General Bid Bulletin No. 15
25 June 2021

IFB No. 21-031-4

THE MALOLOS-CLARK RAILWAY PROJECT AND THE NORTH SOUTH RAILWAY PROJECT-SOUTH LINE COMMUTER PACKAGE CP NS-03: ROLLING STOCK-LIMITED EXPRESS TRAINSETS

This General Bid Bulletin is issued to amend/clarify certain provisions in the Bidding Documents for the abovementioned project. Please refer to the attached Annexes of this General Bid Bulletin duly approved by the end-user and co-implementer for details:

1. Annex "A" – Answers to Queries from the Prospective Bidders including clarifications to the Bidding Documents;

2. Annex "B" – Revisions to the Bidding Documents; and
3. Annex "B" – Attachment 1 – Revised pages/amendments and final form as revised/amended

All other portions of the Bidding Documents affected by these revisions, amendments and/or clarifications shall be made to conform to the same.

Revisions/amendments/clarifications made herein shall be considered an integral part of the Bidding Documents for this project.

For your information and guidance.

For the Bids and Awards Committee IV:

SIGNATURE REDACTED

JOSEPH CONRAD D. DUEÑAS
Chairperson

Annex A

PACKAGE CP NS-03: ROLLING STOCK - LIMITED EXPRESS TRAINSETS
General Bid Bulletin No. 15
Annex A

Item No.	Volume Section No. Page No. Clause No. / Title Reference Text	Clarification Request	Proposed Revised Text (if any)	Response
1.	Volume II/III - Part 2 Section VI ERG Chapter 8.1 Clause 8.1.7 (64/355) ERG-47 SYSTEM ASSURANCE General	A Taking Over Certificate (TOC) will be issued for each trainset. In order to obtain a TOC for the Rolling Stock from the Employer/Engineer, it is required that each trainset achieves 1,500 km of Fault-Free Running (FFR) during the integrated testing and commissioning. 1) The Bidder assumes the word "integrated testing and commissioning" intends ERT 20.5 - Integrated Testing and Commissioning. Please confirm if the Bidder's assumption is correct. 2) May we understand the NS03 Contractor, once become ready, can proceed verification of 1,500km FFR using part of main line (but not full length) which is available and ready to conduct Integrated Testing and Commissioning at that time.	N/A	Bidder understanding is correct. However, please refer to Annex B for updated clause 8.1.7 and 8.1.8.
2.	Part 3 – Section VIII – Particular Conditions	Achievement: Deliver the Mock Up to the site 31 months	Achievement: Deliver the Mock Up to the site ~~23~~24 months	Bidder request accepted. Please refer to Annex B.

	ATTACHMENT 1 SUMMARY OF KEY DATES (16/57) PC-8 KD 2			
	GBB4 Annex B – Attachment 1 (49/51) PC-8 KD2	Achievement: Deliver the Mock Up to the site 14 months		
	GBB10 Annex B – Attachment 1 (80/82) PC-8 KD2	Achievement: Deliver the Mock Up to the site 23month Delivery of the Mock Up until 23rd months is challenging. The Bidder would like to have the Employer consideration to extend it another 1 month.		
3.	GBB10 Annex B – Attachment 1 (80/82) PC-8 KD3	Achievement: Completing FAI and FAT 36 months We cannot find definition of FAI in the Bidding Documents, please clarify.	N/A	Please refer to clause 20.1.4 - First Article Inspections (FAI) shall be performed as specified in Clause 22.4 of ERT.
4.	GBB10 Annex B – Attachment 1 (80/82) PC-8 KD3	Achievement: Completing FAI and FAT 36 months Considering with required design completion period - 30months (KD1), this KD3 at 36 months is unrealistic to achieve. Also there is an inconsistency as delivery of on-board	Achievement: Completing FAI and FAT ~~36~~58 months	Bidder request is rejected. As per the latest Key Dates, gap between KD 1(Month 25) and KD 3(Month 36) has

		equipment – 37 months (AD1) has been scheduled even later than this KD3. (Note: ERT 20.4.2 requires integrated test with on-board equipment during FAT). With this, the Bidder would like to request extension of this KD to 58 months.		longer gap with 11 months. As for AD1 which has been updated to Month 28, it means that the on-board equipment will be included during FAT. FAT should be completed prior to train delivery so as any issues may arise, it can be rectified in the manufacturer's facility prior to delivery.
5.	GBB10 Annex B – Attachment 1 (80/82) PC-8 KD4	Achievement: Supply and delivery of the following Rolling Stock equipment for training purposes to the CP NS-01 Contractor at the North Depot (for Training Center Facility): - Equipment for driving simulator, - Pantograph, and - Bogie assembly for motor car including traction motor, gearbox and coupling. 36 months Considering with required design completion period which is 30months (KD1), this KD4 at 36 months is unrealistic to achieve.	Achievement: Supply and delivery of the following Rolling Stock equipment for training purposes to the CP NS-01 Contractor at the North Depot (for Training Center Facility): - Equipment for driving simulator, - Pantograph, and - Bogie assembly for motor car including	Bidder request is rejected. KD1 has been updated to Month 25 and Supply and Delivery of Rolling Stock Equipment for Training (KD4) was moved to Month 35. Delivery of equipment for training by month 56

		The Bidder would like to request extend this KD to 56 months.	traction motor, gearbox and coupling. ~~36~~56 months	is too late as by that then Trial Operation is already on-going.
6.	Volume II/III - Part 2 Section VI ERG Chapter 9.6 Clause 9.6.1 72/355 (ERG-55) Contract Procedures - Review of Drawings, Documents and Other Information Volume II/III - Part 2 Section VI ERG Chapter 10.2 Clause 10.2.3.2 78/355 (ERG-61) Contract Programs - Design Submission Program	Based upon the final time schedule, the Contractor shall allow for a period of twenty-one (21) days from the date of receipt of submittals by the Employer/Engineer to the issue of his comments. The design submission program shall: 5) Include a list of requisite design details for each and every component or equipment of all systems; and The Bidder request to change the answer time of the Engineer's from 21 to 14 days. "each and every component" is extremely detailed and should be defined to what level: To a reasonable level of detail	Based upon the final time schedule, the Contractor shall allow for a period of fourteen (14) twenty-~~one (21)~~ days from the date of receipt of submittals by the Employer/Engineer to the issue of his comments. Include a list of requisite design details for ~~each and every~~ to a between Employer/Engineer reasonably agreed level of detail	Bidder request is rejected.
7.	Volume II/III - Part 2 Section VI ERG Chapter 10.6 Clause 10.6.1 Clause 10.6.2 85/355	Details of all the proposed materials, assembly and component suppliers, manufacturers and sub-contractors shall be submitted for Employer/Engineer statement of No Objection. The contractor shall demonstrate in their submissions that all of the proposed	Details of the relevant or between Employer/Engineer reasonably agreed proposed materials, assembly and component suppliers,	The Contractor shall define the level of details in the project management plan. Bidder request is rejected.

	(ERG-68) Project Implementation - Approval of Manufacturers and Suppliers	suppliers/manufacturers have successfully manufactured the same or similar equipment and its system with a referenced project. "all" materials and components is extremely detailed and not workable. The level of detail should be defined. Only for relevant materials, assemblies and components.	manufacturers and sub-contractors shall be submitted for Employer/Engineer statement of No Objection. Such statement of No objection shall not be unreasonably withheld	
8.	Volume II/III - Part 2 Section VI ERT Chapter 1.3 Clauses - 1.3.2.2 - 1.3.2.3 150/355 (ERT-5) Configuration Control - Hardware Configuration	As a minimum, serial numbers shall be allocated to the following items of hardware: 1) Any equipment to be removed from the train for overhaul or repair; 2) All electronic boards; 3) All relays; 4) All safety critical equipment; and 5) Any equipment of value greater than USD2, 000. Serial numbers shall not exceed 10 characters, duplicate serial numbers shall not be used within a type of model series. It is common practice that the EMU manufacturer are not authorized to change standard as well as catalogue parts serial product number of the sub suppliers. Therefore, the Bidder request to adjust the requirement.	As a minimum, serial numbers shall be allocated to the following items of hardware: 1) ~~Any~~ equipment to be removed from the train for overhaul or repair as given by the suppliers; 2) ~~All~~ electronic boards as given by the suppliers; 3) ~~All~~ relays as given by the suppliers; 4) All safety critical equipment; and 5) Any equipment of value greater than USD2, 000.	Bidder request is rejected.

			~~Serial numbers shall not exceed 10 characters, duplicate serial numbers shall not be used within a type of model series.~~	
9.	Volume II/III - Part 2 Section VI ERT Chapter 1.6 Clause 1.6.1.3 151/355 (ERT-6) System Requirements - General Vehicle Configuration	The limited express train formation and equipment arrangement architecture shall be finalised during design stage. Any time and cost implication to the changes of train formation and equipment arrangement architecture from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer. Special wishes not related to the Contractor's contract are connected to a change order and will not be a Contractor time and cost implication.	The limited express train formation and equipment arrangement architecture shall be finalised during design stage. Any time and cost implication to the changes of train formation and equipment arrangement architecture from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer. As long as the Contractor satisfy the performance requirement specified in the Employer's	Bidder request is rejected.

			Requirement, such changes of train formation should be subject to variation order.	
10.	Volume II/III - Part 2 Section VI ERT Chapter 1.11 Clause 1.11.1.2 157/355 (ERT-12) System Requirements - Train Performance	The Contractor shall manufacture and supply one complete eight (8)-car train and 'T+M' unit duly equipped with test and measuring equipment and sensors for carrying out the following tests, in addition to those specified in IEC 61133 or an accepted International Standard, on respective lines. 3) Emergency braking distance trials for W0 and W2 under both dry and wet conditions to prove the braking capability of the car. Wet brake condition tests will be done only theoretically (trough a brake calculation) after passing the dry tests. This is a state of the art procedure in Europe and also beneficial for the Employer to avoid damages on track and wheel. Please change accordingly.	3) Emergency braking distance trials for W0 and W2 under both dry and wet conditions to prove the braking capability of the car. Alternatively, the wet emergency braking distance trials can be substituted by calculation on basis of the dry braking distance trials.	Bidder request is rejected.
11.	Volume II/III - Part 2 Section VI ERT Chapter 1.15 Clause 1.15.4.2 164/355 (ERT-19)	Low voltage power supplied equipment shall not be damaged by under voltage of any magnitude or duration. Recovery of connected equipment from the under-voltage condition shall be automatic, manual or by train line reset. Train line and battery supplied relays shall not drop out for under voltages as low as 0.5×(Vnom), with a duration of up to 50µs.	Low voltage power supplied equipment shall not be damaged by under voltage of any magnitude or duration. Recovery of connected equipment from the under-voltage	Bidder request is accepted. Please see Annex B.

	General Electrical Requirements - Electric-Magnetic Compatibility (EMC)	Low voltage power supply will be according to EN requirements. Therefore, the Bidder request to change the last part of the paragraph.	condition shall be automatic, manual or by train line reset. Train line and battery supplied relays shall not drop out for under voltages as low as 0.5×(Vnom), with a duration of up to 50µs or shall be according to IEC 60571.	
12.	Volume II/III - Part 2 Section VI ERT Chapter 1.15 Clause 1.15.5.1 164/355 (ERT-19) General Electrical Requirements - Electric-Magnetic Compatibility (EMC)	Equipment, which may be powered from the battery bus, shall not be damaged by reverse polarity voltage of the same magnitude and duration as the specified positive voltage conditions. Please note that the reverse polarity protection cannot be guaranteed for all components. The reverse polarity protection shall be applied as technically feasible. The Bidder will integrate state of the art railway equipment's for this purpose.	Equipment, which may be powered from the battery bus, shall not be damaged by reverse polarity voltage of the same magnitude and duration as the specified positive voltage conditions as technically feasible.	Bidder request is rejected.
13.	Volume II/III - Part 2 Section VI ERT Chapter 1.15 Clause 1.15.6.1 164/355 (ERT-19)	Equipment connected to the low voltage power supply, including battery and train lines, shall not generate transient voltages in excess of + 200 Vpk, with an energy content not to exceed 0.3 joules	Equipment connected to the low voltage power supply, including battery and train lines, shall not generate transient voltages in excess of + 200 Vpk, with an	Please see Annex B.

	General Electrical Requirements - Electric-Magnetic Compatibility (EMC)	The Bidder do not know the standard connected to this requirement. The Bidder will integrate state of the art railway equipment's following EN as well as IEC requirements.	energy content not to exceed 0.3 joules, or according to IEC 61991.	
14.	Volume II/III - Part 2 Section VI ERT Chapter 1.15 Clause 1.15.6.2 164/355 (ERT-19) General Electrical Requirements - Electric-Magnetic Compatibility (EMC)	The equipment shall be designed such that the rate of change in voltage in any transient conducted from the equipment to the electrical interface shall not exceed 10 VA for up to 1 milli second. The Bidder do not know the standard connected to this requirement. The Bidder will integrate state of the art railway equipment's following EN as well as IEC requirements.	The equipment shall be designed such that the rate of change in voltage in any transient conducted from the equipment to the electrical interface shall not exceed 10 VA for up to 1 milli second, or according to IEC 61991.	Please see Annex B.
15.	Volume II/III - Part 2 Section VI ERT Chapter 1.16 Clause 1.16.1.1 165/355 (ERT-20) Installation and Maintenance Requirements of Electric Works - Printed Circuit Boards	All electronic printed circuit boards shall be of the plug-in type unless subject to review by the Engineer. All electronic printed circuit boards, the type of connector and contact material, the board material, the number of layers in a multi-layer board, use of surface mount devices and the kind of socket shall be of having the sufficient practical operational record and reviewed by the Engineer. The type of connector and contact material shall be reviewed by the Engineer. The board material shall be suitable to rail application and the number of layers in a multi-layer board shall not exceed six. Components shall not be installed using sockets unless specifically reviewed by	All electronic printed circuit boards shall be of the plug-in or fix mounted type unless subject to review by the Engineer. All electronic printed circuit boards, the type of connector and contact material, the board material, the number of layers in a multi-layer board, use of surface mount devices and the kind	Please see Annex B.

		the Engineer. Use of surface mount devices shall be reviewed by the Engineer. Semiconductor operating temperature rating shall meet or exceed +85°C. The Bidder use components that are state of the art for the railway sector and manufactured according international as well as sub supplier standard. The printed circuits boards are not only of plug-in type but can also be mounted in a closed box. Due to conflicts with the Bidder's supplier intellectual properties the number of layers in a multi-layer board cannot be changed. Please remove this part of the requirement. The semiconductor operating temperature rating will be according to EN or other international standard.	of socket shall be of having the sufficient practical operational record and reviewed by the Engineer. The type of connector and contact material shall be reviewed by the Engineer. The board material shall be suitable to rail application ~~and the number of layers in a multi-layer board shall not exceed six~~. Components shall not be installed using sockets unless specifically reviewed by the Engineer. Use of surface mount devices shall be reviewed by the Engineer. Semiconductor operating temperature rating ~~shall meet or exceed +85°C or,~~ be according to EN or other international Standards.	

16.	Volume II/III - Part 2 Section VI ERT Chapter 2.3 Clause 2.3.2.4 177/355 (ERT-32) Carbody - Structural Requirements	The carbody shell shall be designed and tested to ensure that under W2 loading conditions positive camber exists between bogie centers. The Contractor shall ensure, and must demonstrate by test, that all doors operate freely under all carbody loading conditions and will not disengage from their guide ways under the lateral loading conditions exerted by crush-loaded passengers. The testing of the carbody structure and consequently the validation of the finite element simulations is foreseen by non-destructive static testing. The testing is performed at an institute certified according to ISO 17025. While the aluminium carbody complies with EN 12336, it is not state of the art to construct aluminium car bodies with a camber, but straight (zero camber) This car body design is based on a proven, fully welded aluminium integral construction, with double skin extrusions. Many 10'000 carbody are in successful operation for many years without positive camber. Furthermore, the specified door positions of Limited Express are directly above the bogie centres. Therefore, a camber (positive, negative or zero) will not have an impact on the door function. The demonstration and test, that all	The carbody shell shall be designed and tested to ensure <u>the compliancy with the</u> ~~that under~~ W2 loading conditions ~~positive camber exists between bogie centers. The Contractor shall ensure, and must demonstrate by test, that all doors operate freely under all carbody loading conditions and will not disengage from their guide ways under the lateral loading conditions exerted by crush-loaded passengers.~~	Agreed with bidder statement the all doors operate freely under all carbody load conditions can be done as part of the On-site Testing and Commissioning. Bidder request for amendment is rejected. Please see Annex B on the updated requirement.

		doors operate freely under all carbody load conditions can be done as part of the On-site Testing and Commissioning		
17.	Volume II/III - Part 2 Section VI ERT Chapter 2.3 Clause 2.3.2.5 177/355 (ERT-32) Carbody - Structural Requirements	The Contractor shall also design and test the doorposts, the corner posts and the Driver's cab end structure in accordance with the latest industry practices. Please note that the carbody may not be equipped with corner posts but still complying with required strength and applicable standards The Bidder ask to modify the requirement as proposed.	The Contractor shall also design and test the doorposts, the corner posts and the Driver's cab end structure <u>if it is applicable</u> in accordance with the latest industry practices.	Please see Annex B.
18.	Volume II/III - Part 2 Section VI ERT Chapter 2.5 Clause 2.5.1 178/355 (ERT-33) Carbody - Jacking and Lifting Requirements	Jacking and lifting points/pads shall be provided for normal maintenance operation, sized and positioned to accept lifting equipment. In addition to these jacking and lifting points, emergency jacking and lifting points shall also be provided at all four corners and at the center of each vehicle end to allow jacking/ lifting under emergency situation, including derailment. The jacking and lifting points will be positioned and dimensioned according the EN requirements. Therefore, please change the position of the center jacking and lifting point.	Jacking and lifting points/pads shall be provided for normal maintenance operation, sized and positioned to accept lifting equipment. In addition to these jacking and lifting points, emergency jacking and lifting points shall also be provided at all four corners ~~-~~and at the center of each <u>trainset</u> ~~vehicle~~ end to allow jacking/ lifting under	Please see Annex B.

			emergency situation, including derailment.	
19.	Volume II/III - Part 2 Section VI ERT Chapter 2.5 Clause 2.5.3 178/355 (ERT-33) Carbody - Jacking and Lifting Requirements	The carbody shell shall be designed and tested to allow an empty vehicle, with bogies attached, to be lifted at the extreme ends at the bolster jacking pads, or any combination thereof (particularly during re-railing operations), without exceeding the yield strength of any portion of the carbody. Please explain the meaning of the sentence: "to be lifted at the extreme ends at the bolster jacking pads, or any combination thereof (particularly during re-railing operations)".	N/A	Extreme ends mean near the edge of underframe post.
20.	Volume II/III - Part 2 Section VI ERT Chapter 2.8 Clause 2.8.1.5 179/355 (ERT-34) Equipment Mounting - General	All equipment and corresponding cases shall be mounted such that removal and replacement of each is possible without requiring the removal of other major equipment or cases. Similar but non-interchangeable parts shall have different mounting arrangements, to ensure against mistakes in fitting. The Bidder request to change the requirement. A different mounting arrangement for all similar parts will not be present. Some parts must be identified by the specific fitting document (example: passenger side window and emergency side window).	All equipment and corresponding cases shall be mounted such that removal and replacement of each is possible without requiring the removal of other major equipment or cases. Similar but non-interchangeable parts <u>are clearly marked in the fitting documentation</u> ~~shall have different mounting arrangements~~, to	Bidder request is rejected. The Contractor shall assign the compliance of this requirement to such fitting documentation mentioned.

			ensure against mistakes in fitting.	
21.	Volume II/III - Part 2 Section VI ERT Chapter 3.1 Clause 3.1.14 181/355 (ERT-36) Bogie - General GBB08 12/47 Item 15	The bogies shall be capable of being disconnected and reconnected to carbody with minimal operation requirements. The maximum time to remove and replace a bogie with an exchange bogie shall be less than two (2) hours. Bidder request is rejected. From Bidder's experience, the needed time for entire operation (disconnection and connection of the bogie) is different between motor and trailer bogie. Motor bogies needs more time due to the electrical and pneumatical connections. Bidder understands that this 2-hour exchange time requirement is based on certain boundary conditions. Contractor would demonstrate the time required to remove and replace the bogie in less than 2 hours, after adequate workplace preparations, considering a well-trained and instructed, professional maintenance crew, readiness of all required tools as well as optimal maintenance shop arrangement (i.e. drop table arrangement) etc.	N/A	Bidder statement is acceptable.
22.	Volume II/III - Part 2 Section VI ERT Chapter 3.2	Primary suspension vertical stiffness shall not be so great as to impart undue forces on the rail under dynamic conditions and shall be sufficiently flexible to prevent the degree of wheel unloading that would cause a derailment	N/A	The requested information provided in Volume II of III PART 2 – EMPLOYER'S

	Clause 3.2.2.2 Clause 3.2.4.1 182/355 (ERT-37) and 183/355 (ERT-38) Bogie - Suspension System	in any level of deflection in all conditions of track irregularities, curvature, super elevation, etc., consistent with vehicle speed. The bogies shall be designed to enable the safe operation of the vehicles on the most adverse track condition, with any combinations of air springs deflated. Under this condition, the maximum unloading of any wheel shall not exceed 60% of the nominal wheel load. The nominal wheel load is defined as each individual measured wheel load with the vehicle standing on a straight and level track. Refer to ERT section 1.7 for the track standards. The Bidder ask to receive more information about the track twist and dip high.		REQUIREMENTS SECTION VII – ALIGNMENT DRAWINGS
23.	Volume II/III - Part 2 Section VI ERT Chapter 4.1 Clauses 4.1.4 -4.1.5 188/355 (ERT-43) Coupler and Draft Gear - General	4.1.4 The automatic coupler shall, in conjunction with the draft-gear automatically effect mechanical, electrical and pneumatic coupling. It shall also permit separation of units either manually from the track side or remotely from the cab. 4.1.5 In both leading cars, an electrical connecting plug which is necessary for relief operation by connecting train-sets shall be equipped. Also, an emergency connection cable that connects this electrical connection plug shall be equipped. By using this connecting cable, required functions such as brake	4.1.4 The automatic coupler shall, in conjunction with the draft-gear automatically effect mechanical, ~~electrical~~ and pneumatic coupling for identically coupling head. It shall also permit separation of units either manually from the track side or remotely from the cab.	Please refer to Annex B.

		command, broadcasting, buzzer etc. shall operate properly. Length and diagram of cable shall be also consistent with other commuter trains of NSCR, NSPR-South, MMSP. The position of this plug shall be consistent with other commuter trains of NSCR, NSRP-South, MMSP particularly length of cable shall be determined in consideration of the severest deviations during coupled with other train. Basically, utilization of adapter shall not be acceptable The automatic coupler can be automatically connected manual and pneumatical only for identical coupler head. With a different coupler head an adaptor will be necessary. No electrical automatically connection will be available. The Bidder request to receive the electrical as well as signal and software interfaces of all other trainsets present on the future line for the a further evaluation of the requirement compliancy. Please clarify the meaning of the following sentences and clearly define the conditions for the relief operation: "In both leading cars, an electrical connecting plug which is necessary for relief operation by connecting train-sets shall be equipped."		

		"By using this connecting cable, required functions such as brake command, broadcasting, buzzer etc."		
24.	Volume II/III - Part 2 Section VI ERT Chapter 5.7 Clause 5.7.3 192/355 (ERT-47) Car Interior - Passenger Seats	The seats shall be ergonomically designed and the materials to be used in the seat design shall be soft type with moquette, waterproof, fire and vandal resistant. Fire performance testing shall be undertaken by the Contractor with review by the Engineer. The seat design shall eliminate gaps that shall trap dirt or liquids and can be easily maintained. Please note that a moquette upholstery cannot be considered as waterproof. Only leather or E-leather can satisfy this specific criterion. The Bidder assume, that the requested moquette must be water-repellent. Please confirm.	The seats shall be ergonomically designed and the materials to be used in the seat design shall be soft type with moquette, water-repellent ~~waterproof~~, fire and vandal resistant. Fire performance testing shall be undertaken by the Contractor with review by the Engineer. The seat design shall eliminate gaps that shall trap dirt or liquids and can be easily maintained.	Please see Annex B.
25.	Volume II/III - Part 2 Section VI ERT Chapter 5.12 Clause 5.12.7	Windshields shall be provided with external electric wiper/washer units and defogger unit. The driver shall be able to control the active Cab windshield wipers, washers and defogger via the active Driver's Desk. A fan defogger shall not be acceptable. This system shall have	Windshields shall be provided with external electric wiper/washer units and defogger unit. The driver shall be able to control the	This requirement was updated in General Bid Bulletin No. 10 25 May 2021.

	195/355 (ERT-50) Drivers Cab Windshield	no adverse effect on the windshield including overheating in direct sunlight. A rain sensor of proven quality shall be provided and integrated with the wiper unit for detection of rain. Signal from sensor should also be fed to TMS for control of propulsion and braking under wet conditions to avoid wheel slip. For an optimised and efficiency defogging function the Bidder request the possibility to use fan blowers near to the windshield. The use of a fan blowers do not have an influence on the driver's comfort.	active Cab windshield wipers, washers and defogger via the active Driver's Desk. ~~A fan defogger shall not be acceptable.~~ This system shall have no adverse effect on the windshield including overheating in direct sunlight. A rain sensor of proven quality shall be provided and integrated with the wiper unit for detection of rain. Signal from sensor should also be fed to TMS for control of propulsion and braking under wet conditions to avoid wheel slip.	Bidder amendment request is rejected.
26.	Volume II/III - Part 2 Section VI ERT Chapter 9.1 Clause 9.1.6 216/355 (ERT-71) Braking System - General	The braking system shall satisfy the following deceleration at any conditions. For avoidance of doubt, deceleration means an instantaneous deceleration at any velocity. Namely, considering the decrease of deceleration due to rain, the braking system shall control the proper torque corresponding to the load. But the security braking torque shall be same as emergency braking torque at W0 because security braking system doesn't link with load.	The braking system shall satisfy the following deceleration at any conditions. For avoidance of doubt, deceleration means an ~~instantaneous~~ equivalent deceleration ~~at any velocity~~. Namely~~,~~	Bidder request is rejected.

		Wet brake condition tests will be done theoretically (trough a brake calculation) after passing the dry tests. This is a state-of-the-art procedure in Europe. Please change accordingly and replace the word "instantaneous deceleration" with "equivalent deceleration".	~~considering the decrease of deceleration due to rain~~, the braking system shall control the proper torque corresponding to the load. But the security braking torque shall be same as emergency braking torque at W0 because security braking system doesn't link with load.	
27.	Volume II/III - Part 2 Section VI ERT Chapter 9.1 Clause 9.1.9 217/355 (ERT-72) Braking System - General	For service brake, the loaded braking ratio shall be 70% or more. For the security brake, the empty brake ratio shall be 70% or more. The rolling stock shall comply with all relevant requirements in Japanese Ministerial Ordinance, MLIT Chapter 8, Article 69 (Brake unit related) or other equivalent standards. The Bidder will deliver a state-of-the-art brake system according to EN.	For service brake, the loaded braking ratio shall be 70% or more or according to EN standards. For the security brake, the empty brake ratio shall be 70% or more or according to EN standards. The rolling stock shall comply with all relevant requirements in Japanese Ministerial Ordinance, MLIT Chapter 8, Article 69 (Brake unit related) or	Please see Annex B.

			other equivalent standards.	
28.	Volume II/III - Part 2 Section VI ERT Chapter 9.1 Clause 9.1.10 217/355 (ERT-72) Braking System - General	In addition, the above, the balance of deceleration of regenerative and pneumatic shall be finally adjusted considering ATO station stop accuracy. Interface between BCU and ETCS or Running and stopping assistant system about service brake step (via TMS control transmission) shall be at least 31 steps. Please explain the meaning of the sentence: "Interface between BCU and ETCS or Running and stopping assistant system about service brake step (via TMS control transmission) shall be at least 31 steps."	N/A	In order to ensure the stopping accuracy of station stops in ATO (Here, it says ETCS or Running and stopping assistant system), it is necessary to consider the response speed and jerk of the air / regenerative brake. For example, it is necessary to comprehensively adjust the change time of the brake step, the jerk of the air brake change by the BCU, and the jerk of the propulsion system. And also the number of brake steps shall be at least 31steps.
29.	Volume II/III - Part 2 Section VI ERT Chapter 9.2 Clause 9.2.1	All axles shall be equipped with a split type ventilated brake disc and braking torque shall be applied to the disc by the air operated brake cylinder operating the caliper containing the brake pads equipped with tread cleaning and	All axles shall be equipped with a split type ventilated brake disc, unless the lifetime of the disc	Please see Annex B.

	217/355 (ERT-72) Braking System - Friction Brakes	keeping proper condition of the pad. Each axle of motor mounted cars shall be equipped with the disk brake on wheel with tread cleaning. Since the train uses mainly the electrical brake, the brake disc wear is limited. In the Bidder's experience the brake discs last longer, than the wheels. The replacement of wheels and brake discs can be combined. Split brake discs are not necessary. Furthermore, the Bidder and its suppliers have a better choice on one-piece brake discs to choose ~~The type of ventilated brake limit the choice of the brake supplier as well as the definition of~~ the best project related solution. The Bidder asks to remove this specific point.	brake exceeds the lifetime of the wheels. ~~and~~ Braking torque shall be applied to the disc by the air operated brake cylinder operating the caliper containing the brake pads equipped with tread cleaning and keeping proper condition of the pad. Each axle of motor mounted cars shall be equipped with the disk brake on wheel with tread cleaning.	
30.	Volume II/III - Part 2 Section VI ERT Chapter 9.2 Clause 9.2.2 217/355 (ERT-72) Braking System - Friction Brakes	The brake pad shall be designed and manufactured not only with extremely small changing characteristics with respect to water, lubricating oil, fade, pressing pressure, speed and so on, but also with suppression of occurrence of spark caused by friction. The Contractor shall submit these bench test data and obtain statement of No Objection from the Engineer. The Bidder will deliver a state-of-the-art brake pad related to the mentioned aspects water, lubricating oil, fade, pressing pressure, speed.	The brake pad shall be state of the art ~~designed and manufactured not only with extremely small changing characteristics with respect to water, lubricating oil, fade, pressing pressure, speed and so on, but also with suppression of occurrence of spark~~	Bidder request is rejected.

			~~caused by friction~~. The Contractor shall submit these bench test data and obtain statement of No Objection from the Engineer.	
31.	Volume II/III - Part 2 Section VI ERT Chapter 9.2 Clause 9.2.3 217/355 (ERT-72) Braking System - Friction Brakes	The friction brakes shall be fully capable of performing all braking duties, without the assistance of the electric brakes. The brake pads shall be retained by the brake actuator calipers or brake cylinder and shall be of the composite type. The pads shall not contain any asbestos or other cancer inducing materials, and the Contractor shall provide the Engineer with full details of the material composition for the health hazards assessment. The Bidder understands Safety Data Sheet can satisfy the requirement with underline, please confirm if the Bidder's understanding is correct	The friction brakes shall be fully capable of performing all braking duties, without the assistance of the electric brakes. The brake pads shall be retained by the brake actuator calipers or brake cylinder and shall be of the composite type. The pads shall not contain any asbestos or other cancer inducing materials, and the Contractor shall provide the Engineer with safety data sheets ~~full details of the material composition for the health hazards assessment~~.	Bidder understanding is correct. Bidder request for amendment is rejected.

32.	Volume II/III - Part 2 Section VI ERT Chapter 9.4 Clause 9.4.3 218/355 (ERT-73) Braking System - Wheel Slide Control System	The system shall compensate for wheel size differences. The detection of axle speed differences up to 3km/h shall initiate the required reduction of braking effort to eliminate this speed difference. The wheel slide control system should not allow the axle speed differential to be over 5km/h. The operation of the sliding control shall be basically based on the operation at about 3 to 5km/h with the aim of re-adhesion within 1km/h. The Bidder will deliver a state-of-the-art system according to EN.	The system shall compensate for wheel size differences. ~~The detection of axle speed differences up to 3km/h shall initiate the required reduction of braking effort to eliminate this speed difference.~~ ~~The wheel slide control system should not allow the axle speed differential to be over 5km/h. The operation of the sliding control shall be basically based on the operation at about 3 to 5km/h with the aim of re-adhesion within 1km/h.~~	Please see Annex B for the updated requirement on clause 9.4.3 and 9.4.7.
33.	Volume II/III - Part 2 Section VI ERT Chapter 9.4 Clause 9.4.10 219/355 (ERT-74)	The Contractor shall demonstrate that the correction process for wheel slide shall not cause infringements of the signaling compatibility requirements; The Contractor shall incorporate the complete compatibility for slide with the signaling system and interfaces. The Tenderer shall submit full	N/A	Details will be discussed with the NS01 contractor at the detailed design stage. Examples are as follows: This means that the Wheel Slide Control

	Braking System - Wheel Slide Control System	details of wheel slide protection scheme and equipment; and Please explain the requirements, principally related to the signalling compatibility.		System suppresses wheel slide and contributes to improve the speed detection accuracy of the signalling system. Furthermore, when the signalling system requests the suspension of the sliding suppression control, the sliding suppression control is not performed even if the wheels are locked accordingly.
34.	Volume II/III - Part 2 Section VI ERT Chapter 9.6 Clause 9.6.2 Clause 9.6.6 220/355 (ERT-75) Braking System - Brake Control Unit (BCU)	In case of brake shortage during braking by ATP, the vehicle with brake shortage shall apply emergency brake. Also, in case of unloosening brake, braking system shall be equipped with the function forcibly to loosen the brake by remote operation from the cab; When a failure occurs that the brake does not loosen, the brake shall be remotely released from the crew cab.	N/A	Bidder understanding is correct.

		From safety point of view, the Bidder understands the required forcible loosen function by remote operation shall be applicable to each BCU but not trainset basis. Please confirm if the Bidder's understanding is correct.		
35.	Volume II/III - Part 2 Section VI ERT Chapter 9.6 Clause 9.6.3 220/355 (ERT-75) Braking System - Brake Control Unit (BCU)	In case of loosening brake, acceleration command shall be cut off. However, in this function a short circuit switch shall be equipped. Please clarify the requirement.	N/A	Please refer to Annex B. 9.6.3 was updated.
36.	Volume II/III - Part 2 Section VI ERT Chapter 9.6 Clause 9.6.15 221/355 (ERT-76) Braking System - Brake Control Unit (BCU)	The method by which the passenger load-sensing signal is processed shall be arranged to ensure that absence of the signal, for any reason, shall result in a brake force being applied corresponding to a Dense Crush (W3) Loading condition on that Vehicle. The Bidder ask to change from dense crush (W3) to Tara (W0) loading condition. This is a state-of-the-art solution in Europe.	The method by which the passenger load-sensing signal is processed shall be arranged to ensure that absence of the signal, for any reason, shall result in a brake force being applied corresponding to a TARA (W0) ~~Dense Crush (W3)~~ Loading condition on that Vehicle.	Please see Annex B.
37.	Volume II/III - Part 2 Section VI ERT	All flexible hoses shall be date stamped, and its full life indicated. All flexible hose connections	All flexible hoses shall be date stamped, and its full life indicated. All	Please see Annex B.

	Chapter 10.3 Clause 10.3.9 223/355 (ERT-78) Pneumatic Equipment - Pneumatic System	on removable assemblies shall be of railway service proven, quick connect coupling. The bidder usually uses connectors according to ISO 8434 (cutting ring fittings) for the whole pneumatic system. For flexible hoses compatible connectors which are fixed with screwed nuts are used. Since the flexible hoses do not have to be removed regularly and the ISO 8434 type connection can be separated rather quick the bidder does not see the need for quick-connect couplings. Furthermore, the ISO 8434 type connection has a very successful service history. Please consider to accept this type of connection as an alternative.	flexible hose connections on removable assemblies shall be of railway service proven, quick connect coupling or compatible to ISO 8434.	
38.	Volume II/III - Part 2 Section VI ERT Chapter 11.1 Clause 11.1.1 224/355 (ERT-79) Propulsion System - General	A modern and well service-proven three-phase alternating current propulsion system shall be provided and shall have the following features: 9) About the blending between friction brake and regenerative brake when brake starts, the dummy signal of regenerative brake shall be short as possible considering ride effort. In case catenary voltage is higher than the voltage which regenerative brake is effective, the dummy signal of regenerative brake shall not be used.	N/A	Generally, at the beginning of regenerative braking, a dummy signal of regenerative feedback is used to prevent duplication with air brake and regenerative brake, deterioration of ride quality, and wheel locking. At this time, the dummy signal should be made as short as possible

		Please clarify the meaning of this requirement. The bidder is not aware of the meaning/function/use of a “dummy signal”. Can you please give more information?		while considering the above so as not to cause an unnecessary decrease in deceleration. And also in case the overhead catenary voltage is higher than around 1800V and regenerative brake doesn’t work effectively, this dummy signal shall not be used so as not to cause an unnecessary decrease in deceleration. This requirement does not apply to cases where the dummy signal of regenerative feedback is not used based on bidder’s proposal.

39.	Volume II/III - Part 2 Section VI ERT Chapter 11.1 Clause 11.1.13 226/355 (ERT-81) Propulsion System - General	For the parts that shall be considered exothermic, thermal simulation shall be performed, e.g., switching device module, HSCB, LB, and main circuit wires. This simulation shall be performed based on the run curve at the most severe riding rate, taking into account the heat dissipation environment inside the box. Simulation results shall be validated during testing and commissioning with and without load. The Bidder understands that the requirement intends the Contractor to provide theoretical value of temperature escalation at chip, segment or hinge of HSBC & LB during design stage. Please confirm if the Bidder's understanding is correct	~~For the parts that shall be considered exothermic, thermal simulation shall be performed, e.g., switching device module, HSCB, LB, and main circuit wires. This simulation shall be performed based on the run curve at the most severe riding rate, taking into account the heat dissipation environment inside the box. Simulation results shall be validated during testing and commissioning with and without load.~~	Bidder understanding is correct. Bidder request for amendment is rejected.
40.	Volume II/III - Part 2 Section VI ERT Chapter 11.1 Clause 11.1.30 228/355 (ERT-83) Propulsion System - General	In case Main Switch is opened, charge (energy) of filter capacitor shall be discharged within certain time and discharging time shall be subject to Engineer's review. The Bidder will design the capacitor discharging time to be within a defined time periods,	In case Main Switch is opened, the Contractor shall design the capacitor discharging time to be within a defined time periods, commensurate with the maintenance	Bidder request to amend this requirement is rejected.

		commensurate with the maintenance methods employed.	methods employed. ~~charge (energy) of filter capacitor shall be discharged within certain time and discharging time shall be subject to Engineer's review.~~	
41.	Volume II/III - Part 2 Section VI ERT Chapter 14.1 Clause 14.1.~~3~~ 5 234/355 (ERT-89) Auxiliary Electrical Systems - General	The AC output shall be regulated within ±3% for all variations in input voltage and output load. The Bidder will comply with EN requirements. According to EN 50533 the tolerance range (indicated in chapter 4.3, table 2) correspond to ±8%.	The AC output shall be regulated within ±3% or according to EN 50533 for all variations in input voltage and output load.	Please refer to GBB No. 13.
42.	Volume II/III - Part 2 Section VI ERT Chapter 14.1 Clause 14.1.3 235/355 (ERT-90) (related to GBB4) Auxiliary Electrical Systems - General	The architecture and equipment arrangement of APSE shall be finalised during design stage. Any time and cost implication to the changes of APSE architecture and equipment arrangement from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer. The Bidder understands changes of APSE architecture and equipment arrangement which exceed the performance requirements specified	N/A	Bidder understanding is correct.

		in the Employers requirement shall be covered by the variation request.		
43.	Volume II/III - Part 2 Section VI ERT Chapter 14.3 Clause 14.3.1 235/355 (ERT-90) Auxiliary Electrical Systems - Redundant system	APSEs mounted limited express train shall have a parallel synchronous operation. If one of two performing parallel synchronous stops by trouble, the other APSE shall perform normally. Then, the signal of VAC degraded mode of operation shall be transmitted to VAC of the affected area through TMS. In the GBB4 only the first sentence of the requirement has been changed. The Bidder ask to modify also the remaining part of the text to have a coherent requirement.	APSEs mounted limited express train shall have a parallel synchronous operation. If one ~~of~~ ~~two~~ performing parallel synchronous stops by trouble, the others ~~other~~ APSE shall perform normally. Then, the signal of VAC degraded mode of operation shall be transmitted to VAC of the affected area through TMS.	Please see Annex B.
44.	Volume II/III - Part 2 Section VI ERT Chapter 14.7 Clause 14.7.4 237/355 (ERT-92) Auxiliary Electrical Systems - Battery	All cells shall be standard size, and the battery cases shall be made of a material having good thermal stability and suitable chemical resistance and shall be translucent. In the Bidder's experience, translucent cell is not in common and this will significantly limit options of supplier. In order to propose best solution, please remove such requirement.	All cells shall be standard size, and the battery cases shall be made of a material having good thermal stability and suitable chemical resistance ~~and shall be translucent~~.	Please see Annex B.
45.	Volume II/III - Part 2 Section VI ERT	The battery shall always have been floating charge by the DC output from APSE. In such usage, the battery shall operate normally with	The battery shall always have been floating charge by the	Please see Annex B.

	Chapter 14.7 Clause 14.7.6 237/355 (ERT-92) Auxiliary Electrical Systems - Battery	no maintenance experience for over 8 years. The Contractor shall select such a service-proven battery and APS. The required Ni-Cd battery necessities an inspection every 6 months. A battery change after 8 years will be possible. Please change the requirement accordingly.	DC output from APSE. In such usage, the battery shall operate normally with normal maintenance experience inspection for over 8 years. The Contractor shall select such a service-proven battery and APS.	
46.	Volume II/III - Part 2 Section VI ERT Chapter 15.1 Clause 15.1.6 239/355 (ERT-94) Train Management System - General	Hardwired train lines in addition to the TMS shall be provided for the basic train operation functionality for the following critical systems as a minimum. 1) On-board signaling control, except for the part related to the maximum service brake; 5) Battery Control, 6) Pantograph control, The signaling system is independent and supplied by another contractor. The bidder cannot guarantee, that the signaling system requires and allows for hardwires. The battery control (battery charger) the Bidder usually uses is autonomous, it is just connected to the TCMS for diagnostic data (service). An additional hardwired connection is therefore not necessary. The Pantograph is connected to the TCMS in a redundant way with connections to the bus	Hardwired train lines in addition to the TMS shall be provided for the basic train operation functionality for the following critical systems as a minimum. 1) On-board signalling control, except for the part related to the maximum service brake; (if required by the system supplier) 5) Battery Control (if battery control is controlled by the TCMS), 6) Pantograph control (if not already connected to the	Please see Annex B.

		system in different sections of the bus system. Please adapt the requirement as proposed.	TCMS in a redundant way),	
47.	Volume II/III - Part 2 Section VI ERT Chapter 15.3 Clause 15.3.6 240/355 (ERT-95) Train Management System - Design Requirements	Fault analysis algorithms, data acquisition routines and data storage logic shall be programmed and presented using a Windows type of user interface, using the latest windows OS or other equal industry OS. The Bidder propose to use a Linux type of user interface. Please confirm the Bidder's proposition.	Fault analysis algorithms, data acquisition routines and data storage logic shall be programmed and presented using a Windows or Linux type of user interface, using the latest windows OS or other equal industry OS.	Please see Annex B.
48.	Volume II/III - Part 2 Section VI ERT Chapter 15.6 Clause 15.6.1 243/355 (ERT-98) Train Management System - Electrical jumper wire	Electrical jumper wire that is necessary for transmission between the vehicles shall be specified by TMS supplier and shall be achieved 1 million cycles of performance test. Couplings shall be HART type or similar. As required in clause 1.20.1 (ERT-29), the design life of special parts should be about 8 years. The Bidder ask to replace the performance test requirement with the design life requirement.	Electrical jumper wire that is necessary for transmission between the vehicles shall be specified by TMS supplier and shall have a design life about 8 years ~~be achieved 1 million cycles of performance test~~. Couplings shall be HART type or similar.	Please see Annex B.
49.	Volume II/III - Part 2 Section VI ERT Chapter 16.1 Clause 16.1.1	3) Passenger emergency intercom to provide audio communication between carriages and the driver's cab to enable passengers to alert the driver should an emergency situation occur within the train carriage.	N/A	Please see Annex B.

	244/355 (ERT-99) Communication System - General	In case the driver does not pick up the passenger emergency intercom within a predefined time, it automatically connects to the OCC, using the onboard radio. Please define the difference between the on-board radio and train radio.		
50.	Volume II/III - Part 2 Section VI ERT Chapter 16.1 Clause 16.1.2 244/355 (ERT-99) Communication System - General	5) Train radio system to allow full-duplex audio communication between the driver and the OCC. Additional interfaces shall be provided within the OCC to relay to the trains PA audio messages. Train Protection Radio The Bidder suppose that the sentence "Train Protection Radio" is not related to the requirement. Please confirm.	Train radio system to allow full-duplex audio communication between the driver and the OCC. Additional interfaces shall be provided within the OCC to relay to the trains PA audio messages. ~~Train Protection Radio~~	Please see Annex B.
51.	Volume II/III - Part 2 Section VI ERT Chapter 16.2 Clause 16.2.1 Clause 16.2.2 244/355 (ERT-99) and 245/355 (ERT-100)	The CP NS-03 Contractor shall equip each driver's cab with the necessary Human Machine Interface (HMI) facilities for the operation, control and monitoring by the driver of the on-board communications systems. The number of handsets required for driver use shall be rationalized and kept to a minimum. In particular, the CP NS-03 Contractor shall utilize the TMS monitor with respect to the display. Subject to any reliability constraints, both CP NS-03 and CP NS-01 Contractors shall	The CP NS-03 Contractor shall equip each driver's cab with the necessary Human Machine Interface (HMI) facilities for the operation, control and monitoring by the driver of the on-board communications systems. The number of handsets required	Please see Annex B.

	Communication System - General Requirements	consider the integration of all communication operator functions into a single HMI to minimize space requirements. The Bidder strongly suggest to use a dedicated and separated monitor for the communication system functionalities. From Bidder's experience, the use of only one monitor for PIS and TMS can lead to not desired dependencies.	for driver use shall be rationalized and kept to a minimum. In particular, the CP NS-03 Contractor shall utilize a dedicated monitor ~~the TMS monitor with respect to the display.~~ Subject to any reliability constraints, both CP NS-03 and CP NS-01 Contractors shall consider the integration of all communication operator functions into different ~~a single~~ HMI ~~to minimize space requirements~~.	
52.	Volume II/III - Part 2 Section VI ERT Chapter 16.2 Clause 16.2.13 245/355 (ERT-100) Communication System - General Requirements	Suitable automatic test routines shall be available to the driver in the active cab in order that the operational integrity of the on-board communications equipment is verified prior to the train entering passenger service. Please clarify the meaning of the sentence "operational integrity of the on-board	N/A	Please see Annex B.

		communications equipment is verified" and define what shall be automatized.		
53.	Volume II/III - Part 2 Section VI ERT Chapter 16.3 Clause 16.3.12 246/355 (ERT-101) Communication System - Public Address (PA) System	The PA system shall be interfaced to enable selected safety and emergency messages broadcast on the train PA system within each train. Please clarify the meaning of the requirement.	N/A	Please see Annex B.
54.	Volume II/III - Part 2 Section VI ERT Chapter 16.5 Clause 16.5.1 247/355 (ERT-102) Communication System - External Destination Sign System	The destination sign located at the end of the consist shall provide, as a minimum, information on the train running number along with the start and destination locations of the train service and any special information such as 'Not in Service', etc. The destination sign do not show the start location of the train but only the destination and line information. The information of the starting location is of limited use for the passenger but occupies space on the display which is better used for improved presentation of more relevant information. This is a state-of-the-art solution in Europe. Please change accordingly.	The destination sign located at the end of the consist shall provide, as a minimum, information on the train running number along with ~~the start and~~ destination locations of the train service and any special information such as 'Not in Service', etc.	Bidder request is rejected.

55.	Volume II/III - Part 2 Section VI ERT Chapter 16.5 Clause 16.5.5 247/355 (ERT-102) Train Management System - External Destination Sign System	The destination sign shall be programmable from the TMS in the driver's cab. The Bidder strongly suggest to use a dedicated and separated monitor for the communication system functionalities. From Bidder's experience, the use of only one monitor for PIS and TMS can lead to not desired dependencies.	The destination sign shall be programmable from a dedicated PIS monitor ~~the TMS~~ in the driver's cab.	Please see Annex B.
56.	Volume II/III - Part 2 Section VI ERT Chapter 16.5 Clause 16.5.7 247/355 (ERT-102) Communication System - External Destination Sign System	The design of the destination sign shall allow manual override in the case of a defect in the electronics system. Please clarify the meaning of the requirement.	N/A	The destination sign equipment shall have a manual display set up in case of failure set up using PIS screen.
57.	Volume II/III - Part 2 Section VI ERT Chapter 16.6 Clause 16.6.1 247/355 (ERT-102)	Space and power supply provision shall be made available within the train carriages to enable digital signage as described in Sub-Clauses 17.1 item 2 and 17.4 herein. Please clarify the meaning of the requirement.	N/A	Please refer to Annex B.

	Communication System - Digital Signage for Advertising			
58.	Volume II/III - Part 2 Section VI ERT Chapter 16.7 Clause 16.7.5 248/355 (ERT-103) Communication System - Passenger Emergency Intercom	The intercom unit shall consist of a switch to initiate a call along with a flush mounted noise-cancelling microphone and loudspeaker. The Bidder suppose, that an eco-cancelling microphone is required. A noise-cancelling microphone is not technically feasible in the same housing. Please change the requirement accordingly.	The intercom unit shall consist of a switch to initiate a call along with a flush mounted eco-cancelling ~~noise-cancelling~~ microphone and loudspeaker.	Please see Annex B.
59.	Volume II/III - Part 2 Section VI ERT Chapter 16.11 Clause 16.11.1 249/355 (ERT-104) Communication System - Provision for Wi-Fi system	Provision for Wi-Fi system shall be designed in consideration with the following but not limited to: 1) Space and position for installation 2) Materials of interior near the attachment 3) Capacity of powering 4) Provision of circuit 5) Provision of interface The Wi-Fi system is air gapped for security reasons. Therefore, the Bidder asks to remove the point "preparation of interface".	Preparation for Wi-Fi system shall be designed in consideration with follow but not limited to: 1) Space and position for installation 2) Materials of interior near the attachment 3) Capacity of powering 4) Preparation of circuit ~~5) Provision of interface~~	Bidder request is rejected. The provision of interface is referring the WIFI antenna on the train.
60.	Volume II/III - Part 2	The data shall also be recorded onto the memory, meaning it can be viewed historically.	The data shall also be recorded onto the	Please see Annex B.

	Section VI ERT Chapter 18.2 Clause 18.2.2.3 259/355 (ERT-114) CCTV System - Saloon monitoring system by CCTV system for security	As a minimum, high-definition video quality and a week-long video memory capacity shall be provided. The CCTV system shall be reviewed by the Engineer. The data can only be viewed by the means of a service laptop or a viewing station. The Bidder ask to change the requirement.	memory, meaning it can be viewed historically by a service laptop or a viewing station. As a minimum, high-definition video quality and a week-long video memory capacity shall be provided. The CCTV system shall be reviewed by the Engineer.	
61.	Volume II/III - Part 2 Section VI ERT Chapter 19.7 Clause 19.7.1.4 264/355 (ERT-119) General Documentation Requirements - Maintenance Manuals	The maintenance manual shall provide all necessary detail to perform the work required, and shall include the judicious use of diagrams, drawings, photographs, illustrations, etc., as appropriate for the task at hand, including necessary safety precautions. Detailed maintenance and troubleshooting procedures and test and repair procedures and work instructions shall be provided for all electronic assemblies and circuit boards. Manuals shall identify all tools (special and standard) needed to perform the work. This listing of tools shall be provided in the section describing the discrete task being performed. Please note that circuits board can only be replaced and not repaired.	The maintenance manual shall provide all necessary detail to perform the work required, and shall include the judicious use of diagrams, drawings, photographs, illustrations, etc., as appropriate for the task at hand, including necessary safety precautions. Detailed maintenance and troubleshooting procedures and test and repair procedures and work instructions	Please see Annex B. The maintenance manual will identify all tools (special and standard) needed to perform the maintenance work.

		Only special tools are included in the Bidder's maintenance procedures. Therefore, the Bidder requests a modification to the requirement.	shall be provided for all electronic assemblies and circuit boards (only replacement). Manuals shall identify all special tools ~~(special and standard)~~ needed to perform the work. This listing of tools shall be provided in the section describing the discrete task being performed.	
62.	Volume II/III - Part 2 Section VI ERT Chapter 19.8 Clause 19.8.5 265/355 (ERT-120) General Documentation Requirements - Illustrated Parts Catalogs	Six (6) copies of the IPCs shall be provided in electronic and interactive format, along with six (6) properly bound oil and dirt resistant hard copies. Electronic information is available and can be copied as well as printed any number of times. Therefore, the Bidder requests a modification to the requirement.	One (1) ~~Six (6)~~ ~~copies~~ copy of the IPCs shall be provided in electronic and interactive format and can be copied any number of times, ~~along with six (6) properly bound oil and dirt resistant hard copies.~~	Bidder request is rejected.
63.	Volume II/III - Part 2 Section VI ERT Chapter 19.9 Clause 19.9.3 265/355 (ERT-120)	The Operator's Manuals shall also be provided in electronic format (6 copies) Electronic information is available and can be copied as well as printed any number of times.	The Operator's Manuals shall also be provided in electronic format (1 copy) ~~(6 copies)~~ and can be copied any number of times.	Bidder request is rejected.

	General Documentation Requirements - Operator's (Drivers') Manuals	Therefore, the Bidder requests a modification to the requirement.		
64.	Volume II/III - Part 2 Section VI ERT Chapter 19.12 Clause 19.12.1 266/355 (ERT-121) General Documentation Requirements - Intervention/Modifications History Record (During Warranty Period)	The Contractor shall provide a supplemental History record for each vehicle at the time of final acceptance/after the warranty period. Each supplemental History record shall contain the following car-specific information: 1) Intervention and repairs during warranty period, 2) All modifications/revisions done during the warranty period, 3) All tests/validation tests reports and records, and 4) Component exchange, component change reports and new component/serial numbers 5) Signed documentation to show the Employer and/or the Engineer had approved all intervention, modification/ component change and testing. Tests reports and validation tests reports are normally done for operational and safety relevant components. The bidder ask to modify the requirement points 3) and 4) as proposed in the revised text.	The Contractor shall provide a supplemental History record for each vehicle at the time of final acceptance/after the warranty period. Each supplemental History record shall contain the following car-specific information: 1) Intervention and repairs during warranty period, 2) All modifications/revisions done during the warranty period, 3) All tests/validation tests reports and records for operational and safety relevant components, and 4) Component exchange, component change reports and new component/serial numbers	Please see Annex B. The clause number is 19.14.1.

<table>
<tr><td></td><td></td><td></td><td>5) Signed documentation to show the Employer and/or the Engineer had approved all intervention, modification/ component change and testing.</td><td></td></tr>
<tr><td rowspan="2">65.</td><td>Part 2 – Employer's Requirements
Section V1. Employer's Requirements
Technical Requirements
269/355
(ERT123)
20.1 Inspection</td><td rowspan="2">Table 20.2 Inspection Trips
<table><tr><th>No.</th><th>Attendance</th><th>Quantity</th><th>Remarks</th></tr><tr><td>1</td><td>Employer</td><td>76 roundtrips*7 days*3 persons</td><td rowspan="2">Type test, FAT, I FAT and FACI</td></tr><tr><td>2</td><td>Engineer</td><td>76 roundtrips*7 days*2 persons</td></tr></table>
Confirmed.

The Bidder would like to have reconsideration to reduce number of trips considering its impact for cost and schedule.</td><td rowspan="2">Employer: ~~76~~14 roundtrips*7 days*3 persons
Engineer: ~~76~~14 roundtrips*7 days*2 persons</td><td rowspan="2">Please see Annex B.</td></tr>
<tr><td>GBB02
56
Item No.73</td></tr>
<tr><td>66.</td><td>Volume II/III -
Part 2
Section VI ERT
Chapter 20.2
Clause 20.2.1.3
270/355
(ERT-125)</td><td>The Contractor shall responsible to provide sufficient train drivers for all the testing and commissioning activities until handing over.

For the testing and commissioning activities until handing over the service operator is</td><td>The operator ~~Contractor~~ shall responsible to provide sufficient train drivers for all the testing and commissioning</td><td>Bidder request is rejected.</td></tr>
</table>

	Inspection, Testing, and Commissioning - General Testing Requirements	normally responsible for the train drives. The Bidder ask to change the requirement accordingly.	activities until handing over.	
67.	Volume II/III - Part 2 Section VI ERT Chapter 20.2 Clause 20.2.3.1 271/355 (ERT-126) Inspection, Testing, and Commissioning - General Testing Requirements	For any tests where the Engineer has indicated that they wish to witness, no testing shall be carried out against a test specification prior to its review by the Engineer. Please confirm that Bidder's supplier specific internal test can be done in advance. These tests might have to be carried out rather early in the project-timeline or are already carried out for another project (service proven components).	N/A	The test by similarity is subject to the given notice of no objection by the Engineer on the Contractor submitted Inspection, Testing and Commissioning Plan
68.	Volume II/III - Part 2 Section VI ERT Chapter 20.2 Clause 20.2.3.4 271/355 (ERT-126) Inspection, Testing, and Commissioning - General Testing Requirements	The Contractor shall replace any material or detail destroyed in the process of testing. The Bidder will not be responsible for damage that occurs outside the planned testing process. Please change the requirement as proposed.	The Contractor shall replace any material or detail destroyed in the process of testing <u>for tests discussed and validated by the Contractor.</u>	Please see Annex B.
69.	Volume II/III - Part 2 Section VI ERT Chapter 20.4 Clause 20.4.2.2	The following tests shall be carried out as a minimum but not limited to: ... h) Water tightness test. i) Propulsion system test;	N/A	1. Car body loading test is for validating the structure integrity (FEA validation process); 2. Jacking up test is for

	272/355 (ERT-127) Inspection, Testing, and Commissioning - Acceptance Testing	j) Bogie car clearance test (one motor car and trailer car only); k) Carbody loading test (one car only); l) Jacking up test; m) Center of gravity measurement; n) Interior lights illumination test; o) Noise measurement (static); p) Vibration measurement; and q) On-board signalling function test. The Bidder would like to receive more information about the following tests: k) Carbody loading test (one car only); l) Jacking up test; m) Center of gravity measurement; o) Noise measurement (static); p) Vibration measurement; and Can you please add more detail to the tests? Especially the coverage of the tests.		validating the carbody jacking pad; 3. Center of gravity measurement is to validate the manufacturing drawing tolerances; 4. Noise measurement (static) is to validate the train noise emission exterior and interior for the environmental standards, particularly noise attenuation levels and passenger OSHA noise standard. 5. Vibration measurement is the ride comfort performance – Clause 1.12.2 Details of the tests shall be provided by the Contractor making reference to the employer requirement set forth in this tender.
70.	Volume II/III - Part 2 Section VI ERT	The Contractor shall provide data pertaining to all relevant tests having been performed on the materials to be used. A fire hazard assessment	The Contractor shall provide data pertaining to all	Please see Annex B.

	Chapter 21.8 Clause 21.8.3 282/355 (ERT-137) Material and Workmanship - Fire Safety	for each car shall be submitted by the Contractor for review by the Engineer. Assessment shall reflect the “worst” three-minute release rate values of the materials that are specific to the car. The trainset fire safety analysis will be done according to EN 45545. The Bidder ask therefore to change the requirement accordingly.	relevant tests having been performed on the materials to be used. A fire hazard assessment for each car shall be submitted by the Contractor for review by the Engineer. Assessment shall reflect the “worst” three-minute release rate values of the materials that are specific to the car. Alternatively, a fire hazard assessment for each car shall be submitted by the Contractor for review by the Engineer. The assessment will consider each car with respect to EN 50553, using materials compliant to EN 45545.	
71.	Volume II/III - Part 2 Section VI ERT Chapter 21.10 Clause 21.10.7	The Module interior shall be free from gaps and crevices where litter, sharp objects or any other items could be concealed or lodged. Any equipment fitted behind seats shall be adequately designed to eliminate gaps or hidden voids.	N/A	Bidder understanding is correct.

	283/355 (ERT-138) Material and Workmanship - Security, Anti-Social Behavior and Vandalism	The Bidder understand there should be gap between the seat and the side wall (or between seats), if seats provided with a rotation base in accordance with ERT5.7.2. Please confirm that is exceptional of this requirement.		
72.	Volume II/III - Part 2 Section VI ERT Chapter 21.10 Clause 21.10.8 283/355 (ERT-138) Material and Workmanship - Security, Anti-Social Behavior and Vandalism	Soft furnishings shall be resistant to damage by sharp objects and be designed to be economical and easy to replace when deemed necessary. Seat upholstery material is available in a cutting-resistant fabric; however, this material is not moquette (as specified in 5.7.3 (ERT-47)). The cutting proof seat upholstery material is furthermore less comfortable. It is a good choice for metro-style vehicles, but on an Airport Express Train the Bidder proposes to use a more comfortable fabric, like the specified moquette.	Soft furnishings shall be resistant to damage by sharp objects <u>as far as seat comfort is not negatively affected</u> and be designed to be economical and easy to replace when deemed necessary.	Please see Annex B.
73.	Volume II/III - Part 2 Section VI ERT Chapter 22.3 Clause 22.3.2 285/355 (ERT-140) Project Management Requirements - Design Approval Process	The Engineer's response to the submission shall be made within 21 days of receipt of the submission; however, the Engineer shall endeavor to respond within 21 days, provided that the submission is made no later than the date shown on the design submissions program. The Engineer may extend the review period depending on the amount and quality of documentation accompanying the submission.	The Engineer's response to the submission shall be made within <u>14</u> ~~21~~ days of receipt of the submission; however, the Engineer shall endeavor to respond within <u>14</u> ~~21~~ days, provided that the	Bidder request is rejected.

		The Bidder request to change the answer time of the Engineer's from 21 to 14 days.	submission is made no later than the date shown on the design submissions program. The Engineer may extend the review period depending on the amount and quality of documentation accompanying the submission.	
74.	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements ERT142 22.6 Technical Support	22.6.7 All equipment stated above shall be handed over to the Employer after the completion of the depot.	N/A	Please see Annex B. Clause 22.6.7 was updated.
	GBB02 (57/61) Item No. 75	The Contractor is required to hand over the air conditioning unit to the Employer if the unit were previously provided by the Contractor as per ERT clause 22.6.7. There will be air conditioning unit in the Employer's office prepared by the Contractor, however usually it is part of rent office facility and the Contractor will not newly purchase. The Bidder would like to confirm that in such case the Contractor is not required to hand		

		over air conditioning unit specified in ERT 22.6.6 to the Employer.		
75.	Part 2 – Employer's Requirements Section V1. Employer's Requirements Technical Requirements ERT142 22.6.8 Cars for the Employer GBB02 57 Item No.76	22.6.8.3 Leased cars will go off-hire but any purchased cars shall be transferred to the Employer at this time. Bidder's understanding is not correct. Reference to Schedule 1.1 milestone no.109; it is including driver costs, maintenance, insurance, registration costs, fuel costs, and any associated costs from commencement until completion of the Works. Clause 22.6.8 is updated and please refer to Annex B. The Bidder would like to ask clarification on the interpretation of "off-hire" mentioned on 22.6.8.3. The Bidder understands if the Contractor provide leased cars to the Employer's as required during implementation, these cars will not be handed over to the Employer when TOC issued. Please confirm if the Bidder's understanding is correct.	N/A	Off-Hire means when the cars no longer requires the Hired. Bidder understanding is correct.
76.	N/A	No requirements can be found about land side connections in the depot. The Bidder would like to ask how the trainset will be maintained in the depot if the pantograph is not connected to the overhead line. Up to now, the standard EN 50546 is taken into	N/A	The Mabalacat depot was designed to have a fix Overhead Catenary System (OSH) at the pit line and heavy maintenance line to

		account by the Bidder. Please supply additional network access conditions and kindly confirm that the Bidder can use the EN 50546.		support all level of maintenance activities.
77.	Volume II/III - Part 2 Section VI ERG Chapter 8.5 Clause 8.5.2 65/355 (ERG-48) System Assurance - Performance Acceptance Criteria (PAC)	Each trainset shall achieve: 1) Trail Operation (selected trainset) – No major faults. The Bidder request to define the term "major faults". The Bidder suggests the following definition of “Major Fault”: A Fault that causes one or more of the following shall be classified as a Major Fault: (i) prevents Train from further movement under its own power; (ii) leads to evacuation of passengers; (iii) Train must be towed into the depot;	N/A	The major fault shall be defined by the Contractor through the Safety Critical Item List. Hypothetically, from the employer perspective, the major fault shall include but not limited to motion obstruction, smoke, fire etc. Please refer to ERG clause 8.8.3.5.
78.	Volume II/III - Part 2 Section VI ERT Chapter 19.12 Clause 19.12.2 265/355 (ERT-120) Training Material	For maintenance staff this shall include every work instruction provided, the length of time for each training course shall be proposed by the Contractor and be based on the content contained therein. Training shall be carried out in English or Filipino as required by the client. Training material shall be carried out in English or Filipino as required by the client.	For maintenance staff this shall include every work instruction provided, the length of time for each training course shall be proposed by the Contractor and be based on the content contained therein. Training shall be carried out in English	Bidder request is rejected. The requirement has given the option either English or Filipino as required by the employer. Please see Annex B.

		Since the training material as well as the trainers are from different sub-suppliers and therefore most likely not fluent in Filipino the contractor expects a better training quality if the language is English. Accordingly, the Bidder would suggest to perform the Training in English language.	~~or Filipino~~ as required by the client. Training material shall be carried out in English ~~or Filipino~~ as required by the client.	
79.	Volume I/III Part 1 – Bidding Procedures Section II. Bid Data Sheet 27/160 (BDS-5) BDS 18.7/2(ii)	Import VAT and Import duties will be assumed by the Employer, following the tax assumption scheme. Please confirm this assumption of import VAT and duties by the Employer should be applicable for importation of spares which replenished during DNP as required in ERG 11.5.3, ERT 24.3.2 and other applicable clauses.	N/A	The bidder's understanding is correct.
80.	Volume II/III - Part 2 Section VI ERT Chapter 5.7 Clause 5.7.2 192/355 (ERT-47) Passenger seats - Seat mounting	All seats with limited reclining function shall be automatically/manually changeable the direction with locking system and installed to the floor by one stand to facilitate cleaning and storage of Passengers' belongings underneath In order to allow alternative solutions, the Bidder ask to remove the type of seat fixation	All seats with limited reclining function shall be automatically/manually changeable the direction with locking system and installed ~~to the floor by one stand~~ in order to facilitate cleaning and storage of Passengers' belongings underneath.	Please see Annex B.

81.	Volume II/III - Part 2 Section VI ERT Chapter 20.6 Clause 20.6.9 270/355 (ERT-135) Inspection, Testing, and Commissioning	After completion of all the testing and commissioning, Taking-Over Certificate will be issued by the Engineer/Employer	N/A	The TOC will be issued to the Train after the satisfaction of requirement in clause 8.1.7; acceptance of TOC performance report in clause 8.6.2; and ISA acceptance in clause 8.8.3.9. Please see Annex B.
	Volume II/III - Part 2 Section VI ERT Chapter 20.6 Clause 20.6.10 270/355 (ERT-135) Inspection, Testing, and Commissioning	Defect notification should start when trains have completed the acceptance process and are signed off for commercial service. In respect of provisions under ERG 8.1.7 and GC 1.1.3.7, the Bidder understands Taking Over Certificate should be issued when trains have completed 1,500km FFR, and Defect Notification Period should start when Taking Over Certificate has been issued. Please confirm if the Bidder's understanding is correct.		
82.	Part 1 – Bidding Procedures Section II. Bid Data Sheet BDS5 ITB 18.7 2(i)	VAT registered suppliers and subcontractors of the Japanese companies, shall bill and pass on the twelve percent (12%) to the Japanese companies/contractors. In turn, the Japanese contractors shall include in their billing and pass on the 12% VAT to the Employer. Therefore, VAT, except VAT on imports, shall be incorporated into the Local Unit Prices (PhP) and Local Amounts (PhP) of the Bid Price. It will be the responsibility of the Japanese Contractor to file the prescribed VAT returns on gross	N/A	1. VAT will not be taken into consideration during price evaluation. VAT is to be add in on as a direct amount at the rate of 12% (in accordance with the Laws of the Republic of the Philippines) on the total local

		receipts derived from the Project, claim their input taxes from their purchase of goods, properties and services from their suppliers or subcontractors and shall pay the output tax or VAT thereon, after offsetting the creditable or allowable input taxes, considering that the amount intended for payment of the VAT has already been collected and received by the Japanese contractors or nationals from the Employer as part of the total billing/invoice price. (RMC No. 8-2017).		currency (PHP) amount where foreign currency will be converted to the local currency amount before the VAT is added in. 2. Please refer to the sub-item 1 above.
	Part 1 – Bidding Procedures Section IV – Bidding Forms BF49 GRAND SUMMARY	(Table) The Bidder understands, only local currency amount is subject to 12% VAT. 1) Please confirm if the Bidder's understanding is correct. 2) If not, - Please clarify what part of foreign currency amount to be subject to 12% VAT. For the avoidance of any confusion, please do not consider VAT amount for Price Evaluation purpose		3. Value-Added Tax (VAT), under Section 106 to Section 108 of the Tax Code, imposed on all sales of goods and services. VAT from the services and goods purchased by the Contractor should be considered in the unit rate. The Value Added Tax (VAT) for the Foreign Currency portion shall be converted to the Local Currency according to ITB 37.1 and added to the
	GBB02 3 Item No. 4	1) Bidder's understanding is not correct. Reference to the description in the Note no. 3 in Grand Summary, the Value Added Tax (VAT) for the Foreign Currency portion shall be converted to the Local Currency according to ITB 37.1 and added to the VAT for the Local Currency portion. Refer to the guideline stipulated in the BDS ITB 18.7 for	N/A	

		the detail description. 2) Bidder may refer to the guideline reference shown in the BDS ITB 18.7. The evaluation of the Price Bids is in accordance with the guideline stipulated in the ITB 38. BDS 18.7 mentioned "VAT, except VAT on imports, shall be incorporated into the Local Unit Prices (PhP) and Local Amounts (PhP) of the Bid Price". The Bidder would like the Employer to state for which Price Schedule amount the Bidder has to consider the VAT on foreign currency amount. Without that guideline, the Bidder afraid each Bidders makes Bid Price based on different assumption and makes confusion in the price evaluation process. (Note as far as the Bidder's understand ITB 38 is silent or not clear whether VAT amount will be part of the price evaluation)		VAT for the Local Currency portion. Please refer to the Section IV Bidding Forms for the Grand Summary which will indicate the total of Schedule 1.1 to Schedule 1.9 as well as the VAT amount ("VAT (12%)"). Please refer to the RMC No. 8-2017 for the details on the rules for the VAT purposes.
	GBB07 14 Item 14	Bidder to refer to the guideline stipulated in the ITB 18 and BDS ITB 18.7 for the detail description. 1) Please allow the Bidder to ask again whether VAT amount will be considered during price evaluation. As far as the Bidder reviewed ITB 18, BDS ITB 18.7 and other part of Bidding Document including Evaluation Criteria, it is not clearly stated.	N/A	

		2) If the answer to the question above is yes, the Bidder strongly suggest not to consider such VAT during price evaluation, because it is not substantial value proposed by the Bidder's, and the Bidder afraid the guideline stipulated in the ITB 18 and BDS ITB 18.7 are not crystal clear, especially VAT on foreign currency. 3) Regardless to the answers above, the Bidder would request clarification on the provision of such BDS18.7 especially "VAT, except VAT on imports, shall be incorporated into the Local Unit Prices (PhP) and Local Amounts (PhP) of the Bid Price". If the Employer does not intend the Bidder to add 12% VAT on top of all foreign currency amount, please specifically indicate which part of Price Schedule amount should not consider VAT.		
83.	GBB18 Annex B Item 17	KD 1 Achievement: Completing Final Design Review: 30 months KD 3 Achievement: Completing FAI and FAT: 36 months KD 6 Achievement: Delivery of 7 trainsets (1-7) and completion of testing and commissioning thereof plus handing over: 72 months We are afraid that some new KD dates presented in GBB10 are not logical. For example, gap between KD 1 and KD 3 (only 6 months) is impossible to fulfil. Gap between KD 3 and KD 6 seems too big which supposes the need to store all fleet for more than 24 months. This has an direct impact on the warranty cover	N/A	Bidder request is rejected. Please see Annex B on the updated Key Dates.

		of all equipment included in the trains, maintaining the units in good use for service, worse financial costs, … Therefore, we kindly ask the Employer to cancel whole item 17. If this is not possible, we would kindly ask the possibility to advance or accelerate any KD and be paid accordingly with the offered Price Proposal Forms (Schedule 1: Price Schedules). Bidder would finally like to propose that the delivery and completion of testing and commissioning, thereof plus handing over of the whole fleet requested in KD 6 for the 72 months from NTP, could be gradually executed by a 1 trainset per month rate so as the full fleet is fully delivered at the due date. This is to avoid the concentration of this complex activity for the whole fleet in only one month.		
84.	GBB18 Annex B Item 17	KD 3 Achievement: Completing FAI and FAT: 36 months AD 1 On-board Signalling System and other equipment to be mounted on the Rolling Stock supplied by CP NS-01 Contractor from E&M Systems and Track Works. The E&M System and Track Works Contractor will supply this equipment in Japan at the Rolling Stock Contractor's premises or at	N/A	Please see Annex B.

		alternative agreed location(s) AD-1: for trainsets one to seven (1-7) supplied under this contract: 37 months AD 3 Access to the mainline from CIA to Solis for On-Site Testing and Commissioning: 34 months AD 4 Access to the whole mainline from Calamba to CIA 70 months We are afraid that new AD 1 date is not compatible with KD 3. With these new dates FAI & FAT should be done without signalling equipment which is not logical. Please confirm this understanding and clarify how/when/where the signalling equipment must be mounted and tested. According to new AD 4, access to the whole mainline from Calamba to CIA is postponed to 70 months from NTP. Considering that the mainline from CIA to Solis will be ready at month 34 from NTP, Tenderer kindly ask to consider the possibility to have the Taking Over Certificate of the units for the mainline CIA-Solis and afterwards execute a new trial running and test for the rest of the line Solis-Calamba. This is to avoid the storage of the units and a substantial extra cost in the project.		

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		Volume II Part 2 – Employer's Requirements
1	8.1.7, 8.1.8 ERG-47	Updated clause 8.1.7: A Taking Over Certificate (TOC) will be issued for each trainset. In order to obtain a TOC for the Rolling Stock from the Employer/Engineer, it is required that each trainset achieves 1,500 km of Fault-Free Running (FFR) during the integrated testing and commissioning and given notice of no objection by the engineer to the requirement set forth in clause 8.6.2 of ERG. Updated clause 8.1.8: A Performance Certificate will be issued by the Engineer for the total performance of the fleet. This Performance Certificate is required to be achieved by the end of the Defect Notification Period (DNP). Prerequisites to obtain the Performance Certificate includes: each trainset shall achieve 10,000 km or 2 months of FFR, the fleet (7 trainsets) shall achieve a Mean Distance Between Failures (MDBF) of 50,000 km causing a delay greater than 5 minutes, a fleet in-service Operational Mean Time To Restore (OMTTR) of 15 minutes, the fleet maintainability of capital components a Corrective Mean Time To Repair (CMTTR) of 4 hours and the given notice of no objection by the engineer to the requirement set forth in clause 8.6.3 of ERG.
2	1.15.4.2, 1.15.6.1, 1.15.6.2 ERT-19	Updated clause 1.15.4.2:

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		Low voltage power supplied equipment shall not be damaged by under voltage of any magnitude or duration. Recovery of connected equipment from the under-voltage condition shall be automatic, manual or by train line reset. Train line and battery supplied relays shall not drop out for under voltages as low as 0.5×(Vnom), with a duration of up to 50μs or shall be according to IEC 60571. Updated clause 1.15.6.1: Equipment connected to the low voltage power supply, including battery and train lines, shall not generate transient voltages in excess of + 200 Vpk, with an energy content not to exceed 0.3 joules, or according to IEC 61991. Updated clause 1.15.6.2: The equipment shall be designed such that the rate of change in voltage in any transient conducted from the equipment to the electrical interface shall not exceed 10 VA for up to 1 milli second, or according to IEC 61991.
3	1.16.1.1 ERT-19	Updated clause 1.16.1.1: All electronic printed circuit boards shall be of the plug-in or fix mounted type unless subject to review by the Engineer. All electronic printed circuit boards, the type of connector and contact material, the board material, the number of layers in a multi-layer board, use of surface mount devices and the kind of socket shall be of having the sufficient practical operational record and reviewed by the Engineer. The type of connector and contact material shall be reviewed by the Engineer. The board material shall be suitable to rail application. Components shall not be installed

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		using sockets unless specifically reviewed by the Engineer. Use of surface mount devices shall be reviewed by the Engineer. Semiconductor operating temperature rating be according to EN or other international Standards.
4	2.3.2.4, 2.3.2.5 ERT-32	Updated clause 2.3.2.4: The carbody shell shall be designed and tested to ensure that under W2 loading conditions negative camber shall never occur. The Contractor shall evaluate and submit camber values at W0, W1 and W2 loading for engineer review. The Contractor shall ensure, and must demonstrate by test, that all doors operate freely under all carbody loading conditions and will not disengage from their guide ways under the lateral loading conditions exerted by crush-loaded passengers. Update clause 2.3.2.5: The Contractor shall also design and test the doorposts, the corner posts and the Driver's cab end structure if it is applicable in accordance with the latest industry practices.
5	2.5.2 ERT-33	Updated clause 2.5.2: Jacking and lifting points/pads shall be provided for normal maintenance operation, sized and positioned to accept lifting equipment. In addition to these jacking and lifting points, emergency jacking and lifting points shall also be provided at all four corners and at the center of each trainset end to allow jacking/ lifting under emergency situation, including derailment.

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6	4.1.4 ERT-43	Updated clause 4.1.4: The automatic coupler shall, in conjunction with the draft-gear automatically effect mechanical, and pneumatic coupling for identically coupling head. It shall also permit separation of units either by manually from the track side and/or remotely from the cab.
7	5.7.3 ERT-47	Updated clause 5.7.3: The seats shall be ergonomically designed and the materials to be used in the seat design shall be soft type with moquette, water-repellent, fire and vandal resistant. Fire performance testing shall be undertaken by the Contractor with review by the Engineer. The seat design shall eliminate gaps that shall trap dirt or liquids and can be easily maintained.
8	9.1.9, 9.2.1 ERT-72	Updated clause 9.1.9: For service brake, the loaded braking ratio shall be 70% or more or according to EN standards. For the security brake, the empty brake ratio shall be 70% or more or according to EN standards. The rolling stock shall comply with all relevant requirements in Japanese Ministerial Ordinance, MLIT Chapter 8, Article 69 (Brake unit related) or other equivalent standards. Updated clause 9.2.1: All axles shall be equipped with a split type ventilated brake disc unless the lifetime of the disc brake exceeds the lifetime of the wheels. Braking torque shall be applied to the disc by the air operated brake cylinder operating the caliper containing the brake pads equipped with tread cleaning and

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		keeping proper condition of the pad. Each axle of motor mounted cars shall be equipped with the disk brake on wheel with tread cleaning.
9	9.4.3 ERT-73	Updated clause 9.4.3: The system shall compensate for wheel size differences. The detection of axle speed differences up to 3km/h shall initiate the required reduction of braking effort to eliminate this speed difference or according to the EN standard.
10	9.4.7 ERT-74	Updated clause 9.4.7: The wheel slide control system should not allow the axle speed differential to be over 5km/h. The operation of the sliding control shall be basically based on the operation at about 3 to 5km/h with the aim of re-adhesion within 1km/h or according to the EN standard.
11	9.6.3 ERT-75	Updated clause 9.6.3: In case of unloosening brake, acceleration command shall be cut off. However, in this function a short circuit switch shall be equipped.
12	9.6.15 ERT-76	Updated clause 9.6.15: The method by which the passenger load-sensing signal is processed shall be arranged to ensure that absence of the signal, for any reason, shall result in a brake force being applied corresponding to a Dense Crush (W3) or the W0 loading condition on that Vehicle.

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13	10.3.9 ERT-78	Updated clause 10.3.9: All flexible hoses shall be date stamped, and its full life indicated. All flexible hose connections on removable assemblies shall be of railway service proven, quick connect coupling or compatible to ISO 8434.
14	14.3.1 ERT-90	Updated clause 14.3.1: APSEs mounted on limited express train shall have a parallel synchronous operation. If one performing parallel synchronous stops by trouble, the others APSE shall perform normally. Then, the signal of VAC degraded mode of operation shall be transmitted to VAC of the affected area through TMS.
15	14.7.4, 14.7.6 ERT-92	Updated clause 14.7.4: All cells shall be standard size, and the battery cases shall be made of a material having good thermal stability and suitable chemical resistance. Updated clause 14.7.6: The battery shall always have been floating charge by the DC output from APSE. In such usage, the battery shall operate normally with normal maintenance experience for over 8 years. The Contractor shall select such a service-proven battery and APS.

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16	15.1.6 ERT-94	Updated clause 15.1.6: Hardwired train lines in addition to the TMS shall be provided for the basic train operation functionality for the following critical systems as a minimum. 1) On-board signaling control, except for the part related to the maximum service brake (if required by the system supplier); 2) Emergency brake control and security brake control, 3) Door enable, 4) Door open/close, 5) Battery Control (if battery control is controlled by the TCMS), 6) Pantograph control (if not already connected to the TCMS in a redundant way), 7) Radio/public address system. 8) CCTV, and 9) LCD between the doors
17	15.3.6 ERT-95	Updated clause 15.3.6: Fault analysis algorithms, data acquisition routines and data storage logic shall be programmed and presented using a Windows or Linux type of user interface, using the latest windows OS or other equal industry OS.

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<table>
<tr><th>ITEM NO.</th><th>REFERENCE/CLAUSE/ SECTION</th><th>REVISIONS / AMENDMENTS</th></tr>
<tr><td>18</td><td>15.6.1
ERT-98</td><td>Updated clause 15.6.1:

Electrical jumper wire that is necessary for transmission between the vehicles shall be specified by TMS supplier and shall have a design life about 8 years Couplings shall be HART type or similar.</td></tr>
<tr><td>19</td><td>Table 16.1 Responsibility Matrix
ERT-99</td><td>Updated table 16.1:

<table>
<tr><th>SOW</th><th>Item Description</th><th>By Contractor</th></tr>
<tr><td>1</td><td>Public Address (PA) System to broadcast speech messages to train passengers from the driver’s cab.
Facility to broadcast over the train PA System from the Operations Control Center (OCC) with the associated message content relayed to the train via the Train Radio System.</td><td>CP NS-03

CP NS-01</td></tr>
<tr><td>2</td><td>Guidance display for the customer shall be placed under the ceiling in the passenger coaches (or saloons). Guidance display shall be digital signage to present on dedicated TV-style color monitors using LCD displays which is 17-inch or bigger size, and it shall be possible to display the destination, the next station, the side of opening door, transit information, line map, time to arrive at each station, the guidance of the next station and attention, etc. One monitor shall be installed on one door. Securing space and supplying the wiring shall be prepared so that another screen can be added for advertisement.

Advertisement display for the customer shall be placed in the passenger</td><td>CP NS-03</td></tr>
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<tr><th>ITEM NO.</th><th>REFERENCE/CLAUSE/ SECTION</th><th>REVISIONS / AMENDMENTS</th></tr>
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<tr><td></td><td>coaches (or saloons). Advertisement display shall be digital signage to present on dedicated TV-style color monitors using 21.5-inch or more LCD displays. (BG This may interfere with luggage racks)</td><td></td></tr>
<tr><td>3</td><td>Passenger emergency intercom to provide audio communication between carriages and the driver’s cab to enable passengers to alert the driver should an emergency situation occur within the train carriage.

In case the driver does not pick up the passenger emergency intercom within a predefined time, it automatically connects to the OCC, using the Train radio.</td><td>CP NS-03

CP NS-01</td></tr>
<tr><td>4</td><td>Driver’s intercom system to allow full-duplex audio communication between driver’s cabs.</td><td>CP NS-03</td></tr>
<tr><td>5</td><td>Train radio system to allow full-duplex audio communication between the driver and the OCC. Additional interfaces shall be provided within the OCC to relay to the trains PA audio messages.</td><td>CP NS-01</td></tr>
<tr><td>6</td><td>Outdoor display (mounting on the train) consisting of a full color LED to display destination stations for the passengers on the platform.</td><td>CP NS-03</td></tr>
</table>
</td></tr>
<tr><td>20</td><td>16.2.1, 16.2.2
ERT-99,100</td><td>Updated clause 16.2.1:

The CP NS-03 Contractor shall equip each driver’s cab with the necessary Human Machine Interface (HMI) facilities for the operation, control and monitoring by the driver of the on-board</td></tr>
</table>

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		communications systems. The number of handsets required for driver use shall be rationalized and kept to a minimum. In particular, the CP NS-03 Contractor shall utilize a dedicated monitor. Updated clause 16.2.2: Subject to any reliability constraints, both CP NS-03 and CP NS-01 Contractors shall consider the integration of all communication operator functions into a different HMI.
21	16.2.13 ERT-100	Updated clause 16.2.13: Suitable automatic test routines shall be available to the driver in the active cab in order to check the operational status of the on-board communications equipment prior to the train entering passenger service.
22	16.3.12 ERT-101	Updated clause 16.3.12: The PA system shall be able to broadcast a selected safety and emergency messages on all or selected train.
23	16.5.5 ERT-102	Updated clause 16.5.5: The destination sign shall be programmable from the a dedicated PIS monitor in the driver's cab.
24	16.6.1 ERT-102	Updated clause 16.6.1:

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		Space and power supply provision shall be made available within the train carriages to enable digital signage as described in Sub-Clauses 16.1.2 item 2 and 16.4 herein.
25	16.7.5 ERT-103	Updated clause 16.7.5: The intercom unit shall consist of a switch to initiate a call along with a flush mounted eco-cancelling microphone and loudspeaker.
26	16.11.1 ERT-104	Updated clause 16.11.1: **Provision for Wi-Fi system** Provision for Wi-Fi system shall be designed in consideration with the following, but not limited to: 1) Space and position for installation 2) Materials of interior near the attachment 3) Capacity of powering 4) Provision of circuit 5) Provision of interface

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27	18.2.2.3 ERT-114	Updated clause 18.2.2.3: The data shall also be recorded onto the memory, meaning it can be viewed historically by a service laptop or a viewing station. As a minimum, high-definition video quality and a week-long video memory capacity shall be provided. The CCTV system shall be reviewed by the Engineer.
28	19.7.1.4 ERT-119	Updated clause 19.7.1.4 (changed to 19.9.1.4): The maintenance manual shall provide all necessary detail to perform the work required, and shall include the judicious use of diagrams, drawings, photographs, illustrations, etc., as appropriate for the task at hand, including necessary safety precautions. Detailed maintenance and troubleshooting procedures and test and repair procedures and work instructions shall be provided for all electronic assemblies and circuit boards (only replacement). Manuals shall identify all tools (special and standard) needed to perform the work. This listing of tools shall be provided in the section describing the discrete task being performed.
29	19.12.1 ERT-121	Updated clause 19.12.1 (changed to 19.14.1): The Contractor shall provide a supplemental History record for each vehicle at the time of final acceptance/after the warranty period. Each supplemental History record shall contain the following car-specific information: 1) Intervention and repairs during warranty period, 2) All modifications/revisions done during the warranty period, 3) All tests/validation tests reports and records for operational and safety relevant components,

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<table>
<tr><th>ITEM NO.</th><th>REFERENCE/CLAUSE/ SECTION</th><th>REVISIONS / AMENDMENTS</th></tr>
<tr><td></td><td></td><td>4) Component exchange, component change reports and new component/serial numbers. and
5) Signed documentation to show the Employer and/or the Engineer had approved all intervention, modification/ component change and testing.</td></tr>
<tr><td>30</td><td>Table 20.2 Inspection Trips
ERT-124</td><td>Updated table 20.2: Inspection Trips:
<table><tr><th>No.</th><th>Attendance</th><th>Quantity</th><th>Remarks</th></tr><tr><td>1</td><td>Employer</td><td>45 roundtrips*7 days*3 persons</td><td rowspan="2">Type test, FAT, I FAT and FACI</td></tr><tr><td>2</td><td>Engineer</td><td>45 roundtrips*7 days*2 persons</td></tr></table></td></tr>
<tr><td>31</td><td>20.2.3.4
ERT-126</td><td>Updated clause 20.2.3.4:

The Contractor shall replace any material or detail destroyed in the process of testing for tests discussed and validated by the Contractor.</td></tr>
<tr><td>32</td><td>21.8.3
ERT-137</td><td>Updated clause 21.8.3:

The Contractor shall provide data pertaining to all relevant tests having been performed on the materials to be used. A fire hazard assessment for each car shall be submitted by the Contractor for review by the Engineer. Assessment shall reflect the “worst” three-minute release rate values of the materials that are specific to the car. Alternatively, a fire hazard assessment for each car shall be submitted by the Contractor for review by the Engineer. The assessment will consider each car with respect to EN 50553, using materials compliant to EN 45545.</td></tr>
</table>

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33	21.10.8 ERT-138	Updated clause 21.10.8: Soft furnishings shall be resistant to damage by sharp objects as far as seat comfort is not negatively affected and be designed to be economical and easy to replace when deemed necessary.
34	22.6.7 ERT-142	Updated clause 22.6.7: All equipment stated above which purchased by the Contractor under this project shall be handed over to the Employer after the completion of Defects Notification Periods.
35	19.12.2 ERT-120	Updated clause 19.12.2: For maintenance staff this shall include every work instruction provided, the length of time for each training course shall be proposed by the Contractor and be based on the content contained therein. Training shall be carried out in English or Filipino as required by the Employer. Training material shall be carried out in English or Filipino as required by the Employer.
36	5.7.2 ERT-47	Updated clause 5.7.2: All seats with limited reclining function shall be automatically/manually changeable the direction with locking system and installed in order to facilitate cleaning of floors and storage of Passengers' belongings underneath.
37	20.6.9 ERT-131	Updated clause 20.6.9:

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		After completion of all the testing and commissioning, Taking-Over Certificate will be issued by the Engineer/Employer with respect to ERG clause 8.1.7, 8.6.2 and 8.8.3.9.
38	1.10 SOW-2	Updated clause 1.10: Spare parts, consumables, special tools and diagnostic test equipment shall be provided by the Contractor for the maintenance of the Rolling Stock in accordance with the approved maintenance plan by the Employer/Engineer and the O&M manuals. The Contractor shall submit a comprehensive list of recommended spare parts and consumables in accordance with the requirements specified in the ERG and ERT clause 24.2. The Contractor shall also provide all special tools, diagnostic test equipment, test benches, jigs, etc. that shall be necessary for the operations and maintenance of the Rolling Stock and associated equipment which support the heavy maintenance of the rolling stock. The Contractor shall provide all special tools, diagnostic test equipment, test benches, jigs etc. during design stage for the given statement of No Objection. The Contractor shall responsible for the delivery, installation, testing & commissioning of the approved special tools, diagnostic test equipment, test benches, jigs etc. The Contractor shall deliver the training of the special tools, diagnosis test equipment, test benches, jigs, etc.to the Employer's personnel as per clause 1.12.
39	8.6.3 ERG-49	Updated clause 8.6.3: The Rolling Stock Performance report shall be issued progressively on a monthly basis, shall be finalized at the end of DNP, and shall provide: 1) In-service FFR operational performance of individual trainsets as per clause 8.5; 2) In-service operational performance of the fleet (7 trainsets) MDBF as per clause 8.5;

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		3) The in-service OMTTR and CMTTR of all capital components as per clause 8.5, 4) Completion of Defect Remedial, 5) Completion of Open Item, 6) Completion of Modification, and 7) Completion of Spare Part, Special Tools and Test Equipment delivery including the replenished spare parts delivery, final spare part list after DNP, additional spares and consumables including parts replacement, which was not listed, become necessary during the DNP, list associated with spare parts as per clause ERT 24.2 and 8) DRACAS report
40	11.1.4 ERG-70	Updated clause 11.1.4: The Contractor shall submit a comprehensive list of recommended spare parts and consumables in accordance with the requirements specified in the ERG and ERT for the period as per ERT clause 24.2 of the Rolling Stock operation and maintenance.
41	11.5 ERG-71	Updated clause 11.5: Consumable and Recommended Spares Updated clause 11.5.1: The Contractor shall provide spare parts as per ERT clause 24.2 which shall have been included in the Schedule of Prices.

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		Updated clause 11.5.2: The spare parts shall be listed in a practical format as per ERT clause 24.2.3. Updated clause 11.5.3: The stock of all consignment or recommended spare parts shall be replenished at the end of the Defects Notification Period as per the final approved list by the engineer. Added clause 11.5.4: The Contractor shall submit the spare part delivery list and schedule for the engineer review during design review. The schedule shall demonstrate the phases of delivery which shall meet the sufficient quantity required to support the scheduled and unscheduled maintenance of the train. Added clause 11.5.5: The list shall be updated and submitted for engineer review prior to the end of defect notification period to form the final approved spare part delivery list and shall not absolve the Contractor obligation in the Contractor to demonstrate requirement in clause 8.5 of ERG. The list shall include the additional spares and consumables including parts replacement, which was not previously listed, become necessary during the DNP.

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		Added clause 11.5.6: The Contractor shall complete the spare parts delivery to the Employer prior to the completion of Defect Notification Period.
42	19.9.1.7 ERT	Added new clause (19.9.1.7): The Contractor shall provide a complete, computer data-based, list of all spare parts and consumables in the Maintenance Manuals. Items shall be categorized by subsystem or component, and listing the product or part name, Contractor's part number and supplier's part number, special storage requirements, sources/ manufacturers and alternative sources (if available) names and addresses, and guaranteed prices. This list shall be arranged by assemblies and sub-assemblies coordinated with the expanded assembly, pictorials, and assembly instructions of the Maintenance Manuals. Detailed specifications for all such parts and supplies, sufficient to procure these items independently of the Contractor, shall be provided at no extra charge prior to issue of the Performance Certificate.
43	1.6.2.1 ERT-7	Updated clause 1.6.2.1: The following physical characteristics indicate fundamental vehicle dimensions that should be given careful attention. 1. Carbody Length (excluding coupler, overhang of leading car) 19,500 mm 2. Overall length 20,000 mm

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		(excluding overhang of leading car)? 3. Train length (8 cars consist, excluding overhang of both leading cars) — 160,000 mm 4. Door arrangement shall comply with Sub-Clause 7.1 of this ERT 5. Floor height — 1,130～1,150 mm 6. Pantograph lock down height — Max. 4,150 mm 7. Pantograph height working range — 4,400 – 5,415 mm 8. Wheel Diameter — 780～860 mm 9. Wheelbase — 2,100 - 2700 mm 10. Distance between Bogie center — 13,800 mm 11. Passenger Doors — Bi-parting or single leaf plug-in sliding Doors 12. Doorway entrance width — more than 900 mm (This is narrow, 1300 is usual which allows 2 streams of passengers to enter/exit) 13. Gangway door width — more than 800 mm 14. Doorway height — 1,850 mm

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<table>
<tr><th>ITEM NO.</th><th>REFERENCE/CLAUSE/ SECTION</th><th>REVISIONS / AMENDMENTS</th></tr>
<tr><td></td><td></td><td>15. Windows — Double glazed, tempered safety glass suggests shown as laminated glass
16. Maximum axle load under W2 condition — 16,000 kg
17. Wheel back-to-back — 1359 – 1362 mm</td></tr>
<tr><td>44</td><td>1.5.1.3
ERT-6</td><td>Updated clause 1.5.1.3:

The Mockup shall be displayed to public at the ground floor level and the location will be determined by the Employer which will be along the project alignment. The Contractor shall bear all of the associated cost of the mock-up from Manufacture’s Factory to the location of display in Metro Manila, Philippines.</td></tr>
<tr><td colspan="3">Volume III - Conditions of Contract and Contract Forms</td></tr>
<tr><td>45</td><td>ATTACHMENT 1

SUMMARY OF KEY DATES
PC-8</td><td>Updated Table 1 Key Dates:
<table>
<tr><th colspan="3">TABLE 1 – KEY DATES</th></tr>
<tr><th>Key Date</th><th>Element of Work</th><th>No. of Months</th></tr>
<tr><td>KD 1</td><td>Achievement: Completing Final Design Review.</td><td>25 months</td></tr>
<tr><td>KD 2</td><td>Achievement: Deliver the Mock Up to the site</td><td>24 months</td></tr>
<tr><td>KD 3</td><td>Achievement: Completing FAI and FAT.</td><td>36 months</td></tr>
</table>
</td></tr>
</table>

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<table>
<tr><th>ITEM NO.</th><th>REFERENCE/CLAUSE/ SECTION</th><th>REVISIONS / AMENDMENTS</th></tr>
<tr><td></td><td></td><td>
<table>
<tr><td>KD 4</td><td>Achievement: Supply and delivery of the following Rolling Stock equipment for training purposes to the CP NS-01 Contractor at the North Depot (for Training Center Facility):
- Equipment for driving simulator,
- Pantograph, and
- Bogie assembly for motor car including traction motor, gearbox and coupling.</td><td>35 months</td></tr>
<tr><td>KD 5</td><td>Achievement: Completion of training and delivery of Operation and Maintenance Manual.</td><td>55 months</td></tr>
<tr><td>KD 6</td><td>Achievement: Delivery of 7 trainsets (1-7) and completion of testing and commissioning thereof plus handing over.</td><td>58 months</td></tr>
<tr><td>KD 7</td><td>Achievement: Delivery of all spare parts, consumables, special tools and jigs, plus as-built drawings.</td><td>57 months</td></tr>
<tr><td>KD 8</td><td>Achievement: Completion of Trial Operation support and the whole of the Works.</td><td>58 months</td></tr>
</table>
</td></tr>
<tr><td>46</td><td>ATTACHMENT 2

TIME FOR ACCESS TO THE SITE</td><td>Updated Time to Access to the Site:
<table>
<tr><td>Access Date</td><td>Site (Works Area)</td><td>Month no.</td></tr>
</table>
</td></tr>
</table>

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PC-11

AD 1	On-board Signalling System and other equipment to be mounted on the Rolling Stock supplied by CP NS-01 Contractor from E&M Systems and Track Works. The E&M System and Track Works Contractor will supply this equipment in Japan at the Rolling Stock Contractor's premises or at alternative agreed location(s)	
	AD-1: for trainsets one to seven (1-7) supplied under this contract	26 months
AD 2	Access to allocated areas within the North Depot for receiving trainsets, assembling, testing, commissioning and test running within the depot.	28 months
AD 3	Access to the mainline for On-Site Testing and Commissioning	34 months
AD 4	Buendia - CIA Partial Operation	58 months
AD5	Access to the whole mainline from Calamba to CIA	74 months
NB	1. *Access will be given progressively to the whole of the North South Commuter Railway for the use of this Rolling Stock.* 2. *Obtaining permission from the Railway Safety Inspector to use the Rolling Stock for commercial operations will be the responsibility of the Employer with the support of the Rolling Stock manufacturer.*	

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Annex B – Attachment 1

8.1 General

8.1.1 System Assurance Management is applicable for all stages of the Rolling Stock development, including design, manufacture, testing, commissioning, systems integration, trial operations, and in-service operations.

8.1.2 The Contractor shall submit a comprehensive System Assurance Management Plan (SAMP) which contains all requirements within this ERG Section 8 of this document, for the Engineer's review. The SAMP shall include, but not limited to the Contractor's methodology to plan, manage and control the system assurance process, organization and roles/responsibilities of the key personnel for system assurance, tasks, program and procedures for system assurance, and an internal audit program.

8.1.3 The System Assurance activities~~Plan~~ shall cover Reliability, Availability, Maintainability and Safety, Electromagnetic Compatibility (EMC), Fire Safety strategy and System Engineering. shall cover the System Assurance Management, System Safety (including the Electromagnetic Compatibility (EMC), Fire Safety strategy), Software Management and Control, Reliability, Availability, Maintainability (RAM) and Requirement Management. The SAP shall include (but not be limited to) the following details: Project Organization; Roles and Responsibilities; Assurance processes and outputs; System Safety processes and outputs; RAM processes and outputs; Requirements management processes and outputs; Assurance Reporting; and Timescales for Assurance Activities.

8.1.4 The System Assurance Management Plan shall comprise a programme showing in detail the timing of each activity and the anticipated dates for submission of system assurance documentation. The programme will break down the planned activities into discrete stages of work as a minimum design, manufacturing, installation, testing and commissioning and RAM demonstrations.

8.1.5 ~~System Assurance~~The Plan shall clearly identify the reviews to be performed at the end of each stage of the programme. The Contractor shall convene formal System Assurance Review (SAR) meetings to review all SA activities and to ensure operational hazards are comprehensively identified within the scope of the Contract. The SAR meetings shall be held quarterly, or when there is any key system change, and meeting records shall be submitted by the Contractor to the Employer. The Employer and the Engineers may participate in the SAR .System Assurance Report shall be submitted at the end of each stage of the programme which covered all the subjects above. ~~The Subsystem Assurance Plans will be consistent in approach with the System Assurance Plan~~. The Contractor's subcontractor or supplier shall provide the SAMP which will be in consistent in approach with the Contractor SAMP.

8.1.6 The SAMP shall be certified by the Contractor's internal department or by a third-party independent engineer from the design and manufacturing section. The SAMP shall be specifically developed for this Contract. ~~The SAMP shall address the Performance (Reliability, Availability, Maintainability) and Safety of the Rolling Stock.~~

8.1.7 A Taking Over Certificate (TOC) will be issued for each trainset. In order to obtain a TOC for the Rolling Stock from the Employer/Engineer, it is required that each trainset achieves 1,500 km of Fault-Free Running (FFR) during the integrated testing and commissioning and given notice of no objection by the engineer to the requirement set forth in clause 8.6.2 of ERG.~~.~~

8.1.8 A Performance Certificate will be issued by the Engineer for the total performance of the fleet. This Performance Certificate is required to be achieved by the end of the Defect Notification Period (DNP). Prerequisites to obtain the Performance Certificate includes: each trainset shall achieve 10,000 km or 2 months of FFR, the fleet (7 trainsets) shall achieve a Mean Distance Between Failures (MDBF) of 50,000 km causing a delay greater

than 5 minutes, a fleet in-service Operational Mean Time To Restore (OMTTR) of 15 minutes, ~~and~~ the fleet maintainability of capital components a Corrective Mean Time To Repair (CMTTR) of 4 hours ~~.~~and the given notice of no objection by the engineer to the requirement set forth in clause 8.6.3 of ERG.

8.1.9 The Contractor shall provide sufficient documented information for review by the Engineer. It is expected that the design demonstration of the Rolling Stock performance shall be achieved through supplier-based material self-certification, including cross-references to proven and accredited in-service performance of Rolling Stock equipment supplied in a similar railway application.

8.1.10 With regard to Safety, it is expected that certification shall be achieved through supplier-based information via application of cross references to previously certified acceptances from a reputable body (e.g., train operators, national railways authorities, independent accredited safety bodies, etc.) of similarly supplied Rolling Stock equipment, with a product-generic safety case application to be made based on existing safety certification.

8.1.11 The Employer shall conduct compliance audits during design, development, manufacture and testing and commissioning phases to ensure that the Contractor has met all relevant System Assurance requirements. The Engineer shall give 7 days' notice to the Contractor about the audit arrangement. The Contractor shall provide all necessary assistance to enable the Employer or his representative complete the audit.

~~8.1.11~~8.1.12 The Contractor shall propose design, implementation techniques and measures, depending on the SIL of the function in line with the principles of EN50128 and EN50129 or other equivalent standard subject to the given notice of no objection by the Engineer.

8.2 Performance Assurance Plan (PAP)

8.2.1 Within the SAMP, the Contractor shall submit a Performance Assurance Plan (PAP) or RAM Assurance Plan as per EN 50126 or IEC 62278 or any other equivalent international standard for the Rolling Stock as an assurance of reliability, for operational service. Reliability and availability will be assessed against specific targets laid out in this tender. In order to provide confidence that the final operating system shall achieve the requirements of the performance measures, RAM analyses and assessments shall be undertaken at appropriate stages of the project by the Contractor.~~to comply with the Employers Requirement (functional, performance and safety Requirements) and submitted for review by the Employer/Engineer.~~ The PAP shall describe the activities that the Contractor proposes to carry out during the life cycle of the design, implementation and operation of the Rolling Stock, to ensure that design solution will ultimately provide a level of assurance that the project availability requirements have been achieved.~~and shall demonstrate compliance with the Employer's Requirements, achievement of a TOC for each train set, and a Performance Certificate for the total fleet (7 trainsets).~~

8.2.2 ~~The Contractor shall implement~~ Since availability is a function of reliability and maintainability, the Contractor shall require to carry out reliability and maintainability analysis to show the system availability targets will be met and have been achieved by the end of the Demonstration phase.~~a formal Maintainability Plan for Rolling stock any other applicable system to comply with the Technical Requirements (ERT).~~

8.3 Performance (RAM) Requirements

8.3.1 The Contractor shall submit the Performance or RAM (Reliability, Availability and Maintainability) Target Apportionment Report in the preliminary design stage.

8.3.2 The Contractor shall conduct a Preliminary RAM Analysis which shall give an initial

8.1 General

8.1.1 System Assurance Management is applicable for all stages of the Rolling Stock development, including design, manufacture, testing, commissioning, systems integration, trial operations, and in-service operations.

8.1.2 The Contractor shall submit a comprehensive System Assurance Management Plan (SAMP) which contains all requirements within this ERG Section 8 of this document, for the Engineer's review. The SAMP shall include, but not limited to the Contractor's methodology to plan, manage and control the system assurance process, organization and roles/responsibilities of the key personnel for system assurance, tasks, program and procedures for system assurance, and an internal audit program.

8.1.3 The System Assurance activities shall cover Reliability, Availability, Maintainability and Safety, Electromagnetic Compatibility (EMC), Fire Safety strategy and System Engineering. shall cover the System Assurance Management, System Safety (including the Electromagnetic Compatibility (EMC), Fire Safety strategy), Software Management and Control, Reliability, Availability, Maintainability (RAM) and Requirement Management. The SAP shall include (but not be limited to) the following details: Project Organization; Roles and Responsibilities; Assurance processes and outputs; System Safety processes and outputs; RAM processes and outputs; Requirements management processes and outputs; Assurance Reporting; and Timescales for Assurance Activities.

8.1.4 The System Assurance Management Plan shall comprise a programme showing in detail the timing of each activity and the anticipated dates for submission of system assurance documentation. The programme will break down the planned activities into discrete stages of work as a minimum design, manufacturing, installation, testing and commissioning and RAM demonstrations.

8.1.5 The Plan shall clearly identify the reviews to be performed at the end of each stage of the programme. The Contractor shall convene formal System Assurance Review (SAR) meetings to review all SA activities and to ensure operational hazards are comprehensively identified within the scope of the Contract. The SAR meetings shall be held quarterly, or when there is any key system change, and meeting records shall be submitted by the Contractor to the Employer. The Employer and the Engineers may participate in the SAR .System Assurance Report shall be submitted at the end of each stage of the programme which covered all the subjects above.. The Contractor's subcontractor or supplier shall provide the SAMP which will be in consistent in approach with the Contractor SAMP.

8.1.6 The SAMP shall be certified by the Contractor's internal department or by a third-party independent engineer from the design and manufacturing section. The SAMP shall be specifically developed for this Contract.

8.1.7 A Taking Over Certificate (TOC) will be issued for each trainset. In order to obtain a TOC for the Rolling Stock from the Employer/Engineer, it is required that each trainset achieves 1,500 km of Fault-Free Running (FFR) during the integrated testing and commissioning and given notice of no objection by the engineer to the requirement set forth in clause 8.6.2 of ERG.

8.1.8 A Performance Certificate will be issued by the Engineer for the total performance of the fleet. This Performance Certificate is required to be achieved by the end of the Defect Notification Period (DNP). Prerequisites to obtain the Performance Certificate includes: each trainset shall achieve 10,000 km or 2 months of FFR, the fleet (7 trainsets) shall achieve a Mean Distance Between Failures (MDBF) of 50,000 km causing a delay greater than 5 minutes, a fleet in-service Operational Mean Time To Restore (OMTTR) of 15 minutes, the fleet maintainability of capital components a Corrective Mean Time To

Repair (CMTTR) of 4 hours and the given notice of no objection by the engineer to the requirement set forth in clause 8.6.3 of ERG.

8.1.9 The Contractor shall provide sufficient documented information for review by the Engineer. It is expected that the design demonstration of the Rolling Stock performance shall be achieved through supplier-based material self-certification, including cross-references to proven and accredited in-service performance of Rolling Stock equipment supplied in a similar railway application.

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8.1.11 The Employer shall conduct compliance audits during design, development, manufacture and testing and commissioning phases to ensure that the Contractor has met all relevant System Assurance requirements. The Engineer shall give 7 days' notice to the Contractor about the audit arrangement. The Contractor shall provide all necessary assistance to enable the Employer or his representative complete the audit.

8.1.12 The Contractor shall propose design, implementation techniques and measures, depending on the SIL of the function in line with the principles of EN50128 and EN50129 or other equivalent standard subject to the given notice of no objection by the Engineer.

8.2 Performance Assurance Plan (PAP)

8.2.1 Within the SAMP, the Contractor shall submit a Performance Assurance Plan (PAP) or RAM Assurance Plan as per EN 50126 or IEC 62278 or any other equivalent international standard for the Rolling Stock as an assurance of reliability, for operational service. Reliability and availability will be assessed against specific targets laid out in this tender. In order to provide confidence that the final operating system shall achieve the requirements of the performance measures, RAM analyses and assessments shall be undertaken at appropriate stages of the project by the Contractor. The PAP shall describe the activities that the Contractor proposes to carry out during the life cycle of the design, implementation and operation of the Rolling Stock, to ensure that design solution will ultimately provide a level of assurance that the project availability requirements have been achieved.

8.2.2 Since availability is a function of reliability and maintainability, the Contractor shall require to carry out reliability and maintainability analysis to show the system availability targets will be met and have been achieved by the end of the Demonstration phase.

8.3 Performance (RAM) Requirements

8.3.1 The Contractor shall submit the Performance or RAM (Reliability, Availability and Maintainability) Target Apportionment Report in the preliminary design stage.

8.3.2 The Contractor shall conduct a Preliminary RAM Analysis which shall give an initial indication of any RAM problems which may arise which might affect the performance of the rolling stock.

8.3.3 The Contractor shall provide RAM Management Plan (Can be part of Systems Assurance Management plan), RAM Analysis Report, RAM Demonstration Test, Maintainability Demonstration Test Plan, FMECA Analysis Report, RAM Demonstration Report and DRACAS report as necessary in the relevant stages of the project.

8.3.4 RAM Management Plan shall include the strategy for the management of RAM and safety

accumulated kilometer run shall be about 280,000 km.

1.14.8 The Contractor shall schedule the maintenance work meeting for maintainability requirements in consideration of the component design life.

1.15 General Electrical Requirements

1.15.1 Electric-Magnetic Compatibility (EMC)

1.15.1.1 Conducted and radiated Electro-Magnetic Interference/Radio Frequency Interference (EMI/RFI) shall be held to a minimum commensurate with good design practices, and in no case shall signal levels be permitted which interfere with, or compromise, the operation of on-board signal equipment, on-board intercom equipment or Ultra High Frequency (UHF) radio equipment. EMI/RFI or any other form of interference shall not affect the proper and safe operation of through service in MCRP, NSCR and NSRP-S section and any other local facilities.

1.15.1.2 Electrostatic and magnetic electrical shielding methods shall be employed to minimize the effect of stray signals and transient voltage on low level interconnecting cables.

1.15.1.3 Components and functional circuits shall be grouped according to their similar sensitivities to electrical interference and power supply needs and grouped to reduce the effects of voltage drops in the ground circuits, power and return leads, and shall be routed in raceway or harness.

1.15.1.4 The Contractor shall submit an EMC control plan in accordance with IEC 62236 or equivalent standard to the Engineer for review. The plan shall include measures to reduce conducted, induced and radiated emissions to acceptable levels as specified in IEC 61000 series or equivalent standard.

1.15.1.5 The Contractor shall carry out the measurement of ensuring Electromagnetic environment to validate compliance to the above requirements.

1.15.2 Low Voltage DC Control Power

1.15.2.1 The nominal system voltage shall be 1500 V_{DC}. Unless otherwise specified, rated performance shall be provided at nominal voltage, and all equipment connected to the low voltage power supply shall not be damaged by continuous operation within the specified minimum and maximum voltage range. In addition, continuous voltages at the upper threshold shall not damage any equipment. Variation of voltage outside the limits specified in Sub-Clause 1.12.3 shall result to system shutdown without damage.

1.15.3 Operating Voltage Range

1.15.3.1 Unless otherwise specified, equipment connected to the low voltage power supply shall operate over a power supply (line) voltage range from 0.7 x (nom Vdc) to 1.3x (nom V DC). Peak-to-peak ripple voltage from a static power supply shall not exceed three percent of the nominal specified power supply output voltage, unless otherwise allowed. It is recognized that if a transformer-rectifier unit is used to generate the low voltage DC, the ripple voltage will be substantially greater than the three percent limit. In this case, the allowable ripple voltage will be as agreed upon.

1.15.4 Transient Voltage Requirements

1.15.4.1 Equipment connected to the low voltage power system shall be capable of withstanding non-repetitive, transient, peak voltages by complying with IEC62236 or equivalent international standard.

1.15.4.2 Low voltage power supplied equipment shall not be damaged by under voltage of any

magnitude or duration. Recovery of connected equipment from the under-voltage condition shall be automatic, manual or by train line reset. Train line and battery supplied relays shall not drop out for under voltages as low as 0.5×(Vnom), with a duration of up to 50μs or shall be according to IEC 60571.~~.~~

1.15.5 Reverse Voltage

1.15.5.1 Equipment, which may be powered from the battery bus, shall not be damaged by reverse polarity voltage of the same magnitude and duration as the specified positive voltage conditions.

1.15.6 Transients Generated by Equipment

1.15.6.1 Equipment connected to the low voltage power supply, including battery and train lines, shall not generate transient voltages in excess of + 200 Vpk, with an energy content not to exceed 0.3 joules, or according to IEC 61991.~~.~~

1.15.6.2 The equipment shall be designed such that the rate of change in voltage in any transient conducted from the equipment to the electrical interface shall not exceed 10 VA for up to 1 milli second, or according to IEC 61991.~~.~~

1.15.7 Overhead Line Supply System

1.15.7.1 Within 28 days of contract award the Contractor shall provide pantograph and train characteristics to the NS-01 Contractor to enable the computer simulation for the overhead line system / pantograph interface to be undertaken.

1.15.7.2 At a minimum, equipment powered directly from the overhead line power network shall withstand transient voltages with a peak of not less than five times the maximum continuous voltage rating of the overhead line supply. The rise time from 10 to 90 percent of the peak voltage shall be assumed at 1 ms and the fall time from 90 to 50 percent shall be 40 ms. The energy content shall not be less than 1000 joules.

1.16 Installation and Maintenance Requirements of Electric Works

1.16.1 Printed Circuit Boards

1.16.1.1 All electronic printed circuit boards shall be of the plug-in or fix mounted type unless subject to review by the Engineer. All electronic printed circuit boards, the type of connector and contact material, the board material, the number of layers in a multi-layer board, use of surface mount devices and the kind of socket shall be of having the sufficient practical operational record and reviewed by the Engineer. The type of connector and contact material shall be reviewed by the Engineer. The board material shall be suitable to rail application ~~and the number of layers in a multi-layer board shall not exceed six~~. Components shall not be installed using sockets unless specifically reviewed by the Engineer. Use of surface mount devices shall be reviewed by the Engineer. Semiconductor operating temperature rating ~~shall meet or exceed +85°C~~ be according to EN or other international Standards.~~.~~

1.16.1.2 Printed Circuit Boards shall be mechanically retained to prevent loosening in service. Circuit boards shall not be hard wired to the equipment and shall be mechanically keyed to prevent insertion into the wrong rack location. Printed Circuit Boards shall be conformal coated, unless otherwise agreed to by the Engineer.

1.16.2 Equipment Accessibility

1.16.2.1 All gauges, adjustment points, switches, etc., shall be easily accessible and clearly identified with permanent identification markings.

1.15.1.3 Components and functional circuits shall be grouped according to their similar sensitivities to electrical interference and power supply needs and grouped to reduce the effects of voltage drops in the ground circuits, power and return leads, and shall be routed in raceway or harness.

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1.16.3 Device Reference Designators

1.16.3.1 All electrical devices on panels shall be identified with their alphanumeric designation corresponding to that used on the schematic diagrams.

1.16.4 Grounding

1.16.4.1 Safety grounding points shall be provided on all electrical equipment, unless otherwise reviewed by the Engineer. Grounding points shall be of tinned copper, clean, free from paint, and of a sufficient area to ensure proper electrical contact for the grounding cable fasteners. Un-tinned bronze grounding points and austenitic grade stainless steel grounding points are also considered acceptable. The area of any weld joining the grounding pad to a surface shall be at least equal to the cross-sectional area of the grounding cable.

1.16.4.2 Grounding points will have either a tapped hole or, preferably, a clearance hole (with access to both sides) suitably sized for the lug attachment fasteners.

1.16.4.3 Minimum grounding cable size shall be 6 mm2, unless otherwise reviewed by the Engineer, and the size shall be equal to, or larger than, that of the largest power wire connected to that equipment. All grounding wires and cables shall utilize longitudinally striped green and yellow insulation, or heat shrinkable tubing applied over the conductor

components.

2.3.1.2 The Contractor shall ensure the entire carbody structure, bogies, bogie attachments, equipment supports, doors, seats, and interior appointments, are designed in accordance with this ERT and in compliance to JIS E 7106 (2018) or other equivalent standards.

2.3.1.3 The Contractor shall ensure the carbody, bogie and axle mounted components have a minimum design fatigue life of at least five (5) years in excess of the declared service design life. The Contractor is required to submit supporting calculations to demonstrate compliance, with the calculations taking into consideration the operating environment in MCRP, NSCR and NSRP-S. An item that failed within the Contractor's declared life shall be repaired at the Contractor's expense. The Contractor shall provide proposals for this in the bidding.

2.3.2 End Loading and Deflection Requirements

2.3.2.1 The Contractor shall carry out stress analysis of the carbody (including torsion mode) using Finite Element Analysis. The analysis shall demonstrate that the 30 years life requirement and all static and fatigue strength requirement of the carbody and equipment mountings are satisfied.

2.3.2.2 The mechanical strength of the carbody structure shall comply with the requirements of UIC 566 or equivalent standard except for the compressive load, which is applied at the end of the carbody at the centerline of the coupler and shall be compatible in respect of crashworthiness. The tensile force shall be reduced in the same ratio as the compressive force in UIC 566 or equivalent standard.

2.3.2.3 The carbody shell shall be designed to withstand a minimum compressive load of 490kN and tensile end load of 350 kN applied through the draft gear attachment points, in combination with the most adverse vertical loading associated with the W2 loading conditions. For all load cases, all carbody members shall remain elastic, with no evidence of buckling.

2.3.2.4 The carbody shell shall be designed and tested to ensure that under W2 loading conditions negative camber shall never occur. The Contractor shall evaluate and submit camber values at W0, W1 and W2 loading for engineer review. ~~positive camber exists between bogie centers~~. The Contractor shall ensure, and must demonstrate by test, that all doors operate freely under all carbody loading conditions and will not disengage from their guide ways under the lateral loading conditions exerted by crush-loaded passengers.

2.3.2.5 The Contractor shall also design and test the doorposts, the corner posts and the Driver's cab end structure if it is applicable in accordance with the latest industry practices.

2.3.3 Airtight body structure

2.3.3.1 In the future, the new line between Clark station and New Clark City station will be open. The new line plan has some tunnel and maximum operation speed is160km/h. Airtight structure is required for rolling stock body.

2.3.4 Gangway

2.3.4.1 Between the car, Gangway must be installed and airtight structure is recommended. At the end of the car, the automatic door shall be provided for shut down the outside noise. Car end door and gangway passage height shall be more than 1850mm and width more than 800mm. The gangway door design, material and its construction shall comply with the Fire Safety requirement as per clause 21.8 of this ERT.

2.4 Crash Worthiness Requirements

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2.4 Crash Worthiness Requirements

2.4.1 Condition of the crashworthiness design shall be head-to-head collision between two identical cab cars at tare weight, having the same mass at relative speed between them 25km/h on level and tangent track. The cab car shall absorb collision energy by providing a controlled deformation and collapse of areas of the vehicle which are unlikely to be occupied by Train Crew and passengers, to absorb collision energy and to reduce the deceleration on the Train Crew and passengers. This shall be validated by computer simulation such as Finite Element Method.

2.4.2 The Contractor shall submit the details of the design cases, together with the validation process to be adapted, to the Engineer for review and comments.

2.4.3 As an alternative, the Contractor shall propose the crash worthiness, in accordance to the Japanese Ministerial Ordinance, MLIT or EN 15227 C-II or equivalent, subject to the Engineer's review.

2.4.4 In case the Japanese Ministerial Ordinance, Technical Regulatory Standards on Japanese Railways is applied, the cab car shall absorb the collision energy by providing a controlled deformation and collapse of areas of the vehicle which are unlikely to be occupied by the train crew and passengers, to absorb the collision energy and to reduce the deceleration on the train crew and passengers. This shall be validated by the computer simulation such as Finite Element Method (FEM).

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2.5 Jacking and Lifting Requirements

2.5.1 Jacking and lifting points/pads shall be provided for normal maintenance operation, sized and positioned to accept lifting equipment. In addition to these jacking and lifting points, emergency jacking and lifting points shall also be provided at all four corners and at the center of each ~~vehicle~~ trainset end to allow jacking/ lifting under emergency situation, including derailment.

2.5.2 The locations of all jacking and lifting points shall be clearly accessible and marked on the carbody.

2.5.3 The carbody shell shall be designed and tested to allow an empty vehicle, with bogies attached, to be lifted at the extreme ends at the bolster jacking pads, or any combination thereof (particularly during re-railing operations), without exceeding the yield strength of any portion of the carbody.

2.6 Car Roof

2.6.1 Roof construction shall be sufficiently robust as to allow several maintenance personnel to walk over the roof at one time, without causing undue deflection or permanent deformation. Rain gutters shall run for the full length of the vehicles to prevent the spillage of rainwater over passengers when the train is entering or leaving stations. Both ends of the vehicle shall have gutters with adequate water drainpipe that runs to the lowest possible point under the vehicle.

2.6.2 A roof mat under and around the pantograph area shall be installed for electrical insulation and anti-slip protection. In addition, anti-slip surface shall also be provided along the side of the roof covering the whole length of the vehicle.

2.7 Floor

2.7.1 The floor and its mounting structure shall be designed to withstand any loading condition

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2.7 Floor

2.7.1 The floor and its mounting structure shall be designed to withstand any loading condition specified herein, for over 30 years in normal operation of the train.

2.7.2 Transverse joints shall be located over carbody structural members and away from doorways.

2.7.3 All exposed edges of the panels, including openings for ducts and conduits, and joints between panels shall be waterproofed and adequately sealed.

2.7.4 The floor design shall allow the floor covering to be removed without damage to the floor sub-structure.

2.7.5 Floor covering panels shall be insulated from the metallic structure by elastomeric tape or equivalent. At all door openings, the floor shall have a weather tight connection with the threshold plates. Floor covering materials and installation shall be in accordance to the provision of Sub-Clause 5.4 of this ERT and shall be compliant to the Fire Safety requirements specified in Sub-Clause 21.8.

2.8 Equipment Mounting

2.8.1 General

2.8.1.1 Equipment arrangement, weight distribution purposes, on all vehicles shall be as even as possible under W0 loading conditions. Loading difference of axles when measured on weighbridge shall not be more than 1000kg from the average of 4 axles and loading

4 Coupler and Draft Gear

4.1 General

4.1.1 The end cars in each train shall be fitted with an automatic coupler. The coupler shall be placed in a readily accessible position under and from either side of the end vehicle. The position (right side or left side) of parts operated shall be consistent for all end vehicle. It shall be possible to connect with other commuter train of North-South Commuter Railway (NSCR), North-South Railway Project-South, MMSP Line (NSRP-South) without any adapter during train rescue or hauling.

4.1.2 The automatic coupler shall be able to couple with other types of rail vehicle with, if necessary, an adaptor. The adaptor, if required, shall be provided by the rolling stock supply Contractor.

4.1.3 The automatic coupler shall be able to connect a unit with the coupler of another unit on all curves in the depots and main line. The coupler height, measured from the center of the coupler to the top of rail, shall be within 880 mm +10/-15 mm.

4.1.4 The automatic coupler shall, in conjunction with the draft-gear automatically effect mechanical, ~~electrical~~ and pneumatic coupling for identically coupling head. It shall also permit separation of units either by manually from the track side and/or remotely from the cab.

4.1.5 In both leading cars, an electrical connecting plug which is necessary for relief operation by connecting train-sets shall be equipped. Also, an emergency connection cable that connects this electrical connection plug shall be equipped. By using this connecting cable, required functions such as brake command, broadcasting, buzzer etc. shall operate properly. Length and diagram of cable shall be also consistent with other commuter trains of NSCR, NSPR-South, MMSP. The position of this plug shall be consistent with other commuter trains of NSCR, NSRP-South, MMSP particularly length of cable shall be determined in consideration of the severest deviations during coupled with other train. Basically, utilization of adapter shall not be acceptable.

4.1.6 The Contractor shall provide the required cabinet for housing the emergency connection cable on the train. Alternatively, the Contractor shall provide proper mechanism for retaining the emergency connection cable when it is not in used.

4.1.7 All electrical connections shall be made to terminal blocks in junction boxes compliant with IP 65, via jumper cables, using quick connect/disconnect couplings securely locked with wire.

4.1.8 Cable hoses shall be made out of high quality, weather and abrasion resistant insulated rubber.

4.1.9 The connectors for each cable, if of the same size, shall be keyed differently to prevent misconnection, and shall be color coded to enable connectors to be easily distinguished.

4.1.10 In all cases, care shall be taken to ensure that strain relief is provided for all cables leaving the junction boxes, and that all cables are properly supported in suitable cleats, and that no chafing of the cabling takes place under all possible movements of the coupler.

4.1.11 The arrangement shall prevent damage from coupling with misaligned couplers, and shall minimize damage to the carbody wiring, should excessive tension be applied to the cables in the event of an accident.

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4.1.12 The couplers shall be designed to prevent the coupler swinging transversely when it is not coupled.

4.1.13 Couplers and draft gear shall be capable of withstanding all coupling, buffing and draft

be the enough service-proven:

1) Slip resistance of 0.75 dry and 0.62 wet in accordance with JRIS J0745 or other equivalent standards,
2) Hardness of Shore A Hardness 85-90,
3) Resistance to chemicals in accordance with JIS A 1454 (or other equivalent standards) with noticeable variation, and
4) Tensile strength in accordance with JIS K6251 (or other equivalent standards) - 7.3MPa;

The Contractor can propose alternative to the above requirement value for the Engineer review.

5.4.11 The entire floor construction shall be required to comply with the fire safety requirement as per clause 21~~8~~.8 of this ERT.

5.4.12 All floor penetrations (for piping, conduit, etc.) shall be suitably sealed against the elements, and be required to comply with the fire safety requirement as per clause 21.8 of this ERT.

5.5 Ceiling

5.5.1 The vehicle ceiling shall present an aesthetically pleasing smooth service, and shall incorporate lighting fixtures, conditioned air outlet grilles, public address speakers, etc. The ceiling panels and fixtures shall not vibrate, rattle or squeak during normal service conditions. Panels shall comply with fire regulations DIN 5510-2.

5.6 Entrance Room

5.6.1 At the end of passenger saloon, a vestibule shall be provided for the purpose of separating the door area from the passenger accommodation and keeping cooled air in the saloon. Between saloon and vestibule the partition with door shall be provided. That door shall be automatically opened and closed by floor based or button or sensor. Passenger get on and get off the train through vestibule.

5.6.2 Alternate arrangement can be suggested by the Contractor looking into optimum space utilization and carrying capacity in rush hours and will be subject to review and comments by the Engineer.

5.7 Passenger Seats

5.7.1 The Contractor shall propose a cross seating arrangement. Same needs to be submitted for Engineer's review and comments.

5.7.2 All seats with limited reclining function shall be automatically/manually changeable the direction with locking system and installed ~~to the floor by one stand~~ in ~~to~~order to facilitate cleaning of floors and storage of Passengers' belongings underneath.

5.7.3 The seats shall be ergonomically designed and the materials to be used in the seat design shall be soft type with moquette, water-repellent~~waterproof~~, fire and vandal resistant. Fire performance testing shall be undertaken by the Contractor with review by the Engineer.

The seat design shall eliminate gaps that shall trap dirt or liquids and can be easily maintained.

5.7.4 The seats shall be designed and manufactured as per fire safety requirement given in Clause 21.8 of this ERT. Details of the specification and testing requirements are to be supplied by the Contractor to the Engineer for review.

5.7.5 The electrical sockets (220V 60Hz) / USB ports shall be provided adequate position on the seats one socket per person. The sockets shall be protected by a low amp breaker. As there are three (3) designs of socket sed in the Philippines, types A, B and C the most popular type shall be provided.

5.7.6 The seat design shall be ergonomically designed for passenger comfort, aesthetically pleasing, and eliminated gaps that will trap dirt or liquids.

5.7.7 The Contractor shall be required to supply documented evidence the proposed seats to have troubled-free service in a similar operating environment.

5.7.8 Specification of the seat shall be submitted by the Contractor for review by the Engineer.

5.8 Accommodation for Disadvantaged Passengers

5.8.1 The Contractor shall provide space on the leading vehicles to cater for people on wheelchairs, and people with prams. The prospective wheelchair space shall be prominently labeled on the floor with the appropriate standard sign. Additionally, ~~fully retractable and~~ a non-obstructive, ~~–~~self-aid ~~wheelchair tie downs~~ and a railway transportation proven wheelchair securement device with instruction decal shall be made available ~~for ready installation~~ for each wheelchair space.

5.8.2 Each car shall be equipped with one (1) wheelchair space per car and 6 priority seats per car. The disabled and elderly passenger seat's label shall be prominently displayed.

5.8.3 The wheelchair spaces shall be close to disabled type toilets.

~~5.8.3~~5.8.4 The priority seats location shall be nearest to the door as per Rule IV- Requirements for Public Transportation (BATAS PAMBANSA BILANG 344).

5.9 Toilet

5.9.1 The Contractor shall provide the two western type toilets per train. Both toilets must be designed for disabled Passengers and easy using with wheel chair.

5.9.2 The toilet system should have manure dirt tank and discharge it at depot and dispose. The capacity of waste tank shall be enough to store the toilet waste for three (3) days.

5.9.3 The fresh water tank at each toilet location, shall be sufficient for 3 days of usage.

5.9.4 Regarding the amount of waste per one person for the definition of tank-capacity, the Contractor shall be reviewed by the Engineer.

5.9.5 Regarding the direction of vent of waste tank, the Contractor shall discuss with CP N-05 Contractor and the Engineer.

5.9.6 The toilet system shall be vacuum flushing type.

5.9.7 In the toilet room shall be installed mirror, paper holder, hand wash corner and bidet shower (water hose with tap).

be the enough service-proven:

1) Slip resistance of 0.75 dry and 0.62 wet in accordance with JRIS J0745 or other equivalent standards,
2) Hardness of Shore A Hardness 85-90,
3) Resistance to chemicals in accordance with JIS A 1454 (or other equivalent standards) with noticeable variation, and
4) Tensile strength in accordance with JIS K6251 (or other equivalent standards) - 7.3MPa;

The Contractor can propose alternative to the above requirement value for the Engineer review.

5.4.11 The entire floor construction shall be required to comply with the fire safety requirement as per clause 21.8 of this ERT.

5.4.12 All floor penetrations (for piping, conduit, etc.) shall be suitably sealed against the elements, and be required to comply with the fire safety requirement as per clause 21.8 of this ERT.

5.5 Ceiling

5.5.1 The vehicle ceiling shall present an aesthetically pleasing smooth service, and shall incorporate lighting fixtures, conditioned air outlet grilles, public address speakers, etc. The ceiling panels and fixtures shall not vibrate, rattle or squeak during normal service conditions. Panels shall comply with fire regulations DIN 5510-2.

5.6 Entrance Room

5.6.1 At the end of passenger saloon, a vestibule shall be provided for the purpose of separating the door area from the passenger accommodation and keeping cooled air in the saloon. Between saloon and vestibule the partition with door shall be provided. That door shall be automatically opened and closed by floor based or button or sensor. Passenger get on and get off the train through vestibule.

5.6.2 Alternate arrangement can be suggested by the Contractor looking into optimum space utilization and carrying capacity in rush hours and will be subject to review and comments by the Engineer.

5.7 Passenger Seats

5.7.1 The Contractor shall propose a cross seating arrangement. Same needs to be submitted for Engineer's review and comments.

5.7.2 All seats with limited reclining function shall be automatically/manually changeable the direction with locking system and installed in order to facilitate cleaning of floors and storage of Passengers' belongings underneath.

5.7.3 The seats shall be ergonomically designed and the materials to be used in the seat design shall be soft type with moquette, water-repellent, fire and vandal resistant. Fire performance testing shall be undertaken by the Contractor with review by the Engineer.

The seat design shall eliminate gaps that shall trap dirt or liquids and can be easily maintained.

5.7.4 The seats shall be designed and manufactured as per fire safety requirement given in Clause 21.8 of this ERT. Details of the specification and testing requirements are to be supplied by the Contractor to the Engineer for review.

5.7.5 The electrical sockets (220V 60Hz) / USB ports shall be provided adequate position on the seats one socket per person. The sockets shall be protected by a low amp breaker. As there are three (3) designs of socket sed in the Philippines, types A, B and C the most popular type shall be provided.

5.7.6 The seat design shall be ergonomically designed for passenger comfort, aesthetically pleasing, and eliminated gaps that will trap dirt or liquids.

5.7.7 The Contractor shall be required to supply documented evidence the proposed seats to have troubled-free service in a similar operating environment.

5.7.8 Specification of the seat shall be submitted by the Contractor for review by the Engineer.

5.8 Accommodation for Disadvantaged Passengers

5.8.1 The Contractor shall provide space on the leading vehicles to cater for people on wheelchairs, and people with prams. The prospective wheelchair space shall be prominently labeled on the floor with the appropriate standard sign. Additionally, a non-obstructive, self-aid and a railway transportation proven wheelchair securement device with instruction decal shall be made available for each wheelchair space.

5.8.2 Each car shall be equipped with one (1) wheelchair space per car and 6 priority seats per car. The disabled and elderly passenger seat's label shall be prominently displayed.

5.8.3 The wheelchair spaces shall be close to disabled type toilets.

5.8.4 The priority seats location shall be nearest to the door as per Rule IV- Requirements for Public Transportation (BATAS PAMBANSA BILANG 344).

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5.9.2 The toilet system should have manure dirt tank and discharge it at depot and dispose. The capacity of waste tank shall be enough to store the toilet waste for three (3) days.

5.9.3 The fresh water tank at each toilet location, shall be sufficient for 3 days of usage.

5.9.4 Regarding the amount of waste per one person for the definition of tank-capacity, the Contractor shall be reviewed by the Engineer.

5.9.5 Regarding the direction of vent of waste tank, the Contractor shall discuss with CP N-05 Contractor and the Engineer.

5.9.6 The toilet system shall be vacuum flushing type.

5.9.7 In the toilet room shall be installed mirror, paper holder, hand wash corner and bidet shower (water hose with tap).

5.9.8 And shall be installed folding baby chair and folding baby bed on which the baby diaper

9.1.9 For service brake, the loaded braking ratio shall be 70% or more or according to EN standards. For the security brake, the empty brake ratio shall be 70% or more or according to EN standards. The rolling stock shall comply with all relevant requirements in Japanese Ministerial Ordinance, MLIT Chapter 8, Article 69 (Brake unit related) or other equivalent standards.

9.1.10 In addition, the above, the balance of deceleration of regenerative and pneumatic shall be finally adjusted considering ATO station stop accuracy. Interface between BCU and ETCS or Running and stopping assistant system about service brake step (via TMS control transmission) shall be at least 31 steps.

9.1.11 Several sensors shall be incorporated to brake system. Sensors shall be equipped to each brake cylinders and each air suspensions, as a minimum. These data detected by sensors shall be transmitted to Brake control unit, and shall be utilized for control of propulsion, brake and ATO and etc.

9.1.12 The calculation for emergency braking distances under dry and wet conditions shall be submitted during design phase for the Engineer review.

9.1.13 Braking distances for normal service braking with electric brake blending shall also be submitted during the design phase for the Engineer review.

9.2 Friction Brakes

9.2.1 All axles shall be equipped with a split type ventilated brake disc unless the lifetime of the disc brake exceeds the lifetime of the wheels. ~~and b~~Braking torque shall be applied to the disc by the air operated brake cylinder operating the caliper containing the brake pads equipped with tread cleaning and keeping proper condition of the pad. Each axle of motor mounted cars shall be equipped with the disk brake on wheel with tread cleaning.

9.2.2 The brake pad shall be designed and manufactured not only with extremely small changing characteristics with respect to water, lubricating oil, fade, pressing pressure, speed and so on, but also with suppression of occurrence of spark caused by friction. The Contractor shall submit these bench test data and obtain statement of No Objection from the Engineer.

9.2.3 The friction brakes shall be fully capable of performing all braking duties, without the assistance of the electric brakes. The brake pads shall be retained by the brake actuator calipers or brake cylinder and shall be of the composite type. The pads shall not contain any asbestos or other cancer inducing materials, and the Contractor shall provide the Engineer with full details of the material composition for the health hazards assessment.

9.2.4 The parking brakes shall be with spring- applied park brake function, through air release brake actuators, and shall be capable of holding 10 cars train-set in W2 (7t payload) loading condition on a 3.5% grade under all track conditions indefinitely. Parking brakes shall be installed in each leading car and more cars if needed to meet the above performance requirement.

9.2.5 The parking brakes shall be applied in the event of loss of the main compressed air supply. The parking brakes shall be capable of release from within the cab when the compressed air supply is present. With no compressed air supply available, it shall be possible to release individual parking brake actuators manually from track level. Application of parking brakes shall also be controllable from the cab.

9.2.6 The design shall be such that the parking brakes will take effect prior to fade off of service brake and shall ensure that the combined brake effect of the pneumatic brake and parking

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9.2.5 The parking brakes shall be applied in the event of loss of the main compressed air supply. The parking brakes shall be capable of release from within the cab when the compressed air supply is present. With no compressed air supply available, it shall be possible to release individual parking brake actuators manually from track level. Application of parking brakes shall also be controllable from the cab.

9.2.6 The design shall be such that the parking brakes will take effect prior to fade off of service brake and shall ensure that the combined brake effect of the pneumatic brake and parking

brake is never less than the full brake effort of the parking brake alone.

9.2.7 Status of train parking brake shall be displayed in the active cab.

9.2.8 Suitable automatic slack adjuster shall be provided for the brake caliper having air brake cylinders. It shall be possible to isolate the friction brake system individually in each car. The Contractor shall perform a performance test of the friction brake and submit the result for Engineer review.

9.2.9 The disc brakes braking forces shall be calculated based on wheel diameter set by the TMS due to braking forces of disc brake vary as to diameter of wheel mounted.

9.2.10 Regarding the thermal capacity of friction brake system, the Contractor shall recommend based on the achievement in Japan or other equivalent standards. The recommendation shall be reviewed by the Engineer.

9.3 Electric Brakes (Regenerative Brakes)

9.3.1 Regenerative braking shall be supplied and shall be fully effective to support the required braking while reducing the jerk, wheel flat, increasing passenger comfort etc. in all braking modes.~~down to 0.5~1km/h~~, ~~namely nearly 0 km/h. Regeneration shall be inhibited when there is no catenary voltage present.~~Regeneration shall be inhibited when the catenary voltage is above 1,850 V dc or below 900 V dc.

9.3.2 Performance of the regenerative brake must not be less than below performance. Under condition of catenary voltage:1,650V, load:7t/car and velocity: 0~115km/h, regenerative braking capability (including trailer car's brake torque) is the brake torque corresponding to deceleration 3.0 km/h/s.

9.3.3 Under the condition of catenary voltage:1,650V, load:7t/car, velocity:0~82km/h and wheel diameter: 820mm, regenerative braking capability (including trailer car's brake torque) is the brake torque corresponding to deceleration 4.2 km/h/s.

9.3.4 Under the condition of catenary voltage:1,650V, load:0t/car, velocity:0~95.5km/h and wheel diameter: 820mm, regenerative braking capability (including trailer car's brake torque) is the brake torque corresponding to deceleration 4.2 km/h/s.

9.3.5 Under the condition of catenary voltage:1,650V, load:0t/car velocity:0~132km/h and wheel diameter: 820mm, regenerative braking capability (including trailer car's brake torque) is the brake torque corresponding to deceleration 3.0 km/h/s.

9.3.6 The sample of regenerative braking curve is shown in Appendix D.

9.4 Wheel Slide Control System

9.4.1 All cars shall be equipped with a wheel slide detection system to maximize the utilization of available wheel/rail adhesion under low adhesion conditions, to eliminate damage and unnecessary wear to wheel treads. Slide shall be detected on per axle basis, and protection also shall be provided on per axle basis.

9.4.2 The hardware and software shall reliably detect all-wheel-slide conditions that may occur on any axle and shall initiate actions that minimize or terminate these conditions, whether they occur randomly or synchronously.

9.4.3 The system shall compensate for wheel size differences. The detection of axle speed differences up to 3km/h shall initiate the required reduction of braking effort to eliminate

this speed difference or according to the EN standard.~~.~~

9.4.4 During friction braking, brake cylinder pressure shall be modulated in proportion to the axle speed differential, assisted by rapid pressure reduction (dump) valves when differentials or decelerations are large. In emergency braking, the dump valves shall be used.

9.4.5 The system shall incorporate monitoring features to detect both failure of sensor inputs, and system performance indicative of failure of that function. Detection of sensor or system malfunction shall disable the system so as to guarantee braking. All faults shall be logged in the train's Train Management System.

9.4.6 The wheel slide control system shall operate normally with the speed sensor which has 60 pieces of peaks.

9.4.7 The wheel slide control system should not allow the axle speed differential to be over 5km/h. The operation of the sliding control shall be basically based on the operation at about 3 to 5km/h with the aim of re-adhesion within 1km/h or according to the EN standard.~~.~~

9.4.8 Digital wheel slide protection with gradual slide correction shall be provided in all braking modes except in security braking mode. The slide detection shall be performed per axle and the correction per axle. The correction of slide shall operate independently on each vehicle;

9.4.9 The sliding effect shall be maintained during a relevant period of time, in order to increase the available adhesion at the wheel-rail contact with permanent control, in minimizing the air consumption and optimizing stopping distance;

9.4.10 The Contractor shall demonstrate that the correction process for wheel slide shall not cause infringements of the signaling compatibility requirements;

9.4.11 The performance of the wheel slide protection equipment shall satisfy the relevant requirements of Japanese Technical Standards or other equivalent standards;

9.4.12 The wheel slide system shall detect the onset of slide by either an axle deceleration exceeding a pre-set parameter, or detection of a difference between the relative speeds of the axles of any one axle of any bogie;

9.4.13 The Contractor shall incorporate the complete compatibility for slide with the signaling system and interfaces. The Tenderer shall submit full details of wheel slide protection scheme and equipment; and

9.4.14 Wheel slide indication shall be made available in the driving cab through TMS system.

9.4.15 The wheel slide control system shall be reviewed by the Engineer during the design phase.

9.5 Brake Control / Brake Blending

9.5.1 This system shall be service-proven system.

9.5.2 The braking force control in the whole train-set shall be performed by exchanging the required brake amount, the actual brake amount, etc. by the control transmission between these devices in addition to the calculation and operation of the PECE, BCU and TMS.

9.5.3 By using this function, it is necessary to maximize effective utilization of regenerative braking in the whole train-set, energy saving and suppression of wear of the brake shoe

brake is never less than the full brake effort of the parking brake alone.

9.2.7 Status of train parking brake shall be displayed in the active cab.

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9.4.4 During friction braking, brake cylinder pressure shall be modulated in proportion to the axle speed differential, assisted by rapid pressure reduction (dump) valves when differentials or decelerations are large. In emergency braking, the dump valves shall be used.

9.4.5 The system shall incorporate monitoring features to detect both failure of sensor inputs, and system performance indicative of failure of that function. Detection of sensor or system malfunction shall disable the system so as to guarantee braking. All faults shall be logged in the train's Train Management System.

9.4.6 The wheel slide control system shall operate normally with the speed sensor which has 60 pieces of peaks.

9.4.7 The wheel slide control system should not allow the axle speed differential to be over 5km/h. The operation of the sliding control shall be basically based on the operation at about 3 to 5km/h with the aim of re-adhesion within 1km/h or according to the EN standard.

9.4.8 Digital wheel slide protection with gradual slide correction shall be provided in all braking modes except in security braking mode. The slide detection shall be performed per axle and the correction per axle. The correction of slide shall operate independently on each vehicle;

9.4.9 The sliding effect shall be maintained during a relevant period of time, in order to increase the available adhesion at the wheel-rail contact with permanent control, in minimizing the air consumption and optimizing stopping distance;

9.4.10 The Contractor shall demonstrate that the correction process for wheel slide shall not cause infringements of the signaling compatibility requirements;

9.4.11 The performance of the wheel slide protection equipment shall satisfy the relevant requirements of Japanese Technical Standards or other equivalent standards;

9.4.12 The wheel slide system shall detect the onset of slide by either an axle deceleration exceeding a pre-set parameter, or detection of a difference between the relative speeds of the axles of any one axle of any bogie;

9.4.13 The Contractor shall incorporate the complete compatibility for slide with the signaling system and interfaces. The Tenderer shall submit full details of wheel slide protection scheme and equipment; and

9.4.14 Wheel slide indication shall be made available in the driving cab through TMS system.

9.4.15 The wheel slide control system shall be reviewed by the Engineer during the design phase.

9.5 Brake Control / Brake Blending

9.5.1 This system shall be service-proven system.

9.5.2 The braking force control in the whole train-set shall be performed by exchanging the required brake amount, the actual brake amount, etc. by the control transmission between these devices in addition to the calculation and operation of the PECE, BCU and TMS.

9.5.3 By using this function, it is necessary to maximize effective utilization of regenerative braking in the whole train-set, energy saving and suppression of wear of the brake shoe and brake pad.

9.6.2 In case of brake shortage during braking by ATP, the vehicle with brake shortage shall apply emergency brake. Also, in case of unloosening brake, braking system shall be equipped with the function forcibly to loosen the brake by remote operation from the cab;

9.6.3 In case of unloosening brake, acceleration command shall be cut off. However, in this function a short circuit switch shall be equipped.

9.6.4 The friction brake at zero speed shall be interlocked with the door control system. When all the doors are not closed, the brake shall not be loosened.

9.6.5 When the braking torque of the train-set is insufficient due to a breakdown of the BCU, brake release at the trouble of brake un-releasing, etc., the required braking torque of the train-set shall be ensured in conjunction with the train-set brake torque control function of the TMS. This compensate range shall be correspond to the emergency brake force at loaded rate at 7t/car.

9.6.6 When a failure occurs that the brake does not loosen, the brake shall be remotely released from the crew cab.

9.6.7 Gradient starting brake function shall be provided.

9.6.8 Braking in ATO mode and manual mode shall be provided. In the ATO mode, at least 31 steps of brake step shall be transmitted with TMS.

9.6.9 The braking system shall able to prevent changes in braking force which may due to changes of load detection curve or while the train is in motion.

9.6.10 In case door is open, service brake shall not be released. However, depot operation may permit the brake release whilst open door with the available of bypass switch which shall secured in the driver cab.

9.6.11 In case ATP is cut off, maximum service brake or emergency brake shall be actuated when train speed exceed 25km/h.

9.6.12 The associated brake unit shall contain all the pneumatic items necessary to control all applications of the friction service brakes and emergency brakes on that Vehicle. The emergency brake control valves independent of the service brake control valves shall be controlled directly from the emergency brake train control lines. The friction emergency brake shall be fail-safe and of "energize to release" type.

9.6.13 The emergency brake loop shall be a high integrity fail-safe hard-wired circuit and shall in no way be allowed to be bypassed due to an error in operation.

9.6.14 The mechanism of brake force/vehicle weight adjustment employment shall ensure a full proportional adjustment is achieved through the braking range between Tare Loading (W0) and Dense Crush Loading conditions (W3).

9.6.15 The method by which the passenger load-sensing signal is processed shall be arranged to ensure that absence of the signal, for any reason, shall result in a brake force being applied corresponding to a Dense Crush (W3) or the W0 loading condition on that Vehicle.

9.6.16 Abnormal high/low brake cylinder pressure shall be detected, this includes malfunction of sensors etc., for the alarm to the operation/maintenance personnel. The brake shall be able to be isolated during operation in order to resume train motion or at the depot. The detection thresholds shall be set to avoid a misdetection at any situation. This applies to the abnormal air spring pressure detection as well.

9.6.17 In case of sensors malfunction, the braking control system shall not cause any damages to the wheel due to slip, abnormal high pressure, etc.- The braking control scheme during sensors malfunction shall be provided to Engineer review during.

apply emergency brake. Also, in case of unloosening brake, braking system shall be equipped with the function forcibly to loosen the brake by remote operation from the cab;

9.6.3 In case of unloosening brake, acceleration command shall be cut off. However, in this function a short circuit switch shall be equipped.

9.6.4 The friction brake at zero speed shall be interlocked with the door control system. When all the doors are not closed, the brake shall not be loosened.

9.6.5 When the braking torque of the train-set is insufficient due to a breakdown of the BCU, brake release at the trouble of brake un-releasing, etc., the required braking torque of the train-set shall be ensured in conjunction with the train-set brake torque control function of the TMS. This compensate range shall be correspond to the emergency brake force at loaded rate at 7t/car.

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9.6.17 In case of sensors malfunction, the braking control system shall not cause any damages to the wheel due to slip, abnormal high pressure, etc.- The braking control scheme during sensors malfunction shall be provided to Engineer review during.

operation ratio. For this control, train line or transmission of TMS may be utilized.

10.3 **Pneumatic System**

10.3.1 The Contractor shall submit details of stainless-steel pneumatic system piping or an equivalent service-proven material such as copper for ~~for Engineer~~the Engineer review. Joints shall be rail industry approved compression fittings. Joints shall not be made to connect straight runs of pipe work, unless reviewed and approved by the Engineer. Inaccessible runs of pipe work shall not utilize joints. All piping shall be installed to keep fittings to an absolute minimum.

10.3.2 Cut-out valve handles shall be installed so that in the open position they are parallel to the flow of air, and in the closed position they are perpendicular to the flow of air. Cut-out cock handles shall be readily accessible for use in an emergency. All cut-out cocks shall be of the vented type, unless the function prohibits their use. The function of all cut-out cocks shall be clearly identified by means of engraved stainless-steel plates riveted to structure adjacent to the valve, the lettering on which shall be filled with black epoxy paint and suitable color coded.

10.3.3 All pneumatic tanks or reservoirs shall have drain valve to remove condensates.

10.3.4 All pneumatic tanks shall be in accordance with EN286-C or EN286-4 or other equivalent standard.

10.3.5 A cut-off valve shall be provided at a place required for maintenance or abnormality.

10.3.6 Separate systems within the pneumatic system shall be supplied via a vented cut-out valve and a strainer, and shall be provided with separate air reservoirs, supplied through a check valve to protect against sudden loss of air pressure. The air brake reservoir shall be sized to provide at least three emergency brake operations under W2 loading conditions. Reservoirs shall be set to assist moisture collection and shall include automatic/manual drain valves.

10.3.7 The main air reservoir shall have sufficient capacity for the simultaneous operation of all pneumatic devices. Calculations for the capacity of all reservoirs shall be submitted to the Engineer for review.

10.3.8 All air reservoir structure shall comply with EN286-C or EN286-4. or other equivalent standards.

10.3.9 All flexible hoses shall be date stamped, and its full life indicated. All flexible hose connections on removable assemblies shall be of railway service proven, quick connect coupling or compatible to ISO 8434.

10.3.10 The device and air pipe from the last tank as the source of the braking force to brake cylinder used to service brake and emergency brake shall be placed within the width of bogie.

10.3.11 The device and air pipe from the last tank as the source of the braking force to brake cylinder used to security brake shall be placed within the width of bogie frame.

10.3.12 Pneumatic air supply distribution system shall be designed in such a way that any single point failure can be readily isolated to ensure that the affected train can be continued in service in a safe manner.

10.3 Pneumatic System

10.3.1 The Contractor shall submit details of stainless-steel pneumatic system piping or an equivalent service-proven material such as copper for the Engineer review. Joints shall be rail industry approved compression fittings. Joints shall not be made to connect straight runs of pipe work, unless reviewed and approved by the Engineer. Inaccessible runs of pipe work shall not utilize joints. All piping shall be installed to keep fittings to an absolute minimum.

10.3.2 Cut-out valve handles shall be installed so that in the open position they are parallel to the flow of air, and in the closed position they are perpendicular to the flow of air. Cut-out cock handles shall be readily accessible for use in an emergency. All cut-out cocks shall be of the vented type, unless the function prohibits their use. The function of all cut-out cocks shall be clearly identified by means of engraved stainless-steel plates riveted to structure adjacent to the valve, the lettering on which shall be filled with black epoxy paint and suitable color coded.

10.3.3 All pneumatic tanks or reservoirs shall have drain valve to remove condensates.

10.3.4 All pneumatic tanks shall be in accordance with EN286-C or EN286-4 or other equivalent standard.

10.3.5 A cut-off valve shall be provided at a place required for maintenance or abnormality.

10.3.6 Separate systems within the pneumatic system shall be supplied via a vented cut-out valve and a strainer, and shall be provided with separate air reservoirs, supplied through a check valve to protect against sudden loss of air pressure. The air brake reservoir shall be sized to provide at least three emergency brake operations under W2 loading conditions. Reservoirs shall be set to assist moisture collection and shall include automatic/manual drain valves.

10.3.7 The main air reservoir shall have sufficient capacity for the simultaneous operation of all pneumatic devices. Calculations for the capacity of all reservoirs shall be submitted to the Engineer for review.

10.3.8 All air reservoir structure shall comply with EN286-C or EN286-4. or other equivalent standards.

10.3.9 All flexible hoses shall be date stamped, and its full life indicated. All flexible hose connections on removable assemblies shall be of railway service proven, quick connect coupling or compatible to ISO 8434.

10.3.10 The device and air pipe from the last tank as the source of the braking force to brake cylinder used to service brake and emergency brake shall be placed within the width of bogie.

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10.3.12 Pneumatic air supply distribution system shall be designed in such a way that any single point failure can be readily isolated to ensure that the affected train can be continued in service in a safe manner.

14.2.7 The output of the LVPS shall be routed to the low voltage distribution panel/cabinet inside the car. The negative return current from each subsystem shall run individually to the Engineer's reviewed insulated common point located in an enclosure under the car or inside of the car.

14.2.8 The entire Auxiliary Power Supply Equipment and controls shall be reviewed and commented by the Engineer.

14.2.9 If APS stops to operate by a serious failure, switch which can reset from the driver cab shall be installed.

14.3 Redundant system

14.3.1 ~~Two (2)~~ APSEs mounted on ~~train set~~limited express train shall ~~perform~~ have a parallel synchronous operation. If one ~~of two~~ performing parallel synchronous stops by trouble, the others APSE shall perform normally. Then, the signal of VAC degraded mode of operation shall be transmitted to VAC of the affected area through TMS.

14.4 Maintenance Requirements

14.4.1 No component in the APSE and the ACU except for cover packing, power supply unit (AVR), gate IF, contacts of LB shall require removal or replacement for at least 12 years.

14.4.2 Any fault in the APSE or the ACU shall be logged and into the Fault Indication System of the TMS and ACU. What is needed of any fault shall be enunciated in the Driver's Cab. Logged fault into the TMS and ACU shall be stored and remain until certain number of faults. ACU shall have ordinary-speed and high-speed trace function. In high-speed trace function, logged fault related to the switching of element and behavior of instantaneous current and voltage etc. shall be required to be available for fault diagnostic analysis.

14.4.3 Means shall be provided to automatically discharge capacitors whose voltage might present a hazard to a maintenance worker opening any enclosure. Discharge time shall not be more than 5 minutes.

14.5 Circuit Breaker Panels and Isolating Switches

14.5.1 The following distribution panels shall be provided:

1) Low (100 Vdc) Voltage Circuit Breaker Panel;
2) 220/440 V_{AC} Circuit Breaker Panel;
3) All 220/440 V_{AC} circuit breakers shall be located in a separate enclosure, and shall individually protect the circuits;
4) Panel for Auxiliary Power Supply Equipment;
5) Spare Circuit Breakers for all panels and
6) All isolating switches and Circuit breakers necessary for vehicle intervention shall be placed inside the driver's cab for easy access and intervention.

14.5.2 All circuit breakers and switches necessary for vehicle revenue line fault intervention shall be located inside the drivers' cab. The final list of circuit breakers and switches shall be subject to review by the Engineer. All circuit breaker panels shall be reviewed and commented by the Engineer. ~~Attention shall be paid that arrangement of the panels are coordinated in consideration with operations in MCRP, NSCR and NSRP-S.~~

14.2.9 If APS stops to operate by a serious failure, switch which can reset from the driver cab shall be installed.

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14.6 Emergency Power Supply

14.6.1 When battery capacity decreases, pantographs cannot be raised and APSE cannot operate because of lack of DC100V as control power voltage. Therefore, the Emergency Power Supply function, shown below, shall be equipped.

14.6.2 After pantograph raised by releasing the lock manually, it shall be able to take DC1500V power from overhead catenary and the power shall be converted to DC100V by Emergency Power Supply function. This is done at transformer level.

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14.6.3 In this case, insufficient voltage supply to device which need DC100V shall not be permissible for appropriate initialize of device. Cutting off the DC100V circuit from battery may be acceptable, if necessary.

14.6.4 When APSE starts to operate, it shall be considered for circuit breaker not to be tripped by inrush current to the reduced capacity battery.

14.6.5 The way in which Emergency power supply starts APSE shall be submitted for review by the Engineer.

14.7 **Battery**

14.7.1 The battery shall have sufficient capacity to supply all low voltage power loads (which includes ventilation system, emergency lighting, etc. listed as emergency loads under ERT Sub-Clause 14.1.1) during failure of the low voltage power supply for a minimum period of one (1) hour of normal train operation and for a minimum period of 60 minutes of passenger emergency lighting. The Contractor shall submit the battery capacity for the Engineer to review taking into account not only this requirement but also an appropriate allowance rate. In case of failure of the Auxiliary Power Supply the installed battery, capacity is sufficient to perform the following emergency functions for one hour.

1) Emergency Lighting,
2) Lighting of Drivers Cab
3) Train Control System
4) Train Radio
5) Automatic Doors
6) Passenger Announcement System
7) Ventilation of Passenger Areas
8) Ventilation of Drivers Cab,
9) Drivers Display
10) ATP

14.7.2 The functions necessary for power failure necessary for calculating the battery capacity shall comply with all relevant requirements in Japanese Ministerial Ordinance, MLIT Chapter 8, Article 85 (Functional relationship of equipment at power failure) or other equivalent standards.

14.7.3 Each leading car shall be equipped with a sintered electrode type nickel-cadmium-alkali storage battery contained in a steel battery box. The Contractor can propose alternative battery type for Engineer review.

14.7.4 All cells shall be standard size, and the battery cases shall be made of a material having good thermal stability and suitable chemical resistance. ~~and shall be translucent.~~

14.7.5 The battery shall be designed to withstand the shock and vibration conditions associated with a rugged rail service environment.

14.7.6 The battery shall always have been floating charge by the DC output from APSE. In such usage, the battery shall operate normally with normal maintenance experience for over 8 years. The Contractor shall select such a service-proven battery and APS.

14.7.7 In floating charging, the output voltage of the APS and the charging characteristics of the battery shall be completely compliant, and insufficient charging and overcharging shall not occur.

14.7.8 The Contractor shall submit the required capacity calculation considering 10 cars train-sets in the future extension and reviewed by the Engineer.

14.7.9 Battery Installation

14.7.9.1 The battery shall be installed under the vehicle and shall be accessible from the side of the vehicle. The battery box shall be ventilated by natural air convection and have drain holes. The batteries shall be mounted in a stainless-steel roll-out tray, with positive stops when pulled out and a lock in the stored position. Alkali-resistant paint is applied to the battery box and tray.

14.7.9.2 All underfloor boxes/containers shall have indicators visible from more than 5m that confirm outside cover of the box is locked and any slide out sections are locked within to prevent sliding out.

14.7.9.3 The roll-out tray shall have resinous wheel so as to insulate the box and the carriage.

14.7.9.4 Wiring in the box, even if the carriage is moved, shall be considered so that unnecessary slack does not occur. Especially when the carriage is moved or the lid is closed; wiring in the box shall be fixed appropriately so as not to be sandwiched.

14.7.9.5 Fall prevention stopper shall be provided so as not to fall when the carriage pulls out.

14.7.10 Battery Contactor (Main Battery Switch)

14.7.11 The device is a non-contact contactor for opening and closing control the DC100V circuit from the storage battery in the control voltage DC100V and shall be composed of control unit, the main circuit unit in which a semiconductor is incorporated and the circuit that can be operated from both the cabin.

14.7.12 The circuit to confirm whether storage battery contactor is ON or OFF shall be incorporated, and the actual condition of storage battery contactor shall be displayed in the driver's cabin. The contactor switch and status (on/0ff) shall be visible from the outside of the train.

14.7.13 Battery Circuit Open Switch

14.7.14 Battery circuit open switch shall be equipped to work safety for maintenance, replacement or construction, etc. When this switch is opened, it is necessary to make it clear that the state is highly visible.

15 Train Management System

14.6.3 In this case, insufficient voltage supply to device which need DC100V shall not be permissible for appropriate initialize of device. Cutting off the DC100V circuit from battery may be acceptable, if necessary.

14.6.4 When APSE starts to operate, it shall be considered for circuit breaker not to be tripped by inrush current to the reduced capacity battery.

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14.7.3 Each leading car shall be equipped with a sintered electrode type nickel-cadmium-alkali storage battery contained in a steel battery box. The Contractor can propose alternative battery type for Engineer review.

14.7.4 All cells shall be standard size, and the battery cases shall be made of a material having good thermal stability and suitable chemical resistance.

14.7.5 The battery shall be designed to withstand the shock and vibration conditions associated with a rugged rail service environment.

14.7.6 The battery shall always have been floating charge by the DC output from APSE. In such usage, the battery shall operate normally with normal maintenance experience for over 8 years. The Contractor shall select such a service-proven battery and APS.

14.7.7 In floating charging, the output voltage of the APS and the charging characteristics of the battery shall be completely compliant, and insufficient charging and overcharging shall

15.1 **General**

15.1.1 This system improves functions by integrally controlling the control functions of each device on the vehicle using software logic and serial transmission line function, and centrally manages the information used in those devices. TMS centrally shall manage information and shall have functions such as transmission of operation control commands such as powering and service braking, failure monitoring, function inspection, crew support and the like by utilizing this transmission line and shall improve vehicle functions and maintenance efficiency. Basic transmission, transmission with some mounted equipment and between the vehicle and the vehicle shall be connected by Ethernet transmission, and large data sets shall be transmitted and collected at a high speed.

15.1.2 In normal operation, with no equipment failures, the Train Management System (TMS) shall be the primary command and control system for each consist. The TMS shall not be critical to the safety of each consist.

15.1.3 The TMS system shall be sufficiently service-proven as the same method to deal with control command and information within the train which are extremely important but not safety critical.

15.1.4 The TMS shall be capable of performing a bi-directional communication with the on-board signaling equipment for control function if required under the ATO mode.

15.1.5 The Contractor shall ensure that all signal inputs received from on-board signaling equipment and output signals exported to the on-board signaling system shall be recorded and shall be available for retrieval for analysis/record purpose. All signals (input/output between the Rolling Stock and the on-board signaling equipment) shall generally be routed through the TMS. The CP NS-01 Contractor will provide the requisite interface signal to the Contractor during the interface stage.

15.1.6 Hardwired train lines in addition to the TMS shall be provided for the basic train operation functionality for the following critical systems as a minimum.

1) On-board signaling control, except for the part related to the maximum service brake (if required by the system supplier);
2) Emergency brake control and security brake control,
3) Door enable,
4) Door open/close,
5) Battery Control (if battery control is controlled by the TCMS~~,~~),
6) Pantograph control (if not already connected to the TCMS in a redundant way),~~ and~~
7) Radio/public address system.
8) CCTV, and
9) LCD between the doors

15.1.7 The arrangement shall allow for basic consist operation in the event of a TMS failure.

15.1.8 The TMS shall be connected to two reasonably wide LCD screens (A5 size minimum) mounted in the train operator's cab console for fault indicating system (FIS), alarm monitoring, control initiation and data entry etc.

15.1.9 The date of TMS shall be interfaced with communication system provided by CP NS-01. And the same images of TMS monitor in operator cab can be watched at OCC or maintenance office PC monitor, etc. The CP NS-03 Contractor shall provide the software

and maintenance efficiency. Basic transmission, transmission with some mounted equipment and between the vehicle and the vehicle shall be connected by Ethernet transmission, and large data sets shall be transmitted and collected at a high speed.

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3) Door enable,
4) Door open/close,
5) Battery Control (if battery control is controlled by the TCMS),
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15.1.9 The date of TMS shall be interfaced with communication system provided by CP NS-01. And the same images of TMS monitor in operator cab can be watched at OCC or maintenance office PC monitor, etc. The CP NS-03 Contractor shall provide the software of PC in OCC or maintenance office, etc.

15.1.10 TMS configurations and options shall be reviewed by the Engineer.

15.2 **Fault Indication**

15.2.1 The Train Management System (TMS) shall include a Fault Indication Function, which

of PC in OCC or maintenance office, etc.

15.1.10 TMS configurations and options shall be reviewed by the Engineer.

15.2 Fault Indication

15.2.1 The Train Management System (TMS) shall include a Fault Indication Function, which shall enunciate critical faults to the Driver and any further abnormal conditions recorded in the event logger. When a critical fault is detected in the train, the TMS shall automatically change the screen to fault indication mode.

15.2.2 The list of critical faults, that needs to be catered for, shall be submitted to the Engineer for review.

15.2.3 Faults shall be classified in severity, A, B, C etc. with actions required to be taken on the screen.

15.3 Design Requirements

15.3.1 The TMS shall perform control initiation including acceleration, deceleration, air conditioner command, destination and guidance setting, data acquisition, data processing, data communication and data presentation functions, except for emergency brake and security brake. The TMS shall be able to automatically identify number of cars on which mounted. Control transmission related to acceleration / deceleration shall correspond to manual operation and ETCS and Running and stopping assistant system. In particular, the command step number from the (ATO) / ETCS and Running and stopping assistant system shall be capable of handling at least 31 steps or more. Regarding the information about service operation such as train number and train type etc., it shall be capable of setting not only by TMS but also by OCC through signaling system. Values of air spring pressure which are used by propulsion and brake shall be set when doors are just closed so that values of air spring pressure transmitted to other equipment doesn't vary while train is moving.

15.3.2 Interfacing capability shall be provided with twenty percent (20%) spare unallocated vehicle system Input/output capacity for future use and when utilized it shall not produce any adverse performance impact on data throughput performance.

15.3.3 The transmission mode and protocol of the TMS shall be of industry standard and maintain reliable operation and shall be immune to interference or performance degradation in the environment influenced by Electro-Magnetic Interference (EMI) and harmonics generated from the traction power converters, Variable Voltage Variable Frequency (VVVF) inverters and static inverters.

15.3.4 A single point failure of any individual part shall not cause any adverse performance impact or cause loss of data in control transmission.

15.3.5 The TMS shall perform fault analysis, event log fault occurrence, determine the health of the vehicle systems, failure management actions and present alarm and condition status to the train operator. The fault logger shall be configured to sum repetitive faults, and when the memory is full, the next fault shall result in the oldest fault being dropped and the newest added.

15.3.6 Fault analysis algorithms, data acquisition routines and data storage logic shall be programmed and presented using a Windows or Linux type of user interface, using the

latest windows OS or other equal industry OS.

15.3.7 The function of logging on-board fault occurrences and degraded performance condition which is monitored shall be provided as an integral part of the TMS. The Contractor shall nominate the key indicators of degraded performance of the principal vehicle systems for review by the Engineer.

15.3.8 The TMS shall always display a warning message on a per vehicle system overview basis for any consist system detected with an active fault alarm condition. Selectable page by train operator which list of active fault alarms for the total consist shall be provided.

15.3.9 The TMS programming shall allow for easy data entry and function changing and upgrading throughout the life of the system.

15.3.10 The TMS display shall use back lit LCD technology and shall be software driven by the TMS. Commands shall be entered by the train operator via touch screen.

15.3.11 Two TMS monitors shall be prepared. Normally, each piece of information shall be appropriately sorted and displayed on the two units. Basically, one shall display indicators such as propulsion / brake step indicator and so on, the other shall display equipment status information such as temperature of saloon, passenger loading and so on. Contents displayed shall be able to be exchanged between two monitors, and if one monitor fails, contents displayed on the other shall be able to be changed manually.

15.3.12 The TMS display shall provide the train operator with information regarding gauge of each voltage, current and pressure, the operating status of the vehicle consist, vehicle/system health and failure management actions performed by the TMS. The Display shall provide the facility for train operator to input railway operations information (e.g., staff number, train run number).

15.3.13 The TMS shall have function to calculate running distance for trip meter.

15.3.14 TMS shall get time and date information from communication system and on-board signaling system and linked equipment shall get time from TMS.

15.3.15 The Information of the train place shall be transmitted to required system. At least, onboard system, air conditioning system, propulsion system, brake system and auxiliary power supply system are included.

15.3.16 The display shall provide the facility for maintenance people to input maintenance information (e.g., wheel diameter,)

15.3.17 Master Clock System to provide to the various train borne systems an accurate source of time and date information.

15.3.18 In Transmission concerning functions related to driving and devices with high importance, that is, control transmission, the backbone transmission line shall have two systems as the Ethernet system to have redundancy. These two main transmission lines shall be loop or ladder type to have higher redundancy. Each vehicle shall have VS for 1 system and 2 system. ED shall be connected to VS. A central unit shall be installed in both leading vehicles. Here VS is vehicle switch and ED is end device. The simplified block diagram is shown in Appendix F.

15.3.19 In Transmission concerning functions related to CCTV, monitor information, information not directly related to driving, the backbone transmission line shall have one system as the Ethernet system with one loop redundancy. Each vehicle shall have a VS. The simplified block diagram is shown in Appendix G.

15.3.20 Transmission lines shall be capable of network isolation by V-LAN. The communication

shall enunciate critical faults to the Driver and any further abnormal conditions recorded in the event logger. When a critical fault is detected in the train, the TMS shall automatically change the screen to fault indication mode.

15.2.2 The list of critical faults, that needs to be catered for, shall be submitted to the Engineer for review.

15.2.3 Faults shall be classified in severity, A, B, C etc. with actions required to be taken on the screen.

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15.3.2 Interfacing capability shall be provided with twenty percent (20%) spare unallocated vehicle system Input/output capacity for future use and when utilized it shall not produce any adverse performance impact on data throughput performance.

15.3.3 The transmission mode and protocol of the TMS shall be of industry standard and maintain reliable operation and shall be immune to interference or performance degradation in the environment influenced by Electro-Magnetic Interference (EMI) and harmonics generated from the traction power converters, Variable Voltage Variable Frequency (VVVF) inverters and static inverters.

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15.3.7 The function of logging on-board fault occurrences and degraded performance condition which is monitored shall be provided as an integral part of the TMS. The Contractor shall nominate the key indicators of degraded performance of the principal vehicle systems for review by the Engineer.

15.3.8 The TMS shall always display a warning message on a per vehicle system overview basis for any consist system detected with an active fault alarm condition. Selectable page by

6) Main airline pressure / brake cylinder pressure,
7) Emergency brake status,
8) Brake events under manual operation.
9) Driver safety devise,
10) Status of doors and control,
11) ACU events,
12) Wheel Slip and slide,
13) Operation of safety related cut-out switches,
14) Overhead line Voltage,
15) Battery Voltage,
16) Date and Time, and
17) Location.
18) ATO condition
19) PSD condition
20) Battery Contactor status.

15.5 Master Clock

15.5.1 The TMS shall be able to communicate with the Communication or the on-board signaling systems to obtain the time and date details to provide the master clock information to other on-board systems. The accuracy of the clock shall be self-confirmed at the startup of the train.

15.6 Electrical jumper wire

15.6.1 Electrical jumper wire that is necessary for transmission between the vehicles shall be specified by TMS supplier and shall have a design life about 8 years ~~be achieved 1 million cycles of performance test.~~ Couplings shall be HART type or similar.

11) ACU events,

12) Wheel Slip and slide,

13) Operation of safety related cut-out switches,

14) Overhead line Voltage,

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16 Communication System

16.1 General

16.1.1 The Rolling Stock shall be equipped with communications equipment to provide voice, video and data services. This Clause describes the requirements for the CP NS-01 (Communication System) Contractor, and the CP NS-03 (Rolling Stock) Contractor.

16.1.2 Both Contractors shall ensure that all requirements of the specification pertaining to interfaces are comprehensively fulfilled. Below is a brief outline of responsibilities between the CP NS-03 and CP NS-01 Contractors. Further details are specified in following Sub-Clauses:

Table 16.1 Responsibility Matrix

SOW	Item Description	By Contractor
1	Public Address (PA) System to broadcast speech messages to train passengers from the driver's cab. Facility to broadcast over the train PA System from the Operations Control Center (OCC) with the associated message content relayed to the train via the Train Radio System.	CP NS-03 CP NS-01
2	Guidance display for the customer shall be placed ~~above the door~~ under the ceiling in the passenger coaches (or saloons). Guidance display shall be digital signage to present on dedicated TV-style color monitors using ~~17-inch LCD~~ LCD displays which is 17-inch or bigger size~~displays~~, and it shall be possible to display the destination, the next station, the side of opening door, transit information, line map, time to arrive at each station, the guidance of the next station and attention, etc. One monitor shall be installed on one door. Securing space and supplying the wiring shall be prepared so that another screen can be added for advertisement. Advertisement display for the customer shall be placed ~~above the window between doors~~ in the passenger coaches (or saloons). Advertisement display shall be digital signage to present on dedicated TV-style color monitors using 21.5-inch or more LCD displays. (BG This may interfere with luggage racks)	CP NS-03
3	Passenger emergency intercom to provide audio communication between carriages and the driver's cab to enable passengers to alert the driver should an emergency situation occur within the train carriage. In case the driver does not pick up the passenger emergency intercom within a predefined time, it automatically connects to the OCC, using the Train ~~onboard~~ radio.	CP NS-03 CP NS-01
4	Driver's intercom system to allow full-duplex audio communication between driver's cabs.	CP NS-03
5	Train radio system to allow full-duplex audio communication between the driver and the OCC. Additional interfaces shall be provided within the OCC to relay to the trains PA audio messages. ~~Train Protection Radio~~	CP NS-01
6	Outdoor display (mounting on the train) consisting of a full color LED to display destination stations for the passengers on the platform.	CP NS-03

16.2 General Requirements

16.2.1 The CP NS-03 Contractor shall equip each driver's cab with the necessary Human Machine Interface (HMI) facilities for the operation, control and monitoring by the driver of the on-board communications systems. The number of handsets required for driver use

shall be rationalized and kept to a minimum. In particular, the CP NS-03 Contractor shall utilize a dedicated monitor.~~TMS monitor with respect to the display.~~

16.2.2 Subject to any reliability constraints, both CP NS-03 and CP NS-01 Contractors shall consider the integration of all communication operator functions into a different ~~single~~ HMI. ~~to minimize space requirements~~.

16.2.3 All of the cab-mounted equipment shall be fit for purpose and ergonomically designed taking account of human factor issues.

16.2.4 Unless otherwise stated, the equipment shall be controllable from the operational driver's cab and must be fully functional over a length of 10-car trains. The on-board communications equipment shall be fed via individual circuit breakers from a fully regulated low voltage power supply equipped with a battery back-up.

16.2.5 The design shall incorporate the latest proven technology, which shall be highly scalable and reliable, avoiding common mode failure.

16.2.6 The entire installation for each system shall include a comprehensive diagnostic and fault management facility and shall be interfaced to the TMS to log events/incidents and major fault data, to send and to receive a variety of information necessary for control.

16.2.7 Suitable security measures and firewalls shall be employed comprising standardized state-of-the-art authentication mechanisms to block unwanted data traffic and access to the on-board communication systems.

16.2.8 The equipment shall be robustly constructed and shall be resistant to tampering, vandalism and exposure to liquid spillages, etc.

16.2.9 The equipment devices within carriages shall in appearance be aesthetically pleasing and their fitment shall be flush mounted into the carriage body and installed in positions to minimize their exposure to vandalism.

16.2.10 The CP NS-03 Contractor shall perform a study to ensure that, within the train carriages all of the communications equipment is positioned, as appropriate, so as to achieve ease of passenger use and passenger viewing without creating an obstruction to passenger flow and without obscuring other facilities such as signs, notices and other displays, etc.

16.2.11 The CP NS-03 and CP NS-01 Contractors shall ensure that the required number of antennas be minimized and be positioned taking into account the following:

1) The effect of the geometry of the installation location on the radiation/reception performance of the antenna and without exceeding the rolling stock gauge;
2) The effect of any protrusions which might affect the radiation/reception performance of the antenna;
3) The effect of any adjacent aerials on the performance of the radio system;
4) The risk of being struck or otherwise damaged;
5) Electrical safety in relation to proximity to exposed HV lines; and
6) Diversity for improving reception sensitivity.

16.2.12 The systems shall, where appropriate, be interfaced to the TMS for provision of accurate time and date information.

16.2.13 Suitable automatic test routines shall be available to the driver in the active cab in order to check ~~that the operational integrity of~~ the operational status of the on-board communications equipment ~~is verified~~ prior to the train entering passenger service.

16 Communication System

16.1 General

16.1.1 The Rolling Stock shall be equipped with communications equipment to provide voice, video and data services. This Clause describes the requirements for the CP NS-01 (Communication System) Contractor, and the CP NS-03 (Rolling Stock) Contractor.

16.1.2 Both Contractors shall ensure that all requirements of the specification pertaining to interfaces are comprehensively fulfilled. Below is a brief outline of responsibilities between the CP NS-03 and CP NS-01 Contractors. Further details are specified in following Sub-Clauses:

Table 16.1 Responsibility Matrix

SOW	Item Description	By Contractor
1	Public Address (PA) System to broadcast speech messages to train passengers from the driver's cab. Facility to broadcast over the train PA System from the Operations Control Center (OCC) with the associated message content relayed to the train via the Train Radio System.	CP NS-03 CP NS-01
2	Guidance display for the customer shall be placed under the ceiling in the passenger coaches (or saloons). Guidance display shall be digital signage to present on dedicated TV-style color monitors using LCD displays which is 17-inch or bigger size, and it shall be possible to display the destination, the next station, the side of opening door, transit information, line map, time to arrive at each station, the guidance of the next station and attention, etc. One monitor shall be installed on one door. Securing space and supplying the wiring shall be prepared so that another screen can be added for advertisement. Advertisement display for the customer shall be placed in the passenger coaches (or saloons). Advertisement display shall be digital signage to present on dedicated TV-style color monitors using 21.5-inch or more LCD displays. (BG This may interfere with luggage racks)	CP NS-03
3	Passenger emergency intercom to provide audio communication between carriages and the driver's cab to enable passengers to alert the driver should an emergency situation occur within the train carriage. In case the driver does not pick up the passenger emergency intercom within a predefined time, it automatically connects to the OCC, using the Train radio.	CP NS-03 CP NS-01
4	Driver's intercom system to allow full-duplex audio communication between driver's cabs.	CP NS-03
5	Train radio system to allow full-duplex audio communication between the driver and the OCC. Additional interfaces shall be provided within the OCC to relay to the trains PA audio messages.	CP NS-01
6	Outdoor display (mounting on the train) consisting of a full color LED to display destination stations for the passengers on the platform.	CP NS-03

16.2 General Requirements

16.2.1 The CP NS-03 Contractor shall equip each driver's cab with the necessary Human Machine Interface (HMI) facilities for the operation, control and monitoring by the driver of the on-board communications systems. The number of handsets required for driver use

shall be rationalized and kept to a minimum. In particular, the CP NS-03 Contractor shall utilize a dedicated monitor.

16.2.2 Subject to any reliability constraints, both CP NS-03 and CP NS-01 Contractors shall consider the integration of all communication operator functions into a different HMI..

16.2.3 All of the cab-mounted equipment shall be fit for purpose and ergonomically designed taking account of human factor issues.

16.2.4 Unless otherwise stated, the equipment shall be controllable from the operational driver's cab and must be fully functional over a length of 10-car trains. The on-board communications equipment shall be fed via individual circuit breakers from a fully regulated low voltage power supply equipped with a battery back-up.

16.2.5 The design shall incorporate the latest proven technology, which shall be highly scalable and reliable, avoiding common mode failure.

16.2.6 The entire installation for each system shall include a comprehensive diagnostic and fault management facility and shall be interfaced to the TMS to log events/incidents and major fault data, to send and to receive a variety of information necessary for control.

16.2.7 Suitable security measures and firewalls shall be employed comprising standardized state-of-the-art authentication mechanisms to block unwanted data traffic and access to the on-board communication systems.

16.2.8 The equipment shall be robustly constructed and shall be resistant to tampering, vandalism and exposure to liquid spillages, etc.

16.2.9 The equipment devices within carriages shall in appearance be aesthetically pleasing and their fitment shall be flush mounted into the carriage body and installed in positions to minimize their exposure to vandalism.

16.2.10 The CP NS-03 Contractor shall perform a study to ensure that, within the train carriages all of the communications equipment is positioned, as appropriate, so as to achieve ease of passenger use and passenger viewing without creating an obstruction to passenger flow and without obscuring other facilities such as signs, notices and other displays, etc.

16.2.11 The CP NS-03 and CP NS-01 Contractors shall ensure that the required number of antennas be minimized and be positioned taking into account the following:

1) The effect of the geometry of the installation location on the radiation/reception performance of the antenna and without exceeding the rolling stock gauge;
2) The effect of any protrusions which might affect the radiation/reception performance of the antenna;
3) The effect of any adjacent aerials on the performance of the radio system;
4) The risk of being struck or otherwise damaged;
5) Electrical safety in relation to proximity to exposed HV lines; and
6) Diversity for improving reception sensitivity.

16.2.12 The systems shall, where appropriate, be interfaced to the TMS for provision of accurate time and date information.

16.2.13 Suitable automatic test routines shall be available to the driver in the active cab in order to check the operational status of the on-board communications equipment prior to the train entering passenger service.

16.2.14 Externally mounted equipment shall be dustproof and weatherproof and shall be

16.2.14 Externally mounted equipment shall be dustproof and weatherproof and shall be sufficiently robust to withstand frequent train washing involving continuous exposure to high pressure water jets, associated chemical cleaning and mechanical rotary scrubbing brushes.

16.2.15 The communications systems shall be fully compliant with industry recognized railway standards, international standards such as ITU-T and ITU-R and applicable national standards. Special attention shall be given to the shielding of all communications equipment and wiring along with any HV protection.

16.3 Public Address (PA) System

16.3.1 The train carriages shall be equipped with public address speakers, which shall enable voice announcements to be broadcast relating to emergency, safety and information messages.

16.3.2 For speech intelligibility purposes, the design shall achieve an STI (Speech Transmission Index) in excess of 0.6 under the worst-case ambient noise conditions.

16.3.3 In the internal design of the train carriages, the CP NS-03 Contractor shall give due consideration to the selection of suitable materials in order that their acoustical properties are complimentary to achieving the specified STI.

16.3.4 Consideration shall be given to the installation within carriages of ambient noise sensors to maintain, under varying ambient noise conditions, a more uniform signal to noise ratio for PA broadcast coverage.

16.3.5 The driver shall be able to make live announcements over the PA system and shall also have the facility to initiate the broadcast of pre-recorded speech messages accessible from an on-board message library.

16.3.6 The OCC operators shall be capable of making live speech broadcasts and initiating the broadcast of pre-recorded speech messages via an interface between the train radio system provided by the CP NS-01 Contractor and the on-board PA system.

16.3.7 The PA message library shall be solid state and shall be developed by the CP NS-03 Contractor, with agreement with the Employer.

16.3.8 Library messages shall be in both English and Tagalog. Selected messages shall be broadcast firstly in English followed by the same message in Tagalog; each with a pre-set dwell time, the duration of which may be adjusted as an engineering function.

16.3.9 The library shall be suitable for being updated at regular intervals, as the situation demands. The CP NS-03 Contractor shall propose an efficient method by which multiple trains may be updated.

16.3.10 The message library shall be dimensioned with a minimum storage capacity of 1TByte.

16.3.11 Message categories shall include service status, places of interest, safety messages, emergency messages, details of train start location and train destination along with next station details, etc.

16.3.12 The PA system shall be able to broadcast a ~~interfaced to enable~~ selected safety and emergency messages on all or selected train.~~broadcast on the train PA system within each train.~~

16.3.13 Within each train cab a PA Control unit shall be supplied.

sufficiently robust to withstand frequent train washing involving continuous exposure to high pressure water jets, associated chemical cleaning and mechanical rotary scrubbing brushes.

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16.3.13 Within each train cab a PA Control unit shall be supplied.

16.3.14 PA broadcasts initiated by the train driver shall have priority over other broadcasts.

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16.4 Internal Guidance Display

16.4.1 The guidance display shall be digital-signage to present on dedicated TV style color monitors, (17-inch LCD), a display to show typically, the destination, the next station, which side door opening, transit information, line map, time to arrive at each station, the guidance of the next station, etc.

16.4.2 The displays for advertisement (21.5-inch or more LCD) shall be installed at suitable locations in the saloon area. Advertisement contents shall be installed into this system directly. Also, it shall be prepared to be able to be installed remotely by interfacing with the wireless another system.

16.5 External Destination Sign System

16.5.1 The destination sign located at the end of the consist shall provide, as a minimum, information on the train running number along with the start and destination locations of the train service and any special information such as 'Not in Service', etc.

16.5.2 The destination sign shall be installed externally on each cab car above (or below dependent on the cab front design) the windshield and two units on each side of each car above the window.

16.5.3 A hinged panel shall be installed in the driver's cab to provide ready access to the destination sign unit by maintenance personnel.

16.5.4 The destination sign shall be suitably sized with text colors such that passengers waiting on platforms shall be able to see clearly the information displayed on the train approach to the platform under all conditions.

16.5.5 The destination sign shall be programmable from the a dedicated PIS monitor ~~TMS~~ in the driver's cab.

16.5.6 The destination signs in the non-active cab and on the side of the car shall automatically indicate the same destination as in the active cab.

16.5.7 The design of the destination sign shall allow manual override in the case of a defect in the electronics system.

16.5.8 The Contractor shall propose options for the electronic destination display sign system for the Engineer's review.

16.5.9 Choosing optimal colors according to train type, guidance content and display that is easy for the user to understand shall be implemented.

16.5.10 Display contents, colors, fonts, etc. shall be reviewed by the Engineer.

16.6 Digital Signage for Advertising

16.6.1 Space and power supply provision shall be made available within the train carriages to enable digital signage as described in Sub-Clauses 16~~7~~.1.2 item 2 and 16~~7~~.4 herein.

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16.7 Passenger Emergency Intercom

16.7.1 A full-duplex and highly reliable intercom and alarm facility shall be provided to enable an emergency call to be established between passengers in each carriage and the train

16.7 **Passenger Emergency Intercom**

16.7.1 A full-duplex and highly reliable intercom and alarm facility shall be provided to enable an emergency call to be established between passengers in each carriage and the train driver.

16.7.2 Quantity of four (4) intercom units shall be provided per carriage and the location shall be reviewed by the Engineer.

16.7.3 The intercom communications shall provide high voice quality free from distortions, audible noise and other audio impairment. The carriage intercom unit shall be bulkhead mounted and protected by a break-glass cover.

16.7.4 The unit shall be positioned in a readily accessible location and at a suitable height for customer use.

16.7.5 The intercom unit shall consist of a switch to initiate a call along with a flush mounted eco-cancelling ~~noise-cancelling~~ microphone and loudspeaker.

16.7.6 Operation of the emergency switch shall result in the following actions on-board the train:

1) An audible and visual alarm by TMS (monitor) shall be made in the driver's cab also indicating location of actuation;
2) The driver shall be able to communicate via a separate dedicated handset for this purpose;
3) The emergency voice recorder shall record the conversation for the duration of the call; and
4) The event recorder in TMS shall record details of the intercom unit location together with the time and date of the emergency call.

16.8 **Driver's Intercom System**

16.8.1 A full-duplex and highly reliable intercom facility shall be provided to enable personnel within the driver's cab at each end of the train to establish voice communications.

16.8.2 The intercom communications shall provide high voice quality free from distortions, audible noise and other audio impairment.

16.9 **Train Radio System**

16.9.1 The Train Radio System for the Rolling Stock shall be designed and supplied by the CP NS-01 Contractor for the CP NS-03 Contractor to install on the Rolling Stock. The CP NS-01 Contractor shall provide installation for the first Train Radio System installation on-site. The second trainset shall be installed by CP NS-03 Contractor and supervised by CP NS-01 Contractor. The remaining trainsets radio system shall be installed by CP NS-03.

16.9.2 In addition to the communication devices mentioned above, at least the Train Operator Control Panel (TOCP) and the radio transceiver unit shall be included.

16.9.3 The TOCP shall be equipped with all facilities necessary for driver operation of the on-board radio facilities and other on-board radio communication equipment and shall typically include:

driver.

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16.9.2 In addition to the communication devices mentioned above, at least the Train Operator Control Panel (TOCP) and the radio transceiver unit shall be included.

16.9.3 The TOCP shall be equipped with all facilities necessary for driver operation of the on-board radio facilities and other on-board radio communication equipment and shall typically include:

1) Integral flush mounted loudspeaker;
2) Volume control;
3) Gooseneck microphone;

1) Integral flush mounted loudspeaker;
2) Volume control;
3) Gooseneck microphone;
4) Press to talk (PTT) switch; and
5) System selector switch.

16.9.4 The TOCP shall, as a minimum, enable the following functions to be performed:

1) Communication between the cab driver and the OCC via the train radio system;
2) Communication between the leading and trailing cabs via an intercom system;
3) Driver announcements from the cab to passengers within the train via the train PA system; and
4) Display of major telecoms system alarms.

16.9.5 The design shall enable the OCC to communicate with train passengers via the train radio system by broadcasting audio announcements within carriages via the train PA system.

16.9.6 The CP NS-01 Contractor shall be responsible for the configuration, set-up and optimization adjustment of the on-board train radio equipment to ensure full inter-operation with the line side train radio network and facilities within the OCC.

16.9.7 The CP NS-01 Contractor shall determine, in conjunction with the radio equipment manufacturer, all of the necessary interfacing requirements to the various sub-systems.

16.9.8 Within each train cab an integrated hand-held portable radio battery charger with integral cradle shall be provided by CP NS-01 and to be installed by CP NS-03.

16.9.9 The train radio system shall be designed by the CP NS-01 Contractor to allow automatic switchover to the other radio unit on the train, in the case where there is failure of other radio lines.

16.10 Operation of the Mobile Communications Devices

16.10.1 The train structure shall be designed so as not to impede the operation of mobile phones and other similar radio communications devices within the train carriages whilst accessing public operated mobile communications networks such as GSM (2G), UMPS (3G), LTE (4G) or other more advanced network.

16.10.2 In particular, for such signals the attenuation (penetration loss) of the side windows shall not exceed 3dB when the train is on straight track with the side windows perpendicular to the rail.

16.11 ~~Preparation~~ Provision for Wi-Fi system

16.11.1 ~~Preparation~~ Provision for Wi-Fi system shall be designed in consideration with the following, but not limited to:

1) Space and position for installation
2) Materials of interior near the attachment
3) Capacity of powering

4) ~~Preparation~~ Provision of circuit

5) ~~Preparation~~ Provision of interface

16.11.2 Care shall be paid to assume that two individual systems of two companies are introduced.

4) Press to talk (PTT) switch; and

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4) Display of major telecoms system alarms.

16.9.5 The design shall enable the OCC to communicate with train passengers via the train radio system by broadcasting audio announcements within carriages via the train PA system.

16.9.6 The CP NS-01 Contractor shall be responsible for the configuration, set-up and optimization adjustment of the on-board train radio equipment to ensure full inter-operation with the line side train radio network and facilities within the OCC.

16.9.7 The CP NS-01 Contractor shall determine, in conjunction with the radio equipment manufacturer, all of the necessary interfacing requirements to the various sub-systems.

16.9.8 Within each train cab an integrated hand-held portable radio battery charger with integral cradle shall be provided by CP NS-01 and to be installed by CP NS-03.

16.9.9 The train radio system shall be designed by the CP NS-01 Contractor to allow automatic switchover to the other radio unit on the train, in the case where there is failure of other radio lines.

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3) Capacity of powering

4) Provision of circuit

5) Provision of interface

16.11.2 Care shall be paid to assume that two individual systems of two companies are introduced.

18.2.2.2 When the Passenger Emergency Intercom (PEI) is activated, the driver shall be able to view nearby (several) camera image(s) of the activated PEI on TMS monitor in the driver's cab in real time. In addition, the driver shall be able to select specific camera image(s) they want to view. BG This requires control as it could interfere with the driver's concentration.

18.2.2.3 The data shall also be recorded onto the memory, meaning it can be viewed historically by a service laptop or a viewing station. As a minimum, high-definition video quality and a week-long video memory capacity shall be provided. The CCTV system shall be reviewed by the Engineer.

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copies of this ERT, updated and modified to reflect the as-built specification of the train.

~~19.7~~19.9 Maintenance Manuals

~~19.7.1~~19.9.1 General

~~19.7.1.1~~19.9.1.1 A fully integrated maintenance manual shall be provided, which provide step-by-step instructions on how to maintain, repair and replace all components on the vehicles, down to the Lowest Level Replaceable Unit (LLRU) and working time required (man hours) for all maintenance and repair activities.

~~19.7.1.2~~19.9.1.2 The work instructions shall be provided for every maintenance and repair task shall include safety instructions, tools required, spares and consumables required. Torque settings for fixings and test/inspection requirements for the repaired/maintained/modified item.

~~19.7.1.3~~19.9.1.3 The style of the documents may assume that the technicians performing this work have familiarity with rail vehicles, but not a detailed working knowledge. The LLRU shall be defined as any component within an assembly that is identified in the Original Equipment Manufacturers (OEM) illustrated parts catalog and/or is offered for sale by the original equipment manufacturer.

~~19.7.1.4~~19.9.1.4 The maintenance manual shall provide all necessary detail to perform the work required, and shall include the judicious use of diagrams, drawings, photographs, illustrations, etc., as appropriate for the task at hand, including necessary safety precautions. Detailed maintenance and troubleshooting procedures and test and repair procedures and work instructions shall be provided for all electronic assemblies and circuit boards~~.~~ (only replacement). Manuals shall identify all tools (special and standard) needed to perform the work. This listing of tools shall be provided in the section describing the discrete task being performed.

~~19.7.1.5~~19.9.1.5 The Contractor shall provide an appropriate number of all special tools for the Employer's use. Special tools are loosely described as anything that the local hardware shop does not stock. Special tools shall include but not limited to diagnostic test equipment for all electronic assemblies and circuit boards, test stands and simulators as may apply, interface hardware & software, hook-up lines/cables and to test all train lined systems.

19.9.1.6 All manuals shall be provided in electronic format, and six (6) prints of properly bound oil and dirt resistant hard copies. The material for the hard copies shall be reviewed and commented by the Engineer.

~~19.7.1.6~~19.9.1.7 The Contractor shall provide a complete, computer data-based, list of all spare parts and consumables in the Maintenance Manuals. Items shall be categorized by subsystem or component, and listing the product or part name, Contractor's part number and supplier's part number, special storage requirements, sources/ manufacturers and alternative sources (if available) names and addresses, and guaranteed prices. This list shall be arranged by assemblies and sub-assemblies coordinated with the expanded assembly, pictorials, and assembly instructions of the Maintenance Manuals. Detailed specifications for all such parts and supplies, sufficient to procure these items independently of the Contractor, shall be provided at no extra charge prior to issue of the Performance Certificate.

~~19.7.1.7~~19.9.1.8 The maintenance manuals shall be divided into three parts:

1) Running Maintenance Manual,

19.9.1.1 A fully integrated maintenance manual shall be provided, which provide step-by-step instructions on how to maintain, repair and replace all components on the vehicles, down to the Lowest Level Replaceable Unit (LLRU) and working time required (man hours) for all maintenance and repair activities.

19.9.1.2 The work instructions shall be provided for every maintenance and repair task shall include safety instructions, tools required, spares and consumables required. Torque settings for fixings and test/inspection requirements for the repaired/maintained/modified item.

19.9.1.3 The style of the documents may assume that the technicians performing this work have familiarity with rail vehicles, but not a detailed working knowledge. The LLRU shall be defined as any component within an assembly that is identified in the Original Equipment Manufacturers (OEM) illustrated parts catalog and/or is offered for sale by the original equipment manufacturer.

19.9.1.4 The maintenance manual shall provide all necessary detail to perform the work required, and shall include the judicious use of diagrams, drawings, photographs, illustrations, etc., as appropriate for the task at hand, including necessary safety precautions. Detailed maintenance and troubleshooting procedures and test and repair procedures and work instructions shall be provided for all electronic assemblies and circuit boards (only replacement). Manuals shall identify all tools (special and standard) needed to perform the work. This listing of tools shall be provided in the section describing the discrete task being performed.

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19.9.1.6 All manuals shall be provided in electronic format, and six (6) prints of properly bound oil and dirt resistant hard copies. The material for the hard copies shall be reviewed and commented by the Engineer.

19.9.1.7 The Contractor shall provide a complete, computer data-based, list of all spare parts and consumables in the Maintenance Manuals. Items shall be categorized by subsystem or component, and listing the product or part name, Contractor's part number and supplier's part number, special storage requirements, sources/ manufacturers and alternative sources (if available) names and addresses, and guaranteed prices. This list shall be arranged by assemblies and sub-assemblies coordinated with the expanded assembly, pictorials, and assembly instructions of the Maintenance Manuals. Detailed specifications for all such parts and supplies, sufficient to procure these items independently of the Contractor, shall be provided at no extra charge prior to issue of the Performance Certificate.

19.9.1.8 The maintenance manuals shall be divided into three parts:

1) Running Maintenance Manual,
2) Scheduled Maintenance Manual, and
3) Overhaul Manual.

19.9.2 Running Maintenance Manual

19.9.2.1 The Running Maintenance Manual shall describe all work and inspections to be performed on the trains on a routine basis, including servicing, lubrication, adjustments,

activities; and

11) Shipping documents.

~~19.11.2~~19.13.2 The Contractor shall supply an electronic format, and six (6) hard copies of properly bound oil and dirt resistant hard copies for each car of the full history and configuration records, arranged by component type, assembly, sub-assembly, major component and other serially numbered components, including spares, test equipment and special tools.

~~19.11.3~~19.13.3 The Vehicle History Book format shall be reviewed and commented by the Engineer.

~~19.12~~19.14 **Intervention/Modifications History Record (During Warranty Period)**

~~19.12.1~~19.14.1 The Contractor shall provide a supplemental History record for each vehicle at the time of final acceptance/after the warranty period. Each supplemental History record shall contain the following car-specific information:

1) Intervention and repairs during warranty period,
2) All modifications/revisions done during the warranty period,
3) All tests/validation tests reports and records for operational and safety relevant components, ~~and~~
4) Component exchange, component change reports and new component/serial numbers. and
5) Signed documentation to show the Employer and/or the Engineer had approved all intervention, modification/ component change and testing.

~~19.12.2~~19.14.2 The Intervention/Modification History Record shall be provided in electronic format, and six (6) copies of properly bound oil and dirt resistant hard copies.

~~19.12.3~~19.14.3 The Intervention/Modification History Record format shall be reviewed and commented by the Engineer.

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1) Intervention and repairs during warranty period,
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4) Component exchange, component change reports and new component/serial numbers. and
5) Signed documentation to show the Employer and/or the Engineer had approved all intervention, modification/ component change and testing.

19.14.2 The Intervention/Modification History Record shall be provided in electronic format, and six (6) copies of properly bound oil and dirt resistant hard copies.

19.14.3 The Intervention/Modification History Record format shall be reviewed and commented by the Engineer.

20.1.2.3 The Contractor shall propose the inspection hold points within 180 days of the Date for Commencement of the Works. The inspection hold points shall be submitted for review by the Engineer.

20.1.2.4 No Rolling Stock shall be considered ready for delivery without the Engineer's endorsement in writing. The Contractor shall bear the cost of attendance at the inspections/tests made outside the Country including travel, flight charge (economy class) from Manila to the place where the inspection/test will be made, lodging, local transportation, safety gears, insurance, per diem allowance of $100 US each upon landing until the last day of stay on the country of destination, etc., for the Employer's and Engineer's Personnel (attendance). It is expected that five (5) attendances will attend at each inspection/test at seventy-six (76) times with seven (7) days including travel time for each inspection/test as shown in Table 22.2. If the inspection/test cannot be completed satisfactorily, the additional inspection/test attended by attendance will be arranged and the cost of attendance for such additional inspection shall be borne by the Contractor;

Table 20.2 Inspection Trips

No.	Attendance	Quantity	Remarks
1	Employer	4076 roundtrips*7 days*3 persons	Type test, FAT, I FAT and FACI
2	Engineer	4076 roundtrips*7 days*2 persons	

20.1.2.5 The Contractor shall submit the inspection/test procedure for Engineer review ninety (90) days prior to the commencement of the respective inspection/test activity

20.1.2.6 The Contractor shall prepare and submit to the Engineer for review two (2) copies of inspection or test report immediately after the completion of each inspection or test;

20.1.2.7 Once the inspection/test and any required remedial actions are completed to the satisfaction of the Engineer, the Engineer shall give a notice of endorsement for unit shipment; and

20.1.2.8 Any unit delivered without the Engineer's endorsement may be rejected at the Site and all expenses thereby incurred shall be borne by the Contractor.

20.1.3 Inspection Prior to Delivery

20.1.3.1 The Engineer/Employer shall be afforded the opportunity of inspecting all cars to be delivered under the Contract before leaving the Contractor's facility and prior to delivery to the Site.

20.1.3.2 The Contractor shall advise the Engineer no less than 15 days in advance of a vehicle being available for inspection.

20.1.3.3 Once the inspection and any required remedial actions are completed to the satisfaction of the Engineer, the Engineer shall give consent for vehicle shipment.

20.1.4 First Article Inspection

20.1.4.1 First Article Inspections (FAI) shall be performed as specified in Clause 22.4 of ERT.

20.1.2.4 No Rolling Stock shall be considered ready for delivery without the Engineer's endorsement in writing. The Contractor shall bear the cost of attendance at the inspections/tests made outside the Country including travel, flight charge (economy class) from Manila to the place where the inspection/test will be made, lodging, local transportation, safety gears, insurance, per diem allowance of $100 US each upon landing until the last day of stay on the country of destination, etc., for the Employer's and Engineer's Personnel (attendance). It is expected that five (5) attendances will attend at each inspection/test at seventy-six (76) times with seven (7) days including travel time for each inspection/test as shown in Table 22.2. If the inspection/test cannot be completed satisfactorily, the additional inspection/test attended by attendance will be arranged and the cost of attendance for such additional inspection shall be borne by the Contractor;

Table 20.2 Inspection Trips

No.	Attendance	Quantity	Remarks
1	Employer	45 roundtrips*7 days*3 persons	Type test, FAT, I FAT and FACI
2	Engineer	45 roundtrips*7 days*2 persons	

20.1.2.5 The Contractor shall submit the inspection/test procedure for Engineer review ninety (90) days prior to the commencement of the respective inspection/test activity

20.1.2.6 The Contractor shall prepare and submit to the Engineer for review two (2) copies of inspection or test report immediately after the completion of each inspection or test;

20.1.2.7 Once the inspection/test and any required remedial actions are completed to the satisfaction of the Engineer, the Engineer shall give a notice of endorsement for unit shipment; and

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20.2 General Testing Requirements

20.2.1 General

20.2.1.1 The Contractor, in addition to testing for design verification purposes, shall carry out all

for review a Commissioning Plan Compendium, recording all testing carried out, functions and performance demonstrated, reports produced and reviewed by the Engineer. This shall include the Trial Operation as mentioned in ERG clause 12.2.4.

20.2.3 Testing Details

20.2.3.1 For any tests where the Engineer has indicated that they wish to witness, no testing shall be carried out against a test specification prior to its review by the Engineer.

20.2.3.2 The test specification shall include sample test certificates and the design values and also the tolerances shall be shown.

20.2.3.3 All materials and/or details represented by samples, which are found to be non-compliant, will be rejected.

20.2.3.4 The Contractor shall replace any material or detail destroyed in the process of testing for tests discussed and validated by the Contractor.~~.~~

20.3 **Design Qualification Testing**

20.3.1 As part of the design verification process, type tests shall be carried out to demonstrate that the design of the train consist, and its systems are in full compliance with the requirements specified in this ERT. The tests shall be completed at the Contractor's manufacturing facility unless otherwise specified or reviewed by the Engineer.

20.3.2 The Contractor shall perform an endurance test in accordance to the requirements of Sub-Clause 7.1 of this ERT on the proposed door design to demonstrate that the requirements specified therein are met.

20.3.3 The door system shall be endurance tested on a rig in suitable climatic conditions to demonstrate that the door system will allow the train consist to meet the requirements of this ERT. The rig shall test opening and closing of the door, obstruction detection and re-open of the door in a combination to simulate likely service operation and shall be submitted for review by the Engineer.

20.3.4 Design Qualification testing shall be performed of the complete propulsion, braking and Train Management System (TMS) systems configuration, using simulated loads on the traction motors. Combined propulsion system testing shall be in accordance with JIS E 5008 and JIS E 5011 or other equivalent standards like IEC 61287-1 and IEC 61377.

20.3.5 Design Qualification testing shall be performed on the complete auxiliary power system configuration, using simulated loads. Combined auxiliary power system testing shall be in accordance with JIS E 5008 or other equivalent standards like IEC 61287-1.

20.3.6 Design Qualification testing shall be performed for the TMS system to verify designed capacity of the systems, functional requirement and correct interfacing. The real interface hardware and software should be used where possible.

20.3.7 The braking system shall be tested to demonstrate its ability to satisfactorily interface with the Train Control and Signaling systems and provide performance as specified herein.

20.3.8 The CP NS-03 Contractor shall provide the facility for the bogie curve test.

~~20.3.7~~

~~20.3.8~~20.3.9 The parking brake shall be tested to demonstrate its ability to hold a consist on the

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20.3.7 The braking system shall be tested to demonstrate its ability to satisfactorily interface with the Train Control and Signaling systems and provide performance as specified herein.

20.3.8 The CP NS-03 Contractor shall provide the facility for the bogie curve test.

20.3.9 The parking brake shall be tested to demonstrate its ability to hold a consist on the specified gradient. The test shall record the actual force required to overcome the parking brake in a failure recovery situation on both level track and a 3.5% gradient. This shall be carried out with a number of parking brakes (20%) isolated.

complying with relevant requirement in Japanese Ministerial Ordinance, MLIT Chapter 8, Section 5, Article 83 (Countermeasures for Fire of Rolling Stock) or other equivalent international standards like EN45545 HL2/3 or DIN 5510.

21.8.2 Each equipment/ system shall be designed to minimize the risk of any fire. Materials used in the manufacture of vehicle and the equipment shall be selected to reduce the heat load, rate of heat release, propensity to ignite, rate of flame spread, smoke emission and toxicity of combustion gases. The use of suitable materials shall be combined with technology for timely detection and reporting of fire sources to ensure a very high level of safety as per above fire safety standards. The Cars shall be equipped with fire extinguishers, fire and smoke detectors and~~, a~~ CCTV monitoring system ~~and external cameras~~. The passenger emergency communication unit shall be installed within the train near the passenger entrance/exit doorways.

21.8.3 The Contractor shall provide data pertaining to all relevant tests having been performed on the materials to be used. A fire hazard assessment for each car shall be submitted by the Contractor for review by the Engineer. Assessment shall reflect the "worst" three-minute release rate values of the materials that are specific to the car. Alternatively, a fire hazard assessment for each car shall be submitted by the Contractor for review by the Engineer. The assessment will consider each car with respect to EN 50553, using materials compliant to EN 45545.

21.8.4 The Contractor shall produce a matrix showing all items/locations description, material, coating, supplier, classification, requirements according to the standards and standard sections, achieved performance in smoke, propagation, flame spread, toxic fumes, comment and open issues,

21.8.5 The Employer/Engineer reserves the right to prove compliance to this specification.

21.9 Equipment Enclosures

21.9.1 All equipment enclosures installed in locations exposed to outside ambient conditions shall be designed and manufactured to prevent the entry of foreign substances, such as liquids (including water, spilled drinks, vehicle wash over spray, and wheel splash), dust and dirt, oil, or debris.

21.9.2 Enclosures shall be made to IP 55 rating or better.

21.9.3 Enclosures containing equipment, which may produce gases (such as battery boxes), shall be designed and manufactured to ensure that the gases are safely exhausted to outside the enclosure.

21.9.4 The enclosures must be secured or locked to prevent unauthorized or accidental entry.

21.10 Security, Anti-Social Behavior and Vandalism

21.10.1 The vehicle shall be capable of being made secure when stabled without compromising the need to maintain accessibility for emergencies.

21.10.2 The design of the interior body side windows and glazed surfaces shall optimize passenger safety in all foreseeable circumstances.

21.10.3 The Module interior shall be sufficiently robust to minimize damage from foreseeable vandalism and misuse.

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21.10.3 The Module interior shall be sufficiently robust to minimize damage from foreseeable vandalism and misuse.

21.10.4 Tamper-proof fixing arrangements shall be fitted where necessary. Fasteners shall not be visible or accessible to passengers as far as practicable.

21.10.5 All interior body side windows and glazed surfaces shall incorporate a means to minimize the damage from vandalism by etching or scratching.

21.10.6 Internal and external finishes shall permit the easy removal of graffiti by trained personnel using commercial graffiti cleaning chemicals, and the surfaces shall not readily degrade as a result of the removal process.

21.10.7 The Module interior shall be free from gaps and crevices where litter, sharp objects or any other items could be concealed or lodged. Any equipment fitted behind seats shall be

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21.10.8 Soft furnishings shall be resistant to damage by sharp objects as far as seat comfort is not negatively affected and be designed to be economical and easy to replace when deemed necessary.

21.10.9 All Modular interior equipment within the passenger areas shall be resistant to vandalism.

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21.10.9 All Modular interior equipment within the passenger areas shall be resistant to vandalism.

22.5 **Systems Integration**

22.5.1 The Contractor shall submit a Systems Integration Plan for review and given statement of No Objection. This plan shall describe in detail the means by which the Contractor will ensure that all systems and subsystems are compatible with each other and will work together to satisfy the requirements of this ERT.

22.6 **Technical Support**

22.6.1 The Contractor shall make available experienced Maintenance Engineers & maintenance staff to provide assistance throughout all Defects Notification Periods. All works carried by the Contractor during the Defects Notification Period shall be carried out within the operating schedule maintenance periods. During the Defects Notification Periods, it is preferable that engineers & maintenance staffs should stay near the depot or place to work.

22.6.2 Assigned Maintenance Engineers and staff shall have good command of English language.

22.6.3 Access to the depot and to cars by the Contractor's staff shall be controlled by the Engineer. The Contractor shall adhere to all the Employer's working practices, including safety procedures of the Employer.

22.6.4 The Contractor shall provide operation and maintenance training to the Employer, as defined in Clause 14 of the ERG and Clause 25 of this ERT.

22.6.5 Where Defects Notification maintenance or additional work is required on the cars, the procedure and documentation for the work shall be applied strictly, regardless of whether the work is carried out by the Contractor and/or the Employer.

22.6.6 The Contractor shall provide an office space at the site, from the Commencement Date until the end of Defects Notification Period (DNP), for ten (10) engineers, and equipped with complete facilities. As a minimum, the office shall be equipped with the following essential furniture/equipment:

1) Tables and chairs for ten persons;
2) Secured locker cabinet (10 units);
3) Telephone line with international direct dial;
4) Fax machine and photocopy machine (latest model heavy duty);
5) Computer with internet connection (ten (10) sets, current model with printers and all peripherals);
6) Air conditioning; and
7) Meeting room with 1 conference table, 10 chairs, white board and bookshelves

22.6.7 All equipment stated above which purchased by the Contractor under this project shall be handed over to the Employer after the completion of ~~the depot.~~ Defects Notification Periods.

22.6.8 Cars for the Employer

22.6.8.1 It shall be decided in liaison with the Contractor the best arrangement to ensure the following cars are available as a minimum until completion of the Works, including driver

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5) Computer with internet connection (ten (10) sets, current model with printers and all peripherals);
6) Air conditioning; and
7) Meeting room with 1 conference table, 10 chairs, white board and bookshelves

22.6.7 All equipment stated above which purchased by the Contractor under this project shall be handed over to the Employer after the completion of Defects Notification Periods.

22.6.8 Cars for the Employer

22.6.8.1 It shall be decided in liaison with the Contractor the best arrangement to ensure the following cars are available as a minimum until completion of the Works, including driver costs, maintenance, insurance, registration costs, fuel costs, and any associated costs from

~~19.9.1~~19.11.1 The Contractor shall provide six (6) sets of properly bound, oil and dirt resistant hard copies of Operator's Manuals, which shall contain all information required for the proper operation of the vehicles. This shall include general vehicle familiarization material and the location, function and operation of all controls, switches, indicators, gauges, etc.

~~19.9.2~~19.11.2 Fault finding shall be included.

~~19.9.3~~19.11.3 The Operator's Manuals shall also be provided in electronic format (6 copies).

~~19.9.4~~19.11.4 The Operator's Manuals shall be reviewed and commented by the Engineer.

~~19.10~~19.12 Training Material

~~19.10.1~~19.12.1 The Contractor shall provide six (6) sets of all material used to train the Employer's personnel to operate and maintain the vehicles.

~~19.10.2~~19.12.2 For maintenance staff this shall include every work instruction provided, the length of time for each training course shall be proposed by the Contractor and be based on the content contained therein. Training shall be carried out in English or Filipino as required by the Employer~~client~~. Training material shall be carried out in English or Filipino as required by the Employer~~client~~.

~~19.10.3~~19.12.3 The training material and the entire training program shall be reviewed and commented by the Engineer.

~~19.10.4~~19.12.4 The training materials shall also be provided in electronic format (6 sets).

~~19.11~~19.13 Vehicle History Books

~~19.11.1~~19.13.1 The Contractor shall provide a Vehicle History Book for each vehicle at the time of delivery and acceptance. Each Vehicle History Book shall contain but not limited to the following car-specific information:

1) Certified weight (vehicle and axle loads), including scale tickets;
2) Results summary of all tests performed on the complete vehicle and its systems, subsystems and components, including certification performed where required;
3) A set of test results for each component or system where these are required;
4) A description of each configuration changes from the base line in sufficient detail for the Engineer's understanding;
5) Configuration record of each assembly, sub-assemblies and major component, including revision number and dates;
6) List of defects noted, status and disposition;
7) List, description, weight and serial number and location of serial-numbered equipment;
8) List of "as built" drawings with revision status;
9) Axle assembly (wheels, bearings, gears) mounting records, including pressing charts and NDT records;
10) Provision for the Service to record inspection, servicing, overhaul and repair

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2) Results summary of all tests performed on the complete vehicle and its systems, subsystems and components, including certification performed where required;
3) A set of test results for each component or system where these are required;
4) A description of each configuration changes from the base line in sufficient detail for the Engineer's understanding;
5) Configuration record of each assembly, sub-assemblies and major component, including revision number and dates;
6) List of defects noted, status and disposition;
7) List, description, weight and serial number and location of serial-numbered equipment;
8) List of "as built" drawings with revision status;
9) Axle assembly (wheels, bearings, gears) mounting records, including pressing charts and NDT records;
10) Provision for the Service to record inspection, servicing, overhaul and repair activities; and
11) Shipping documents.

19.13.2 The Contractor shall supply an electronic format, and six (6) hard copies of properly bound oil and dirt resistant hard copies for each car of the full history and configuration records, arranged by component type, assembly, sub-assembly, major component and other serially numbered components, including spares, test equipment and special tools.

19.13.3 The Vehicle History Book format shall be reviewed and commented by the Engineer.

19.14 Intervention/Modifications History Record (During Warranty Period)

5) Training of drivers, OCC staff and line managers; and

6) Emergency exercises.

20.6.5 Different test cases shall be developed in normal operation (checking that new trains can achieve daily timetable without delays and incidents) and degraded modes (simulating different incidents) as follows:

1) Failure during pre-departure tests;

2) Traction mode failure;

3) Train doors fail to close;

4) On-board signaling defects; and

5) Rescue of Failed Train.

20.6.6 A detailed list of test cases shall be drafted by all interested parties prior to the commencement of the Trial Operations. Some of these tests may be an opportunity for close coordination with third parties such as the police and emergency services, to check any new features of the procured new trains.

20.6.7 As for station stop precision, improvement and trial operation must be continued until a certain standard is achieved. The required standard is for each passenger door to stop within the platform screen door opening. Regarding this improvement, coordination with equipment such as a propulsion system, a brake system, a TMS, a brake shoe, etc. shall be made when necessary.

20.6.8 All trains shall run the entire line taking into consideration Revenue Service, without passengers and in accordance with commercial service pattern.

20.6.9 After completion of all the testing and commissioning, Taking-Over Certificate will be issued by the Engineer/Employer with respect to ERG clause 8.1.7, 8.6.2 and 8.8.3.9.~~.~~

20.6.10 Defect notification should start when trains have completed the acceptance process and are signed off for commercial service.

20.7 Test Documentation

20.7.1 All test documentation, procedures, reports and certifications shall be provided with a unique document number and properly controlled.

20.7.2 Test Procedures

20.7.2.1 The test procedure must state the purpose of the test, and reference the relevant portion of the ERT or standard with which the procedure intends to comply.

20.7.2.2 The test procedure shall clearly define the condition of the equipment and the test set-up (test conditions), and any tests that the equipment must have previously passed. The test procedure must describe in detail the equipment needed to perform the test.

20.7.2.3 The test procedure must provide detailed, step-by-step instructions as to how the test is to be carried out. This includes results expected, and actions to be taken should the expected result not be achieved.

20.7.2.4 During the test the testing shall be carried out strictly in accordance with the approved test procedure. If additional steps are found to be necessary during testing, the testing

achieve daily timetable without delays and incidents) and degraded modes (simulating different incidents) as follows:

1) Failure during pre-departure tests;
2) Traction mode failure;
3) Train doors fail to close;
4) On-board signaling defects; and
5) Rescue of Failed Train.

20.6.6 A detailed list of test cases shall be drafted by all interested parties prior to the commencement of the Trial Operations. Some of these tests may be an opportunity for close coordination with third parties such as the police and emergency services, to check any new features of the procured new trains.

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20.7.2.3 The test procedure must provide detailed, step-by-step instructions as to how the test is to be carried out. This includes results expected, and actions to be taken should the expected result not be achieved.

20.7.2.4 During the test the testing shall be carried out strictly in accordance with the approved test procedure. If additional steps are found to be necessary during testing, the testing shall stop, the test procedure shall be rewritten to include the changes and the procedure shall be submitted to the Engineer for given statement of No Objection. Once approved, the changed test shall be performed.

20.7.2.5 The test procedure shall define the data to be recorded.

contract and any equipment etc. shall be borne by the Contractor.

1.10 Provision for Spare Parts and Special Tools

Spare parts, consumables, special tools and diagnostic test equipment shall be provided by the Contractor for the maintenance of the Rolling Stock in accordance with the approved maintenance plan by the Employer/Engineer and the O&M manuals.

The Contractor shall submit a comprehensive list of recommended spare parts and consumables in accordance with the requirements specified in the ERG and ERT clause 24.2. ~~for the period of at least 2 years.~~

The Contractor shall also provide all special tools, diagnostic test equipment, test benches, jigs, etc. that shall be necessary for the operations and maintenance of the Rolling Stock and associated equipment which support the heavy maintenance of the rolling stock. The Contractor shall provide all special tools, diagnostic test equipment, test benches, jigs etc. during design stage for the ~~given statement~~given statement of No ~~Objection .~~Objection. The Contractor shall responsible for the delivery, installation, testing & commissioning of the approved special tools, diagnostic test equipment, test benches, jigs etc. The Contractor shall deliver the training of the special tools, diagnosis test equipment, test benches, jigs, etc.to the Employer's personnel as per clause 1.12.

1.11 Provision of Rolling Stock Operation and Maintenance (O&M) Manuals

The Contractor shall provide fully illustrated Operation and Maintenance (O&M) Manuals complete with the following:

1) Drawings;
2) Diagrams;
3) Schematics; and
4) Spare parts catalogues.

The maintenance manual shall be categorized as follows:

1) Running maintenance requirements;
2) Scheduled maintenance requirements; and
3) Overhaul maintenance requirements.

The Manuals shall be in the form of high-quality printed 'hard' copy for at least 20 copies and in the form of 'soft' copy which is to be proposed by the Contactor during the design phase.

1.12 Training for Employer's Personnel

The Contractor shall provide operational and maintenance training to the operation and maintenance staff.

Training shall be categorized as follows:

1) Operation staff training;
2) Maintenance staff training; and
3) Engineering staff training

Training shall include provision of all required training materials and appropriate training venues.

1.13 Providing "As-Built" Drawings and Schematic

The Contractor shall submit as-built documentation for the Rolling Stock and its

1.10 Provision for Spare Parts and Special Tools

Spare parts, consumables, special tools and diagnostic test equipment shall be provided by the Contractor for the maintenance of the Rolling Stock in accordance with the approved maintenance plan by the Employer/Engineer and the O&M manuals.

The Contractor shall submit a comprehensive list of recommended spare parts and consumables in accordance with the requirements specified in the ERG and ERT clause 24.2.

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Training shall be categorized as follows:

1) Operation staff training;
2) Maintenance staff training; and
3) Engineering staff training

Training shall include provision of all required training materials and appropriate training venues.

1.13 Providing "As-Built" Drawings and Schematic

The Contractor shall submit as-built documentation for the Rolling Stock and its associated equipment.

trainsets shall be restored to operational order in an OMTTR of 15 minutes.

3) **CMTTR –** Corrective Mean Time To Repair (CMTTR) capital components shall not be greater than 4 hours.

8.5.4 Where appropriate, the Contractor shall also specify RAM (Reliability, Availability and Maintainability) requirements for the design, operation and maintenance of subsystems where the failure mode, effects and criticality analysis (FMECA) identify failure modes that have a maintenance, operations or safety impact, using the risk assessment methodology.

8.5.5 The Contractor shall commence the use of the Data reporting analysis and corrective action system (DRACAS) prior to any factory or site acceptance tests and report to the Employer/Engineer on a regular basis.

8.5.6 (Not Used)

8.6 Performance Reports

8.6.1 The Contractor shall provide Performance Reports to support the applications for Rolling Stock TOC for each trainset and the Performance Certificate for the fleet (7 trainsets).

8.6.2 The Rolling Stock TOC Performance report shall be issued for each trainset prior to operational acceptance and shall provide:

1) Technical design justification of performance;

2) Cross reference to Rolling Stock performance in a similar application;

3) The design prediction at LRU (Line replaceable unit) level (MDBF, OMTTR and CMTTR) of all capital components;

4) Failure mode, effect, & criticality analysis (FMECA) and Fault Tree Analysis (FTA), FTA shall only applicable to new or critical subsystem equipment or when failure consequences is not solved.

~~4)~~

5) Reliability Critical item list which might impact the operations of the train or train service,

6) Manufacturing Completion Certificate for each train,

7) Design Qualification Testing Completion Certificate,

8) Factory Acceptance Tests Completion Certificate,

9) Train Delivery to site completion Certificate,

10) Design Safety Case of Safety Report,

~~9)~~

~~10)~~11) Engineer Notice of No Objection of submitted list of As-built Drawing,

~~11)~~12) Engineer Notice of No Objection of c~~C~~ompletion of Training program,

~~12)~~13) On-site Testing and Commissioning Completion Certificate for each train, and

~~13)~~14) Train Operation Completion Certificate for each train 1500 km (FFR)

8.6.3 The Rolling Stock Performance report shall be issued progressively on a monthly basis, shall be finalized at the end of DNP, and shall provide:

1) In-service FFR operational performance of individual trainsets as per clause 8.5~~3.3~~;

2) In-service operational performance of the fleet (7 trainsets) MDBF as per clause 8.5~~3.3~~;

3) The in-service OMTTR and CMTTR of all capital components as per clause 8.5~~3.3~~,

4) Completion of Defect Remedial,

5) Completion of Open Item,

6) Completion of Modification, and

7) Completion of Spare Part, Special Tools and Test Equipment delivery including the replenished spare parts delivery, final spare part list after DNP, additional spares and consumables including parts replacement, which was not listed, become necessary during the DNP, list associated with spare parts as per clause ERT 24.2 and

8) DRACAS report

8.7 Performance Certificate

8.7.1 During the in-service Defects Notification Period (DNP), the fleet (all 7 trainsets) in total shall demonstrate successful achievement of the Performance Acceptance Criteria (PAC) which will be a prerequisite of the application for a Performance Certificate to be issued by the Engineer.

8.7.2 Failure to meet the PAC within the DNP shall mean that the DNP shall be extended until such time as the PAC of the total fleet has been met. All cost associated with the extension of the DNP shall be borne by the Contractor.

8.7.3 The DNP shall be up to a limit of 4 years from the date of commencement of the first train in-service operation.

8.8 Safety Assurance

8.8.1 Safety

8.8.1.1 Safety is defined as freedom from those conditions that can cause death, injury, occupational illness, or damage to or loss of equipment or property. All circumstances susceptible to cause injuries or fatalities of passengers, operation staff, and maintenance staff are considered as risks, and by extension, includes all events leading to a partial or total destruction of costly equipment. The objective of safety is expressed by the capability of the Rolling Stock to keep the physical integrity of the asset and to preserve the safety during railway operations and maintenance for passengers, staff and persons in general. The safety assurance program aims to reduce to a tolerable level the probability of occurrence of catastrophic or critical events causing damage to assets or harm to any person. The Contractor shall follow appropriate risk reduction principle such as ALARP (As Low as Reasonably Possible) to demonstrate the risk acceptance to the Employer.

8.8.1.2 The Contractor shall bear the duty of safety in design for the assurance of safety for the life cycle of operations for MCRP and NSRP-S. The Rolling Stock shall fulfil the safety requirements of all General Requirements and Technical Requirements and shall demonstrate that the train is fit for purpose to be operated and maintained in a safe manner for these projects.

8.8.2 System Safety ~~Assurance~~ Management Plan (S~~A~~MP)

8.8.2.1 Within the SAMP, the Contractor shall provide a Safety ~~Assurance~~ Management Plan (SM~~A~~P) for review by the Engineer however the document shall detail the specific safety related activities planned to be carried out by the Contractor to ensure the design solution

8.5.5 The Contractor shall commence the use of the Data reporting analysis and corrective action system (DRACAS) prior to any factory or site acceptance tests and report to the Employer/Engineer on a regular basis.

8.5.6 (Not Used)

8.6 Performance Reports

8.6.1 The Contractor shall provide Performance Reports to support the applications for Rolling Stock TOC for each trainset and the Performance Certificate for the fleet (7 trainsets).

8.6.2 The Rolling Stock TOC Performance report shall be issued for each trainset prior to operational acceptance and shall provide:

1) Technical design justification of performance;
2) Cross reference to Rolling Stock performance in a similar application;
3) The design prediction at LRU (Line replaceable unit) level (MDBF, OMTTR and CMTTR) of all capital components;
4) Failure mode, effect, & criticality analysis (FMECA) and Fault Tree Analysis (FTA), FTA shall only applicable to new or critical subsystem equipment or when failure consequences is not solved.
5) Reliability Critical item list which might impact the operations of the train or train service,
6) Manufacturing Completion Certificate for each train,
7) Design Qualification Testing Completion Certificate,
8) Factory Acceptance Tests Completion Certificate,
9) Train Delivery to site completion Certificate,
10) Design Safety Case of Safety Report,
11) Engineer Notice of No Objection of submitted list of As-built Drawing,
12) Engineer Notice of No Objection of completion of Training program,
13) On-site Testing and Commissioning Completion Certificate for each train, and
14) Train Operation Completion Certificate for each train 1500 km (FFR)

8.6.3 The Rolling Stock Performance report shall be issued progressively on a monthly basis, shall be finalized at the end of DNP, and shall provide:

1) In-service FFR operational performance of individual trainsets as per clause 8.5;
2) In-service operational performance of the fleet (7 trainsets) MDBF as per clause 8.5;
3) The in-service OMTTR and CMTTR of all capital components as per clause 8.5,
4) Completion of Defect Remedial,
5) Completion of Open Item,
6) Completion of Modification, and
7) Completion of Spare Part, Special Tools and Test Equipment delivery including the replenished spare parts delivery, final spare part list after DNP, additional spares and consumables including parts replacement, which was not listed, become necessary during the DNP, list associated with spare parts as per clause ERT 24.2 and
8) DRACAS report

1) The manufacturer's part number;
2) Space for the Employer's part number;
3) Description - a full description of the spare part, including a note as to whether it is a sealed unit or whether it is an assembly or sub-assembly which can be broken down into component parts. The detail of the breakdown shall be included as part of the submission under Sub-Clause 13.4;
4) Quantity supplied;
5) Expected utilization in twelve months;
6) Overall dimensions and weight including packing (if any) for shelf space purposes;
7) A note as to interchangeability or otherwise with similar parts;
8) The unit price;
9) The source - the manufacturer's name and address; and
10) The normal manufacturing and shipment lead times for additional quantities.
11) Applicable illustration
12) Applicable figures
13) Applicable mechanical information
14) Application electrical information
15) Dimension
16) Life expectancy etc.

11.1.3 The Contractor shall be allowed to request for changes to the approved list upon submitting a change request by updating the revision lists submission. The change request shall be reviewed and approved by the Employer/Engineer. Any additional cost incurred due to the changes of the lists shall be borne by the Contractor. Employer/Engineer statement of No Objection to the lists shall not absolve the Contractor obligation under the contract.

11.1.4 The Contractor shall submit a comprehensive list of recommended spare parts and consumables in accordance with the requirements specified in the ERG and ERT for the period ~~of at least 2 years~~as per ERT clause 24.2 of the Rolling Stock operation and maintenance.

11.1.5 The Contractor shall also provide all special tools, diagnostic test equipment, test benches, jigs, etc. that shall be necessary for the operations and maintenance of the Rolling Stock and associated equipment which support the heavy maintenance of the rolling stock. The Contractor shall responsible for the delivery, installation, testing & commissioning of the approved special tools, diagnostic test equipment, test benches, jigs etc. The Contractor shall deliver the training of the special tools, diagnosis test equipment, test benches, jigs, etc.to the Employer's personnel as per clause 1.12.

11.2 Spare Parts Manufacture and Delivery

11.2.1 Spares parts shall be manufactured, tested and delivered to the Employer by the Contractor, as part of the Performance Acceptance Criteria (PAC) stated at Clause 8.5. The spare parts shall suitably packed and identified for prolonged storage.

11.3 Special Tools and Test Equipment

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11.3 Special Tools and Test Equipment

11.3.1 Special tools, test equipment, jigs, fixtures and gauges required to carry out all functions described in the maintenance instructions or as required by the Particular Technical Requirements shall be delivered as part of the Performance Acceptance Criteria (PAC) stated at Clause 8.5, according to the approved lists by the Employer/Engineer.

11.3.2 The Contractor may add any additional equipment required, but, at no extra cost to the Employer. The extent of supply shall include protective or carrying cases, as may be appropriate for the storage and use of each item.

11.3.3 In the event the Employer/Engineer encountered an inconsistency of the approved list and the maintenance manual or other means, at no adjustment to the Contract sum, the Contractor shall with immediate effect shall update the lists and delivered the additional special tools and test equipment as per clause 11.1.5 and as part of the PAC stated at Clause 8.3.

11.4 Capital Spares

11.4.1 The Contractor is to provide recommended list of Capital Spares for the limited express train.

11.4.2 The proposed capital spares by the Contractor shall be able to support the unit exchange program and to achieve the efficient CMTTR as per clause 8.5.3.

11.5 Consumable and Recommended Spares

11.5.1 The Contractor shall provide spare parts as per ERT clause 24.2 which shall have been included in the Schedule of Prices.

11.5.2 The spare parts shall be listed in a practical format as per ERT clause 24.2.3.

11.5.3 The stock of all consignment or recommended spare parts shall be replenished at the end of the Defects Notification Period as per the final approved list by the engineer.

11.5.4 The Contractor shall submit the spare part delivery list and schedule for the engineer review during design review. The schedule shall demonstrate the phases of delivery which shall meet the sufficient quantity required to support the scheduled and

11.3.1 Special tools, test equipment, jigs, fixtures and gauges required to carry out all functions described in the maintenance instructions or as required by the Particular Technical Requirements shall be delivered as part of the Performance Acceptance Criteria (PAC) stated at Clause 8.5, according to the approved lists by the Employer/Engineer.

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11.3.3 In the event the Employer/Engineer encountered an inconsistency of the approved list and the maintenance manual or other means, at no adjustment to the Contract sum, the Contractor shall with immediate effect shall update the lists and delivered the additional special tools and test equipment as per clause 11.1.5 and as part of the PAC stated at Clause 8.3.

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11.4.2 The proposed capital spares by the Contractor shall be able to support the unit exchange program and to achieve the efficient CMTTR as per clause 8.5.3.

11.5 Consumable and Recommended Spares

11.5.1 ~~The Contractor shall provide all spare parts for all of its supplied equipment necessary during the Defects Notification Period, the price of which shall have been included in the Schedule of Prices.~~The Contractor shall provide spare parts as per ERT clause 24.2 which shall have been included in the Schedule of Prices.

11.5.2 The spare parts shall be listed in a practical format as per ERT clause 24.2.3.~~.~~

11.5.3 The stock of all ~~consumable~~ consignment or ~~spare~~recommended spare parts shall be replenished at the end of the Defects Notification Period as per the final approved list by the engineer.~~to match as a minimum the list of consumables of the bid and be handed over to the Employer.~~

11.5.4 The Contractor shall submit the spare part delivery list and schedule for the engineer review during design review. The schedule shall demonstrate the phases of delivery which shall meet the sufficient quantity required to support the scheduled and unscheduled maintenance of the train.

11.5.5 The list shall be updated and submitted for engineer review prior to the end of defect notification period to form the final approved spare part delivery list and shall not absolve the Contractor obligation in the Contractor to demonstrate requirement in clause 8.5 of ERG. The list shall include the additional spares and consumables including parts replacement, which was not previously listed, become necessary during the DNP.

~~11.5.3~~11.5.6 The Contractor shall complete the spare parts delivery to the Employer prior to the completion of Defect Notification Period.

11.6 Start-Up Material

11.6.1 The Contractor shall provide all material for testing and commissioning and sufficient material to start the service.

11.7 Spare Parts Installation Support

11.7.1 The Contractor shall provide sufficient maintenance support staff to ensure that the all

statement of No Objection to the lists shall not absolve the Contractor obligation under the contract.

11.1.4 The Contractor shall submit a comprehensive list of recommended spare parts and consumables in accordance with the requirements specified in the ERG and ERT for the period as per ERT clause 24.2 of the Rolling Stock operation and maintenance.

11.1.5 The Contractor shall also provide all special tools, diagnostic test equipment, test benches, jigs, etc. that shall be necessary for the operations and maintenance of the Rolling Stock and associated equipment which support the heavy maintenance of the rolling stock. The Contractor shall responsible for the delivery, installation, testing & commissioning of the approved special tools, diagnostic test equipment, test benches, jigs etc. The Contractor shall deliver the training of the special tools, diagnosis test equipment, test benches, jigs, etc.to the Employer's personnel as per clause 1.12.

11.2 Spare Parts Manufacture and Delivery

11.2.1 Spares parts shall be manufactured, tested and delivered to the Employer by the Contractor, as part of the Performance Acceptance Criteria (PAC) stated at Clause 8.5. The spare parts shall suitably packed and identified for prolonged storage.

11.3 Special Tools and Test Equipment

11.3.1 Special tools, test equipment, jigs, fixtures and gauges required to carry out all functions described in the maintenance instructions or as required by the Particular Technical Requirements shall be delivered as part of the Performance Acceptance Criteria (PAC) stated at Clause 8.5, according to the approved lists by the Employer/Engineer.

11.3.2 The Contractor may add any additional equipment required, but, at no extra cost to the Employer. The extent of supply shall include protective or carrying cases, as may be appropriate for the storage and use of each item.

11.3.3 In the event the Employer/Engineer encountered an inconsistency of the approved list and the maintenance manual or other means, at no adjustment to the Contract sum, the Contractor shall with immediate effect shall update the lists and delivered the additional special tools and test equipment as per clause 11.1.5 and as part of the PAC stated at Clause 8.3.

11.4 Capital Spares

11.4.1 The Contractor is to provide recommended list of Capital Spares for the limited express train.

11.4.2 The proposed capital spares by the Contractor shall be able to support the unit exchange program and to achieve the efficient CMTTR as per clause 8.5.3.

11.5 Consumable and Recommended Spares

11.5.1 The Contractor shall provide spare parts as per ERT clause 24.2 which shall have been included in the Schedule of Prices.

11.5.2 The spare parts shall be listed in a practical format as per ERT clause 24.2.3.

11.5.3 The stock of all consignment or recommended spare parts shall be replenished at the end of the Defects Notification Period as per the final approved list by the engineer.

11.5.4 The Contractor shall submit the spare part delivery list and schedule for the engineer review during design review. The schedule shall demonstrate the phases of delivery which shall meet the sufficient quantity required to support the scheduled and

unscheduled maintenance of the train.

11.5.5 The list shall be updated and submitted for engineer review prior to the end of defect notification period to form the final approved spare part delivery list and shall not absolve the Contractor obligation in the Contractor to demonstrate requirement in clause 8.5 of ERG. The list shall include the additional spares and consumables including parts replacement, which was not previously listed, become necessary during the DNP.

11.5.6 The Contractor shall complete the spare parts delivery to the Employer prior to the completion of Defect Notification Period.

11.6 Start-Up Material

11.6.1 The Contractor shall provide all material for testing and commissioning and sufficient material to start the service.

11.7 Spare Parts Installation Support

11.7.1 The Contractor shall provide sufficient maintenance support staff to ensure that the all spares can be efficiently installed during the Defects Notification Period.

11.8 (Not Used)

11.9 Train Operation Simulator Parts

11.9.1 The Contractor shall procure and transport to the Driving Simulator Contractor (under CP NS-01: E&M System and Track Works) the equipment for the Driving Simulator to be installed in the Training Center by the designated date.

12 INSPECTION, TESTING AND COMMISSIONING

12.1 General

12.1.1 The Contractor shall perform all necessary testing and commissioning activities in order to ensure satisfactory operation of the Rolling Stock completed system plus compliance with the requirements of the Technical Requirements. The Engineer shall witness the tests as set out in the test plan.

12.1.2 The test of the signaling Equipment provided by the CP NS-01 and CP04 Contractors shall be part of the test plan and the technical responsibility for integrated performance sets with the CP NS-01 and CP04 Contractors.

12.1.3 All inspections, testing and commissioning shall be clearly identified in the Quality Management Plan identifying the witness, inspection and hold points as required by the Contractor, the Engineer or both. The quality management plan shall be submitted by the Contractor to the Engineer for review in accordance with the Quality Management Plan (refer Sub-Clause 7.1).

12.1.4 All tests shall be carried out by the Contractor in the presence of the Employer and the Engineer in accordance with the agreed Quality Management Plan.

12.1.5 The Contractor shall provide testing procedures that shall be in accordance with the Technical Requirements and the International and Philippine Standards (as specified in the Technical Requirements Sub-Clause 1.2.2**,** Codes, Standards and Requirements).

12.1.6 The Contractor shall appoint a dedicated test and commissioning manager, to coordinate all activities of the commissioning schedule.

12.1.7 All costs associated with testing shall be borne by the Contractor, including any expenses

1.6.2.1 The following physical characteristics indicate fundamental vehicle dimensions that should be given careful attention.

1.	Carbody Length (excluding coupler, overhang of leading car)	19,500 mm
2.	Overall length (excluding overhang of leading car)?	20,000 mm
3.	Train length (~~In case of~~ 8 cars consist, excluding overhang of both leading cars)	160,000 mm
~~4.~~	~~Overall Width (excluding light on both sides of the vehicle)~~	~~2,950 mm~~
~~5.~~	~~Overall height from top of rail to roof (excluding air conditioning system on the roof)~~	~~3,655 mm~~
~~6.~~4.	Door arrangement shall comply with Sub-Clause ~~7~~8.1 of this ERT	
~~7.~~5.	Floor height	1,130～1,150 mm
~~8.~~6.	Pantograph lock down height	Max. 4,150 mm
~~9.~~7.	Pantograph height working range	4,400 – 5,415 mm
~~10.~~8.	Wheel Diameter	780～860 mm
~~11.~~9.	Wheelbase	2,100 - 2700 mm
~~12.~~10.	Distance between Bogie center	13,800 mm
~~13.~~11.	Passenger Doors	Bi-parting or single leaf plug-in sliding Doors
~~14.~~12.	Doorway entrance width	more than 900 mm (This is narrow, 1300 is usual which allows 2 streams of passengers to enter/exit)
~~15.~~13.	Gangway door width	more than 800 mm
~~16.~~14.	Doorway height	1,850 mm
~~17.~~15.	Windows	Double glazed, tempered safety glass suggests shown as laminated glass
~~18.~~16.	Maximum axle load under W2 condition	16,000 kg
~~19.~~17.	Wheel back-to-back	1359 – 1362 mm

1.7 Track Standards

Main Line	: EN 60 E1	Standard Length 25m
Depot	: JIS 50N	Standard Length 25m

1.8 Route Data

1.8.1 Horizontal Curve Radius

1) For main line: More than 260 m for NSCR-N1, NSCR-N2 and NSCR-SC
2) For side track: More than 100m
3) For stations: More than 400 m
4) For turnouts: More than 160 m (Main Line) for NSCR-N1;
   More than 165m (Main Line) for NSCR-N2 and NSCR-SC
5) For depot: More than 100 m for NSCR-N1, NSCR-N2 and NSCR-SC

mounted) cars with operator cab is shown in Appendix A. The bidder shall propose the limited express eight (8) cars train formation comprises of motor mounted cars, trailer cars and cars with operator cab. The proposed formation and the equipment architecture shall meet the system requirements in this tender not limited to weights limits, train performance, noise and vibration etc. The proposed train formation and equipment architecture data/documents shall be provided in the bid submission.

1.6.1.3 The limited express train formation and equipment arrangement architecture shall be finalised during design stage. Any time and cost implication to the changes of train formation and equipment arrangement architecture from the bid submission to the given notice of no objection at final design, shall be borne by the Contractor and no contract variation shall be provided by the Employer.

1.6.1.4 Auxiliary Power Equipment, Battery and Battery charger location shall be arranged to avoid the EMI to the signaling equipment unless otherwise specified.

1.6.1.5 The mass (tare weight) of the 8-cars trainset shall be 315 tons or less.

1.6.1.6 Weight balance, lower center of gravity, etc., shall be taken into consideration. The weight distribution shall be as defined in IEC 61133 or any equivalent standard approved the Engineer.

1.6.1.7 Total gross axle load of leading car and middle car shall not exceed 16 Tonnes for loads as in section 8.5 of IEC61133

1.6.1.8 Provision for 10 car trainsets shall be provided for future upgrade. The evidence of data/document shall be provided in the bid submission.

1.6.1.9 Typical Power and Auxiliary Electric System Configuration is as follow:

1) Six (6) power conversion systems which can drive four (4) AC motors shall be equipped in suitable three (3) intermediate cars of trainsets. Two (2) auxiliary power supply systems with a primary inverter to serve the auxiliary loads shall be equipped in the proper place of trainsets. The simplified block diagram for reference is shown in Appendix A

1.6.1.10 The bidder shall propose the power and auxiliary electric system configuration and this proposal shall be submitted in the bid submission. The positions where these devices shall be reviewed by the Engineers. Both leading cars shall be trailer car (not motor mounted) considering EMC and the mounted space for on-board ETCS, Running and Stopping Assistant system and PSD controller.

1.6.1.11 Under emergency conditions, one train in W2 (Clause 1.1) loading must be capable of operating with another train in W2 loading coupled to it for hauling or pushing.

1.6.1.12 The major electrical equipment table shall be provided by bidder in the bid submission. The major electrical equipment table shall be finalized during design stage.

1.6.2 Vehicle Physical Characteristics

1.6.2.1 The following physical characteristics indicate fundamental vehicle dimensions that should be given careful attention.

1.	Carbody Length (excluding coupler, overhang of leading car)	19,500 mm
2.	Overall length (excluding overhang of leading car)?	20,000 mm
3.	Train length (8 cars consist, excluding overhang of both leading cars)	160,000 mm

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4.	Door arrangement shall comply with Sub-Clause 7.1 of this ERT	
5.	Floor height	1,130～1,150 mm
6.	Pantograph lock down height	Max. 4,150 mm
7.	Pantograph height working range	4,400 – 5,415 mm
8.	Wheel Diameter	780～860 mm
9.	Wheelbase	2,100 - 2700 mm
10.	Distance between Bogie center	13,800 mm
11.	Passenger Doors	Bi-parting or single leaf plug-in sliding Doors
12.	Doorway entrance width	more than 900 mm (This is narrow, 1300 is usual which allows 2 streams of passengers to enter/exit)
13.	Gangway door width	more than 800 mm
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15.	Windows	Double glazed, tempered safety glass suggests shown as laminated glass
16.	Maximum axle load under W2 condition	16,000 kg
17.	Wheel back-to-back	1359 – 1362 mm

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Main Line	: EN 60 E1	Standard Length 25m
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   More than 165m (Main Line) for NSCR-N2 and NSCR-SC
5) For depot: More than 100 m for NSCR-N1, NSCR-N2 and NSCR-SC

1.8.2 Transition Curve Length:

1.8.2.1 For NSCR-N1:

1) Maximum out of L1, L2, and L3
2) Where L1=800 C, L2=7.5 CV, L3=6.75 CdV
3) Length between transition curves: more than 20 m

1.8.2.2 For NSCR-N2 and NSCR-SC:

1) Maximum out of L1, L2 and L3

5) Modification 'strike box' with a minimum of 10 positions.

~~5)~~1.3.2.6 The Contractor shall identify the rolling stock hardware main components/subcomponent to be installed with the name plate during the design phase and will be reviewed by the Engineer.

1.3.3 Software Configuration

1.3.3.1 Configuration of software shall comply with the requirements of EN 50128 or any equivalent standard approved by the Engineer.

1.4 Special Responsibility of the Contractor

1.4.1.1 No examination, review and given statement of No Objection by the Engineer of the design, drawings, and documents submitted by the Contractor, with or without amendment, or any given statement of No Objection or consent given by the Engineer for any equipment or part of the Works, shall absolve the Contractor from any of his obligations under the contract or any liability arising out of the designs, drawings and documents or equipment or part of Works.

1.5 Mockup

1.5.1.1 In order to evaluate the effectiveness of the vehicle interior and its layout, the Contractor shall develop the interior design using a full-scale half- vehicle (with driver's cab) mockup. The drivers cab mockup shall be fully equipped to show completely built condition. The entire design of the vehicle interior including the drivers cab shall be reviewed by the Engineer/Employer.

1.5.1.2 The exterior of the mockup shall accurately represent that of the vehicle, and shall be painted to simulate actual materials or equivalent used. The mock-up shall be strong enough to accommodate persons inside without the damage or deformation. It shall be constructed on a substantial platform, to facilitate transportation and to prevent damage (cracking) and distortion of the hardware.

1.5.1.3 The Mockup shall be displayed to public at the ground floor level and the location will be determined by the Employer which will be along the project alignment. The Contractor shall bear all of the associated cost of the mock-up from Manufacture's Factory to the location of display in Metro Manila, Philippines.

1.5.1.4 The Contractor shall prepare the provision of at least twelve (12) display sites which shall be determined by the Employer over a period of 18 months of mockup display. The Contractor shall bear all of the associated cost of the Mockup logistics and others i.e., security, authority approval etc. including the demobilization of the mockup upon completion of the mockup display period.

1.6 Basic Train Formation

1.6.1 General Vehicle Configuration

1.6.1.1 ~~The limited express train is consisting of 6 motor mounted cars and 2 trailer (not motor mounted) cars with operator cab. However, the Contractor can propose alternative to the motor configuration during the design stage~~. The limited express train formation shall consist of eight (8) car sets comprises of motor mounted cars and trailer cars (not motor mounted) with operator cab. The design flexibility shall be provided for the limited

5) Modification 'strike box' with a minimum of 10 positions.

1.3.2.6 The Contractor shall identify the rolling stock hardware main components/subcomponent to be installed with the name plate during the design phase and will be reviewed by the Engineer.

1.3.3 Software Configuration

1.3.3.1 Configuration of software shall comply with the requirements of EN 50128 or any equivalent standard approved by the Engineer.

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1.5 Mockup

1.5.1.1 In order to evaluate the effectiveness of the vehicle interior and its layout, the Contractor shall develop the interior design using a full-scale half- vehicle (with driver's cab) mockup. The drivers cab mockup shall be fully equipped to show completely built condition. The entire design of the vehicle interior including the drivers cab shall be reviewed by the Engineer/Employer.

1.5.1.2 The exterior of the mockup shall accurately represent that of the vehicle, and shall be painted to simulate actual materials or equivalent used. The mock-up shall be strong enough to accommodate persons inside without the damage or deformation. It shall be constructed on a substantial platform, to facilitate transportation and to prevent damage (cracking) and distortion of the hardware.

1.5.1.3 The Mockup shall be displayed to public at the ground floor level and the location will be determined by the Employer which will be along the project alignment. The Contractor shall bear all of the associated cost of the mock-up from Manufacture's Factory to the location of display in Metro Manila, Philippines.

1.5.1.4 The Contractor shall prepare the provision of at least twelve (12) display sites which shall be determined by the Employer over a period of 18 months of mockup display. The Contractor shall bear all of the associated cost of the Mockup logistics and others i.e., security, authority approval etc. including the demobilization of the mockup upon completion of the mockup display period.

1.6 Basic Train Formation

1.6.1 General Vehicle Configuration

1.6.1.1 . The limited express train formation shall consist of eight (8) car sets comprises of motor mounted cars and trailer cars (not motor mounted) with operator cab. The design flexibility shall be provided for the limited express train formation of 10 car sets per consist for future expansion.

1.6.1.2 Typical vehicle configuration consisting of 6 motor mounted cars and 2 trailer (not motor

ATTACHMENT 1

SUMMARY OF KEY DATES

(1) The Employer requires the Contractor to complete certain elements of work by specific Key Dates (KD). Delay in achieving those Key Dates shall render the Contractor liable to pay Delay Damages (as set out in Part A, Contract Data, of the Particular Conditions).

(2) Achieving a Key Date for an element of work means that, before the expiry of the number of months relevant to the element in question (as specified in "Table 1 – Key Dates" below), all works related to that element have been completed to the satisfaction of the Engineer. The number of months shown in Table 1 against a Key Date and its specific element of work signifies the maximum duration in months from the Commencement Date within which the identified element must be completed. The number of months shown in Table 1 will be converted into actual calendar dates after receipt by the Contractor of the Engineer's notification of the Commencement Date for the Project.

TABLE 1 – KEY DATES

Key Date	Element of Work	No. of Months
KD 1	Achievement: Completing Final Design Review.	~~18~~ 25~~19~~ months
KD 2	Achievement: Deliver the Mock Up to the site	~~31~~ 24~~14~~ months
KD 3	Achievement: Completing FAI and FAT.	~~36~~ 36~~43~~ months
KD 4	Achievement: Supply and delivery of the following Rolling Stock equipment for training purposes to the CP NS-01 Contractor at the North Depot (for Training Center Facility): - Equipment for driving simulator, - Pantograph, and - Bogie assembly for motor car including traction motor, gearbox and coupling.	~~40~~ 35~~48~~ months
KD 5	Achievement: Completion of training and delivery of Operation and Maintenance Manual.	~~48~~ 55~~49~~ months
KD 6	Achievement: Delivery of 7 trainsets (1-7) and completion of testing and commissioning thereof plus handing over.	58~~46~~ months
KD 7	Achievement: Delivery of ~~all spare parts, consumables,~~ special tools and jigs and ~~, plus~~ as-built drawings.	57~~49~~ months
KD 8	Achievement: Completion of Trial Operation support and the whole of the Works.	58~~53~~ months

(3) The Contract Packages with which the Works will be required to interface are as shown below.

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SUMMARY OF KEY DATES

(1) The Employer requires the Contractor to complete certain elements of work by specific Key Dates (KD). Delay in achieving those Key Dates shall render the Contractor liable to pay Delay Damages (as set out in Part A, Contract Data, of the Particular Conditions).

(2) Achieving a Key Date for an element of work means that, before the expiry of the number of months relevant to the element in question (as specified in "Table 1 – Key Dates" below), all works related to that element have been completed to the satisfaction of the Engineer. The number of months shown in Table 1 against a Key Date and its specific element of work signifies the maximum duration in months from the Commencement Date within which the identified element must be completed. The number of months shown in Table 1 will be converted into actual calendar dates after receipt by the Contractor of the Engineer's notification of the Commencement Date for the Project.

TABLE 1 – KEY DATES

Key Date	Element of Work	No. of Months
KD 1	Achievement: Completing Final Design Review.	25 months
KD 2	Achievement: Deliver the Mock Up to the site	24months
KD 3	Achievement: Completing FAI and FAT.	36months
KD 4	Achievement: Supply and delivery of the following Rolling Stock equipment for training purposes to the CP NS-01 Contractor at the North Depot (for Training Center Facility): - Equipment for driving simulator, - Pantograph, and - Bogie assembly for motor car including traction motor, gearbox and coupling.	35 months
KD 5	Achievement: Completion of training and delivery of Operation and Maintenance Manual.	55 months
KD 6	Achievement: Delivery of 7 trainsets (1-7) and completion of testing and commissioning thereof plus handing over.	58 months
KD 7	Achievement: Delivery of all spare parts, consumables, special tools and jigs, plus as-built drawings.	57 months
KD 8	Achievement: Completion of Trial Operation support and the whole of the Works.	58 months

(3) The Contract Packages with which the Works will be required to interface are as shown below.

- The North South Commuter Railway Project (Malolos-Tutuban) (NSCR):
  - Package CP 01 Elevated Structures, 6 Stations and Depot

ATTACHMENT 2

TIME FOR ACCESS TO THE SITE

(1) The date on which the right to access to a part of the Site as the works area available to the Contractor are defined below and the extents of such areas are specified in the Employer's Requirements.
(2) Month numbers shown in the schedule signify the elapsed time in months from the Commencement Date. The month numbers shall be converted into actual calendar dates after receipt by the Contractor of the Engineer's notification of the Commencement Date. Access Date means the first day of the month specified below

Access Date	Site (Works Area)	Month no.
AD 1	On-board Signalling System and other equipment to be mounted on the Rolling Stock supplied by CP NS-01 Contractor from E&M Systems and Track Works. The E&M System and Track Works Contractor will supply this equipment in Japan at the Rolling Stock Contractor's premises or at alternative agreed location(s)	
	AD-1: for trainsets one to seven (1-7) supplied under this contract	~~37~~ 2625 ~~25~~ months
AD 2	Access to allocated areas within the North Depot for receiving trainsets, assembling, testing, commissioning and test running within the depot.	~~35~~ 2828 ~~28~~ months
AD 3	Access to the mainline ~~from CIA to Clark (as available)~~ for ~~Test running and Performance Proving~~On-Site Testing and Commissioning	~~36~~ 3428 ~~28~~ months
AD 4	Buendia - CIA Partial Operation~~Access to the whole mainline from Calamba to CIA~~	~~68~~ 5878 ~~78~~ months
AD5	Access to the whole mainline from Calamba to CIA	74 months
NB	1. *Access will be given progressively to the whole of the North South Commuter Railway for the use of this Rolling Stock.* 2. *Obtaining permission from the Railway Safety Inspector to use the Rolling Stock for commercial operations will be the responsibility of the Employer with the support of the Rolling Stock manufacturer.*	

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(1) The date on which the right to access to a part of the Site as the works area available to the Contractor are defined below and the extents of such areas are specified in the Employer's Requirements.
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AD 1	On-board Signalling System and other equipment to be mounted on the Rolling Stock supplied by CP NS-01 Contractor from E&M Systems and Track Works. The E&M System and Track Works Contractor will supply this equipment in Japan at the Rolling Stock Contractor's premises or at alternative agreed location(s)	
	AD-1: for trainsets one to seven (1-7) supplied under this contract	26 months
AD 2	Access to allocated areas within the North Depot for receiving trainsets, assembling, testing, commissioning and test running within the depot.	28 months
AD 3	Access to the mainline for On-Site Testing and Commissioning	34months
AD 4	Buendia - CIA Partial Operation	58 months
AD5	Access to the whole mainline from Calamba to CIA	74 months
NB	1. *Access will be given progressively to the whole of the North South Commuter Railway for the use of this Rolling Stock.* 2. *Obtaining permission from the Railway Safety Inspector to use the Rolling Stock for commercial operations will be the responsibility of the Employer with the support of the Rolling Stock manufacturer.*	