Procurement of Plant for Clarifications - Design, Supply, Installation and Commissioning of 132kV Transmission Line Conductor Upgrading ICB: PMD/EGMP/TLUP-077/78-01

CLARIFICATION 1: ISSUED BY NEPAL ELECTRICITY AUTHORITY

S.N.	From	Section/Clause No.	Comment/Question of Bidder	NEA Reply
1	Vol-1	Section 2, ITB & BDS, Clause 18.6	made up of highly volatile material i.e. aluminum, we request employer to consider supply of conductor on Variable basis.	No changes in the PV clause
2	Vol-1	Section – 3, Clause1.3.4.1	Please Confirm. The Bidder shall furnish guaranteed AC resistance per km (Rac) at temperature corresponding to the continuous operating current of 550 (650) Amp for different conductor under normal condition in "Form FUNC" attached in Section - 4 "Bidding Forms". We understand that Continuous operating current will be 550 Amp for ACCC Bear Conductor & 650 Amp for ACCC Duck Conductor. Please confirm if our understanding is correct.	Confirm
3	Vol-1	Section – 3, Clause1.3.7	In the comparison of Bids, only the CIP price component of each Bid for the Plant and Equipment offered from outside the Employer's country shall be increased by 15%. Kindly Clarify criteria of defining domestically produced plant and equipment, i.e. how much minimum percentage of value must have been added to the offer plant and equipment to be considered as domestically produced.	In the comparison of Bids, only the CIP price component of eac Bid for the Plant and Equipment offered from outside the Employer's country vis a vis the equipment supplied from with Nepal shall be increased by 15%.
4	Vol-1	Section 3, Clause 2.4.1	Participation in at least two contracts that have been successfully or substantially completed within the last 10 (Ten) years and that are similar to the proposed contract, where the value of the Bidder's participation exceeds US\$ 13.0 Million. The similarity of the Bidder's participation shall be based on design, supply, installation and commissioning of 132 kV or higher voltage Transmission Line involving Conductor stringing length of 450 km AND/OR design, supply, installation, testing and commissioning of Conductor upgrading of 132 kV or higher voltage Transmission Line with minimum conductor length of 450 Km. We understand, conductor upgradation of these lines are to be done in Hot Condition i.e. while one circuit is being upgraded, second circuit will be charged, which make it highly skilled job, which needs tremendous experience in Hot Line stringing. However NEA has not asked any specific experience of Hot Line strining. We request you to please ask for specific experience is this regard.	No changes in EQC is envisaged

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5	Vol-1	Clause 2.5	The same must be validated by Notarized End User's Certificate issued by Utility. We request you to please relax requirement of Notarized documents, as COVID-19 has made public places high risk zones and visiting such places and arranging notarization is very challenging and risky task. Kindly accept our request of relaxing this requirement. However the requirement of notarizing the translated documents may remain there for the sake of authenticity.	No changes in EQC is envisaged
6	Vol - 1	Section 9, Appendix – 1, Payment Terms	HTLS Conductor shall be supplied and delivered in 3 (three) Lots (of equal quantity) and accordingly the Payment shall be made in 3 (three) installments. The payment for first Lot shall be made upon receipt of the invoice and shipping documents. The second lot of conductor shall be inspected and dispatched after the installation and testing of at least 60 % of HTLS conductor of the first lot has been completed. Similarly, the third lot of conductor shall be inspected and dispatched after the complete installation and testing of conductor of first lot and minimum 60 % of conductor installation and testing of the second lot.	
7			Please confirm following: - 1. We understand that Payment of second lot will be done only after testing of first circuit that is being strung. Please confirm if our understanding is correct. 2. We understand program of performance is schedule of Design, Supply, Installation Testing and Commissioning. Please confirm if our understanding is correct.	The NEA intends to install and charge the conductor section wise. The shutdown will be provided for daytime only, the cir shall be charged each day during peak hours. So, the paymen for the 2nd lot will be made when 60% of 1st Lot conductor is installed and charged. 2. Confirm
8	Vol - 2		existing ACSR conductor as mentioned above, Rerolling into a Drum and storing the dismantled conductor in NEA Local store or any other place designated by the Employer. The supply of the drums, if required shall be in the scope of the Contractors without any cost to NEA. Please Confirm Following: 1. Drums supplied for ACCC Conductor can be used for re-rolling of dismantled conducted. Please confirm if our understanding is correct. If Not please clarify of drums to supplied under the contract will be of Wooden, Steel or Hybrid. 2. Please identify location of store, where dismantled conductor and associated insulators are to be handed over to NEA. 3. Please confirm if dismantled insulators are to be	

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9	Vol - 2	Section -1, Clause 2.1.1	Supply of HTLS conductor along with all necessary accessories, hardware and fittings completely compatible for use in stringing of proposed HTLS conductor by replacing the existing one. Please Confirm Following: 1. We understand only live end (Line Side) of hardware fitting is to be supplied. Please confirm. 2. If completed set of hardware fittings is to be supplied. Please supplied please provide drawings of existing fittings.	1. All required hardware and fitting for HTLS conductor in transmission line and hardware and fitting required for upgrading of conductors in the switchyard shall also be provid. 2. The available drawings for substation equipment will be provided during DDE, else the contractor shall make the necessary site visit.
10	Vol – 2 & Vol 3	Section -1, Clause 2.1.1 and Item No. G of Price Schedule - 1	Supply of Insulators and hardware as much as the quantity required compensating the punctured and ageing insulators and hardware in the existing line. The insulators & hardware fittings (excluding clamps) if in good condition to be re-used. And All necessary accessories, hardware and fittings (Tension, suspension clamps, Connector etc.) required to complete the HTLS stringing works completely Request you to please quantify the aforementioned items instead of LOT.	The bidder is required to make the site visit and make their assessment, and quote accordingly.
11	Vol - 2	Section -1, Clause 2.1.1	Stringing of the HTLS conductor along with insulator, hardware fittings and other accessories required complete and commissioning of the line without changing / modification of existing transmission line structures and foundations. We understand in case of modification or replacement of members in existing structure will be paid separately as per item no. C.1 of price schedule no. 01. Please confirm.	Confirm
12	Vol - 2	Section -1, Clause 2.1.1	The scope also includes supply, delivery, installation and commissioning of Current Transformers in the AIS bays and GIS Bay (at Balaju) is required to be replaced with higher rated CT. Please Confirm Following: 1. Replacement of higher rating current transformer in GIS Bay (at Balaju) will be done at manufacturer's premises of GIS or at site.	The replacement work is to be done in existing GIS which is a working condition at site. The replacement work shall be done site.



Vol - 2		The scope includes supply, delivery and installation of all hardware and connectors required for transmission line and replacement of existing conductors of the switchyard in the respective line bays. 1. Request you to please provide drawings of existing clamps & fittings installed in substations, if drawings are not available, please confirm, shut down will be provided for sufficient time to measure the existing fitting.	Refer above
Vol - 2		substations, if drawings are not available, please confirm, shut down will be provided for	Refer above
		sufficient time to measure the existing fitting.	
Vol – 2	Section -1, Clause 2.3	Employer shall endeavor to provide the information, it shall not be binding for the Employer to provide the same. Please Confirm Make & Country of Origin of Existing equipment's in all substation, as same would be critical to understand the work to be done in relay setting after	various make of Relays installed in the substation, which includes AREVA, Siemens, Easun Reyrolle and ABB. The GIS installed at Balaju substation is of ALSTOM Make. Other details will be provided to successful bidders.
Vol - 2	Section-1, Clause 2.7	The Employer shall arrange shut down of one circuit at a time and the other circuit shall be kept under charged condition. The contractor shall de-string the existing conductor and restring the circuit with the HTLS conductor section by section and restore the line in original conditions as per program finalized in co-ordination with site. 1. We understand employer will provide shutdown in such a way that, contractor's resources will be utilized to full extent and no idiling will occur due to non availability of shutdown. Please confirm	Shutdown will be provided without delaus as far as possible No compensation is envisaged.
		compensate contractor for overheads and idiling. Please Confirm. For the critical lines where shutdown may not be availed easily, the bidder may use the	
Vol -2	Section -1, Clause 2.8	Employer but the installation of tower and reconductoring shall be done by the Contractor without any extra cost to employer. The bidder is required to include such cost in the respective items in the BPS.	The ERT is envisaged to be used in Kathmandu only.
	Vol - 2	Vol - 2 Section -1, Clause 2.7	Employer to provide the same. Please Confirm Make & Country of Origin of Existing equipment's in all substation, as same would be critical to understand the work to be done in relay setting after installation of current transformers. The Employer shall arrange shut down of one circuit at a time and the other circuit shall be kept under charged condition. The contractor shall de-string the existing conductor and restring the circuit with the HTLS conductor section by section and restore the line in original conditions as per program finalized in co-ordination with site. Vol - 2 Section -1, Clause 2.7 1. We understand employer will provide shutdown in such a way that, contractor's resources will be utilized to full extent and no idiling will occur due to non availability of shutdown. Please confirm 2. We understand, in case of non availability of timely shutdown, employer will compensate contractor for overheads and idiling. Please Confirm. For the critical lines where shutdown may not be availed easily, the bidder may use the ERT system for installation of HTLS conductor. Such ERT tower will be provided by the Employer but the installation of tower and reconductoring shall be done by the Contractor without any extra cost to employer. The bidder is required to include such



S.N.	From	Section/Clause No.	Comment/Question of Bidder	NEA Reply
17	Vol - 3	Price Schedule No. 1, Item No. B1 & B2	Design, manufacture, testing and Supply of Disc Insulators 70 KN with fittings & Design, manufacture, testing and Supply of Disc Insulators 120 KN with fittings. 1. We Understand above mentioned items are complete set of hardware fittings (Live Side & Non Live Side) along with Insulators. Please confirm if our understanding is correct. 2. If above mentioned items are not complete set i.e. including hardware fittings, then request you to please provide quantity of hardware fittings also.	It is complete set.
18		Price Schedule No. 1, Item No. G1	All necessary accessories, hardware and fittings (Tension, suspension clamps, Connector etc.) required to complete the HTLS stringing works completely. 1. We understand these are the quantities, which are to be installed in substation only and contractor has to assess them accordingly. Please confirm. If not then request you to please quantify hardware fittings quantity to be supplied under this contract.	Refer above



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19			We have quarries that the length of 132 kV transmission line is Circuit length or Conductor length?	
			Please clarify the above point so that we proceed further & start preparation of our offer.	Total Line Length is 900 Km. Please refer PSR.



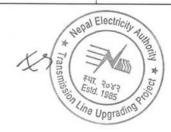
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Sr. No.	Clause No	Existing Clause	Change Requested / Clarification Requested	Remarks / Reason	NEA Reply
20	Volume II, Chapter	The HTLS Conductor shall be capable of providing the Ampacity of 1100 A for ACSR Bear equivalent HTLS conductor and 12500 A for Duck Equivalent HTLS conductor, not exceeding the maximum permissible operating temperature for continuous operation of the offered HTLS Conductor and without exceeding the level of maximum permissible sag indicated at normal condition.	Please amend as follows, The HTLS Conductor shall be capable of providing the Ampacity of 1100 A for ACSR Bear equivalent HTLS conductor and 1250 A for Duck Equivalent HTLS conductor, not exceeding the maximum permissible operating temperature for continuous operation of the offered HTLS Conductor and without exceeding the level of maximum permissible sag indicated at normal condition.	Please amend typo error.	Please refer the Amendment 1 issued
21	Volume II Chapter 4 - General Technical Requirement - HTLS Conductor Clause 1.2.1	Maximum permissible Conductor sag for 447m and 300m span respectively at steady state conductor temperature and nil wind corresponding to 50 Hz alternating current of 1100 Amperes and 780 Amperes per conductor respectively under ambient conditions specified above = Not exceeding the sag for existing ACSR type of Conductor or existing sag of line, whichever is lower.	Maximum permissible Conductor sag for 447m and 300m span respectively at steady state conductor temperature and nil wind corresponding to 50 Hz alternating current of 1100 Amperes and 1250 Amperes per conductor respectively under ambient conditions specified above = Not exceeding the sag for existing ACSR type of Conductor or existing sag of line, whichever is lower.	780 A Should be Replace by 1250 A	Please refer the Amendment 1 issued
22	Volume II Chapter 4 - General Technical Requirement - HTLS Conductor Clause 1.2.2	The UTS of conductor at ambient temperature and maximum continuous operating temperature shall be declared in the GTP. Further, UTS of conductor achieved at maximum continuous operating temperature shall not be less than 80% of UTS at ambient temperature declared in the GTP.	Please amend as follows; The UTS of conductor at ambient temperature and maximum continuous operating temperature shall be declared in the GTP. Further, UTS of conductor achieved at maximum continuous operating temperature shall not be less than 70% of UTS at ambient temperature declared in the GTP.	Please clarify UTS value at Elevated Temperature should be limited to 70% of the UTS. Reference to UTS & Stress-Strain test at Elevated Temp.	Please refer the Amendment 1 issued
23	Volume II Chapter 4 - General Technical Requirement - HTLS Conductor Clause 1.3	A. For ACSR Bear Equivalent. Max allowable sag for 1100A or maximum continuous safe operational temperature for 447 m ruling span = 10m or less than the existing sag	A.For ACSR Bear Equivalent. Max allowable sag for 1100A or maximum continuous safe operational temperature for 447 m ruling span = 12.595 m at 75 deg.C or less than the existing sag	Please Clarify the Existing Sag Requirement of ACSR Bear Conductor.	The bidder is required to perfrom the survey wexisting line, which includes measuring of existing. The HTLS conductor shall be strung constitue existing sag, and apply necessary tension vexceeding existing sag.



Sr. No.	Clause No	Existing Clause	Change Requested / Clarification Requested	Remarks / Reason	NEA Reply
24	Volume II Chapter 4 - General Technical Requirement - HTLS Conductor Clause 1.3	C.For ACSR DUCK Equivalent. Max allowable sag for 1250A or maximum continuous safe operational temperature for 300 m ruling span = 7.30m or less than the existing sag	C.For ACSR DUCK Equivalent. Max allowable sag for 1250A or maximum continuous safe operational temperature for 300 m ruling span = 6.88 m at 75 deg.C or less than the existing sag	Please Clarify the Existing Sag Requirement of ACSR Duck Conductor.	The bidder is required to perfrom the survey wexisting line, which includes measuring of existing. The HTLS conductor shall be strung constitue existing sag, and apply necessary tension wexceeding existing sag.
25	Volume II Chapter 4 – General Technical Requirement – HTLS Conductor Clause 1.4. Sag-Tension Requirements	Sag at designed maximum temperature (corresponding to max. specified temperature Amperes and ambient conditions specified at 1.2.1) = Lower of value of Standard sag for existing ACSR conductor for specified span @ 75DegC and measured sag of existing line @ specified span.	Sag at designed maximum temperature (corresponding to max. specified temperature Amperes and ambient conditions specified at 1.2.1) = Lower of value of Standard sag for existing ACSR Bear & ACSR Duck conductor for specified span @ 75DegC (i.e 12.595 m & 6.883 m Respectively) and measured sag of existing line @ specified span.	Please Clarify and Include the Sag Limitation Value.	Please refer above
26	Clause 1.4	Tension at following wind pressure: - Tension at 32 deg C, full wind (166.8kg/m2) = < Tension of existing Conductor ≤ not exceeding 70% of UTS of proposed conductor	ACSR Bear Conductor (6812 Kg) ≤ not exceeding 70%	Please Clarify and Include the Tension Value Correspondence to Existing Conductor at 32FW.	Please refer the Amendment 1 issued
27	Volume II Chapter 4 — General Technical Requirement — HTLS Conductor Clause 1.6.2	Core Wires There shall be no joint of any kind in the finished wire entering into the manufacture of the strand. There shall also be no joints or splices in any length of the complete stranded core.	Please add following; There shall be no joint of any kind in the finished wire entering into the manufacture of the strand. There shall also be no joints or splices in any length of the complete stranded core. For composite core wires, during the production run, splicing of the galvanic protection barrier is allowed, provided diameter specifications are maintained.	Please refer NEA tenders, NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 KB/ICB/TL/076/77-01 As per section 19 of ASTM B987	Please refer the Amendment 1 issued



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	Requirement –	Loading Average Ohmic loss (kW) = Total Length x (550)2 x Rac/1000	2. Average Ohmic loss (kW) = Total Length x (650)2 x Rac/1000. 1. Total Length: 2. Total Length:	Kindly Share the Total Length to be	Total length as per the BPSwill be considered respective conductor type
29	Volume II, Chapter – 04, Clause 1.8 – Materials, Sub Clause 1.8.2 – Core,	Where composite material for core is offered, the material shall be either of High strength grade or extra high strength grade as per ASTM B987.	strength grade as per ASTM B987. The offered	Non conductivity Galvanic Protection Barrier Layer requirement added as per recently updated ASTM B987/B987M-20, section 3.1.5	Please refer the Amendment 1 issued
30		c) Radio interference voltage test (dry)	e) Radio interference voltage test (dry) d) Corona extinction voltage test (dry)	This Test is applicable for conductor 220 kV and above.	Shall be waived if not applicable during DDE.
31	Volume II Chapter 4 – General Technical Requirement – HTLS Conductor Clause 2.1.2	required to be carried out if a valid test certificate is available for the offered design, i.e., tests conducted earlier should have been conducted in accredited laboratory (accredited based on ISO/IEC guide 25/17025 or EN 45001 by the National Accreditation body of the country where laboratory	Type tests specified under Clause 2.1.1 shall not be required to be carried out if a valid test certificate is available for the offered design, i.e., tests conducted earlier should have been conducted in accredited laboratory (accredited based on ISO/IEC guide 25/17025 or EN 45001 by the National Accreditation body of the country where laboratory is located) or witnessed by the representative (s) of POWERGRID or Utility. In the case of composite core conductors, the tests specified under Clause 2.1.1 (ii) shall be carried out before stranding on at-manufactured samples.	ASTM B987 says all test on composite core to be performed before stranding on as manufactured conditions. Please refer past NEA tenders, NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 KB/ICB /TL/076/77- 01 ICB/PMD/MCTLP/018/19-01	S Please refer the Amendment 1 issued
32	Requirement –		To Be Read As: 2.2 Acceptance Tests s) Bending test on polymer composite core t) Galvanic Protection Barrier Layer Thickness test (on polymer composite core) As per ASTM B987	Typographical Mistake in Sr.NO & reference Standard to be consider for Test.	Please refer the Amendment 1 issued

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33	Volume II Chapter 4 – General Technical Requirement – HTLS Conductor Clause 2.2	Note: All the above tests except (m) shall be carried out on Aluminium Alloy and core / core strands after stranding only	Please add follows, For composite core (i) is not applicable and (c), (g), (h), (o), (p), (t) and (u) shall be carried out before stranding. The testing and requirements listed in this specifications are based on as manufactured properties of the materials. If tests on strands or core materials are made after field exposure, the Employer and the Manufacturer should agree on the properties to be met.	ASTM B987 says all test on composite core to be performed before stranding on as manufactured conditions. Please refer past NEA tenders, NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 KB/ICB /TL/076/77-01 ICB/PMD/MCTLP/018/19-01	Please refer the Amendment 1 issued
34	Volume II, Chapter – 04, Annexure A, Clause – 1.1 UTS test on Stranded Conductor,	b) UTS Test on Stranded Conductor at elevated temperature UTS Test on Stranded Conductor shall be conducted as per clause no. 1.1(a) specified above keeping conductor temperature at the designed maximum temperature.	Please amend as follows, b) UTS Test on Stranded Conductor at elevated temperature UTS Test on Stranded Conductor shall be conducted as per clause no. 1.1(a) specified above keeping conductor temperature at the designed maximum temperature. UTS for this test shall be 70% of the UTS guaranteed in GTP.	As this test requirement was not present in following past tenders of NEA so request to remove the same or amend UTS requirement to 70%. NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 KB/ICB /TL/076/77-01 ICB/PMD/MCTLP/018/19-01	Please refer the Amendment 1 issued
				Evaluating Stress Stain behaviour at Elevated Temperature does not provide information on how the conductor will perform when operating above the conductor's thermal knee and as it approaches its maximum operating temperature. When the conductor temperature climbs above the thermal knee point all remaining tensile load on the conductor will be on the core. From this temperature and above, only the core will carry the load. Because of this, the	



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35	Volume II Chapter 4 – General Technical Requirement – HTLS Conductor Annexure-A Clause 1.5	Stress-strain test at elevated temperature Stress-strain test as per IEC-61089 shall be conducted keeping conductor temperature at designed maximum temperature. UTS for this test shall be 80% of the UTS guaranteed in the GTP	Please amend as follows; Stress-strain test as per IEC-61089 shall be conducted keeping conductor temperature at designed maximum temperature. UTS for this test shall be 70% of the UTS guaranteed in the GTP	aluminium has no influence on the high temperature sag of the conductor from the thermal knee point temperature and upward. When performing this testing at temperatures in excesses of the calculated thermal knee point, the strength of the conductor should take into account two factors: 1) The aluminium will lose potentially up to 60% of its rated strength as the test temperatures approach the maximum use temperature of the conductor. Thus, the aluminium will not carry any load until very high levels of stress when at high temperatures. 2) For the composite cores, the strength can be ~80% of the ambient strength as the test temperatures approach the conductor's maximum use temperature. As a result of these two factors, the strength of the conductor at its maximum use temperature should be rated at 70% of the ambient strength A better alternative to adjusting the protocol is to remove the test because it does not model a situation that occurs in operation: High temperature and high loads	Please refer the Amendment 1 issue



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866	Volume II, Chapter – 04, Annexure A, Clause – 1.6 – High Temperature Endurance and Creep test	(ii)On other conductor sample, the conductor temperature shall be increased to designed maximum temperature steps of 20 deg. C and thermal elongation of the conductor sample shall be measured & recorded at each step. The temperature shall be held at each step for sufficient duration for stabilization of temperature. Further, the temperature of the conductor shall be maintained at designed maximum temperature +10 Deg. C for 1000 hours. The elongation/creep strain of the conductor during this period shall be measured and recorded at end of 1 hour, 10 hour, 100 hour and subsequently every 100 hour upto 1000 hours time period. After completion of the above, the core of the conductor sample shall be subjected to UTS test as mentioned above at clause 1.1. The conductor core shall withstand a load equivalent to 95 % of UTS. In case of polymer composite core conductor, the flexural strength & glass transition temperature of the core shall also be evaluated and the same shall not be degraded by more than 10 % over the initial value. The supplier shall plot the thermal elongation with temperature.	Please amend as follows, (ii)On other conductor sample, the conductor temperature shall be increased to designed maximum temperature steps of 20 deg. C and thermal elongation of the conductor sample shall be measured & recorded at each step. The temperature shall be held at each step for sufficient duration for stabilization of temperature. Further, the temperature of the conductor shall be maintained at designed maximum temperature (±2.5 Deg. C) for 1000 hours. The elongation/creep strain of the conductor during this period shall be measured and recorded at end of 1 hour, 10 hour, 100 hour and subsequently every 100 hour upto 1000 hours time period. After completion of the above, the core of the conductor sample shall be subjected to UTS test as mentioned above at clause1.1. The conductor core shall withstand a load equivalent to 95 % of UTS. In case of carbon-fibre-composite core conductor, the flexural strength & glass transition temperature of the core shall also be evaluated and the same shall not be degraded by more than 10 % over the value guaranteed in GTP. The supplier shall plot the thermal elongation with temperature.	Please refer past NEA tenders, NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 KB/ICB /TL/076/77-01 ICB/PMD/MCTLP/018/19-01 Degradation of Flexural Strength and Glass transition temperature values should be checked with respect to values specified by bidder in GTP and not with respect to initial values. Please refer past NEA tenders,	As per the specification
37	Volume II, Chapter – 04, Annexure A, Clause – 1.7 – Sheave test	The conductor sample of minimum length of 35 meter shall be tensioned at 25 % of the UTS and shall be passed through pulleys having diameter of 32 times that of the conductor with angle of 20 deg. between the pulleys. The conductor shall be passed over the pulleys 36 times a speed of 2 m/sec. After this test UTS test on the conductor shall be carried out as mentioned above at clause 1.1. In case of polymer composite core conductors, the core shall be inspected for any sign of damage or cracking through dye penetration test as per ASTM D5117 / ASTM B987 section 14. Dye penetrant exposure time shall be 30 +1/-0 minutes.	Please amend as follows. The conductor sample of minimum length of 35 meter shall be tensioned at 22 % of the UTS and shall be passed through pulleys having diameter of 32 times that of the conductor with angle of 20 deg. between the pulleys. The conductor shall be passed over the pulleys 36 times a speed of 2 m/sec. After this test UTS test on the conductor shall be carried out as mentioned above at clause 1.1. In case of polymer composite core conductors, the core shall be inspected for any sign of damage or cracking through dye penetration test as per ASTM D5117 / ASTM B987 section 14. Dye penetrant exposure time shall be 30 +1/-0 minutes.	NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 KB/ICB /TL/076/77-01 ICB/PMD/MCTLP/018/19-01 Installation tension is not going to be as high as initial tension hence please amend the test tension to 22%	Please refer the Amendment 1 issued
		time shall be 30 +1/-0 minutes.	time shall be 30 +1/-0 minutes.	* Transmission	al Electricity authority with Royal Solid 1985

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Volume II, Chapter – 04, Annexure A, Clause – 1.12 – Temperature Cycle Test Should r Glass Timore the strength procedura filer the		In case of polymer composites, the flexural strength should not degrade by more than 10 % and the Glass Transition temperature shall not degrade by more than 10 % after thermal cycling. Flexural strength shall be obtained on the basis of test procedure indicated at 1.32 below. The value of Tg after the test, shall however, in no case be less than the design maximum temperature of conductor.	Please amend as follows, In case of carbon-fibre composites, the flexural strength should not be less than 90% of the value guaranteed in GTP and the Glass Transition temperature shall not be less than 90% of the value guaranteed in GTP after thermal cycling. Flexural strength shall be obtained on the basis of test procedure indicated at 1.32 below.	Please remain requirement as per original tender clause. Degradation of Flexural Strength and Glass transition temperature values should be checked with respect to values specified by bidder in GTP and not with respect to initial values.	Please refer the Amendment 1 issued	
39	Requirement – HTLS Conductor Annexure-A Clause 1.16	Coefficient of linear expansion for core/core strands The temperature and elongation on a sample shall be continuously measured and recorded at interval of approximately 15 degree C from 15 degree C to designed maximum temperature corresponding to rated current(1200A)by changing the temperature by suitable means. Coefficient of linear expansion shall be determined from the measured results.	Please amend as follows; The temperature and elongation on a sample shall be continuously measured and recorded at interval of approximately 15 degree C from Laboratory Ambient Temp to designed maximum temperature corresponding to rated current (1100 A & 1250 A) by changing the temperature by suitable means. Coefficient of linear expansion shall be determined from the measured results.	Please correct test ampere from 1200A to 1100 & 1250 A and confirm the Initial/starting Temperature to be consider as laboratory ambient temperature.	Please refer the Amendment 1 issued	



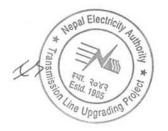
Sr. No.	Clause No	Existing Clause	Change Requested / Clarification Requested	Remarks / Reason	NEA Reply
40	Volume II, Chapter – 04, Annexure A, Clause – 1.24 – Torsion and Elongation tests on Composite Core/INVAR core	ii) Torsion Test: The purpose of the testis to determine the resilience of the composite core to twisting and to show that after the composite core has experienced the prescribed twisting, it will not crack or have a loss in tensile strength due to the twisting. A sample length that is 170 times the diameter of the composite core being tested is mounted in the gripping fixtures. One grip shall then be fixed so that it does not twist, and the other end shall be twisted a full 360 degrees and then fixed in this position for 2 minutes. Once the twist time is completed, the core is untwisted an inspected for any crazing or other damage. If no damage is observed, the composite core is then tensile tested to failure and the final load recorded. For the test to be accepted, the composite core must withstand at least 100% of its rated tensile strength. Two samples need to be completed in order to satisfy the testing requirement.	diameter of the composite core being tested. For core	NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 Please clarify gauge length and twist degree if sample is smaller than specified.	Please refer the Amendment 1 issued
41	Volume II, Chapter – 04, Annexure A, Clause – 1.32	Flexural Strength Test (for carbon-fibre composite core only) Test method shall be as per ASTM D7264, ASTM D4475 or ISO 14125. The flexural strength shall not be less than the value guaranteed in the GTP	Please amend as follows, Test method shall be as per ASTM D7264, ASTM D4475 or ISO 14125. The guaranteed average minimum value before stranding shall be listed in the GTP.	Please refer past NEA tenders, NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 KB/ICB/TL/076/77-01 The manufacturer shall state what the average minimum guaranteed value is in the GTP	As per the specification



Sr. No.	Clause No	Existing Clause	Change Requested / Clarification Requested	Remarks / Reason	NEA Reply
42	Volume II, Chapter – 06, Annexure A, Clause 1.6	deg. C above designed maximum operating temperature of the conductor. ii) Number of cycle: 100 iii) Slip strength test shall also be carried out after heating cycle test	i) Temperature of conductor during each cycle: 40 deg. C above designed maximum operating temperature of the conductor but not to exceed the maximum Continuous Operating temperature of the conductor.	Please refer NEA tender, NCB/BBP/CC/TL-076/77-02 NCB/BBP/Re/TL-076/77-01 KB/ICB /TL/076/77-01 (Refer addendum) The protocol as written could force conductors to be subjected to temperatures in excess of their emergency temperatures. Please amend this protocol to ensure that the conductor is not subjected to a temperature in excess of the emergency temperature that may cause a failure of the hardware test.	As per the specification
43	Tower Schedule and KMZ for all lines			Please provide the tower schedule and KMZ files for all lines.	Attached.
44	Terrain details for all lines			Please provide the terrain details for all lines	Data not avialable.
45	ROW Scope	ROW Scope		Please clarify whether ROW is in contractor's scope or employer's scope.	The work is to be done in the existing line, so issue may not arise.
46	Work Visa or process	Work Visa or process		If we deploy manpower & labour from India in that case where	Will be assisted
47	Shut Down	Shut Down		Please confirm that shut down will be available in hours basis or day basis or continuously.	Please refer PSR. The shutdown will be provid day tim, the line shall be recharged during pea hoursi.e. evening time.
48				Please clarify whether electrical license, labour license & other compulsory compliances we have to fulfil during project execution.	Yes



Sr. No.	Clause No	Existing Clause	Change Requested / Clarification Requested	Remarks / Reason	NEA Reply
49	Vol I, Clause No. 11,Pg.16	In the case of a bid submitted by a Joint Venture, the Bid shall include a copy of the Joint Venture Agreement entered into by all partners. Alternatively, a Letter of Intent to execute a Joint Venture Agreement in the event of a successful bid shall be signed by all partners and submitted with the Bid, together with a copy of the proposed agreement.		There is no JV agreement format and letter of intent format given in tender document. Please confirm the same.	The format are not part of the bid document. T bidder may submit the J/V agreement and Lett intent for J/V considering the requirement of the document.
50	Vol-II Chapter IV Annexure A	Type test reports	All the type tests should have been carried out as specified in Vol-II Chapter IV Annexure A within the last 5 years.	All the type tests should have been carried out as specified in Vol-II Chapter IV Annexure A within the last 5 years. But Type Validity Prescribed in CEA Guideline is valid for 7 years. Please clarify.	Please refer EQC
51			In order to conduct a preliminary assessment of the route, and in the view of the current constraints to immediate travel, it would be very helpful to have access to the tower schedule for the entire route(s) under consideration. May I please request you to help in providing a soft copy of the tower schedule for the lines referenced in the tender?		Will be provided if available.



Procurement of Plant for Clarifications - Design, Supply, Installation and Commissioning of 132kV Transmission Line Conductor Upgrading ICB: PMD/EGMP/TLUP-077/78-01

CLARIFICATION 1: ISSUED BY NEPAL ELECTRICITY AUTHORITY

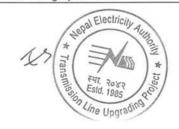
Sr. No.	Clause No	Page No.	Change Requested / Clarification Requested	Remarks / Reason	NEA Reply
52	Volume I Section 3	2_11	If the bidder submits the type test report of higher rated equipment, the bidder must provide the commitment that the type test will be performed without any extra cost to employer.	Bidder's understanding the type test for equipment will be accepted if bidder submit the type report of higher rated equipment in bidding phase with commitment that the type test for the offered technology and size of equipment will be carry out after contract awarded.	Confirmed
53				Bidder ask client to provide the existing poles structure list, and Profile drawing and existing tower drawing.	Tower span data is attached
54				Bidder ask client to provide the layout of existing GIS substation and AIS substation.	will be provided to successful bidder
55	Volume II R1 Chapter 1 -2.8	1_4	For the critical lines where shutdown may not be availed easily, the bidder may use the ERT system for installation of HTLS conductor. Such ERT tower will be provided by the Employer but the installation of tower and reconductoring shall be done by the Contractor without any extra cost to employer. The bidder is required to include such cost in the respective items in the BPS.	RT system for installation of over will be provided by the ower and reconductoring shall ut any extra cost to employer. We such cost in the respective	
56	Volume II R1 Chapter 1 -2,11-X	1_3	The scope includes supply, delivery and installation of 132kV XLPE 1000 sq.mm Cu cable with all termination for termination into existing ALSTOM make GIS including all accessories complete at Balaju Substation	Bidder ask client to provide the detailed information of exsiting ALSTOM GIS, like Model Number.	will be provided to successful bidder



Procurement of Plant for Clarifications - Design, Supply, Installation and Commissioning of 132kV Transmission Line Conductor Upgradin ICB: PMD/EGMP/TLUP-077/78-01

CLARIFICATION 1: ISSUED BY NEPAL ELECTRICITY AUTHORITY

SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
57	Volume I, Section 7 - GCC	10. Employer's Responsibilities	As per Clause 10.2 The Employer shall be responsible for acquiring and providing legal and physical possession of the Site and access thereto, and for providing possession of and access to all other areas reasonably required for the proper execution of the Contract, including all requisite rights of way. From the above we understand that the compensation for arranging Right of way, damages during construction work in Right of way and Temporary Access Road, Tree felling & Compensation in Forest & Non Forest area shall be arranged by the Owner Please Confirm.	The NEA will be respobsible for any compensation. E cost for any damages, breakages, dismantling work, temporary access road shall be in the contractor's so No extra payment will be made. However, NEA will a the contractor for any permissions etc.
58	Volume II, Chapter-1	Project specific requirement (PSR) - Content - Annexure -I, List of drawing	Owner. Please Confirm. Referred annexure is not available in the bidding documents. Please check and furnish the following drawings of each station which is involved under the present scope: a) Single line diagram b) Overall layout c) Control building layout d) Earthing layout e) Cable trench layout (Indoor and Outdoor)	The work involved in substation is minimum, so no drawings has been attached. Please visist the sites in required.
59	Volume II, Chapter-1	Project specific requirement (PSR)	As per Clause No. 1.2.1, Sl. No. g - with upgrading of CT, Connectors and accessories Please clarify the following regarding CT upgradation: a) Whether existing CT junction box can be reused? b) Whether existing LT cables between CT to CT junction box can be reused? c) Whether existing LT cables from junction box to Control & relay panel need to be replaced? d) Whether existing CT terminal connector can be reused? e) Whether existing connection between CT & adjacent equipment need to be replaced by new conductor or Al Tube? Else existing connection can be reused?	The cotractor can use any reuasable cable, junction boxes such as exiswting system function is not afec The existing system shall be restored to as it is conditional to the conditional conditions are conditional to the conditional conditions are conditional conditional conditions.



			Reply (NEA)
Volume II, Chapter-1	Project specific requirement (PSR)	As per Clause No. 2.1.1, Sl. No. XI. "Currently, the busbar protection at the substations are rated for 600/1A. The busbar relays used in most substations are static type. Therefore, the integration arrangement shall be provided to integrate the new HTLS line with CT into the busbar protection. The bidder is required to include all such cost in the price quoted for installation of Current Transformer and conductors".	The existing busbar protection at Pathlaiya (decentra Numerical), Chandranigahpur (Numerical), Dhalkeba (Static), Duhabi (static) required to be modified after new CT is replaced, so contractor is required to do the modification works as required.
		Please elaborate the scope of work regarding busbar protection augmentation.	
Volume II, Chapter-1	Project specific requirement (PSR)	As per Clause No. 2.1.1, Sl. No. XI. Please furnish the following details of existing busbar protection of each station involved in the present scope: a) Make & model no. of busbar protection b) Type of busbar protection - Centralised or Decentralised.	Refer above
Volume II, Chapter-1	Project specific requirement (PSR)	As per Clause No. 4.2, Altitude above sea level: We understand that Pathlaiya, Chandranigahpur, Dhalkebar, Inerwa, Kusaha, Duhabi Substation are 440m above MSL and Balaju, Suichatar and Teku substation are 1440m above MSL.	Confirm
	Volume II, Chapter-1	Volume II, Project specific requirement (PSR) Volume II, Project specific requirement (PSR) Volume II, Project specific	Volume II, Chapter-1 Project specific requirement (PSR) Project



SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
63	Volume II, Chapter-1	Project specific requirement (PSR) -	As per Clause No. 4.2 - Altitude above sea level: We understanding from referred specification, the following are the stations where the upgradation / augmentation work need to be carried out: a) Pathalaiya b) Chandranigahpur c) Dhalkebar d) Inerwa e) Kusaha f) Duhabi g) Suichatar h) Teku i) Balaju However, as per Chapter 1 - Project Specific Requirement (PSR), Clause No. 1.2.1, it is mentioned that this specification covers the execution of Upgradation of following lines: a. Suichatar - Matatirtha ~5 Km DC ACSR Bear b. Suichatar - Balaju ~4 Km SC ACSR Duck c. Suichatar - Teku ~4.5 Km DC ACSR Bear e. Pathlaiya - Dhalkebar ~102 Km DC ACSR Bear f. Kushaha Duhabi ~28 Km DC (string of this line on one Ckt) ACSR Bear As the substation locations are contradicting between above specification clauses, please check and confirm where the upgradation / augmentation work need to be	a) Pathalaiya b) Chandranigahpur c) Dhalkebar d) Inerwa (new substation under construction) e) Kusaha (Switching station, S/S under construction) f) Duhabi g) Suichatar h) Teku i) Balaju j) Matatirtha
64	Volume II, Chapter-1	Project specific requirement (PSR)	As per Clause No. 7.0 Order of precedence: In case of discrepancy between price schedule, project specification requirement & Tender drawings, Please clarify the order of precedence. b) In case of discrepancy between , Vol.II, Chapter 11: Technical Data Sheet and individual technical specification, Please clarify the order of precedence	Both will supplement each other as per the site requirment, such as to sucessfully complete the scowork.
65	Volume II, Chapter-1	Project Specific Requirement (PSR)	As per Clause No. 8.0 & 9.0: Spares & Special tools - Please furnish the mandatory spare list & Special tool if required.	Tools list for HTLS conductor is attached.



SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
66	Volume II, Chapter-2	General Technical Requirement	As per Clause No.2 9.2: Type Test Report - In case of instrument transformers, the following type tests should have been conducted within 5 (five) years prior to the originally Scheduled date of bid opening. i) Lightning Impulse Test ii) Switching Impulse Test iii) Multiple Chopped Impulse Test (For CT) iv) Chopped Impulse Test (For CVT) However, as per Vol.I, Section 3 - Evaluation and Qualification Criteria, Item No. 4 - 132 kV Current Transformer, "Must submit the type test report carried out in Internationally accredited independent testing laboratory over last 7 (seven) years" In this regard, Please check and confirm the validly of type test reports.	As per the EQC.
67	Volume II, Chapter-3	General Technical Requirement, Instrument Transformer	[- 18 - 18 - 18 - 18 - 18 - 18 - 18 - 1	The CT rating and ratio will be decided during detail engineering.
68	Volume II, Chapter-3	General Technical Requirement, Instrument Transformer	As per referred Table - 1A - Requirement of 145kV Current transformer: Accuracy class & VA burden of metering core is 0.2s and 20VA respectively. However, As per Vol.II, Section-11, Technical data sheet of outdoor oil filled CT & GIS type CT, accuracy class & VA burden are mentioned as 0.5 & 30VA respectively. As the above clauses are contradicting, please check and furnish the actual requirement.	The accuracy class and burden shall be 0.2 and 20V
69	Volume II, Chapter-3	General Technical Requirement, Instrument Transformer	However, extended primary current of current transformer is not mentioned in Chapter-1. In this regard, Please check and specify the extended primary current for AIS type CT and GIS type CT.	
70	Volume II, Chapter-3	General Technical Requirement, Instrument Transformer	As per Clause No. 6.2 (a), report for Seismic withstand shall be required for current transformer. We understand Seismic calculation & analysis report need to be	Confirm Negal Electricity August 1

SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
71	Volume II, Chapter-4	Annexure A		Please refer amendment 1 issued.
72	Volume II, Chapter-4	Volume II, Chapter – 04, Annexure A,	As per Clause No. 1.12 – Temperature Cycle Test: In case of polymer composites, the flexural strength should not degrade by more than 10 % and the Glass Transition temperature shall not degrade by more than 10 % after thermal cycling. Flexural strength shall be obtained on the basis of test procedure indicated at 1.32 below. The value of Tg after the test, shall however, in no case be less than the design maximum temperature of conductor. Please amend as follows, In case of carbon-fibre composites, the flexural strength should not be less than 90% of the value guaranteed in GTP and the Glass Transition temperature shall not be less than 90% of the value guaranteed in GTP after thermal cycling. Flexural strength shall be obtained on the basis of test procedure indicated at 1.32 below.	Please refer amendment 1 issued.
73	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 1.16: The HTLS Conductor shall be capable of providing the Ampacity of 1100 A for ACSR Bear equivalent HTLS conductor and 12500 A for Duck Equivalent HTLS conductor, not exceeding the maximum permissible operating temperature for continuous operation of the offered HTLS Conductor and without exceeding the level of maximum permissible sag indicated at normal condition. Request you to amed the typo error of 12500 A to 1250 A.	Please refer amendment 1 issued.



SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
74	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor Annexure-A	As per Clause No. 1.16: Coefficient of linear expansion for core/ core wires - Coefficient of linear expansion for core/core strands The temperature and elongation on a sample shall be continuously measured and recorded at interval of approximately 15 degree C from 15 degree C to designed maximum temperature corresponding to rated current(1200A)by changing the temperature by suitable means. Coefficient of linear expansion shall be determined from the measured results. Please correct test ampere from 1200A to 1100 & 1250 A and confirm the Initial/starting Temperature to be consider as laboratory ambient temperature. Please amend as follows; "The temperature and elongation on a sample shall be continuously measured and recorded at interval of approximately 15 degree C from Laboratory Ambient Temp to designed maximum temperature corresponding to rated current (1100 A & 1250 A) by changing the temperature by suitable means. Coefficient of linear expansion shall be determined from the measured results."	Please refer amendment 1 issued.
75	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 1.2.1: Maximum permissible Conductor sag for 447m and 300m span respectively at steady state conductor temperature and nil wind corresponding to 50 Hz alternating current of 1100 Amperes and 780 Amperes per conductor respectively under ambient conditions specified above = Not exceeding the sag for existing ACSR type of Conductor or existing sag of line, whichever is lower.	Please refer amendment 1 issued.
76	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 1.2.2: The UTS of conductor at ambient temperature and maximum continuous operating temperature shall be declared in the GTP. Further, UTS of conductor achieved at maximum continuous operating temperature shall not be less than 80% of UTS at ambient temperature declared in the GTP. Please clarify UTS value at Elevated Temperature should be limited to 70% of the UTS. Reference to UTS & Stress-Strain test at Elevated Temperature.	Please refer amendment 1 issued.



SI. No.	/ Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
77	Volume II, Chapter-4	Annexure A Clause – 1.24 – Torsion and Elongation tests on Composite Core/INVAR core	composite core to twisting and to show that after the composite core has experienced the prescribed twisting, it will not crack or have a loss in tensile strength due to the twisting. A sample length that is 170 times the diameter of the composite core being tested is mounted in the gripping fixtures. One grip shall then be fixed so that it does not twist, and the other end shall be twisted a full 360 degrees and then fixed in this position for 2 minutes. Once the twist time is completed, the core is untwisted an inspected for any crazing or other damage. If no damage is observed, the composite core is then tensile tested to failure and the final load recorded. For the test to be accepted, the composite core must withstand at least 100% of its rated tensile strength. Two samples need to be completed in order to satisfy the testing requirement. Please clarify gauge length and twist degree if sample is smaller than specified gauge length. Please amend as follows, ii) Torsion Test: The purpose of the testis to determine the resilience of the composite core to twisting and to show that after the composite core has experienced the prescribed twisting, it will not crack or have a loss in tensile strength due to the twisting. For Standard and High Strength Grade composite cores as per ASTM B987 Table 2, samples should be long enough to have a gauge length between the gripping fixtures 170 times the diameter of the composite core being tested. For core lengths less than 170 times the core OD, rotate the core to maintain the same rotation to length ratio. For Extra High Strength Grade composite core as per ASTM B987 Table 2, samples should be long enough to have a gauge length between the gripping fixtures that is 340 times the diameter of the composite core being tested. For core lengths less than 340 times the core OD, rotate the core to maintain the same rotation to length	Please refer amendment 1 issued.
78	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 1.3: A.For ACSR Bear Equivalent. Max allowable sag for 1100A or maximum continuous safe operational temperature for 447 m ruling span = 10m or less than the existing sag Max allowable sag for 1100A or maximum continuous safe operational temperature for 447 m ruling span = 12.595 m at 75 deg.C or less than the existing sag. Please Clarify the Existing Sag Requirement of ACSR Bear Conductor.	Please refer amendment 1 issued.

SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
79	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 1.3: C.For ACSR DUCK Equivalent. Max allowable sag for 1250A or maximum continuous safe operational temperature for 300 m ruling span = 7.30m or less than the existing sag Max allowable sag for 1250A or maximum continuous safe operational temperature for 300 m ruling span = 6.88 m at 75 deg.C or less than the existing sag. Please Clarify the Existing Sag Requirement of ACSR Duck Conductor.	Please refer amendment 1 issued.
80	Volume II, Chapter-4	Annexure A Clause – 1.32	Flexural Strength Test (for carbon-fibre composite core only) Test method shall be as per ASTM D7264, ASTM D4475 or ISO 14125. The flexural strength shall not be less than the value guaranteed in the GTP The manufacturer shall state what the average minimum guaranteed value is in the GTP Please amend as follows, "Test method shall be as per ASTM D7264, ASTM D4475 or ISO 14125. The guaranteed average minimum value before stranding shall be listed in the GTP".	Please refer amendment 1 issued.
81	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 1.4: Sag-Tension Requirements - Sag at designed maximum temperature (corresponding to max. specified temperature Amperes and ambient conditions specified at 1.2.1) = Lower of value of Standard sag for existing ACSR conductor for specified span @ 75DegC and measured sag of existing line @ specified span. ACSR Bear & ACSR Duck conductor for specified span @ 75DegC (i.e 12.595 m & 6.883 m Respectively) and measured sag of existing line @ specified span. Please Clarify, and Include the Sag Limitation Value.	Please refer amendment 1 issued.
82	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	Clarify and Include the Saq Limitation Value. As per Clause No. 1.4: Sag-Tension Requirements - Tension at following wind pressure: Tension at 32 deg C, full wind (166.8kg/m2) = < Tension of existing Conductor ≤ not exceeding 70% of UTS of proposed conductor. Please Clarify and Include the Tension Value Correspondence to Existing Conductor at 32FW. Tension at following wind pressure: Tension at 32 deg C, full wind (166.8kg/m2) = < Tension of existing ACSR Bear Conductor (6812 Kg) ≤ not exceeding 70% of UTS of proposed conductor & = < Tension of existing ACSR Duck Conductor (5586 Kg) ≤ not exceeding 70% of UTS of proposed conductor	Please refer amendment 1 issued.

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SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
83	Volume II, Chapter-4		As per Clause No. 1.5: Stress-strain test at elevated temperature - Stress-strain test as per IEC-61089 shall be conducted keeping conductor temperature at designed maximum temperature. UTS for this test shall be 80% of the UTS guaranteed in the GTP. Please amend as follows; "Stress-strain test as per IEC-61089 shall be conducted keeping conductor temperature at designed maximum temperature. UTS for this test shall be 70% of the UTS guaranteed in the GTP". Evaluating Stress Stain behaviour at Elevated Temperature does not provide information on how the conductor will perform when operating above the conductor's thermal knee and as it approaches its maximum operating temperature. When the conductor temperature climbs above the thermal knee point all remaining tensile load on the conductor will be on the core. From this temperature and above, only the core will carry the load. Because of this, the aluminium has no influence on the high temperature sag of the conductor from the thermal knee point temperature and upward. When performing this testing at temperatures in excesses of the calculated thermal knee point, the strength of the conductor should take into account two factors: 1) The aluminium will lose potentially up to 60% of its rated strength as the test temperatures approach the maximum use temperature of the conductor. Thus, the aluminium will not carry any load until very high levels of stress when at high temperatures. 2) For the composite cores, the strength can be ~80% of the ambient strength as the test temperatures approach the conductor's maximum use temperature. As a result of these two factors, the strength of the conductor at its maximum use temperature should be rated at 70% of the ambient strength. A better alternative to adjusting the protocol is to remove the test because it does not model a situation that occurs in operation: High temperature and high loads do not occur together.	Please refer amendment 1 issued.



SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
84	Volume II, Chapter-4	Annexure A	As per Clause No. 1.6: High Temperature Endurance and Creep test (ii) On other conductor sample, the conductor temperature shall be increased to designed maximum temperature steps of 20 deg. C and thermal elongation of the conductor sample shall be measured & recorded at each step. The temperature shall be held at each step for sufficient duration for stabilization of temperature. Further, the temperature of the conductor shall be maintained at designed maximum temperature +10 Deg. C for 1000 hours. The elongation/creep strain of the conductor during this period shall be measured and recorded at end of 1 hour, 10 hour, 100 hour and subsequently every 100 hour upto 1000 hours time period. After completion of the above, the core of the conductor sample shall be subjected to UTS test as mentioned above at clause 1.1. The conductor core shall withstand a load equivalent to 95 % of UTS. In case of polymer composite core conductor, the flexural strength & glass transition temperature of the core shall also be evaluated and the same shall not be degraded by more than 10 % over the initial value. The supplier shall plot the thermal elongation with temperature. Degradation of Flexural Strength and Glass transition temperature values should be checked with respect to values specified by bidder in GTP and not with respect to initial values. Please amend as follows, "(ii) On other conductor sample, the conductor temperature shall be increased to designed maximum temperature steps of 20 deg. C and thermal elongation of the conductor sample shall be measured & recorded at each step. The temperature shall be held at each step for sufficient duration for stabilization of temperature. Further, the temperature of the conductor shall be maintained at designed maximum temperature (±2.5 Deg. C) for 1000 hours. The elongation/creep strain of the conductor during this period shall be measured and recorded at end of 1 hour, 10 hour, 100 hour and subsequently every 100 hour upto 1000 hours time period. After completion of the above	Please refer amendment 1 issued.
85	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 1.6.2: Sag-Tension Requirements - Core Wires There shall be no joint of any kind in the finished wire entering into the manufacture of the strand. There shall also be no joints or splices in any length of the complete stranded core. For composite core wires, during the production run, splicing of the galvanic protection barrier is allowed, provided diameter specifications are maintained. Kindly Clarify	Please refer amendment 1 issued.

SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
86	Volume II, Chapter-4	Annexure A	As per Clause No. 1./: Sheave test - The conductor sample of minimum length of 35 meter shall be tensioned at 25% of the UTS and shall be passed through pulleys having diameter of 32 times that of the conductor with angle of 20 deg. between the pulleys. The conductor shall be passed over the pulleys 36 times a speed of 2 m/sec. After this test UTS test on the conductor shall be carried out as mentioned above at clause 1.1. In case of polymer composite core conductors, the core shall be inspected for any sign of damage or cracking through dye penetration test as per ASTM D5117 / ASTM B987 section 14. Dye penetrant exposure time shall be 30 +1/-0 minutes.	Please refer amendment 1 issued.
			Installation tension is not going to be as high as initial tension hence please amend the test tension to 22%. As per Clause No. 1.8 – Materials, Sub Clause 1.8.2 – Core - Where composite	
87	Volume II, Chapter-4	Clause No. 1.8 – Materials	material for core is offered, the material shall be either of High strength grade or extra high strength grade as per ASTM B987. Non conductivity Galvanic Protection Barrier Layer requirement added as per recently updated ASTM B987/B987M-20, section 3.1.5 Please amend as follow: Where composite material for core is offered, the material shall be either of High strength grade or extra high strength grade as per ASTM B987. The offered composite core must have a non-conductive Galvanic Protection Barrier Layer.	Please refer amendment 1 issued.
88	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 1.10.1: Evaluation of Ohmic Losses & Differential Price Loading Average Ohmic loss (kW) = Total Length x (550)2 x Rac/1000 Kindly Share the Total Length to be consider for Calculating the Average Ohmic loss (kW). 1.Average Ohmic loss (kW) = Total Length x (550)2 x Rac/1000 & 2.Average Ohmic loss (kW) = Total Length x (650)2 x Rac/1000.	Refer previous reply above.
89	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 2.1.1 c) Radio interference voltage test (dry) d) Corona extinction voltage test (dry) This Test is applicable for conductor 220 kV and above. Kindly amend the clause as per requirement.	Refer previous reply above.

Transmission Line Upgrading

SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
90	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 2.1.2: Type tests specified under Clause 2.1.1 shall not be required to be carried out if a valid test certificate is available for the offered design, i.e., tests conducted earlier should have been conducted in accredited laboratory (accredited based on ISO/IEC guide 25/17025 or EN 45001 by the National Accreditation body of the country where laboratory is located) or witnessed by the representative (s) of POWERGRID or Utility. ASTM B987 says all test on composite core to be performed before stranding on as manufactured conditions. In the case of composite core conductors, the tests specified under Clause 2.1.1 (ii) shall be carried out before stranding on at-	Please refer amendment 1 issued.
91	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 2.2: Acceptance Tests t) Bending test on polymer composite core t) Galvanic Protection Barrier Layer Thickness test (on polymer composite core) As per ASTM B958 Kindly amend the typographical error in Sr. No. & reference Standard to be consider for Test. 2.2 Acceptance Tests s) Bending test on polymer composite core t) Galvanic Protection Barrier Layer Thickness test (on polymer composite core) As per ASTM B987	Please refer amendment 1 issued.
92	Volume II, Chapter-4	General Technical Requirement – HTLS Conductor	As per Clause No. 2.2: Note: All the above tests except (m) shall be carried out on Aluminium Alloy and core / core strands after stranding only. ASTM B987 says all test on composite core to be performed before stranding on as	Please refer amendment 1 issued.



SI. No.	/ Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
93	Volume II, Chapter-6	Annexure A Clause 1.6	Heating Cycle Test: Heating cycle test shall be performed in accordance with IS 2486 (Part-I) with following modifications: - i) Temperature of conductor during each cycle: 40 deg. C above designed maximum operating temperature of the conductor. ii) Number of cycle: 100 iii) Slip strength test shall also be carried out after heating cycle test. The protocol as written could force conductors to be subjected to temperatures in excess of their emergency temperatures. Please amend this protocol to ensure that the conductor is not subjected to a temperature in excess of the emergency temperature that may cause a failure of the hardware test. Please amend as follows. Heating cycle test shall be performed in accordance with IS 2486 (Part-I) with following modifications: - i) Temperature of conductor during each cycle: 40 deg. C above designed maximum operating temperature of the conductor but not to exceed the maximum Continuous Operating temperature of the conductor. ii) Number of cycle: 100 iii) Slip strength test shall also be carried out after heating cycle test	Please refer amendment 1 issued.



SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
94	Volume II, Chapter-6	Annexure A Clause 2.1 (b)	Heating Cycle Test: Heating cycle test shall be performed in accordance with IS 2121 (Part-II-1981) with following modifications: - i) Temperature of conductor during each cycle: 40 deg. C above designed maximum operating temperature of the conductor. ii) Number of cycle: 100 iii) Slip strength test shall also be carried out after heating cycle test. Testing requirement and procedure are in line with Sr. No. 23 hence changes considered for sr. no. 23 are applicable for this clause also. The protocol as written could force conductors to be subjected to temperatures in excess of their emergency temperatures. Please amend this protocol to ensure that the conductor is not subjected to a temperature in excess of the emergency temperature that may cause a failure of the hardware test. Please amend as follows, "Heating cycle test shall be performed in accordance with IS 2121 (Part-II-1981) with following modifications: - i) Temperature of conductor during each cycle: 40 deg. C above designed maximum operating temperature of the conductor but not to exceed the maximum Continuous Operating temperature of the conductor. ii) Number of cycle: 100 iii) Slip strength test shall also be carried out after heating cycle test".	As per the specification
95	Volume II, Chapter-10	General Technical Requirement – EHV Cable	As per Clause No. 1.8: Conductor - The shape of conductor shall be compacted segmental having high compactness and smooth surface finish. However, as per IEC 60228, Table-1, conductor shape shall be circular upto 1000 Sqmm cable. In this regard, please check and issue the suitable amendment for conductor shape of 132kV, 1000 Sqmm cable.	Shall be as per IEC



Volume II, Chapter-10	General Technical Requirement – EHV Cable,	wire (if required) to meet short time current requirement, followed by an open helix of copper. Short circuit requirement shall be meet by Corrugated aluminium sheath. Please confirm. c) Please furnish the required earth fault current & its duration that need to be withstood by the Metallic sheath/screen.	As per the specification. During DDE
Chapter-10	General Technical Requirement – EHV Cable	As per Clause No. 1.12: Radial Moisture Barrier - extruded corrugated aluminium sheath is mentioned. In this regard, we propose seam welded corrugated aluminium sheath which is acceptable by all utilities. Please confirm acceptance.	As per the specification. During DDE
Volume II, Chapter-10	General Technical Requirement – EHV Cable	As per Clause No.2 - Trefoil/ Flat formation: Please check and confirm whether	As per the site condition
Volume II, Chapter-10	General Technical Requirement – EHV Cable	As per Clause No. 9 - Bonding of screen/Sheath: Cross-bonding is mentioned for sheath bonding. As the cables are of shorter length within the substation plot, we request NEA to accept Single point bonding. Please confirm.	To be decided during DDE
Volume II, Chapter-10	General Technical Requirement – EHV Cable	Kindly provide installation conditions such as: a) Installation in trench (in free air) / underground b) Depth of laying	As per the site condition
Volume II, Chapter-10		a) Please specify the continuous current requirement (if any) for the EHV cables used for 132kV lines. b) We presume 1run per phase shal be considered. Please confirm.	To be decided during DDE. Shall be suitable as per t rating of HTLS conductor.
Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. B.1 & B.2, we understand Tension and Suspension fitting Unit should be in Sets and Disc Insulator in Numbers.	As per the BPS
V CI	/olume II, hapter-10 /olume II, hapter-10 /olume II, hapter-10	Cable /olume II, hapter-10 General Technical Requirement – EHV Cable /olume II, hapter-10 General Technical Requirement – EHV Cable /olume II, hapter-10 General Technical Requirement – EHV Cable /olume II, hapter-10 Flant and Equipment including Mandatory Spares to be supplied	Cable Cable Cable General Technical Requirement – EHV Cable Cable General Technical Requirement – EHV Cable Cable General Technical Requirement – EHV Cable (Cable Department of Interfoll Tormation or flat formation. As per Clause No. 9 - Bonding of screen/Sheath: Cross-bonding is mentioned for sheath bonding. As the cables are of shorter length within the substation plot, we request NEA to accept Single point bonding. Please confirm. Kindly provide installation conditions such as: a) Installation in trench (in free air) / underground b) Depth of laying c) Type of formation : Trefoil / flat d) Ground temperature e) Ambient air temperature f) Soil Thermal resistivity a) Please specify the continuous current requirement (if any) for the EHV cables used for 132kV lines. b) We presume 1run per phase shal be considered. Please confirm. In Price Schedule No.1: Item No. B.1 & B.2, we understand Tension and Suspension fitting Unit should be in Sets and Disc Insulator in Numbers. We request to provide Disc Insulator in Numbers as separate item as bidders needs

SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
103	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. D - Current transformer, Quantity of 132 kV, 3 Phase, 5 Core Current Transformer with all accessories as per Technical Specification is 122 nos. In this regard, we request NEA to furnish the station-wise break-up of CT quantity. In Price Schedule No.1: Item No. 6.1 mentioned that Tension, Suspension clamps,	Please quote as per the BPS
104	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	Connector etc to be quoted in Lotwise. Request you to provide Tower Schedule of all existing lines to work out the clamps	Please quote as per the BPS
105	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. G.3 mentioned that All tools and tackles for installation of HTLS conductor - Whether 4 Ton winch machine and 5 meter Sag Bridge is to be supplied? It would be better if list if tools required is provided.	Refer attached list
106	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. G - Erection Hardware, Item No. 2 - Twenty (20) percent spare parts equivalent in cost of all necessary accessories, hardware & fittings of item no. H.1 a) As per referred item, we understand that 20% spare shall be provided for item no. G.1 instead of H.1. Please check and issue suitable amendments. b) We understand that item no. H.1 is pertaining to erection hardware requirement (if any) which shall be used inside the substation. Please confirm.	Please read H.1 as G.1 in the BPS. The erection hardware mentioned in the BPS G.1 is necessary accessories, hardware and fittings (Tensic suspension clamps, Connector etc) required to compute HTLS stringing works completely including any in required inside of the switchyard.
107	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. H: As the scope of this package is only CT upgradation, we are not envisaging following works in the present scope: a) Illumination b) Cable trays & supports c) PVC/GI pipes d) Buried trench e) Earth wire If required, Please specify the station wise scope of work with necessary quantities.	Confirm
108	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. H - Erection Hardware Please clarify whether 132kV EHV cable shall be directly buried or laid in the cable trench? If 132kV cable trench shall be laid in the cable trench, Whether the same shall be laid in the existing trench or new trench is required?	EHV Cable shall be laid as per the site condition. If retrench is required, it shall be designed and construct by the contractor.
108		Spares to be supplied	If 132kV cable trench shall be laid in the cable trench, Whether the same shall be	but the contractor

SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
109	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. I: a) Please clarify whether existing earthing riser of CT can be reused? b) We are not envisaging any lightning protection under present scope as all stations are existing. For any specific requirement regarding lightning protection, please specify and add a separate line item (station-wise) in the BoQ along with necessary quantities.	Existing Earthing risers can be reused, if suitable. Confirm.
110	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	necessary quantities. In Price Schedule No.1: Item No. J: Power & Control Cable - PVC (1.1kV grade), Voltage grade of LT power & control cable shall be 1.1kV. However, as per technical specification, Chapter 6 – General Technical Requirement – Power and Control Cable, Clause No. 1.1.2, The PVC (70°C) insulated power cables shall be of FR type, C1 category, conforming to IEC: 60502 (Part-I). However, as per IEC 60502 (Part-1), Cable rated voltage is 1kV. In this regard. Please check and confirm the Voltage grade of LT cables.	
111	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. K: 132kV 1000 Sq.mm Cu XLPE Cable with termination for connection from existing AIS system to existing GIS complete with earthing and other accessories. Tentative length required 60m. As per referred item, 132kV cable route length is mentioned as 60m. In this regard, if the same is increased/decreased during detail engineering based on site condition, the same shall be paid on actual length basis. Please confirm.	The length mention is minimum and tentative. Pleas visit the site for detail. No extra payment will be made
112	Volume III, Schedule No.1:	Plant and Equipment including Mandatory Spares to be supplied from abroad	In Price Schedule No.1: Item No. K, 132kV GIS type cable termination shall be provided. In this regard, interface & scope split between GIS Manufacturer & EHV cable termination Manufacturer shall be as per IEC 62271-209. Please confirm.	The contractor shall provide the termination arrange for both end of the cable.
113	General		We are not envisaging following works in the any station involved in the present scope: a) Augmentation/ Upgradation of substation automation system b) Augmentation/ Upgradation of Control & relay panel c) Augmentation/ Upgradation of RTU d) Augmentation/ Upgradation of LT switchgear e) Relay setting calculation f) Augmentation/ Upgradation of existing Bushar protection	Relay setting and busbar protection modification wo required.



SI. No.	Document Volume / Section & Page No.	Reference Clause/ Heading	Bidders Query	Reply (NEA)
114	General	Applicable for AIS Station: List of stations where work need to be carried out		Confirm. Refer clarification above
115	General	Station: Altitude above	As per technical specification, an altitude of 400m from MSL for all terai substation & 1440m for substations in kathmandu has been mentioned. In this regard, please specify the altitude of each substation location.	The altitute generally is as per PSR
116	General	Applicable for AIS Station: Equipment connection	Please provide the following details: a) Equipment bus type- Rigid (or) Flexible b) Equipment bus Conductor type & cross-section (Eg. ACSR Moose, Bear etc.) c) Equipment bus Conductor configuration- Single/Twin/Quad d) Height of Equipment bus	Please visit the site for detail. The busbar type outsic kathmandu is generally rigid. The bus conductor sha kathmandu varies from bear. Zebra or Duck.
117	General	Applicable for AIS Station: Station-wise CT quantity	Please provide the following details: a) Station wise quantity of the Current transformers which need to be replaced under this package. b) Bays at which the replacement to be done to be identified station-wise c) Photograph of the Name plate details for each existing CT which need to be replaced	Refer clarification above
118	General	Applicable for AIS Station: Earthing	Please provide the following details: a) Earthing conductor size b) Material of Earthing conductor (Copper or MS or GI) c) Earth mat spacing	Only the risers needs to be provided. The conductor shall not be lessthan 120 Sq.mm., Copper.
119	General	Applicable for AIS Station: Cable trench Details	Please provide the following details: a) Whether cable trench is available with sufficiet space from Control room to the Bay where CT need to be replaced? b) Please furnish photograph of typical cable trench cross-section c) Check for details such as Number of tiers & Width of tray	Please visit the site for detail

SI. No.	Document Volume / Section & Page No.		Bidders Query	Reply (NEA)
120	General	facilities	Please furnish the following details of existing system: a) Type of 132kV Busbar protection - Centralised or De-centralised c) Make & model no. of 132kV Busbar protection d) Whether station is RTU based or Substation automation system e) Make & model no. of existing substation automation system or RTU (as applicable)	Refer above
121	General	Station. Dismanding	Kindly confirm whether any dismantling scope is involved in the proposed substation plot	include such cost in their respective bid price. The co
122	General	Applicable for AIS Station: Shut down sequence	Kindly confirm whether any specific shut down sequence to be followed.	shall include restoration work, as required. During detail engineering and implementation
123	General	Station - Balaju:	Please provide the following details: a) Earthing conductor size b) Material of Earthing conductor (Copper or MS or GI) c) Earth mat spacing	Refer above
124	General	Station - Balaju: 132kV EHV cable	b) Distance between the GIS bay & the existing AIS system/Gantry (In BPS tentative route length is mentioned as 60m)	The cable shall be laid from existing terminatin gantr and structure upto the GIS. Please visit the site for details.
125	General	Applicable for GIS Station - Balaju: Existing 132kV EHV cable (If available)	As the project scope is upgradation work, please confirm whether any 132kV cable of lesser size had already been installed from the identified GIS Bay up to the line terminal gantry. If available, please furnish the following details: a) The existing cable is laid in trench with supports/trays (or) diret buried?	The new cable is to replace existing cable. Th dismanlting cost shall be included with the cost.



ANNEXURE: List of Tools and tackles for HTLS stringing

mentioned is minimum, the bidder is required to provide the calculation and documents during DDE. The minimum items required for Tools and tackle are described below. The tonnage and quantity The bidder may propose critical equipment required for installation & commissioning:

1NOS
PIPE
HOSE
1 50 M
/ WITH
APACITY
0 MT C
E TYPE 10
PORTABLE TY
DRAULIC PRESS
) H
HYDRAULIC

1 SET	
OF CONDUCTOR	
THE SIZE	
SUITABLE TO 1	
PUNCH SET	
DIES AND	
(7	

2 NOS	
HYDRAULIC CUTER	
3)	

3 NOS
CORE RETAINER FOR CONDUCTOR AS APPLICABLE
4)

... 10 BUNDLES

... 6 NOS

...2 NOS

... 4 NOS

...1 NOS

... 6 NOS

12 REELS	SON 2
COLORED CELLO TAPE	ALLEN WRENCH ET
11)	12)

2EACH	
NNER SIZE 16 TO 30/32	
RING SPA	
13)	

4 NOS	15 NOS
CONDUCTOR LIFTING HOOK	RUNNING BLOCKS 660 MM
14)	15)

GTH 600 M EACH	10 NOS	10 PAIRS
STEEL SLINGS DIFFERENT SIZE (12 MM TO 18 MM) LENGTH	SAFETY HELMETS	SAFETY GLOVES
16)	17)	18)

10 PAIRS	10 SETS
SAFETY SHOES	ELECTRICAL RESISTANCE GLOVES
19)	20)

6 SETS	2 NOS
MOBILE FALL ARRESTORS	PLATFORM LADDERS 4 MTR
21)	22)

8 NOS	
GROUNDED ROLLER ARRAY STRINGING BLOCK (S&R)	
23)	

24)

... 12 REELS.



NEPAL ELECTRICITY AUTHORITY

Duhabi Grid Branch, Duhabi, Sunsari

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Triny 10 Towner files (RAA)						000		40	
838 0.006 60 Gentry 838 0.00 DA 834 0.256 300 300 837.885 0.04 DA 835 0.26 300 300 837.885 DA DA 834 1.5 310 310 837.835 DA DA 834 1.5 310 310 837.835 22°-00°-00° RT DA 834 1.5 310 310 837.835 22°-00°-00° RT DA 834 1.5 310 314 837.835 22°-00°-00° RT DA 834 1.8 330 330 832.833 22°-00°-00° RT DA 825 1.36 330 330 832.833 22°-00°-00° RT DA 825 2.746 330 330 823.833 22°-00°-00° RT DA 827 3.246 330 330 823.833 22°-00°-00° RT DA 828 2.746 330 330 823.833 <th>S.NO. From</th> <th>To (Tower No.)</th> <th></th> <th></th> <th>(Mtr.)</th> <th>Span between</th> <th>Tower</th> <th>Tower</th> <th>Remarks</th>	S.NO. From	To (Tower No.)			(Mtr.)	Span between	Tower	Tower	Remarks
837 0.056 200 300 838-835 40°-46°-00°° NT DA 838 0.056 320 320 837-835 DA DA 834 1.15 310 310 837-835 DA DA 834 1.15 310 310 835-831 DA DA 832 1.18 314 324 832-831 22°-00°-00° RT DA 832 1.18 314 314 832-831 22°-00°-00° RT DA 839 2.446 320 320 839-829 DA DA 829 2.746 320 320 832-828 DA DA 829 2.746 330 330 825-828 DA DA 820 3.756 330 330 825-828 DA DA 821 8.75 330 330 825-828 DA DA 822 3.75 330 825-828 DA DA	Duhabi s/s	838	90.0		09	Gantry-838		QQ	Duhabi
56 0.56 300 300 337.936 DA 57 0.088 320 320 837.936 DA 31 1.15 310 310 837.834 DA 31 1.15 310 310 838.833 22*.00*.00*RT DA 31 1.824 3.24 324 324 838.832 22*.00*.00*RT DA 31 1.824 3.30 330 883.832 22*.00*.00*RT DC 31 2.446 308 330 832.831 29*.00*.00*RT DC 31 2.446 330 330 822.825 DA DA 4 3.456 330 330 82.8282 DA DA 5 3.406 360 360 82.8282 DA DA 6 3.40 340 32.8282 DA DA 4 4.436 340 340 82.8282 DA 5 4.056	Gantry	837	0.26	200	200	838-837	-46' -00"	Od	
515 0.88 3.20 3.20 3.20 3.20 3.20 3.20 3.20 3.20 3.20 3.20 3.20 0.0		836	0.56	300	300	837-836		DA	
44 1.19 310 310 313-334 DA 32 1.15 310 310 319-333-34 DA 31 1.15 324 324 324 324 324 11 2.138 314 314 314 314 314 0 10 2.446 308 380 382 22-00-00"RT DC 10 2.446 309 330 839-829 DA DA 12 3.406 330 330 828-827 DA DA 13 3.406 330 330 828-827 DA DA 14 4.456 340 340 828-827 DA DA 14 4.456 340 340 828-827 DA DA 14 4.456 340 340 828-827 DA DA 14 4.456 340 330 828-827 DA DA 14		835	0.88	320	320	836-835		ΔQ	
33 115 310 310 310 310 314 0 0 10 2.446 308 308 320 830-831 22*-00*-00*RT DC 10 2.446 320 320 820-828 DA DA 11 2.346 330 330 828-825 DA DA 12 3.406 340 340 825-828 DA DA 4 4.436 340 340 827-826 DA DA 4 4.436 340 340 827-826 DA DA 4 4.436 340 330 822-823 DA DA 4 4.436 340 340 827-826 DA		834	1.19	310	310	835-834		DA	
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3 4,756 320 320 824-823 DA 2 5.086 330 330 823-822 DA 0 5.746 330 330 823-823 DA 0 5.746 330 330 820-819 87-28*-00"LT DA 0 5.746 310 310 820-819 8*-28*-00"LT DB 8 6.046 320 320 820-819 8*-28*-00"LT DB 8 6.046 320 320 820-819 8*-28*-00"LT DB 8 6.371 373 373 818-817 DA+4(IE+3) 7 6.711 350 350 815-813 DA+4(IE+3) 8 6.711 340 340 81-813 DA+4(IE+3) 9 8.171 340 340 81-813 DA+4(IE+3) 1 1.481 350 350 81-813 DA+4(IE+3) 2 1.451 340 340 81-80<		824	4.436	340	340	825-824		DA	
2 5.086 330 330 823-822 DA 1 5.416 330 330 822-831 DA 0 5.726 310 330 822-831 DA 8 6.038 352 320 820-819 8"-28"-00"LT DAA 8 6.771 373 373 818-817 DAA+4[LE+3] 7 6.771 373 350 817-816 DAA+4[LE+3] 8 6.772 350 350 815-813 DAA+4[LE+3] 9 7.481 360 350 815-813 DAA+4[LE+3] 8 8.511 340 818-813 DAA+4[LE+3] 9 9.491 340 815-813 DAA+4[LE+3] 1 8.831 350 812-811 DAA+4[LE+3] 2 8.511 340 812-813 DAA+4[LE+3] 3 8.831 330 812-813 DAA 4 7.831 350 808-808 DAA+4[LE+3]<		823	4.756	320	320	824-823		DA	
1 5.416 330 330 822-821 DA 0 5.726 310 310 821-820 DA 0 6.046 320 320 820-839 87-281-00"LT DA 8 6.348 352 323 818-817 DA+4(LE+3) DA+4(LE+3) 7 6.771 373 373 818-817 DA+4(LE+3) DA+4(LE+3) 8 6.771 373 350 815-813 DA+4(LE+3) DA+4(LE+3) 8 7.481 360 350 815-813 DA+4(LE+3) DA+4(LE+3) 8 8.511 340 340 815-813 DA+4(LE+3) DA+4(LE+3) 9 8.511 340 340 815-813 DA+4(LE+3) DA+4(LE+3) 1 8.831 320 350 812-813 DA+4(LE+3) DA+4(LE+3) 1 8.831 320 320 812-813 DA+4(LE+3) DA+4(LE+3) 1 9.451 330 320		822	5.086	330	330	823-822		DA	
0 5.726 310 310 321-820 DA-4(IE+3) 8 6.046 320 320 820-819 8°-28'-00" LT DB 8 6.046 320 320 819-818 PA-4(IE+3) DA-4(IE+3) 6 7.121 373 373 818-817 DA-4(IE+3) DA-4(IE+3) 6 7.121 350 350 817-814 DA-4(IE+3) DA-4(IE+3) 7 7.121 350 350 811-813 DA-4(IE+3) DA-4(IE+3) 8 8.171 340 340 818-813 DA-4(IE+3) DA-4(IE+3) 8 8.171 340 340 818-813 DA-4(IE+3) DA-4(IE+3) 8 8.171 340 318-813 B1-813 DA-4(IE+3) DA-4(IE+3) 9 9.161 330 330 812-811 DA-4(IE+3) DA-4(IE+3) 1 8.831 350 380 805-805 DA-4(IE+3) DA-4(IE+3) 1 10.366 <td></td> <td>821</td> <td>5.416</td> <td>330</td> <td>330</td> <td>822-821</td> <td></td> <td>DA</td> <td></td>		821	5.416	330	330	822-821		DA	
9 6.046 320 320 320-819 8°-28'-00" LT DB 8 6.398 352 352 819-818 8°-28'-00" LT DB 7 6.771 373 373 818-817 DA+4(LE+3) 6 7.481 360 350 817-816 DA+4(LE+3) 7 7.811 360 350 815-813 DA+4(LE+3) 8 7.481 360 816-813 DA+4(LE+3) 8 8.511 340 340 814-813 DA+4(LE+3) 9 9.481 340 814-813 DA+4(LE+3) 1 8.831 340 814-813 DA+4(LE+3) 2 8.511 340 340 814-813 DA+4(LE+3) 3 8.511 340 814-813 DA+4(LE+3) 4 8.831 320 810-807 DA 9 9.161 330 310-818 816-807 DA 10.186 350 350		820	5.726	310	310	821-820		DA	
8 6.398 35.2 35.2 819-818 DA+4(LE+3) 7 6.771 37.3 37.3 818-817 DA+4(LE+3) 6 7.121 350 350 817-816 DA+4(LE+3) 7 7.481 360 316-815 DA+4(LE+3) 8 7.481 360 316-813 DA+4(LE+3) 8 8.511 340 340 814-813 DA+4(LE+3) 8 8.511 340 340 814-813 DA+4(LE+3) 9 9.161 340 340 814-813 DA+4(LE+3) 1 8.831 320 340 814-813 DA+4(LE+3) 1 8.831 320 812-811 DA DA 1 8.831 330 811-810 DA DA 1 8.831 330 810-808 DA DA 1 10.366 330 330 802-807 DA 1 11.566 330 330		819	6.046	320	320	820-819	8°-28'-00"LT	DB	
7 6.711 373 373 818-817 DA44(IE+3) 6 7.121 350 350 817-816 DA44(IE+3) 6 7.121 350 350 815-814 DA44(IE+3) 4 7.831 350 816-815 DA44(IE+3) 4 7.831 350 815-814 DA 5 8.511 340 340 814-813 DA44(IE+3) 6 8.511 340 340 814-813 DA44(IE+3) 7 8.511 340 340 813-812 DA 8 8.511 340 340 813-812 DA 9 9.161 330 320 812-812 DA 9 9.161 330 330 810-809 PA-4(IE+3) 1 10.386 330 330 805-804 DA 1 11.266 330 330 802-801 DA+4(IE+3) 1 11.266 330 330		818	6.398	352	352	819-818		DA+4(1F+3)	
6 7.121 350 350 817-816 DA 8 7.481 360 360 816-815 DA+4([E+3] 8 7.481 360 350 815-814 DA+4([E+3] 8 8.171 340 340 814-813 DA+4([E+3] 8 8.171 340 340 814-813 DA+4([E+3] 9 8.171 340 340 814-813 DA+4([E+3] 1 8.831 320 320 812-811 DA 9 9.491 330 330 811-810 DA 9 9.491 330 380 809-808 DA 9 9.836 345 809-808 DA DA 1 10.366 330 330 807-806 DA DA 1 1.1.36 330 330 802-801 DA DA 1 1.1.366 330 330 802-801 DA DA		817	6.771	373	373	818-817		DA+4(LF+3)	
5 7.481 360 360 816-815 DA+4(IE+3) 4 7.831 350 350 815-814 DA 3 8.171 340 340 814-813 DA+4(IE+3) 4 8.831 320 330 813-812 DA 9 9.451 330 330 811-810 DA 9 9.451 330 330 810-808 DA 9 9.451 330 810-808 DA DA 9 9.451 330 805-808 DA DA 9 9.451 330 805-808 DA DA 10.186 350 380 805-808 DA DA 10.186 330 330 805-808 DA DA 10.186 330 330 807-808 DA DA 11.216 320 330 807-809 DA DA 11.266 330 330 807-809		816	7.121	350	350	817-816		DA	
4 7.831 350 350 815-814 DA 3 8.171 340 340 814-813 DA 4 8.171 340 340 813-812 DA 5 8.511 340 340 813-812 DA 1 8.831 320 330 812-811 DA 0 9.451 330 330 810-809 DA 1 10.186 350 380 806-807 DA 1 10.186 350 380 806-807 DA 1 10.186 330 807-804 DA 1 11.216 330 807-803 DA 1 11.256 330 330 </td <td></td> <td>815</td> <td>7.481</td> <td>360</td> <td>360</td> <td>816-815</td> <td></td> <td>DA+4(LE+3)</td> <td></td>		815	7.481	360	360	816-815		DA+4(LE+3)	
3 8.171 340 340 814-813 DA+4(IE+3) 2 8.511 340 340 813-812 DA 1 8.831 320 320 812-811 DA 2 9.161 330 330 811-810 DA 3 9.491 330 330 810-809 7°-18-00"LT DB 3 9.836 345 345 808-807 DA DA 1 10.186 350 350 807-806 DA DA 1 10.266 380 380 806-805 DA DA 1 10.866 330 330 806-803 DA DA 1 11.216 320 320 807-804 DA DA 1 11.266 330 330 806-803 DA DA 1 11.266 330 330 807-802 DA DA 1 11.266 350		814	7.831	350	350	815-814		DA	
2 8.511 340 340 813-812 DA 1 8.831 320 320 812-811 DA 9.161 330 330 811-810 DA 9.491 330 330 811-810 DA 1 9.491 330 330 810-809 7°-18'-00"LT DB 3 9.836 345 345 809-808 7°-18'-00"LT DB 1 10.186 350 350 806-807 DA DA 1 10.186 350 350 806-807 DA DA 1 10.186 330 330 807-806 DA DA 1 10.186 330 330 807-806 DA DA 1 11.216 330 330 807-802 DA DA 1 11.256 330 330 807-806 DA DA 1 12.366 350 360 360-807		813	8.171	340	340	814-813		DA+4(LE+3)	
1 8.831 320 320 812-811 DA 9-161 330 330 811-810 DA 9-491 330 330 811-810 DA 9-491 330 330 811-810 DA 10.186 345 345 809-808 DA+6 10.186 350 350 808-807 DA 10.186 330 330 808-807 DA 10.186 330 330 808-805 DA 11.216 320 320 808-805 DA 11.216 320 320 808-805 DA 11.216 330 330 808-802 DA 11.216 330 330 808-803 DA 11.286 330 330 808-801 DA 12.366 350 350 801-802 DA 12.366 350 360 798-796 DA 14.206 360 360		812	8.511	340	340	813-812		DA	
9 -1.61 330 310 811-810 DA 9 -491 330 330 811-810 7*-18"-00" LT DB 8 9-491 330 330 810-809 7*-18"-00" LT DB 1 0.186 350 350 808-807 DA+6 DA 5 10.56 380 380 807-806 DA DA 6 10.56 380 330 807-804 DA DA 6 11.216 320 320 808-803 DA DA 8 11.536 330 330 808-804 DA DA 9 11.540 330 330 807-801 DA DA 9 12.546 350 350 801-800 DA DA 1 12.546 350 350 807-801 DA DA 1 12.546 350 350 807-802 DA DA 1 12.546 350 350 807-802 DA DA 1 13.526 330 330		811	8.831	320	320	812-811		DA	
9 9.491 330 330 810-809 7°-18'-00" LT DB 8 9.836 345 345 809-808 7°-18'-00" LT DA+6 7 10.186 350 350 808-807 DA+6 DA 8 10.566 380 380 807-806 DA DA 9 10.566 380 330 807-805 DA DA 1 1.346 330 320 807-804 DA DA 1 1.356 330 330 805-804 DA DA 1 1.356 330 330 807-802 DA DA 1 1.356 330 330 802-801 DA DA 1 1.356 330 330 802-801 DA DA 1 1.356 330 330 799-796 DA DA 1 1.356 330 330 795-794 DA DA 1 1.450 300 300 795-794 DA DA 1 1.536 350 <td></td> <td>810</td> <td>9.161</td> <td>330</td> <td>330</td> <td>811-810</td> <td></td> <td>DA</td> <td></td>		810	9.161	330	330	811-810		DA	
3 9,836 345 345 809-808 DA 7 10,186 350 350 808-807 DA+6 5 10,566 380 380 807-806 DA 6 10,866 330 330 806-805 DA 7 10,186 330 320 806-803 DA 8 11,136 320 320 804-803 DA 9 11,136 330 330 803-802 DB 1 11,186 330 330 802-801 DA 1 11,186 330 330 802-801 DB 1 11,186 330 330 802-801 DB 1 11,186 330 330 802-801 DB 1 11,186 330 330 799-798 DA 1 12,246 350 350 799-796 DB 1 13,246 350 360 796-795 DA+4(LE+3) 1 14,506 360 360 794-793 DA+4(LE+3) 1 15,236		808	9.491	330	330	810-809	-18	DB	
7 10.186 350 3808-807 DA+6 5 10.566 380 380 807-806 DA 5 10.566 380 330 806-805 DA 6 10.896 330 320 806-805 DA 7 11.15 320 320 806-803 DA 8 11.156 330 330 804-803 DA 9 11.156 330 330 802-801 DA 1 11.866 330 330 802-801 DA 1 12.196 330 330 802-801 DA 1 12.246 350 360-799 DA 1 13.226 330 799-798 DA 1 13.846 320 796-795 DA 1 14.506 360 796-795 DA+4(LE+3) 1 15.226 354 354 793-791 DA 1 15.36		808	9.836	345	345	808-808		DA	
5 10.566 380 380 807-806 DA 5 10.896 330 330 806-805 DA 6 10.896 330 320 806-805 DA 7 11.216 320 320 804-803 DA 8 11.536 320 330 803-802 DA 11.866 330 330 803-802 DA 12.196 330 330 802-801 DA 12.186 350 350 802-801 DA 12.246 350 360 799-798 DA 13.256 330 300 798-794 DA 13.364 320 360 796-794 DA 14.206 360 360 796-794 DA 14.506 360 366 794-793 DA 15.236 310 310 792-794 DA 15.536 310 310 792-794 DA		807	10.186	350	350	808-807		DA+6	
5 10.896 330 330 806-805 DA 1 1.1.216 320 320 805-804 DA 1 1.1.216 320 320 805-804 DA 1 1.1.36 320 320 804-803 DA 1 1.1.36 330 330 803-802 DA 1 1.2.36 330 330 801-800 DA 1 1.2.36 350 350 801-800 DA 1 1.2.896 350 350 801-793 DA 1 1.3.26 300 300 795-794 DA 1 1.3.846 350 360 795-794 DA 1 1.4.206 360 795-794 DA 1 1.4.506 360 795-794 DA 1 1.5.26 350 360 795-794 DA 1 1.5.36 350 350 791-796 DA		908	10.566	380	380	807-806		DA	
11.216 320 805-804 DA 11.536 320 804-803 DA 11.536 320 804-803 DA 11.866 330 330 803-802 DA 12.196 330 330 802-801 DA 12.546 350 350 801-800 DA 12.546 350 350 801-800 DA 12.546 350 350 801-800 DA 13.226 330 330 799-798 DA 13.846 320 360 796-796 DA 14.206 360 360 796-796 DA 14.506 300 300 795-794 DA 14.506 366 366 794-793 DA+4(LE+3) 15.26 354 350 792-791 DA 15.26 350 350 791-790 DA+4(LE+3) 16.196 310 310 790-791 DA		805	10.896	330	330	806-805		DA	
3 11.536 320 804-803 DA 1 11.866 330 330 803-802 DB 1 12.196 330 330 802-801 DB 1 12.546 350 350 801-800 DA+4(LE+3) 1 12.546 350 350 801-800 DA 1 12.546 350 360-799 DA 1 13.256 300 300 798-798 DA 1 13.526 300 300 796-796 DA 1 14.206 360 360 796-795 DA 14.506 300 300 796-795 DA 14.506 300 366 796-795 DA 14.506 360 366 796-795 DA 15.226 354 793-791 DA 15.536 310 310 790-789 DA 16.196 340 789-788 DA+4(LE+3)		804	11.216	320	320	805-804		DA	
11.866 330 330 803-802 DB 12.196 330 330 802-801 DA 12.546 350 350 801-800 DA+4(LE+3) 12.896 350 350 801-800 DA+4(LE+3) 13.226 330 330 799-798 DA 13.846 320 320 798-797 DA 14.206 360 360 795-794 DA 14.506 300 300 795-794 DA 14.872 366 366 794-793 DA+6 15.226 354 354 793-792 DA 15.286 350 350 791-790 DA 15.536 310 310 792-791 DA 16.196 310 340 789-788 DA+4(LE+3) 16.536 340 340 789-788 DA+4(LE+3) 16.536 340 340 789-788 DA+4(LE+3) 16.876 340 <td></td> <td>803</td> <td>11.536</td> <td>320</td> <td>320</td> <td>804-803</td> <td></td> <td>DA</td> <td></td>		803	11.536	320	320	804-803		DA	
12.196 330 330 802-801 DA 12.546 350 350 801-800 DA+4(LE+3) 12.896 350 350 800-799 DA 13.226 330 300 799-798 DA 13.846 320 320 797-796 DA 14.206 360 360 795-794 DA 14.506 300 300 795-794 DA 14.872 366 366 794-793 DA 15.226 354 354 793-792 DA 15.886 350 350 791-790 DA 16.196 310 310 792-791 DA 16.186 340 340 789-789 DA+4(LE+3) 16.186 340 340 789-789 DA+4(LE+3) 16.876 340 789-788 DA+4(LE+3)		802	11.866	330	330	803-802		90	
12.546 350 350 801-800 DA+4(LE+3) 12.896 350 350 800-799 DA 13.226 330 799-798 DA 13.526 300 300 798-797 DA 13.846 320 320 797-796 DA 14.206 360 360 796-795 DA+4(LE+3) 14.506 300 300 795-794 DA 14.872 366 366 794-793 DA 15.226 354 793-792 DA 15.886 350 350 791-790 DA+4(LE+3) 16.196 310 792-791 DA 16.186 340 789-788 DA+4(LE+3) 16.1876 340 789-788 DA+4(LE+3) 16.876 340 789-788 DA+4(LE+3)		801	12.196	330	330	802-801		DA	
12.896 350 350 800-799 DA 13.226 330 330 799-798 DA 13.846 320 300 797-796 DA 14.206 360 360 797-796 DA 14.506 360 360 796-795 DA+4(LE+3) 14.506 300 300 795-794 DA 14.872 366 366 794-793 DA 15.226 354 354 793-792 DA 15.886 350 310 792-791 DA 16.196 310 310 792-791 DA 16.186 350 340 789-789 DA+4(LE+3) 16.186 340 340 789-788 DA+4(LE+3) 16.876 340 789-788 DA+4(LE+3) 16.876 340 788-787 DA		800	12.546	350	350	801-800		DA+4(LE+3)	
13.226 330 799-798 DA 13.526 300 300 798-797 DA 13.846 320 320 797-796 DA 14.206 360 360 796-795 DA 14.506 300 300 795-794 DA+4(LE+3) 14.872 366 366 794-793 DA 15.226 354 354 793-791 DA 15.886 350 310 792-791 DA 16.196 310 310 790-789 DA+4(LE+3) 16.196 340 789-788 DA+4(LE+3) 16.876 340 789-788 DA+4(LE+3)		799	12.896	350	350	800-799		DA	
13.526 300 798-797 DA 13.846 320 320 797-796 DB 14.206 360 360 796-795 DA+4(LE+3) 14.506 300 300 795-794 DA+4(LE+3) 14.872 366 366 794-793 DA+6 15.226 354 354 793-791 DA 15.536 310 310 792-791 DA 16.196 350 791-790 DA+4(LE+3) 16.196 340 789-788 DA+4(LE+3) 16.876 340 789-788 DA+4(LE+3)		798	13.226	330	330	799-798		DA	
13.846 320 320 797-796 DB 14.206 360 360 796-795 DA+4(LE+3) 14.506 300 300 795-794 DA+6(LE+3) 14.872 366 366 794-793 DA+6 15.226 354 354 793-791 DA 15.536 310 310 792-791 DA 16.196 310 310 790-789 DA+4(LE+3) 16.536 340 789-788 DA+4(LE+3) 16.876 340 789-788 DA+4(LE+3)		797	13.526	300	300	798-797		DA	
14.206 360 360 796-795 DA+4(LE+3) 14.506 300 300 795-794 DA 14.872 366 366 794-793 DA+6 15.226 354 354 793-792 DA 15.536 310 310 792-791 DA 16.196 310 310 790-789 DA+4(LE+3) 16.536 340 340 789-788 DA+4(LE+3) 16.876 340 340 789-787 DA		962	13.846	320	320	797-796		DB	
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14.872 366 366 794-793 DA+6 15.226 354 354 793-792 DA 15.536 310 310 792-791 DA 15.886 350 350 791-790 DA+4(LE+3) 16.196 310 310 790-789 DA 16.536 340 340 789-788 DA+4(LE+3) 16.876 340 340 788-787 DA		794	14.506	300	300	795-794		DA	
15.226 354 354 793-792 DA 15.336 310 792-791 DA 15.886 350 350 791-790 DA+4(LE+3) 16.196 310 310 790-789 DA 16.536 340 340 789-788 DA+4(LE+3) 16.876 340 340 788-787 DA		793	14.872	366	366	794-793		DA+6	
15.536 310 310 792-791 DA 15.886 350 350 791-790 DA+4(LE+3) 16.196 310 310 790-789 DA 16.536 340 789-788 DA+4(LE+3) 16.876 340 340 788-787 DA		792	15.226	354	354	793-792		DA	
15.886 350 350 791-790 DA+4(LE+3) 16.196 310 310 790-789 DA 16.536 340 789-788 DA+4(LE+3) 16.876 340 788-787 DA		791	15.536	310	310	792-791		DA	
16.196 310 310 790-789 DA 16.536 340 340 789-788 DA+4(LE+3) 16.876 340 788-787 DA		790	15.886	350	350	791-790		DA+4(LE+3)	
16.536 340 340 789-788 DA+4(LE+3) 16.876 340 788-787 DA		789	16.196	310	310	790-789		DA	
16.876 340 340 788-787 DA		788	16.536	340	340	789-788		DA+4(LE+3)	
		787	16.876	340	340	700 007		* 4	\

783 782 782 786 777 778 779 777 776 779 777 770 770 771 772 773 774 773 774 775 774 775 777 770 770 770 770 770 770	90 788 18.186 330 330 784.38 80 781 18.186 330 330 782.782 80 781 18.186 330 330 782.782 90 780 19.196 320 330 778-773 10 778 19.846 330 330 779-779 11 778 19.846 330 330 779-779 12 777 20.186 390 330 779-774 12 777 20.186 390 390 779-774 12 777 20.186 390 390 779-774 12 777 20.286 390 390 779-774 18 770 20.241 320 320 779-774 18 770 20.241 320 330 779-774 19 770 20.241 323 323 777-771 10 770 20.244		
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7.85 7.80	7.8 18.876 35.0 35.0 782-780 35.		DA+4(1F+3)
1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1, 1,	7.00 131,156 320 330 779,779 779,779 779,779 330 330 779,779 779		DA
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17. 12.046 330 779-778 779-778 770-778 770-778 770-78 770	22 77.7 20.166 33.0 33.0 779.778 20.166 32.0 33.0 779.778 20.166 32.0 33.0 777.77 20.166 32.0 33.0 777.77 20.166 32.0 33.0 777.77 20.166 33.0 33.0 777.77 20.166 33.0 33.0 777.77 20.166 33.0 33.0 777.77 32.126 410 410 777.77 14.77 32.284 32.0 32.0 777.77 32.284 32.0 32.0 777.77 32.284 32.0 32.0 777.77 32.284 32.0 32.0 777.77 32.284 32.0 32.0 777.77 14.		DA
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727 1° 58' -00" IT	2000 2000 1000		
1 00- 8C- T /2/-82/ CSC 300	300 300 728-727	728-727 1°-58'-00" LT	DA

773	43.300	478	478	725-724		DALA	
140	43.776	410	410	724-723		DA+6	
722	44.206	430	430	723-722		DA+6	
721	44.656	450	450	722-721		DA+6	
720	45.066	410	410	721-720		DA+6	
719	45.456	390	390	720-719		DA	
718	45.776	320	320	719-718		DA	
/1/	46.106	330	330	718-717		DB	
/16	46.436	330	330	717-716		DA	
715	46.696	260	260	716-715		DA+6	
714	47.106	410	410	715-714		DA	
713	47.436	330	330	714-713		DA	
712	47.686	250	250	713-712		DA	
711	48.008	322	322	712-711		DA	
710	48.338	330	330	711-710		DC+4(LE+3)	
709	48.848	510	510	710-709		LDA	
708	49.668	820	820	709-708		LDA	
707	50.068	400	400	708-707		DA+6	
206	50.308	240	240	707-706	18° -50' -00" RT	DC	
705	50.664	356	356	706-705		DA+4(LF+3)	
704	51.004	340	340	705-704		DA	
703	51.344	340	340	704-703		DA	
702	51.684	340	340	703-702		DA+4(LE+3)	
701	52.034	350	350	702-701		DA	
700	52.364	330	330	701-700		DA	
669	52.668	304	304	700-699		DA	
869	53.034	366	366	869-669		DA	
269	53.354	320	320	269-869		DA	
969	53.614	260	260	969-/69		DA	
695	53.954	340	340	969-969	15° -24' -00" LT	DC	
694	54.287	333	333	695-694		DA	
693	54.617	330	330	694-693		DA+4(LE+3)	
692	54.987	370	370	693-692		DA	
691	55.247	260	260	692-691		DA	
069	55.537	290	290	691-690		DA	
689	55.857	320	320	689-069		DA	
688	56.182	325	325	889-689		DA	
687	56.477	295	295	688-687		DA	
989	56.797	320	320	687-686		DA	
685	57.107	310	310	686-685		DA	
684	57.437	330	330	685-684	13° -20' -00" LT	DB	
683	57.747	310	310	684-683		DA	
682	58.047	300	300	683-682		DA	
681	58.387	340	340	682-681		DA	
089	58.747	360	360	681-680		DA+4(LE+3)	
629	59.077	330	330	629-089		DA	
678	59.377	300	300	879-679		DA+4(LE+3)	
677	10000	000	0.00	The second second	ilea ien o.		

Line Upgrading A Colect * Missing A Colect * Missin

Callity	III			
		70		Hetauda Substation
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107	1	380		CHECK
2	+			
102	-	280		
2	+	0		
103	+	300		
	+	330		
104	<u> </u>	2		
	-	320		
105		2		
2		350		
106		3		
	370	0,		
107				
	330	30		
108				
	340	0:		
109				
	330	0		
110				
	330	0		
111	+			
0.7	330	0		
112	+			
4.0	360			
2	+			
144	400			
114	+			
14	430			
0	700			
116	420			
	300			
117	200			
	00000	36		

3.140.		Spanitherery	Tower Type	Span(Meter) Tower Type Angle of Deviation	Remarks
119	119	340			
T		320			
120	120				
+		340			
17	121	000			
122	122	320			
+	777	220			
123	123	220			
		324			
124	124				
\vdash		346			
125	125				
\dashv		310			
126	126				
+		330			
171	127				
+		290			
128	128				
+		299			
129	129				
+		350			
130	130				
+		400			0.00
4	131				
+	007	350			
1	132	1			
+	700	315			
+	133	200			
1	124	300			
\perp	10	364			
1	135	too			
1	2	336			
	136	200			
		350			
	137				
		345			
	138				
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	139				
	4.,	310			
	140				
	444	320			
	4	000			
	142	380			
	74.	900			
		408			

1				Mellidiks
1		302		
144	144			
		300		
145	145			
		250		
146	146			
!		440		
14/	147			
1		350		
248	148			
1		320		
149	149			
		340		
120	150			
1		300		
151	151			
1		290.82		
152	152			
1		334		
153	153			
1		320		
154	154			
		340		
155	155			
		356		
156	156			
		385		
157	157			
		405		
158	158			
		356		
159	159			
		328		
160	160			
-		322		
161	161			
+		354		
162	162			
+		318.14		
163	163			
-		336		
164	164			
+		314		
165	165			
+		316		
166	166			
-		312		
167	167			
		342		
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			Angle of De	Angle of Deviation	Domonto
1		310			Normal RS
169	169				
9		384			
2	170				
171	474	446			
-					
172	172	410			
+	7	300			
173	173	200			
		364			
174	174				
+		320			
175	175				
176	717	290			
+	9/1	000			
177	177	330			
+		370			
178	178				
		360			
179	179				
\dashv		320			
180	180				
107	707	384			
+	181				
182	182	346			
+	102	020			
183	183	2/0			
-		370			
184	184				
		424			
185	185				
		386			
186	186				
1	407	330			
/01	101	0,00			
188	188	2			
		330			
	189				
		320			
	190				
1	3	330			
	191	0.00			
	192	340			
	10.	310			

194	194	320			
2	405	320			
)	22				
	2	370			
196	196				
107	407	310		*	
+	18/	000			
198	198	000	,		
400	007	310			
+	188	000			
200	200	320			
H		310			
201	201				
000	000	333			
+	707	007			
203	203	400			
Н		391.5			
204	204				
205	205	340			
+	202	000			
_	206	320			
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	209	320			
		344			
	210				
	770	305			
	711				
	212	385			
		400			
	213				
		370			
	214	000			
	215	220			
		320			
	216	2			
		310			
	217	000			
	218	320			
	2				Electric

220			
0			
0	330		
224	320		
	320		
222			
	320		
223			
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224			
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225			
200	350		
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227	5		
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		281	281	Augic of Deviation	Kemarks
244	244				
		320			
245	245				
246	246	340			
2	740				
747	747	320			
	747	010			
248	248	372			
	2	550			
249	249				
		384			
250	250				
		300			
251	251				
1		334			
252	252				
+		306			
253	253				
\forall		295			
254	254				
+		290			
255	255				
1		330			
256	256				
1	1	320			
/27	797				
-		306			
720	867				
+		314			
259	259				
+		320			
260	260				
+		260			
261	261				
-		280			
292	262				
+		270			
263	263				
+		240			
704	264				
-		300			
202	592				
000	000	275			
+	997				
727	100	340			
+	/97				
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283	+	282	330		
283 440 284 201 285 380 286 390 287 350 288 397 289 360 290 310 291 320 292 360	-		360		
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294	294	288		
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967	296			
297	297	322		
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301	301	202		
\vdash		357		
302	302			
+		330		
303	303			
304	304	320		
-		317		
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306	306			
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		320		Nemarks
319	319			
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320	320			
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321	321			
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775	322			
0		280		
323	323			
224	201	315		
17	324	100		
325	325	282		
2	250	27.0		
326	376	3/3		
27	320	CCC		
10	200	320		
327	327			
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328	328			
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329	329			
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330	330			
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331	331			
		395		
332	332			
		380		
333	333			
-		320		
334	334			
+		335		
335	335			
		325		
336	336			
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338	338			
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339	339			
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344			The state of Deviation	
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-		310		
351	351			
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352	352			
-		380		
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		385		
354	354			
		325		
355	355			
		345		
356	356			
-		352		
357	357			
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		280		
359	350	2004		
	200	2000		
360	380	200.0		
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361	361	320		
_	- 00	330		
362	367	000		
	202	244		
363	363	244		
	200	100		
364	364	335		
1	2024	CLC		
385	200	350		
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368	368			

Angle of De			add i she	Aligie of Deviation	Comonica
		352			Kemarks
394	394				
		330			
395	395				
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396	396				
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397	397				
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398	398				
		340			
399	399				
1		352			
400	400				
		428			
401	401				
		190			
402	402				
		400			
403	403				
		248			
404	404				
		340			
405	405				
		334			
406	406				
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407	407				
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