

Reasoned Document bases on comments received from various Firms and concerned Directorates of RDSO on Draft Technical specification No. TI/SPEC/OHE/NETRA /0140 of August-2018 for E-Tender No. RE2017NETRA0001.

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
1.	1.2.6/ 2.2(12/ 2.2(14)/ 4.1(para-3)	(a) Maximum Speed under its own power/when coupled to train=160 kmph	M/s SAN Engg.	The maximum self-propelled speed should have been 105 kmph and towing speed should have been 160 kmph. If the required speed during self-propulsion is 160 kmph, it is not possible with present AC/DC under slung traction power pack and need to go with AC/AC traction. For the required application, this solution will be too expensive, complex and will have space constraints.	Self-propelled speed will remain 160 kmph. AC-DC Traction System has been decided with two power packs. Accordingly, new clauses have been added in Chapter-4 for Transmission system viz. Engine, Traction motor, Alternator, Rectifier etc.	(a) Maximum Speed under its own power/when coupled to train.=160 kmph (on tangent track) (b)Maximum measuring/recording speed =160 kmph
2.	#	-	Electrical Directorate /RDSO	i) The specification does not specify any type of traction motor and requirement related to TM ii) Traction Motor is mentioned in para no. 1.4 of Annexure-IV, where vendor has to specify, make type, HP & Characteristic only.	AC-DC Traction System has been decided with two power packs. Accordingly, new clauses have been added in Chapter-4 for Transmission	New Clause# 4.10 for Traction Motor: Four DC Traction Motor of suitable rating of proven design, two on each Bogie, shall be provided on the OHE car conforming to IEC 60349-1. The traction motors should meet the

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				<p>iii) Thus as per draft specification, vendor is not required to even carry out prototype testing of TM and get design approval of TM.</p> <p>iv) It is suggested that suitable type of traction motor like fully suspended or axle hung nose suspended and DC or Induction Motor may be specified depending upon the system requirement.</p> <p>v) Necessary clauses may also be incorporated for submission of design of TM, design approval by RDSO & Type Testing by RDSO.</p> <p>vi) Maximum speed is specified as 160 Kmph. The test speed of the vehicle also needs to be specified.</p>	<p>system viz. Traction motor, Alternator, Rectifier etc.</p>	<p>requirements of Specification to run the vehicle at the speed of 160 kmph (level track). Motor shall be from approved source of RDSO/CLW/DLW or any other IR's vendor approving organization approved sources. In case the same is not from the RDSO /CLW/DLW approved sources, type testing shall be carried out by RDSO.</p> <p>Maximum speed modified as per SN-1 above.</p>
3.	2.1.1	The equipments and their arrangement shall withstand satisfactorily, the vibration and shocks normally	Electrical Directorate /RDSO	It is suggested to specify IEC 61373 for Shock & vibration levels.	Acceptable. Accordingly, clause has been modified.	Modified as The equipments and their arrangement shall withstand satisfactorily, the vibration and shocks as per IEC:61373.

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		<p>encountered in service which are as below:-</p> <p>(a)<u>Maximum Vertical Acceleration</u> 3.0 g</p> <p>(b)<u>Maximum Longitudinal Acceleration</u> 5.0 g</p> <p>(c)<u>Maximum Train Acceleration</u> 2.0 g</p> <p>(Where g: Acceleration due to Gravity)</p>				
4.	2.2 -(2) Minimum radius of curve	<p>Normally 175 meters, sharper curves with radius less than 175 meter are also available at isolated locations. Regarding minimum radius of curvature for slip points, turnouts or crossover roads, para 17 of chapter II of Schedule-I of</p>	Track Dte./RDSO	<p>Para shall be modified as:</p> <p>"Normally 175 meters, however, the vehicle shall also capable to negotiate on curves <u>having radius of 145 meters.</u></p> <p>For minimum radius of curvature for slip points, turnouts or crossover roads, para 17 of chapter II of Schedule-1 of IRSOD (BG) Revised 2004 shall be applicable which provides for minimum of 175 metres radius curves in case of 1 in 8.5 scissors</p>	<p>Acceptable.</p> <p>Accordingly, clause has been modified.</p>	<p>Modified as:</p> <p>Normally 175 meters, however, the vehicle shall also be capable to negotiate on curves having radius of 145 meters. For minimum radius of curvature for slip points, turnouts or crossover roads, para 17 of chapter- II of Schedule-1 of IRSOD (BG) Revised 2004 shall be applicable which provide for minimum of 175 meters radius curves in case of I in 8.5</p>

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		IRSOD (BG) Revised 2004 shall be applicable which provides for minimum of 175 m radius curves in case of 1 in 8.5 scissors cross over.		cross over."		scissors cross over.
5.	2.2-(9) Permitted irregularities	The track is maintained as per Indian Permanent Way Manual and para 607 (I) gives details of track Category for various parameters. Third report of criteria committee shall be considered for number of peaks per kilometre, if specified any.	Track Dte./RDSO	Para shall be modified as: "The vehicle shall be capable to negotiate on track irregularities of various parameters classified as A, B, C or D as mentioned in para 607(1) and limiting values of Gauge, Unevenness and Twist for lower speeds have been specified in para 607(4) of Indian Railways Permanent Way Manual 2004 with latest A&C slip. The tolerances given under para 607(2) are for suitability of operation at speed above 100 kmph for riding comfort of passengers and are not to be mistaken as limiting maintenance standards. Actual values observed	Acceptable. Accordingly, clause has been modified.	The vehicle shall be capable to negotiate on track irregularities of various parameters classified as A, B, C or D as mentioned in para 607(1) and limiting values of Gauge, Unevenness and Twist for lower speeds have been specified in para 607(4) of Indian Railways Permanent Way Manual 2004 with latest A&C slip. The tolerances given under para 607(2) are for suitability of operation at speed above 100 kmph for riding comfort of passengers and are not to be mistaken as limiting maintenance standards. Actual values observed

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				during track recording may be much more than these values. <u>No safety limits for tack geometry parameters have been laid down."</u>		during track recording may be much more than these values. No safety limits for tack geometry parameters have been laid down.
6.	2.3 Maximum moving Dimensions	Maximum moving dimensions shall conform to diagram 1D of Indian Railway Schedule of Dimension (SOD) 1676 mm gauge (BG) revised 2004 (With Latest Amendments) with the pantograph and platform in lock down condition. Infringements, if unavoidable and fully justified, may be considered, if within the limits shown in SOD 1676 mm gauge (BG) revised 2004.	Track Dte./RDSO	Para shall be modified as: "Maximum Moving Dimensions shall conform to diagram 1D of Indian Railway Schedule of Dimension 1676mm gauge (BG) Revised 2004 (with latest Amendments & Corrigendum Slip) with pantograph locked down conditions. Infringements, if unavoidable and fully justified, may be considered with approval of Railway Board."	Acceptable. Accordingly, clause has been modified.	Maximum Moving Dimensions shall conform to diagram 1D of Indian Railway Schedule of Dimension 1676mm gauge (BG) Revised 2004 (with latest Amendments & Corrigendum Slip) with pantograph locked down conditions. Infringements, if unavoidable and fully justified, may be considered with approval of Railway Board.
7.	4.1- para	The machine	Track	Need of sub para 9 of 4.1	Acceptable.	Detected (para-9 of

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	(9) Maximum Moving Dimensions	shall not infringe the Maximum Moving Dimensions, as per Diagram 1-D of Indian railways Schedule of Dimensions 1676 mm Gauge (BG), Revised 2004 (with latest revision)	Dte./RDSO	is not understood as it is also given in para 2.3. If it is required at this location also, the content should be same as in para 2.3 and as suggested against 2.3 above.	Accordingly, para (9) of 4.1 has been deleted and MMD as suggested against 2.3 above has been modified in clause no. 2.3 above.	4.1). The machine shall not infringe the Maximum Moving Dimensions, as per Diagram 1-D of Indian railways Schedule of Dimensions 1676 mm Gauge (BG), Revised 2004 (with latest revision)
8.	4.1 (para-1)	The OHE Recording Car shall have diesel electric/ Diesel Hydraulic transmission . The general design of the OHE Recording Car shall be as per standard industry practices, and fit for the purpose. It shall be manufactured with adequate running stability and suitable for use on Indian Railways. All	M/s Phooltas's Trainsrail Ltd.	We strongly recommend that both options (diesel electric/Diesel Hydraulic transmission) should be allowed as there are many companies in the world who are into Diesel Hydraulic only	As per Railway policy (vide Railway Board Letter No. 84/RE/158/1/2/FTS-2862, dated 16.12.2011), all future procurement of tower wagons shall be of 8 wheeler DETC only except for the proposal where RSP sanction are already available for different type of vehicles.	The OHE Recording Car shall have Diesel Electric Transmission . The general design of the OHE Recording Car shall be as per standard industry practices, and fit for the purpose. It shall be manufactured with adequate running stability and suitable for use on Indian Railways. All standard materials shall be used to manufacture the OHE Recording Car that it is acceptable to the buyer. The OHE Recording Car shall be manufactured so that it can be used for working under all

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		standard materials shall be used to manufacture the OHE Recording Car that it is acceptable to the buyer. The OHE Recording Car shall be manufactured so that it can be used for working under all weather conditions in India.			The same was also discussed during pre-bid meeting of NETRA for E-Tender No. RE2017NETRA0001. Hence, firms request for Hydraulic transmission can't be accepted.	weather conditions in India.
9.	5.1.2 Renumbering 5.1.4	The structure of the OHE Recording Car body including shell shall be suitable for severe testing and recording of OHE parameters and have a design life of at least 40 years in the services under 200% overload conditions with no fatigue or permanent	Carriage Dte./RDSO	This clause may be modified as (As loading condition are already defied in Standard EN12663:2010.): "The structure of the OHE Recording Car body including Shell shall be suitable for severe testing and recording of OHE parameters and have a design life of at least 40 years in the services under with no fatigue or permanent deformation or failure."	Acceptable. Accordingly, clause has been modified.	The structure of the OHE Recording Car body including Shell shall be suitable for severe testing and recording of OHE parameters and have a design life of at least 40 years in the services under with no fatigue or permanent deformation or failure. Renumbering 5.1.4

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		deformation or failure.				
10.	Added new clause 5.1.1 Superstructure & Car Body	-	-	-	Based on decision JDTI	Mentioned in Red Colour in final draft spec.
11.	Added new clause 5.1.2	-	-	-	Based on decision JDTI	Mentioned in Red Colour in final draft spec.
12.	5.1.5 Renumbering 5.1.7	The OHE Recording Car structure shall be designed so as to withstand the load specified for the material used in accordance with International specification.	Carriage Dte./RDSO	This clause may be modified as: "The mechanical strength of Railcar body shall confirm to EN12663-1:2010 (category P1) with the stipulation that 1500KN static tensile load shall be considered for design and testing purpose."	Acceptable. Accordingly, clause has been modified. Since, Standard EN12663-1:2010 is incorporated for more clarity.	The OHE Recording Car structure shall be designed so as to withstand the load specified for the material used in accordance with International specification. The mechanical strength of Railcar body shall confirm to EN12663-1:2010 (category P1) with the stipulation that 1500KN static tensile load shall be considered for design and testing purpose.
13.	5.5.1	The mechanical strength of the OHE Recording Car body	Carriage Dte./RDSO	This clause may be modified as: "The mechanical strength	Acceptable. Accordingly, clause has been modified. To	Modified as The mechanical strength of the OHE Recording Car body structure shall

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		structure shall comply with the requirements of UIC 566.		of the OHE Recording Car body structure shall comply with requirement of EN12663-1:2010 (category P1)."	make this clause in line with clause No. 5.1.5	comply with the requirements of UIC 566 EN12663-1:2010 (category P1).
14.	5.5.2	The Car body, and any equipment mounted on, beneath or within it shall be designed to withstand the fatigue loads that the car body structure will encounter in service during its design life. The fatigue life assessment of body structure shall be carried out using proven standard techniques and shall be submitted by the car manufacturer for review by the IR's representative.	Carriage Dte./RDSO	This clause may be modified as: "The Car body, and any equipment mounted on, beneath or within it shall be designed to withstand the fatigue loads that the car body structure will encounter in service during its design life. The fatigue life assessment of body structure shall be carried out as per Standard EN12663-1:2010 (category P1) and shall be submitted by car manufacturer for review by the IR's representative."	Acceptable. Accordingly, clause has been modified. Since, Standard EN12663-1:2010 is incorporated for more clarity.	The Car body, and any equipment mounted on, beneath or within it shall be designed to withstand the fatigue loads that the car body structure will encounter in service during its design life. The fatigue life assessment of body structure shall be carried out using proven standard techniques as per Standard EN12663-1:2010 (category P1) and shall be submitted by the car manufacturer for review by the IR's representative.
15.	New Clause#	-----	Carriage Dte./RDSO	New clause:	Acceptable. Accordingly,	New clause: The design of the OHE

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	5.5.3			"The design of the OHE Recording car body shall be such as to ensure that Static deflection of car body in maximum vertical load condition shall not exceed 1% of the space between two bogie pivot points."	New clause has been incorporated.	Recording car body shall be such as to ensure that Static deflection of car body in maximum vertical load condition shall not exceed 1% of the space between two bogie pivot points.
16.	New Clause# 5.5.4	-----	Carriage Dte./RDSO	New clause: "All equipment mounting shall withstand maximum accelerations in vertical, longitudinal & transverse directions according to standard EN12663-1:2010 for P1 category vehicles."	Acceptable. Accordingly, New clause has been incorporated.	New clause: All equipment mounting shall withstand maximum accelerations in vertical, longitudinal & transverse directions according to standard EN12663-1:2010 for P1 category vehicles.
17.	New Clause# 5.5.5	-----	Carriage Dte./RDSO	New clause: "All mounting shall withstand fatigue loading for 10 ⁷ cycles according to Standard EN12663-1:2010 for P1 category vehicles."	Acceptable. Accordingly, New clause has been incorporated.	New clause: All mounting shall withstand fatigue loading for 10 ⁷ cycles according to Standard EN12663-1:2010 for P1 category vehicles.
18.	5.15.1	Two pantographs one of which shall be an AM-12 type and the other direct air raised pantograph for high speed electric. The	Electrical Directorate, RDSO	1. AM-12 type pantograph (Speed upto 120 kmph) should not be used and high speed pantograph (speed up to 250 kmph) is not capable to work in high rise OHE height of 7570 mm. hence, High reach pantograph may be used, which is	1. Electrical Directorate of RDSO, have suggestion for the use of high reach pantograph which is acceptable since this is capable	Modified as: One high reach pantograph having capability to operate at the speed of 160 kmph shall be provided as per Specification No. RDSO/2007/EL/SPEC/00 54 Rev 2, November 2015 or latest and shall

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		OHE car manufactured by successful tenderer shall be fitted with both the pantographs. The roof layout and instrumentation fitment shall be so configured that it is possible to view either of the pantographs from the observation dome. Appropriate switching mechanism to allow raising of only one Pantograph at a time shall be provided to preclude the possibility of both Pantographs being lifted up simultaneously.		capable to work in conventional as well as high rise OHE up to speed of 200 kmph. Panto pan width of high speed pantograph is 1800mm whereas the width of high reach pantograph is 2030±2mm. 2. Since high reach pantograph is to work in conventional as well as high rise OHE then both pantograph may be high reach pantograph if high speed pantograph is not specially required. 3. There is contradiction in para 5.15.1 and para 4 which say two pantograph & one one pantograph respectively. Same may be corrected. 4. Annexure-II SN 3 may be deleted.	to work in conventional OHE as well as High Rise OHE up to speed of 200 kmph (with panto pan width of 2030±2mm). Accordingly clause may be changed. 2. Only one high reach pantograph is acceptable. 3. Agreed. Both the clauses (5.15.1 and para-4), may be corrected accordingly. 4. Agreed.	be procured from the approved source of RDSO/CLW/DLW or any other IR's vendor approving organization approved sources. In case the same is not from the RDSO/CLW approved sources, type testing shall be carried out by RDSO. The roof layout and instrumentation fitment on roof shall be so configured that it is possible to view the pantograph from the observation dome. Pantograph shall be so configured so as to give correct measurement from low to high speed. The roof layout and instrumentation fitment shall be so configured that it is possible to view either of the pantograph from the observation dome.
19.	6.1	Illumination: Driving cabs,	PS&EMU Dte./RDSO	Suitable LED light may be provided as per RDSO	Acceptable. Accordingly,	Driving cabs, staff cabins, observation

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		staff cabins, observation dome and instrument room shall be provided with adequate level of illumination at the working plan level (1m above the floor level).		Specification No. RDSO/PE/SPEC/TL/0091-2016 (Rev.'1') with adequate level of illumination at working plan level (1m above the floor level).	clause has been modified.	dome and instrument room shall be provided with suitable LED light as per RDSO Specification No. RDSO/PE/SPEC/TL/0091-2016 (Rev.'1') with adequate level of illumination at working plan level (1m above the floor level).
20.	6.2	Alternators	PS&EMU Dte./RDSO	Alternator may be provided as per RDSO Specification No. RDSO/PE/SPEC/TL/0054-2003 (Rev. '0') with Amdt. 1 & 2.	Acceptable. Accordingly, clause has been modified.	Alternator shall be provided as per RDSO Specification No. RDSO/PE/SPEC/TL/0054-2003 (Rev. '0') with Amdt. 1 & 2 or latest.
21.	6.3	Rectifier-Regulator	PS&EMU Dte./RDSO	Rectifier-Regulator may be provided as per RDSO Specification No. RDSO/PE/SPEC/TL/0054-2003 (Rev.'0') with Amdt. 1 & 2. However, Electronic Rectifier-cum-Regulating unit as per RDSO Specification No. RDSO/PE/SPEC/AC/0013-2011 (Rev.'3) may be provided for better control & regulation.	Electronic Rectifier-cum-Regulating unit for better control & regulation is Acceptable. Accordingly, clause has been modified.	Cl 6.3.1, Modified as The rectifier-regulating equipment shall be under frame mounted and confirming to IEC-60571. Electronic Rectifier-cum-Regulating unit as per RDSO Specification No. RDSO/PE/SPEC/AC/0013-2011 (Rev.'3) or latest shall be provided for better control & regulation. It shall be under frame mounted. Crimping sockets required for inter-

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						connecting and output cables shall be supplied along with the equipment.
22.	6.4.2	Battery for controls: 110 V, 120 Ah, VRLA type batteries of approved make, conforming to RDSO/PE/SPEC/TL/0009-1999 with latest amendment, shall be provided for controls & lighting which cater to all auxiliary electrical load of the OHE Recording Car for two hours and only lighting and fan load for five hours in case of auxiliary alternator failure.	PS&EMU Dte./RDSO	Battery for controls: 110 V, 120 Ah, VRLA batteries of approved make, confirming to RDSO/PE/SPEC/AC/0009-2014 (Rev.2) or latest, shall be provided for control & lighting which cater to all auxiliary electrical load of the OHE Recording car for two hours and only lighting and fan load for five hours in case of alternator failure.	Acceptable. Accordingly, clause has been modified.	Battery for controls: 110 V, 120 Ah, VRLA batteries of approved make, confirming to RDSO/PE/SPEC/AC/0009-2014 (Rev.2) or latest , shall be provided for control & lighting which cater to all auxiliary electrical load of the OHE Recording car for two hours and only lighting and fan load for five hours in case of auxiliary alternator failure.
23.	6.8.2	Head light: Twin Beam head lights shall be provided at both ends. The head	Motive poer note dated 07.01.2019	RDSO/2017/EL/SPEC/0134 ,Rev-0 or latest and Specification for DC-DC Converter should be ELRS/SPEC/DC-DC	accepted	Modified as Head light: Twin Beam head lights shall be provided at both ends. The head light shall

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		light shall conform to RDSO,s specification No ELRS/SPEC/PR/0022(Rev-1) Oct,2004 The operating voltage of head light shall be 24 V DC.		Converter/0021, Rev-1, Sept'04 or latest		conform to RDSO's specification No ELRS/SPEC/PR/0022(Rev-1) Oct,2004 RDSO/2017/EL/SPEC/0134,Rev-0 or latest and Specification for DC-DC Converter should be ELRS/SPEC/DC-DC Converter/0021, Rev-1, Sept'04 or latest. The operating voltage of head light shall be 24 V DC.
24.	6.8.3	Tail light: Two aspect (red and white) LED type 24 V 15 W tail light shall be provided at each end to comply with general rule of Indian Railway.	PS&EMU Dte./RDSO	PS&EMU Directorate deal <u>LED based tail light red color as per specification No. RDSO/PE/SPEC/EMU/0063-2004 (Rev.'1')</u> with steady/flashing and <u>RDSO/PE/SPEC/TL/0119-2008 (Rev. '0') with steady.</u>	<u>Steady/flashing type LED based Tail Light is Acceptable.</u> Accordingly, clause has been modified.	Tail light: <u>LED based tail light red color</u> Two aspect (red and white) LED type 24 V 15 W <u>was per specification No. RDSO/PE/SPEC/EMU/0063-2004 (Rev.'1') with steady/flashing</u> shall be provided at each end to comply with general rule of Indian Railway.
25.	Annexure-II, Sl. No.-3,	SKEL - 970, General arrangement of pantograph AM-12	Electrical Directorate /RDSO	Annexure-II, Sl. No.-3 may be deleted.	Acceptable. The same is deleted.	Deleted. SKEL - 970, General arrangement of pantograph AM-12

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26.	Annexure-II, Sl. No.-4,	RDSO/SK. No. 99003 , Draw gear arrangement	Carriage Dte./RDSO	Sl. No. 4 seems to be redundant.	Acceptable. Accordingly, clause has been modified.	deleted
27.	Annexure-VI,	MAXIMUM MOVING DIMENSIONS	Track Dte./RDSO	Maximum Moving Dimension shown in Annexure-VI is not correct version. This should be replaced by ACS-14 or latest ACS to Indian Railways Schedule of Dimension 2004.	Acceptable. Accordingly, clause has been modified as per ACS-14 of IRSOD.	Annexure-VI for MMD has been updated as per ACS-14 of IRSOD.
28.	New Clause# (in mechanical chapter)	-----	Carriage Dte./RDSO	New clause: New clauses for Mechanical Chapter (like Chapter-III of 8W DETC spec.) to be incorporated. Para related to test trial, para related to camber and deflection, 5.2.9 & 5.2.10 (selection of material), 5.7, 5.1 (roof ventilator), 5.23 (noise level), tentative GA layout (with some principal parameter)	Acceptable. However, Accordingly, some New clauses has been incorporated and changes in respective clauses. Also, GA Layout has been modified	<u>New Clauses#</u> Has been incorporated in Mechanical Chapter-5
29.	Cl no. 2.2.6		Motive Power Directorate, Note No. SD.DETC	Maximum gradient has been mentioned as 1.33 whereas in cl 4.1.3 (Diesel Engine) the grade has been mentioned as 1 in 60. The steepest grade	Acceptable.	modified as : gradient= 1:33

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			(8-W OHE Car), dated 28.09.2018	may be confirmed from track Directorate and incorporated in the spec. along-with corresponding speed. Further, corresponding speeds on various gradients as desired shall also be mentioned in specification along-with steepest gradient for correct traction power assessment by tenderer & thereby selection of no. of diesel engine(s) & matching electrics.		
30.	CI No. 2.2.8		Motive Power Directorate, Note No. SD.DETC (8-W OHE Car), dated 28.09.2018	The type of track standard has been mentioned as 90R. this may not be suitable for proposed NETRA car having speed potential of 160 km/h. the same may be confirmed from Track Directorate & incorporated in the Specification.	acceptable	incorporated
31.	CI 4.2.1 & 4.4.1 (renumbered clause# 4.3.1)		Motive Power Directorate, Note No. SD.DETC (8-W OHE Car), dated 28.09.2018	Make of engine has been mentioned as Cummins (CIL). Firm's shall be removed & para suitably modified as "suitable indigenous diesel engine". Also, the emission standard of diesel engine	Removing the make of engine is acceptable.	Clause 4.2.1, Modified as (renumbered clause 4.3.1): The OHE Recording Car shall be powered by two independent under slung type diesel engine of suitable capacity of

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				has not been mentioned. The same may be mentioned, if desired.		proven make as per requirement of this specification.
32.	Cl no. 4.3 renumbering 4.4		Motive Power Directorate, Note No. SD.DETC (8-W OHE Car), dated 28.09.2018	In this clause, there is a reference of Clause no. 3.11 related to climate conditions, which doesn't exist in the draft specification. Instead the details of climatic conditions are mentioned at Clause no. 2.1. the Clause no. 4.3 may be corrected accordingly.	acceptable	As modified and renumbering 4.4
33.	Clause No. 4.5.1 Renumbering 4.6.1		Motive Power Directorate, " "	Following gauges may be added i) Digital fuel gauge ii) Lube oil temperature gauge. iii) Engine hour meter	acceptable	Added as at SN xii, xiii & xiv. (xii) Digital Fuel Gauge (xiii) Lube oil temperature gauge (xiv) Engine hour meter Renumbering 4.6.1
34.	Annexure-I		Motive Power Directorate, " "	The item at SI no. 33 may be deleted as the same is already mentioned at SI no. 22. Also, the item no. 35 (Axle drive gear box assembly) is not applicable for diesel-electric traction. the same may be removed.	acceptable	deleted
35.	Annexure-IV		Motive Power Directorate, " "	The following safety devices may be added in Clause no. 1.1.17: i) Low lube oil pressure	acceptable	Modified as: Safety devices provided (i) Over speed (ii) Low lube oil

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				gauge. ii) Low lube oil level gauge. iii) Low cooling water level sensor iv) Engine emergency stop switch v) Low hydraulic oil level sensor.		(iii) Overload (iv) High cooling water temperature (v) High lube oil temperature (vi) High exhaust temperature (vii) High intake temperature (viii) Low lube oil pressure gauge (ix) Low lube oil level gauge (x) Low cooling water level sensor (xi) Engine emergency stop switch (xii) Low hydraulic oil level sensor (xiii) Any other
36.	New clause	-	Motive Power Directorate,	1. Test speed: The test speed of the subject vehicle shall be 176 km/h i.e. 10% higher than operating speed. The same shall also be mentioned in the specification. 2. Mounting of Power pack: in the specification, there is no mention about type of mounting of power pack i.e. on board/ semi-onboard/under slung.	New Clauses# Accordingly, changes in respective clause have been modified. Also, new clauses has been Incorporated. As decided per Decided type of traction system	Incorporated in respective clauses of Chapter-4. Clauses No. 4.2, 4.2.1 & 4.8, to 4.23 are added. The Decided type of transmission is AC-DC.

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				<p>However, in the Annexure-V, the power pack has been shown as under slung. The same may be removed from the layout because it will depend on power assessment, thereby total no. of engines matching the requirement based on availability in the market. Mounting shall be left to tenderer.</p> <p>3. Traction power requirement & maximum tractive effort: the traction power requirement & maximum tractive effort w.r.t grade/level for the subject vehicle has not been mentioned in the specification.</p> <p>4. Power requirement for air condition & other auxiliaries: NETRA car with speed potential of 160 kmph has to be fully air-conditioned. However, air conditioning load requirement & how it will be met has not been mentioned in the specification in the specification. The same</p>		

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
				<p>may be incorporated in th spec.</p> <p>5. Type of Traction system: the type of traction system (AC-DC or AC-AC) has not been mentioned in the specification. The same shall be incorporated in spec.</p> <p>6. Technical details of traction equipments: in case of AC-AC traction system, the clause no. Power Rectifier, traction inverter system, DC link, vehicle control system, fault diagnostic system, user settable param,eter etc. may be added. The technical details of TA & power rectifier similar to the details mentioned in TI specification for 8-Wheeler DETC may be included in the subject draft specification. Cooling provision for alternator such as TA blower, it's drive shall also be included in the specification.</p> <p>7. testing & inspection of traction equipments: there is no clause related to type testing & routine</p>		

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
				inspection(acceptance test) of power pack/traction equipments. The same may be included. 8. Special tools for maintenance of traction equipments. The same may be included. 9. Recommended spare parts: there is no clause related to list of spare parts to be recommended by the tenderer. The same may be included.		
37.	New Clauses#	-----	Motive Power	Test Speed, Mounting of Power Pack, Tractive effort, Power requirement of for Air condition& other Auxiliaries (as NETRA car with speed of 160 kmph has to be fully air condition), Type of Traction System (AC-DC or AC-AC), Technical details of traction equipment (Power rectifier, traction alternator, DC-link control system etc.), Testing clause (for prototype and routine test), Special Tool & maintenance, Spare parts.	New Clauses# Accordingly, changes in respective have been modified and new clauses have been explored/ Incorporated.	New Clauses# Refer SN-36 as mentioned above.
38.	Annexure-V	Tentative General Layout	Motive Power	Cardan Shaft has been indicated in the layout	Acceptable.	Drawing is attached at Annexure-V

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		of OHE Recording Car	Directorate /RDSO	which is not applicable for Diesel Electric Transmission system. The layout may be corrected	Tentative layout has to be modified accordingly.	
39.	<u>New Clause#</u> 4.1-para(15)	Acceptance Criteria for Vehicle	Track Directorate /RDSO	There are no acceptance criteria for vehicle. Same should be included in the specification which is given as under: "The acceptance of the vehicle for operation/working on Indian Railway track shall be based on stipulations given under the RDSO document named as "Third report of Standing Criteria Committee with latest revision/alteration."	Acceptable. New clause para under clause No. has been incorporated.	New Clause# 4.1- para(15): Acceptance Criteria for Vehicle: "The acceptance of the vehicle for operation/working on Indian Railway track shall be based on stipulations given under the RDSO document named as "Third report of Standing Criteria Committee with latest revision/alteration."
40.	2.2-(11) And 4.1-(3)- Axle	Maximum Axle Load: 20.32 t (The maximum axle load shall not exceed 20.32 tonne in any case and preferably shall be as less as possible)	Track Directorate /RDSO	The maximum axle load has been kept as 20.32t, the axle load needs to be <u>restricted to 17t</u> for operation at 160kmph. <u>For 20.32t axle load, the maximum operation speed shall be restricted to 130kmph.</u>	Acceptable. Accordingly, clause has been modified.	Modified as: 17t (The maximum axle load shall not exceed 20.32 17 tonne in any case and preferably shall be as less as possible)
41.	Chapter-1 forward	In and around Mumbai area, 1500 V d.c.	DTI-2 (OHE-D)	In and around Mumbai area, 1500 V d.c. traction system also exists, which	As per DTI-2, this line has been deleted.	Deleted.

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		traction system also exists, which is under conversion to 25 kV a.c. system.		is under conversion to 25 kV a.c. system.		
42.	2.1 Wind pressure	High wind speed in certain areas, with wind pressure reaching 200 kgf/m ²	DTI-2 (OHE-D)	High wind speed 49.52 m/s in certain areas, with wind pressure reaching 200 kgf/m ²	Modified as per DTI-2	High wind speed 49.52 m/s in certain areas, with wind pressure reaching 200 kgf/m ²
43.	2.4.1 Para-III	Normal vertical and lateral electrical clearance of 320 mm. has been adopted, with passing clearances i.e. of short time duration of 270 mm. and 220 mm. respectively, as per chapter-V A of Schedule of dimensions, BG. The normal height of the contact wire above the rail level is 5.50 m but at loco sheds and inspection pits, the height is kept as 5.8 m		Normal vertical and lateral electrical clearance of 320 mm. has been adopted, with passing clearances i.e. of short time duration of 270 mm. and 220 mm. respectively, as per chapter V A of Schedule of dimensions, BG. It is desirable to provide the maximum possible clearance in the case of lines equipped for 25kV A.C. 50 cycle single phase electric traction. Minimum clearance between live bare conductors/pantographs) and structure (a) Short term clearances- vertical and lateral distance between live conductors and earth (normally existing only for a brief	As per DTI-2: It may be deleted and modified as per comments of DTI-2.	Deleted and modified.

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		Any change in the height of the contact wire is made gradually		<p>period): 200 mm.(b) long term clearances- vertical and lateral distance between live conductors and earth (which may remain for a considerable period): 250 mm.</p> <p>The normal height of the contact wire at mid span above the rail level is 5.50 m but at loco sheds and inspection pits, the height is kept as 5.8 m</p> <p>Any change in the height of the contact wire is made gradually and permissible gradient depends upon permissible speed.</p>		
44.	2.4.2 (3.0)	1000 kgf. for catenary and 1000 kgf for contact wire	DTI-2 (OHE-D)	1000 kgf/1200kgf for catenary and 1000 kgf/1200kgf for contact wire.	Modified as per DTI-2	Modified as 1000 kgf/ 1200kgf for catenary and 1000 kgf/ 1200kgf for contact wire.
45.	2.4.2 (SN-6)	Height of contact wire:- 7570 mm (Conventional Height -5500 mm, High Rise Height- 7570 mm)	DTI-2	7570 mm (Conventional Height -5500 mm, High Rise Height -7570 mm) height of Contact wire at mid span - -7520mm for High Rise -5500mm for conventional OHE	Modified as per DTI-2	7570 mm (Conventional Height -5500 mm, High Rise Height -7570 mm) height of Contact wire at mid span - -7520mm for High Rise -5500mm for conventional OHE
46.	2.4.2	Height of	“ ”	9070 mm height of	“ ”	9070 mm

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
	(SN-7)	Catenary Wire: 9070 mm		Catenary Wire at support- -8970 mm for High Rise OHE. -6950 mm for Conventional OHE.		height of Catenary Wire at support- -8970 mm for High Rise OHE. -6950 mm for Conventional OHE.
47.	2.4.2 (S.N.-10)	200 mm on straight track & 300 mm on curves.	" "	200 mm on straight track & 300 mm on curves. Stagger of Contact wire- For conventional OHE Stagger of contact wire: ±200 mm on straight track. ±300mm on curves. For High rise OHE Stagger of contact wire ±150 mm on straight track. ±250 mm on curves.	" "	200 mm on straight track & 300 mm on curves. Stagger of Contact wire- For conventional OHE Stagger of contact wire: ±200 mm on straight track. ±300mm on curves. For High rise OHE Stagger of contact wire ±150 mm on straight track. ±250 mm on curves.
48.	2.4.2 (S.N. 14)	The maximum contact wire gradient is 3mm per meter and permissible variation in gradient over 2 consecutive spans is 1.5 mm per meter. (variation of 1.5 mm/m on consecutive span.)	" "	The maximum contact wire gradient is 3mm per meter and permissible variation in gradient over 2 consecutive spans is 1.5 mm per meter. (variation of 1.5 mm/m on consecutive span.) The maximum gradient does not normally exceed 3 mm/m on main lines and the 10 mm/m elsewhere. The variation of gradient on adjacent spans is not more than 1.5 mm/m for	" "	Modified as The maximum contact wire gradient is 3mm per meter and permissible variation in gradient over 2 consecutive spans is 1.5 mm per meter. (variation of 1.5 mm/m on consecutive span.) The maximum gradient does not normally exceed 3 mm/m on main lines and the 10 mm/m elsewhere. The

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
				main lines and 05 mm/m on secondary tracks.		variation of gradient on adjacent spans is not more than 1.5 mm/m for main lines and 05 mm/m on secondary tracks.
49.	2.4.2 (S.N. 15)	Spacing of droppers: First dropper 2.25 m from support, second one is 4.50 m/6.75 m and thereafter the droppers are at 9 m spacing.	'' ''	First dropper 2.25 m from support, second one is 6.75 m/9.0m and thereafter the droppers are at 9 m spacing.	'' ''	First dropper 2.25 m from support, second one is 6.75 m/9.0m and thereafter the droppers are at 9 m spacing.
50.	2.4.2 (S.N. 16)	Permissible uplift of contact wire: 60 mm (at registration arm)		120mm	'' ''	Permissible uplift of Contact wire:120mm
51.	Chapter-3 Cl 3.1.5 (i)	For parameters like contact wire height, stagger, slope and thickness/diameter of contact wire, only contact-less measurement system employing state of the art technology shall	'' ''	For parameters like contact wire height, stagger, gradient, relative gradient slope and thickness/diameter of contact wire, only contact-less measurement system employing state of the art technology shall be acceptable conforming to environmental standards. The system shall be designed according to	'' ''	As modified.

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		be acceptable conforming to environmental standards.		electromagnetic compatibility, Shocks and vibrations and shall have no moving parts, completely sealed and rugged construction.		
52.	3.1.6 (a)	The accuracy of stagger measurement should be minimum ± 10 mm. sampling distance for Stagger measurement shall be 200 mm.	'' ''	The accuracy of stagger measurement should be minimum ± 10 5 mm. sampling distance for Stagger measurement shall be 200 mm.	'' ''	The accuracy of stagger measurement should be minimum \pm 5 mm. sampling distance for Stagger measurement shall be 200 mm.
53.	3.1.6 (b)	The accuracy of height measurement shall be minimum ± 10 mm. Sampling distance shall be 200 mm.	'' ''	The accuracy of height measurement shall be minimum ± 10 2 mm. Sampling distance shall be 200 mm.	'' ''	The accuracy of height measurement shall be minimum \pm 2 mm. Sampling distance shall be 200 mm.
54.	3.1.6 (c)	Condemning limit 8.24 mm, accuracy of contact wire thickness +0.2	''	Condemning limit 8.25 mm. and accuracy of Contact wire thickness ± 0.02mm	'' ''	Condemning limit 8.25 mm. and accuracy of Contact wire thickness ± 0.02mm
55.	3.1.6 (d)	The gradient of the contact wire is the rate of	'' ''	The gradient of the contact wire is the rate of change of height expressed in	'' ''	Modified as

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		change of height expressed in mm/m of distance. This may be calculated based on variation in height of contact wire and distance travelled. Alternately, contractor's design can also be considered, subject to meeting the requirements. The accuracy of gradient (slope) of the contact wire measurement should be minimum + \pm 0.5 mm per 50 meter.		mm/m of distance. For relative gradient this may be calculated based on variation in height of contact wire and distance travelled. Alternately, contractor's design can also be considered, subject to meeting the requirements. The accuracy of gradient (slope) and relative gradient of the contact wire measurement should be minimum + \pm 0.5 mm per 50 meter.		
56.	Cl no. 4.6.1 renumber 4.7	Speed indicating and recording equipment of 0 - 170 km/h range, shall consist of an axle box mounted opto-	Motive Power	The oscillation trial to be conducted is 10% higher than the maximum specified speed of vehicle which comes to be 160+16=176 km/h. it is higher than the maximum speed furnished in clause No.	acceptable	Renumbered 4.7, Speed indicating and recording equipment of 0 -180 km/h range, shall consist of an axle box mounted opto-electronic speed sensor, one

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		electronic speed sensor, one junction box and one recorder cum indicator unit with micro controller containing FLASH EEPROM internal memory for calculating and recording the journey data. A portable FLASH memory card shall be used for external memory. Whenever speed exceeds 160 kmph, a beep sound should come to alert the driver of NETRA car.		4.6.1 i.e. 170km/h. So speed range for speed indicator/Recorder should be sufficiently higher than 176 km/h. the maximum speed range available in motive power spec No. MP.0.3700.07 Rev-07 Aug2017 is 0-160km/h.		junction box and one recorder cum indicator unit with micro controller containing FLASH EEPROM internal memory for calculating and recording the journey data. A portable FLASH memory card shall be used for external memory. Whenever speed exceeds 160 kmph, a beep sound should come to alert the driver of NETRA car.
57.	6.4.1	Starter Battery	'' ''	Battery should be procured from RDSO approved sources.	acceptable	Added as: Preferably any other auxiliary load shall not be connected to 24 V, 450 Ah cranking battery. Battery should be procured from RDSO approved sources.
58.	6.8.2	Head light	'' ''	The specification for Head light should be RDSO/2017/EL/SPEC/0134 , Rev-0 or latest revision.	acceptable	Added: Head light should be RDSO/2017/EL/SPEC/0134, Rev-0 or latest

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
				The specification for DC-DC converter should be ELRS/SPEC/CD-CD converter/0021, Rev-1, Sept 04 or latest.		revision. The specification for DC-DC converter should be ELRS/SPEC/CD-CD converter/0021, Rev-1, Sept 04 or latest.
59.	6.8.4	Flasher light	'' ''	The specification for Flasher light should be ELRS/SPEC/LFL/0017, Rev -1, Sept 04 or latest revision.	acceptable	added
60.	6.8,5	Marker Light	'' ''	The specification for Marker light should be ELRS/SPEC/PR/0022, Rev -1, Oct' 04 or latest	Already exist	-
61.	New advised	-	'' ''	The details of traction alternator, traction motors, type of transmission (AC-AC or AC-DC) system and Control System suitable for 160 kmph, requirement of Dynamic Brake is not specified in the draft specification. The requirement may be specified in the specification to furnish the comments pertaining to Electrical Controls.	As per final decision: The details of traction alternator, traction motors, type of transmission (AC-DC) system and Control System suitable for 160 kmph, requirement of Dynamic Brake is not specified in the draft specification.	As per advised, New clauses No. 4.2, 4.2.1 & 4.8, to 4.23 are added. Decided the type of transmission should be AC-DC.
62.	4.1-3	Parking Brake	Carriage Dte,	Parking Brake should fulfill the requirement of RDSO	Acceptable	Modified clause No. 4.1-3, Parking Brake shall

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
				Specification of parking brake system for EMU's, DMU's and self-propelled Vehicle's to spec No. C-K408		be provided as per standard. Parking brake should fulfill the requirement of RDSO Specification No. C-K408 (latest revision) capable of holding OHE recording car in un-Braked state on 1 in 33 down gradient under wet condition.
63.	3.1.6 (L)	Detection of Hard Spot	-	-	As per description of existing NETRA	added
64.	3.1.6 (M)	Checking of Cross- over and turn-out	-	-	As per description of existing NETRA	added
65.	3.1.6 (N)	Method for measurement of speed:	-	-	'' ''	added
66.	3.1.6 (O)	The method of measurement for distance run	-	-	'' ''	added
67.	3.1.6 (P)	Measurement of Voltage	-	-	'' ''	added
68.	3.1.6 (Q)	Video and audio recording of OHE Pantograph interaction	-	-	'' ''	added
69.	4.1-2 Purpose of use (applications)	The OHE Recording car shall have following features and	-	-	Added new parameters as per existing NETRA	Modification and added new parameters as under 5. Setting Distance/ Implantation.

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		shall be equipped for measuring and recording OHE parameters such as - 1. Stagger of contact wire 2. Height of contact wire 3. Thickness of contact wire 4. Gradient of the contact wire 5. Setting Distance 6. Contact Force 7. Loss of contact 8. Mast Identification System 9. Pantograph acceleration etc 10. Body Vertical Acceleration 11. Body lateral Acceleration				7. Pantograph acceleration Vertical 8. Pantograph acceleration Lateral 13. Hard Spots 14. Speed 15. Distance 16. Identification of Crossover/turnout 17. OHE Voltage 18. OHE Voltage Video & Audio Recording of OHE Pantograph interaction
70.	New point 4.1 (15)	New clause Acceptance Criteria of Vehicle	-	-	-	The acceptance of the vehicle for operation/working on Indian Railway Track shall be based upon

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
						stipulations given under the RDSO document named as "Third report of Standing Criteria Committee with latest revision/alteration."
71.	Added new clause 4.2	Diesel Engine and Transmission system	Motive Power Directorate, note dated 07.01.2019	The details of traction alternator, traction motors, type of transmission (AC-AC or AC-DC) system and Control System suitable for 160 kmph, requirement of Dynamic Breake is not specified in the draft specification. The requirement may be specified in the specification to furnish the comments pertaining to Electrical Controls.	-	The OHE Recording Car (NETRA) will have two independent diesel electric transmission systems, each comprising a diesel engine, an alternator along with its power rectifier, two traction motors mounted on one bogie, auxiliary alternators with their rectifier-cum regulator units, engine and traction controls, synchronised for operation from a common master controller from the driving cab(s). In case of failure of one of the transmission systems, provision shall be made so that the same can be isolated and the OHE car can still be worked at reduced power from the healthy transmission.
72.	Added	-	-	-	-	Detailed calculations

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
	4.2.1					shall be submitted along with tender indicating the power demand by the traction motors for different conditions and the demand on the power pack. These calculations shall indicate whether adequate reserve power has been provided. Characteristic curves for the Traction Alternator& Rectifier indicating the performance for different notch positions should be furnished. These curves, inter-alia, should indicate speed, BHP, power consumption by auxiliaries, excitation voltage and a.c. and d.c. currents. These characteristics should clearly indicate the extent of matching or mismatching of power.
73.	4.2.1	Diesel Engine	-			(Renumbered as 4.3.1) Modified as: The OHE Recording Car shall be powered by suitable capacity of proven make Cummins or equivalent or better, fuel efficient capable of

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
						<p>fulfilling the requirement of Specification.</p> <p>The OHE Recording Car shall be powered by two independent under slung type diesel engine of suitable capacity of proven make as per requirement of this specification.</p>
74.	4.2.8	The fuel tanks of adequate capacity shall be provided.	-	-	As per requirement of fuel tank	Modified as: Fuel tanks of adequate minimum 1500 Ltr. capacity shall be provided. However, if required, Number of fuel tank shall be decided during design approval stage.
75.	5.14.7	Staff Cabins: One air conditioned Cabin with four cushioned Berths and one air conditioned Cabin with two cushioned Berths shall be provided. The Cabins shall have separate entry and have windows on	-	-	Added new line: In addition, two folding berths shall be provided at suitable location without cabin.	Modified as Staff Cabins: One air conditioned Cabin with four cushioned Berths and one air conditioned Cabin with two cushioned Berths shall be provided. The Cabins shall have separate entry and have windows on both sides. The Cabins shall preferably be not over the wheels and made sound proof as far as possible. In

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		both sides. The Cabins shall preferably be not over the wheels and made sound proof as far as possible.				addition, two folding berths shall be provided at suitable location without cabin.
76.	5.14.8	Lavatory: One Indian style stainless steel WC with separate over head Tank, Stainless Steel Sink and other accessory fitting and a folding cushioned seat including shower with flexible Hose shall be provided. The WC shall be provided with an exhaust Fan. The lavatory shall be provided with pan as given in coach layout. The flooring in lavatories shall be provided with stainless steel	-	-	Amended.	Amended as- Lavatory: One Indian style stainless steel WC with separate over head Tank, Stainless Steel Sink and other accessory fitting and a folding cushioned seat including shower with flexible Hose shall be provided. The WC shall be provided with an exhaust Fan. The lavatory shall be provided with pan as given in coach layout. The flooring in lavatories shall be provided with stainless steel inlay fabricated out of stainless steel sheet to AISI 304. The inlay in lavatory with Indian Style lavatory shall be covered with single piece vinyl sheet to RDSO Schedule of

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		inlay fabricated out of stainless steel sheet to AISI-304. The inlay in lavatory with Indian Style lavatory shall be covered with single piece vinyl sheet to RDSO Schedule of Technical Requirement of flexible polyvinyl flooring used in coaching stock. RDSO/2006/CG-12 (latest version with all amendments), all joints shall be hot air welded to avoid seepage of water.				Technical Requirement of flexible polyvinyl flooring used in coaching stock. RDSO/2006/CG-12 (latest version with all amendments), all joints shall be hot air welded to avoid seepage of water.
77.	5.14.9	Provision of two Mobile Charging points to be made provided in each Cabins & working area and as well as one charging point in each both the driving	-	-	amended	Provision of two Mobile Charging points to be made provided in each Cabins & working area and as well as one charging point in each both the driving cab and working area. In addition, two folding berths shall be provided

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
		cab and working area. In addition, two folding berths shall be provided at suitable location without cabin.				at suitable location without cabin.
78.	Added New Chapter is Chepter-7	Testing and Inspection 7.1 Type testing 7.2 Acceptance tests 7.2.1 Performance Capability tests 7.2.2 Riding Quality tests 7.2.3 Emergency Breaking distance 7.2.4 track standards (track structure & permitted irregularities)	-	-	As decided by JDTI-1	Added in draft spec of NETRA-2, mentioned in red color please see.
79.	New clause added 4.2, 4.2.1, & 4.8 to 4.23 for Engine,	-	Motive Power	The details of traction alternator, traction motors, type of transmission (AC-AC or AC-DC) system and Control System suitable for 160 kmph, requirement	Acceptable AC-DC Traction System has been decided with two power packs. Accordingly,	New Clauses No. 4.2, 4.2.1, & 4.8 to 4.23 for Engine, TM, Tr. Alt., Rectifier, Control system etc. have been incorporated in draft spec. please see draft

S. No.	Clause No. of Spec.	Description (as per Draft Spec.)	Firm's Name	Firm's comment	View of TI Directorate, RDSO	Amended based on comments
	TM, Tr. Alt., Rectifier, Control system etc.			of Dynamic Breake is not specified in the draft specification. The requirement may be specified in the specification to furnish the comments pertaining to Electrical Controls.	new clauses have been added for Transmission system viz. Engine, Traction motor, Alternator, Rectifier etc.	spec. mentioned in red colour.
80.	New Chapter added Chapter-8	-	-	-	New Chapter-8 is added based on discussion.	Added. Mentioned in final Draft Spec of NETRA in Red Colour
81.	New Annexure-VIII is added	-	-	-	Based on discussion Annexure-VIII, Transmission system particulars are added	Mention in final Draft spec in Red colour.in Annexure-VIII
82.	New Annexure-IX is added	-	-	-	Based on discussion Annexure-VIII, Transmission system particulars are added	Mention in final Draft spec in Red colour.in Annexure-IX