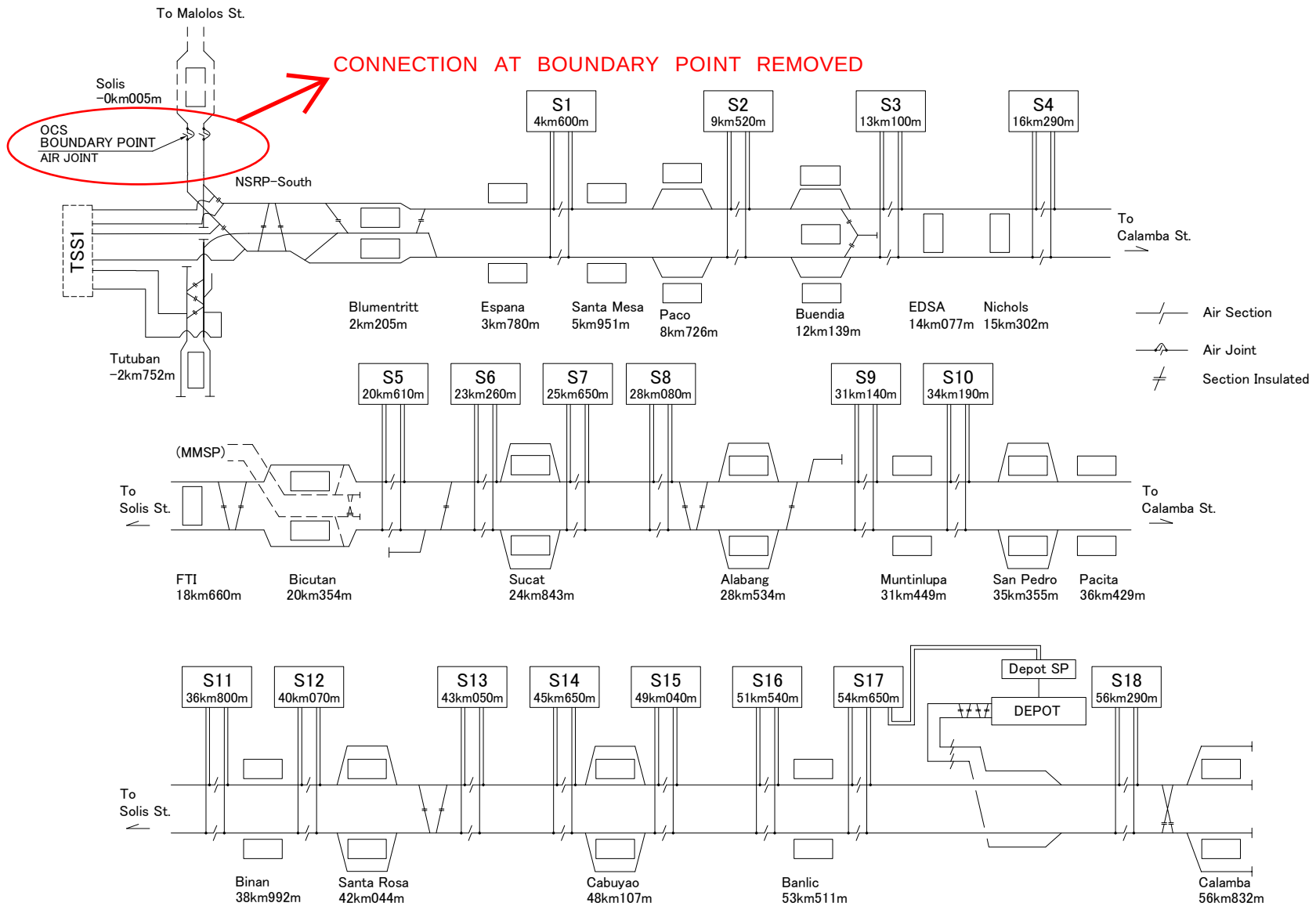
TITLE	JDT	SMEC
DESIGNER	I.KOBAYASHI	−
CHECK	T.MATSUMOTO	−
TEAM LEADER	H.OGURA	−
P. MANAGER	N.KAWAI	−

MALOLOS − CLARK RAILWAY PROJECT (MCRP)
NORTH SOUTH RAILWAY PROJECT−SOUTH (NSRP−SOUTH)

Package CP NS−01 : Bidding Documents

OVERHEAD CONTACT LINE SYSTEM
STATION AND SUBSTATION

DATE 19 DECEMBER 2018
SCALE NONE
SHEET No. −
DRG No. NSRP−South−DWG−X/X−OCS−0002
DRG S. −
REV 06



NOTE: For details of sectioning refer to Traction Power Feeding drawings. → NOTE TO BE ADDED IN GBB16

VERSIONS	DATE	DESCRIPTION
01	28 MAY 2020	TSS FEED REVISED
02	02 MAR 2021	ISSUED FOR REFERENCE
03	16 JUN 2021	SUCAT,SANTA ROSA,BUENDIA AND TUTUBAN STATIONS MODIFIED
04	25 JUN 2021	SUCAT STATION CHAINAGE CHANGED

DEPARTMENT OF TRANSPORTATION (DOTr)
PHILIPPINE NATIONAL RAILWAYS

CONSULTANT

JICA DESIGN TEAM (JDT)

ORIENTAL CONSULTANTS GLOBAL CO.,LTD.
JAPAN INTERNATIONAL CONSULTANTS FOR TRANSPORTATION CO.,LTD.
KATAHIRA & ENGINEER INTERNATIONAL
TONICHI ENGINEERING CONSULTANTS, INC.
PACIFIC CONSULTANTS CO.,LTD.
Tokyo Metro Co.,Ltd.

TITLE	JDT	SMEC
DESIGNER	I.KOBAYASHI	-
CHECK	T.MATSUMOTO	-
TEAM LEADER	H.OGURA	-
P. MANAGER	N.KAWAI	-

MALOLOS – CLARK RAILWAY PROJECT (MCRP)
NORTH SOUTH RAILWAY PROJECT-SOUTH (NSRP-SOUTH)

Package CP NS-01 : Bidding Documents

OVERHEAD CONTACT LINE SYSTEM
STATION AND SUBSTATION

DATE 19 DECEMBER 2018
SCALE NONE
SHEET No. -
DRG No. NSRP-South-DWG-X/X-OCS-0002
DRG S. -
REV 04