

**KOSHI CORRIDOR 220 KV TRANSMISSION LINE PROJECT**  
**TRANSMISSION DIRECTORATE**  
**NEPAL ELECTRICITY AUTHORITY**

**Procurement of Plant Design, Supply and Installation of 220 kV Basantapur (Terhathum District)-Dhungesangu ( Taplejung District) Double circuit Transmission Line and 132/33 kV Substation in Dhungesangu (Taplejung) District.**

**Bid/Contract Identification No: KOSHI/NEA/KC-3**

**Addendum No. 2**

In accordance with the ITB 8.1 of the Bidding Document, following amendments have been made in the bidding Document.

Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended
1.	Chapter-1	-	<p>The following new clause stands added after clause 1.28.7.14:</p> <p><b>1.28.7.15 Raised Chimney</b>                      The raised chimney may be required in some of the tower foundations as per topography of tower locations after detailed/check survey and contouring of tower locations to minimize the requirement of benching. The height of raised chimney shall be not more than 6.0 meters above ground level.</p>
2.	Chapter-3	-	<p>The following new clauses stand added after clause 3.12.1.5.1.3:</p> <p><b>3.12.1.5.1.4 Rotary Boring</b>                      Rotary Boring may be used in all types of soil below water table. In this method, the boring is carried out by rotating the bit fixed at the lower end of the drill rod. Proper care shall be taken to maintain firm contact between the bit and the bottom of the borehole. Bentonite or drilling mud shall be used as drilling fluid to stabilize and protect the inside surfaces of the borehole against collapse. Use of percussion tools shall be permitted in hard clays and in dense sandy deposits.</p> <p><b>3.12.1.5.1.5 Cleaning of Boreholes</b>                      Boreholes shall be cleaned up to testing or sampling elevation using suitable tools before carrying out SPT or before</p>



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended
3	Chapter-3	<p><b>3.12.1.5.3.6 Vane Shear Test. (required for boreholes where collection of Undisturbed Soil Sampling is not possible. To be conducted at Special locations only)</b> Field vane shear test shall be performed inside the borehole to determine the shear strength and bearing capacity of cohesive soils, especially of soft and sensitive clays, which are highly susceptible to sampling disturbance. Equipment, accessories, test procedures, field observations shall correspond to IS:4434. Tests may also be conducted by direct penetration from ground surface. If the cuttings at the test depth in the borehole show any presence of gravel, sand shells, decomposed wood, etc., which are likely to influence the test results substantially, the test at that particular depth may be omitted with the permission of the Employer/PMC. However, the test shall be conducted at a depth where these obstructions cease to occur. On completion of the test, the results shall be reported in an approved proforma as specified in Appendix-A of IS:4434.</p>	<p>collection of undisturbed soil samples from borehole. Cleaning of borehole above water table shall be done by bailer with flap valves. The cleaning of borehole below water table shall be carried out by continuing circulation of drilling fluid for 10 to 15 minutes after reaching the desired level so that all soil cuttings are removed by drilling fluid and clear drilling fluid comes out from borehole.</p> <p><b>3.12.1.5.3.6 Vane Shear Test</b> Field vane shear test shall be performed in the borehole in cohesive soils, especially in case of encountering soft and sensitive clays, which are highly susceptible to sampling disturbance, or as directed by Employer/PMC, to determine the shear strength and bearing capacity of such soil strata. Equipment, accessories, test procedure, field observations etc. shall be in accordance with IS:4434. If the cuttings at the test depth in the borehole show any presence of gravel, sand, shells, decomposed wood etc., which are likely to influence the test results substantially, the test at that particular depth shall be omitted with the permission of the Employer/PMC. However, the test shall be conducted at a depth where these obstructions cease to occur. On completion of the test, the results shall be reported in Proforma as specified in Appendix-A of IS:4434. Disturbed &amp; undisturbed soil samples shall also be collected from boreholes as per specification or as directed by Employer/PMC.</p>
4.	Clause 3.12.1.9.1/Chapter-3	<p><b>3.12.1.9.1 Rates</b> The contractor's quoted rates shall be inclusive of carrying out all investigations and tests and making observations as specified above, establishing the ground level and co-ordinates at the location of each borehole, test pit etc. No extra payments shall be made for conducting Standard Penetration Test, collecting, packing, transporting of all soil/rock samples and cores, recording of results on approved formats, preparation and submission of geotechnical investigation report and all related works.</p>	<p><b>3.12.1.9.1 Measurement and Rates</b> The payment for work of soil investigation shall be made for actual depth of borehole bored in soil strata and actual depth of drilling done in rock in rocky strata at each location where geotechnical investigation has been carried out. The contractor's quoted rates shall be inclusive of carrying out all investigations and tests and making observations as specified, establishing the ground level and co-ordinates at the location of each borehole, test pit etc. No separate payment shall be made for conducting Standard Penetration</p>



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended
5.	Clause 3.12.3/ Chapter-3	<p><b>3.12.3: Stability of slope</b> Study of both short-term and long-term Slope stability at tower location as per the decision of Employer/PMC using any acceptable software shall be within the scope of the contractor; and if in-house facilities are not available and contractor may hire the services of a specialized soil investigation and geotechnical firm for this study. During detailed and Check survey, the contractor in consultation with Employer/PMC shall identify such tower locations which may have the risk of slope stability due to formation of benches for tower foundations or otherwise and he will collect, topographical data, subsoil data, observe any feature or activity in the vicinity which may have adverse impact on slope stability and he shall recommend any other type of foundation or protection measures necessary for long-term stability of slope and protection of tower foundation.</p>	<p>Test or Vane Shear Test in boreholes; collecting, packing, transporting of all disturbed and undisturbed soil/rock samples to approved testing laboratory; carrying out logging of rock cores and preparation of report through an engineering geologist; conducting all prescribed tests on soil/rock samples, recording of test results on approved formats; preparation and submission of geotechnical investigation report and all other related works, complete as per specification and direction of Employer/PMC.</p> <p><b>3.12.3 Stability of Hill Slope having Slope Wash Material</b> <b>3.12.3.1 General</b> As the terrain through which line passes is hilly, most of the towers are likely to be located on hill slopes. The hill slopes may be made up of either slope wash material having the characteristics of normal soils or made up of weathered/fissured rock or hard rock. The tower locations located on hill slopes which are made up of slope wash material may have erosion, landslide and slope stability issues after formation of benches or otherwise. The study of both short term and long term stability of hill slopes at such locations is an important aspect for overall safety and reliability of the transmission line. Such slope stability studies shall be carried out by the contractor through an specialized consultancy firm having experience in such studies by using a mutually acceptable and internationally recognized software.</p> <p><b>3.12.3.2 Erosion, Landslide and Slope Stability Studies</b> During detailed/check survey, the contractor in consultation with an engineer geologist or agency/firm having requisite experience of similar works in Himalayan region as well as Employer/PMC shall identify such tower locations which may have the risk of soil erosion, landslides and slope stability due to formation of benches for tower foundations or otherwise. The contractor shall collect all necessary topographical and subsoil data required for carrying out aforesaid studies observe any feature or activity in the vicinity which may have adverse impact on slope stability or may</p>



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended
			<p>cause soil erosion or landslide. Based on the outcome of aforesaid studies, the contractor shall recommend any other type of foundation or protection measures necessary for long-term stability of slope and protection of tower foundation including recommendation for shifting the location of tower if the same is the only solution for tackling the long term slope stability of the location. A detailed report for each location where slope stability studies have been carried out shall be submitted to Employer/PMC for approval.</p> <p><b>3.12.3.2 Measurement and Rates</b> The item of slope stability study shall be measured in number of tower locations where such studies have been carried out. The bidders shall quote the rate per tower location where such studies have been carried out. The quoted rates shall be inclusive of engaging of an engineer geologist/agency/firm; carrying out both short term and long term, erosion, landslide and slope stability studies and collection of all necessary topographical, subsoil and geological data as well as other information which may be required for carrying out aforesaid studies and preparation and submission of report to Employer/PMC for approval, complete as per specifications and directions of Employer/PMC.</p>
6.	Clause 3.12.4/ Chapter-3	<p><b>3.12.4 Geological stability of slope</b> The majority of the transmission line routes pass through steep Himalayan slopes physiographical region of middle hills with altitude from below 1300 meter to 3000 meter. The geology of middle hills of the alignment primarily consists of sedimentary rocks like siltstone, sandstone and mudstone. The middle hill exhibits a rugged topography with deeply dissected gullies and steep slopes, the hills of Siwalik are characterized by low terraces, alluvial fans, badlands and thin sandy soil covers. All the tower locations, however, uphill or downhill of a slope shall be assessed from engineering geological point of view to ensure avoiding of landslide prone areas and possibilities, erosion prone soft over ground areas and a report shall be submitted along with the detailed survey</p>	<p><b>3.12.4 Geological Stability of Hill Slopes having Weathered/Fissured/Hard Rock</b></p> <p><b>3.12.4.1 General</b> The terrain through which line passes is hilly and most of the towers are likely to be located on hill slopes. The hill slope where tower is located, may be made up of weathered/fissured rock or hard rock. Such tower locations especially located on steep slopes or weathered/fissured rock may have slope stability issues after formation of benches. The geological stability of such tower locations is an important aspect for long term safety and reliability of the line.</p>



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended
		<p>report. The cost of the Engineering geologist's services and necessary geological analysis shall be in-built within the contract price of detailed survey of transmission line route/alignment.</p> <p>The detailed reports of all the tower locations in steep slope from the stability point of view shall be submitted by the contractor along with the soil investigation report.</p>	<p><b>3.12.4.2 General Geology of Line Route</b>  The major portion of the transmission line route passes through steep Himalayan ranges of middle hills with altitude varying from below 1300 meter and up to about 3000 meter. The geology of middle hills through which the route alignment of line is passing, consists of primarily sedimentary rocks like siltstone, sandstone and mudstone etc. The middle hill exhibits a rugged topography with deeply dissected gullies and steep slopes. The hills of Siwalik range are characterized by low terraces, alluvial fans, badlands and thin sandy soil covers.</p> <p><b>3.12.4.3 Geological Stability Studies</b>  All the tower locations, uphill or downhill of a hill slope located on rocky strata or where rocky strata is available at shallow depth shall be assessed for stability of hill slopes after formation of benches from geological point of view by engaging an engineering geologist or an organization/firm having requisite experience of not less than 5 years in carrying out such works in Himalayan region. It shall be ensured that hill slope is geologically stable and landslide prone areas/erosion prone soft over ground areas shall be avoided for locating the towers.</p> <p>During detailed/check survey, the contractor in consultation with engineering geologist as well as Employer/PMC shall identify such tower locations which may have the risk of geological slope stability issues due to formation of benches for tower foundations or otherwise. The contractor shall collect all necessary topographical and geological data including carrying out geological mapping of the area required for aforesaid studies, observe any other feature or activity in the vicinity which may have adverse impact on geological stability of hill slope. Based on the outcome of geological slope stability studies, the contractor shall recommend any other type of foundation or protection measures necessary for long-term geological stability of hill slope and protection of tower foundation including</p>



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended
			<p>recommendation for shifting the location of tower if that is the only option.  A detailed report for each location where geological stability studies of hill slope have been carried out shall be submitted by contractor to Employer/PMC for approval.</p> <p><b>3.12.4.4 Measurement and Rates</b>  The item of geological stability study of hill slope shall be measured in number of tower locations where such studies have been carried out. The bidders shall quote the rate per tower location. The quoted rates shall be inclusive of the cost of engaging an engineer geologist or an agency/firm having requisite experience in similar works in Himalayan region for carrying out long term geological stability studies of hill slope and collection of all necessary topographical and geological data including carrying out geological mapping as well as other information which may be required for carrying out aforesaid studies and preparation and submission of report to Employer/PMC for approval, complete as per specifications and directions of Employer/PMC.</p>
7.	Chapter 3		<p>The following new clauses stand added after clause 3.42.1:</p> <p><b>3.42.2 Measurement and Rates</b>  The quantity of Earth work in benching shall be measured in Cu.m. Correct up to second place of decimal. The original ground levels shall be taken before starting the benching operations and a contour map of each location where benching is proposed shall be prepared as specified elsewhere in the specifications. The total volume of required excavation and filling for formation of bench shall be worked out based on original ground level as taken above and approved benching drawing. The payment for excavation shall be made as per rates for benching for different type of soils quoted by bidders in Schedule-4 against item of benching. However, the payment for filling shall be made as per the rate quoted by bidders for benching in all type of soils except soft rock /dry fissured rock and hard rock. The bidders shall quote the rates for benching work accordingly.</p>



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended																				
8.	Clause 3.43.6/Chapter 3	3.43.6 For some of the locations in small water streams (Nalas), river bed or undulated terrain etc., boulders of minimum. 150mm size bounded and packed in galvanized wire net / mesh of 8 SWG wire and 152 square (maximum) mesh are to be provided. These stones shall be provided in crates size of 2.0mx2.0m or as deemed suitable for a particular location.	3.43.6 For some of the locations in small water streams (Nalas), river bed or undulated terrain etc., boulders of size of not less than 150mm bounded and packed in galvanized wire mesh of 8 SWG wire and 100 mm square mesh are to be provided. These stones shall be provided in crates of size of 2.0mx2.0m or as deemed suitable for a particular location or as directed by Employer/PMC.																				
9.	Chapter 3	-	<p>The following new clauses stand added after clause 3.43.6:</p> <p><b>3.43.7 Measurement and Rates</b>  The quantity of protection works shall be measured in Cu.m., correct up to second place of decimal. No separate payment shall be made for necessary excavation which may be required for undertaking protection works and same is deemed to be included in the quoted rates for protection works. The cross sectional area of protection works shall be taken as per approved drawings. However, the length in which protection work has been provided shall be measured at site in meters correct up to second place of decimal. Based on cross sectional area and measured length, the volume of each type of protection works shall be worked out for the purpose of payment. For the item of backfilling within revetment, the cross sections shall be taken at a spacing of 3.0 meters before taking up protection works and the quantity of back filling shall be worked out based on said cross sections. However, the nos. of cross sections shall not be less than three. No separate payment shall be made for necessary weep holes and filters behind the weep holes and the same shall be included in the quoted rates for protection works.</p>																				
10	Schedule-4: Construction and Installation services; Price Shedule No. 4.A. Basantapur-DhungeSangu Transmission Line	<table border="1"> <thead> <tr> <th>Sr. no.</th> <th>Description</th> <th>Unit</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>4.2</td> <td>Geotechnical Investigation including all associated works as per specifications</td> <td></td> <td></td> </tr> <tr> <td>a.</td> <td>Geotechnical Investigation at</td> <td>Loc.</td> <td>129</td> </tr> </tbody> </table>	Sr. no.	Description	Unit	Quantity	4.2	Geotechnical Investigation including all associated works as per specifications			a.	Geotechnical Investigation at	Loc.	129	<table border="1"> <thead> <tr> <th>Sr. no.</th> <th>Description</th> <th>Unit</th> <th>Quantity</th> </tr> </thead> <tbody> <tr> <td>4.2</td> <td>Geotechnical Investigations: Carrying out Geotechnical Investigations at designated tower locations (comprising about 124 nos. of normal</td> <td></td> <td></td> </tr> </tbody> </table>	Sr. no.	Description	Unit	Quantity	4.2	Geotechnical Investigations: Carrying out Geotechnical Investigations at designated tower locations (comprising about 124 nos. of normal		
Sr. no.	Description	Unit	Quantity																				
4.2	Geotechnical Investigation including all associated works as per specifications																						
a.	Geotechnical Investigation at	Loc.	129																				
Sr. no.	Description	Unit	Quantity																				
4.2	Geotechnical Investigations: Carrying out Geotechnical Investigations at designated tower locations (comprising about 124 nos. of normal																						



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended																
		<p>designated tower locations for all type of soils including fissured rock and Hard rock up to a depth of 12 m below ground level or 1.5 times the width of foundation below foundation level whichever is more and conducting SPT tests, Vane shear tests, collection of disturbed and undisturbed soil samples from various depths including conducting all necessary laboratory tests on soil samples etc and preparation of Geotechnical Investigation Report at each tower location complete as per specification.</p> <table border="1" data-bbox="792 835 1203 1528"> <tr> <td data-bbox="792 1465 885 1528">4.4</td> <td data-bbox="792 1056 885 1465">Geological stability and slope stability studies</td> <td data-bbox="792 961 885 1056">Loc.</td> <td data-bbox="792 835 885 961">30</td> </tr> <tr> <td data-bbox="889 1465 1203 1528">4.9</td> <td data-bbox="889 1056 1203 1465"><b>Protection of tower footing including all the associated work complete for D/C Twin Moose Tower</b></td> <td data-bbox="889 961 1203 1056"></td> <td data-bbox="889 835 1203 961"></td> </tr> <tr> <td data-bbox="987 1465 1079 1528">a.</td> <td data-bbox="987 1056 1079 1465">Random rubble stone masonry including excavation (1:5 cement : concrete)</td> <td data-bbox="987 961 1079 1056">CUM</td> <td data-bbox="987 835 1079 961">5000</td> </tr> <tr> <td data-bbox="1084 1465 1203 1528">c.</td> <td data-bbox="1084 1056 1203 1465">Back filling and levelling within revetment</td> <td data-bbox="1084 961 1203 1056">CUM</td> <td data-bbox="1084 835 1203 961">5000</td> </tr> </table>	4.4	Geological stability and slope stability studies	Loc.	30	4.9	<b>Protection of tower footing including all the associated work complete for D/C Twin Moose Tower</b>			a.	Random rubble stone masonry including excavation (1:5 cement : concrete)	CUM	5000	c.	Back filling and levelling within revetment	CUM	5000	<p>locations and about 5 nos. of special locations) for all type of soils including fissured/hard rock up to a depth of 12 m at normal tower locations and 40m at special tower locations (like river crossing or marshy land) requiring pile foundation or refusal, whichever occurs early, through 150mm dia. bore holes in soils and through drilling in rock using Nx size drill bits; conducting SPT tests in boreholes, collection of disturbed &amp; undisturbed soil/rock samples from specified depths, conducting chemical analysis of soil and subsoil water samples obtained from boreholes, conducting necessary laboratory tests on soil/rock samples for determining all necessary engineering properties of soil/rock and preparation of report with recommendation on type of foundation, dry &amp; submerged unit weight of soil/rock, shear parameters of soil/rock including angle of repose of soils under dry conditions and submerged conditions, allowable &amp; safe bearing capacity of soil/rock, soil resistivity values, etc.</p>
4.4	Geological stability and slope stability studies	Loc.	30																
4.9	<b>Protection of tower footing including all the associated work complete for D/C Twin Moose Tower</b>																		
a.	Random rubble stone masonry including excavation (1:5 cement : concrete)	CUM	5000																
c.	Back filling and levelling within revetment	CUM	5000																





Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended
			<p>including the cost of all materials, labour, POL, hire charges of equipments, etc. complete as per specifications, relevant Indian Standards and directions of Employer/PMC;</p> <p>a. Boring 150mm dia. boreholes in soils up to specified depth or refusal, whichever occurs early, conducting SPT at specified depths and collection of disturbed and undisturbed soil samples from boreholes from specified depths, packing and transportation of soil samples from site to approved Soil Testing Laboratory, conducting prescribed tests on soil samples in laboratory and preparation of detailed geotechnical investigation report etc. complete as per specification and direction of Employer/PMC;</p> <p>(i) Normal locations Running Meter 1340</p> <p>(ii) Special locations Running Meter 180</p> <p>b. Drilling in rock using Nx size drilling bits up to specified depth (i.e. 3.0 m at normal locations and 7.0m at special locations or as directed by Employer/PMC), obtaining</p>



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended
			<p>continuous cores of rock, supplying the wooden core boxes and storing the cores therein, transportation of core boxes to stores, logging of cores by an engineering geologist, transportation of rock samples from site to approved Rock Testing Laboratory, conducting prescribed tests on rock samples in laboratory and preparation of detailed geotechnical investigation report etc. complete as per specification and direction of Employer/PMC;</p> <p>(i) Normal locations Running Meter 150</p> <p>(ii) Special locations Running Meter 20</p>
			<p>4.4 Carrying out slope stability and geological stability studies at designated tower locations as per specifications, relevant Indian/Nepalese standards, other relevant references, best engineering practices and direction of Employer/PMC</p>
			<p>a. Slope stability studies of tower locations Loc. 30</p>
			<p>b. Geological stability studies of hill slopes at tower locations Loc. 30</p>
			<p>4.9 Protection of tower footing including all the associated work complete as per specifications, relevant Indian/Nepalese standards, other</p>



Sl. No.	Reference Clause/Chapter No.	Clause/Chapter as Existing	Clause/Chapter as Amended		
			relevant references Employer/PMC	and direction	of
			a. Random rubble stone masonry in 1 : 5 cement sand mortar (1 cement : 5 coarse sand) including filling the voids within masonry with 1 : 4 : 8 lean concrete (1 cement : 4 fine aggregate : 8 coarse aggregate of 40mm nominal size) and flush pointing of joints on earth side and raised pointing on other side complete as per specifications, Indian/Nepalese standards, and direction of Employer/PMC	CUM	5000
			c. Back filling and levelling within revetment with approved earth in layers of 300mm thickness (un-compacted thickness) and compacting each layer to 90% of Proctor's dry density at optimum moisture content complete as per specifications, Indian/Nepalese standards, and direction of Employer/PMC	CUM	5000

