

HLL INFRA TECH SERVICES LTD. (HITES)
(Subsidiary of HLL Lifecare Ltd., A Government of India Enterprise)

As executing agency of CDSCO
Invites E-tender for

33KV HT line Works on EPC Basis

VOLUME- 3

DESIGN BASIS REPORT

Tender No. -HITES/IDN/2023-24/CDSCO/HT LINE WORKS



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DESIGN BASIS REPORT-33KV HT LINE WORKS

The project shall be executed on EPC (Engineering, Procurement & Construction) basis wherein the Master Plans & Concept Designs shall be as per the UPPCL Specifications, Survey Plans and other drawings. EPC Contractor shall be responsible for complete detailed designing, engineering, procurement, Installation, construction and commissioning of the 33 KV HT line works from 220 KV Sub-Station Bapudham, Ghaziabad to IPC Campus, Raj Nagar, Ghaziabad, U.P.

GENERAL

- (a) The EPC Contractor shall carry out Design, Engineering, Supply, Installation, Testing & Commissioning of underground 33KV HT line works through Horizontal Directional Drilling (HDD) from 33 KV Bay at 220KV Bapudham Substation to HT meter inside HT meter room at IPC Campus, Raj Nagar Ghaziabad. All Electrical works shall be designed and executed as per latest codes of practice for Electrical installations and meeting the requirements of Indian Electricity Rules/Act, applicable I.S. Codes/ Rules and relevant IS/ CPWD Specifications/ UPPCL Specifications/requirements, latest up to date.
- (b) The rating and capacity of equipment indicated herein below are minimum to be provided. However, during detailed designing, if required and found necessary, the capacity / rating of the equipment may be upgraded by the EPC Contractor.
- (c) Contractor shall be responsible to get all required clearances from concerned Government departments, viz.-Environment, Forest Department, Electrical safety, Railways, Highway Authorities, Municipalities/Ghaziabad Development Authority/ IGL /Fire Safety Department/ UP Pollution Control Board (UP Pollution Control Board) or the Central Pollution Control Board and other concerned statutory authorities, before the start of work. The required fees by these departments for issuing the clearances for the work shall be paid by the Client/HITES, If any fee paid towards these by the contractor, same shall be reimbursed against the production of original payment receipts and therefore, expected fees shall not be the part of price bids. The contractor shall pursue/liaison with the concerned departments in getting the clearances as per requirements.

1. SCOPE OF WORK**Details of the works involved**

Supply, transit, storage, erection, Installation, testing & commissioning of Laying of 33 KV HT Line and all required major and minor equipment as per requirements.

33KV Substation Bay:-

- Tap the 33KV bay at 220 KV Substation Bapudham Ghaziabad, as per directions of UPPCL.

33kV Line

- New underground cables 2 Runs from 33 KV Bay at 220 KV Substation Bapudham Ghaziabad to HT meter at Metering Room, IPC Complex Raj Nagar, Ghaziabad .
- Bifurcation and Reconductoring of existing lines, as per requirements.

- Termination of 33KV HT line at Metering Room, IPC Complex Raj Nagar, Ghaziabad .
- Termination of 33KV HT line at 220KV Sub Station bay at Bapudham Ghaziabad, as directed by UPPCL.
- Charging of the 33KV line.
- Testing & Commissioning
- Successful Handover to PVVNL/UPPCL.

The scope shall cover complete installation of all equipment and accessories covered under this contract. Details as given below shall be strictly adhered to as per relevant codes and standards:-

Particular	Detail
Execution	All the works indicated above are to be carried out complete in all respect on Turnkey basis within the specified time.
Bill of Quantity (BOQ)	It is an EPC contract; hence no BoQ is being issued with tender. However, during final handover to UPPCL O&M the contractor shall submit the measurements of all the executed items of the work.
Pre Tender Survey & Site Visit	<ol style="list-style-type: none"> 1. It will be mandatory of the bidders to conduct pre tender survey of the sites and for that they should visit the 220KV Bapudham Substation, IPC Complex Raj Nagar , Ghaziabad and other works site & also see the tentative line routes to assess the quantum of work. 2. To access the quantum of work before quoting the price bid, tenderer shall contact respective Engineer-Incharge for 33KV HT Line works.
Procurement of Material and Equipment	<ol style="list-style-type: none"> 1. The contractor has to make his own arrangements for procurement, supply and use of materials as per requirement. 2. In procurement of these items the contractor shall follows all regulations of the UPPCL/UP govt. / Government of India in respect of import license etc., if he chooses to procure these from imports. Further, the contractor shall be responsible for the payment of applicable duties and taxes, port clearance, inland transportation etc. 3. Manufacturer's test certificate for these materials shall be submitted and got approved by Engineer of the contract/UPPCL, before utilization. The materials so supplied by the contractor shall be guaranteed as per UPPCL Guidelines/ procedures .
Accessories	<ol style="list-style-type: none"> 1. This being a EPC contract, successful installation, commissioning & integration with existing system, of those equipment/accessories/material not specifically mentioned in the specifications, shall be the responsibility of contractor. No extra payment shall be made for these inherent works. 2. He shall also supply all other associated equipment/

Particular	Detail																					
	<p>material/accessories not specifically mentioned in this tender / specification but are required for successful and trouble free operation of the executed work as a whole. For that no extra payment shall be made to the contractor.</p> <p>3. This also includes insulators, cross arms, hardware, jumpers, cable racks, GI strips, junction boxes, lugs, clamps, connectors, earthing rods, hardware fittings, angles and channels and all other unforeseen items whose prices are not indicated in the price schedule.</p> <p>4. Contractor shall be supplying suitable size jumpers/droppers/any other item, needed for connecting equipments with existing equipments.</p>																					
Technical Standards	<p>1. The electrical equipments and materials required during erection should be of high standard. Technical features of these equipments and materials must conform to the technical specification given in this bidding document. Wherever the same is not specified, it must conform to the relevant I.S for that material.</p> <p>2. Materials conforming to other international standards, which ensure equal or higher quality than the standards mentioned above, shall also be acceptable. In case the bidders who wish to offer materials conforming to other standards, salient points of difference between standards adopted and specific standards shall be clearly brought out in the respective schedule. Four copies of such standards with authentic English version shall be furnished along with the offer.</p> <p>3. Whenever a material or an article is specified or described by the name of a particular brand, manufacturer or trade mark, the specific item shall be understood as establishing type, function and quality desired. Products of other manufacturers may also be considered, provided sufficient information is furnished, so as to enable the owner to determine that the products are equivalent to those mentioned.</p> <p>4. Materials supplied/used shall conform in all respects to the relevant Indian Standard Specification with latest amendments there to.</p> <table><tr><th></th><th>Title</th><th>IS No.</th></tr><tr><td>1.</td><td>Cement</td><td>IS 269</td></tr><tr><td>2.</td><td>Steel</td><td>IS 6003/1970</td></tr><tr><td>3.</td><td>Fasteners</td><td>IS 6639/1972</td></tr><tr><td>4.</td><td>Concrete mix</td><td>IS 1343</td></tr><tr><td>5.</td><td>RCC</td><td>IS 456</td></tr><tr><td>6.</td><td>Cable laying and jointing</td><td>IS 1255</td></tr></table> <p>5. Installation work pertaining to equipment, cabling etc should be in accordance with the applicable standards,</p>		Title	IS No.	1.	Cement	IS 269	2.	Steel	IS 6003/1970	3.	Fasteners	IS 6639/1972	4.	Concrete mix	IS 1343	5.	RCC	IS 456	6.	Cable laying and jointing	IS 1255
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	safety codes etc.
Quality Assurance, Inspection & Testing (QA&I)	<p>The major equipments/material supplied by the contractor or its sub vendor has to be got inspected and tested by the UPPCL/HITES for its quality and quantity before dispatch to the work site.</p> <p>The contractor shall have to follow the procedures laid down with this tender specification or any other procedure intimated later on.</p> <p>Rest of the equipment/ materials shall be checked at site for dimensions, weights, finish and quality. For this purpose the contractor shall have to provide general measuring equipment like steel tape, vernier calipers, screw gauge, tong tester, earth resistance tester, 2.5 KV meggar and other equipment as per requirements.</p> <p>The following items shall be inspected/tested at the manufacturers premises before dispatch:</p> <ol style="list-style-type: none"> 1) Transformers 2) 33 kV Lightning Arrestors 3) 33 kV VCB 4) 33 kV control panels 5) 11 kV VCB panels 6) 33 kV CT 7) 33 kV PT 8) 33 kV Isolators 9) All types of power cable including 33 KV HT Cable 10) TPMO 11) D.O. fuse set 12) Distribution Pillar Box 13) TVMs 14) Aerial Bunched conductors 15) ST Poles 16) Conductors 17) Transformer trolley & connecting system 18) Battery & Battery Charger 19) 11 kV Capacitor Banks & panels 20) Metering Cubicles 21) 11 kV outdoor type combined CT- PT metering unit with meter box. 22) GI & GSS wire 23) Distribution Boxes/Kiosks used for tapping the connection from Aerial Bunched conductor. 24) LT Distribution Pillar Boxes and fuses 25) All other items required for completion of work
Approaches	The approaches to site of work, if necessary, shall have to be made by the contractor at his own cost so as to get easy access for both personnel and equipments.
Water And Power Supply	The Contractor has to make use of the water supply if available at any of the substation site for construction purpose. However

Particular	Detail
	<p>transport of water from the source to the working area will be contractor's responsibility.</p> <p>It is essential that the contractor shall prevent misuse of wastage of water at all time, failing which necessary charges will be collected from the contractor. In case, water is not available at site, the contractor has to make his own arrangement and any extra claim on account of this will not be entertained.</p> <p>Power required for construction will be made available on demand at one point for which payment shall be made by the contractor.</p>
Men, Material & T&P	<ol style="list-style-type: none"> 1. The contractor shall himself arrange all men & material, all constructional T & P and any other material required for successful and speedy execution of the job within the prescribed time 2. All tools, welding equipment, crane, scaffolding, rigging materials, ladders, consumables, hardware etc. required for installation shall be arranged by the contractor. 3. The contractor shall provide experienced, technically qualified, and supervising Engineers for supervision. The contractor shall engage only competent skilled workers. 4. The contractor shall observe strict adherence to the existing labour laws.
Site Storage/ Transportation	<ol style="list-style-type: none"> 1. It shall be the responsibility of the contractor to store, move/transport from stores/storage yard etc., relevant items and accessories to the place of installation wherever necessary he will assemble all parts of equipment. In accordance with the specific installation instructions as directed by Site Engineer. 2. The stores should be dismantled and site cleared after the work is completed
Co-ordination	<ol style="list-style-type: none"> 1. The contractor shall be responsible for overall co-ordination with internal/external agencies, project management, training of owner's manpower etc. as required. 2. The supplier/ contractor shall open his office in that town and shall co-ordinate with concerned authorities of HITES/UPPCL/ related Statutory Authorities for all the matters pertaining to the works.
Erection, Testing and Commissioning	<ol style="list-style-type: none"> 1. All the works covered under the scope of the tender shall be done in accordance with the norms defined in urban construction manual/ required Manual/Norms of UPPCL, unless the same is not specifically defined in the specification or with the provisions of Indian Electricity Rules/Acts/Other Government Rules/Regulations as prevalent at the time of execution of the job/work. 2. Installation shall be carried out strictly in accordance with the approved drawings, Modifications, if any, required to suit site conditions, shall be carried out only with the prior

Particular	Detail
	<p>approval of the Engineer In charge. All such changes shall be incorporated in "As built" drawings to be furnished by the contractor.</p> <ol style="list-style-type: none"> 3. Responsibility for successful installation of other equipment accessories, purchased but not mentioned specifically above, and their commissioning shall be on contractor. For all such items the contractor shall be supplying all material and equipment required to accomplish the job complete in all respect. 4. Installation work pertaining to equipment, cabling etc should be in accordance with the applicable standards, safety codes etc. 5. The contractors shall themselves be responsible for timely arrangement/ procurement of all the raw materials required for the manufacture of all tendered items by them/ their and / or by their vendors. 6. While Repairing & Replacing the equipment, if any other equipment gets damaged due to negligent handling of the contractor the same shall be replaced by the contractor at his cost to the owner satisfaction. He shall be responsible for dismantling of defective equipments, there proper handling and shifting. Also he shall hand over the old & dismantled equipments/ material to the UPPCL/ purchaser's local stores or other sites as per instructions of the UPPCL for which no extra payment shall be made. 7. All charges on account of damages/losses/claims/thefts etc. involved under the conditions laid down above shall be borne by the contractor. It's cost shall be recovered from his bills /security deposits /other assets. 8. In order to avoid hazards to personnel moving around, the equipment such as Transformer, Capacitor Banks, Switchgears etc. if required to be kept charged after installation till their commissioning, shall be cordoned off by suitable barriers to prevent accidental injury to personnel moving around. 9. Where the equipments/ assemblies are supplied in more than one part, the contractor shall make all necessary mechanical and electrical connections between the sections. The contractor shall also do necessary adjustment in the alignments required for its proper operation. 10. Care shall be taken in handling instruments relays and other delicate devices where instruments and relays are supplied separately they shall be mounted only after the associated switch gear/control panels are erected and aligned. 11. Precaution: The contractor shall exercise all possible care to avoid damage to public utilities e.g. water/ sewage pipes telephone and power lines/cable already existing. In case of

Particular	Detail
	<p>any accidental damage during the work, the contractor shall be responsible to repair/replace the same at his own cost, and shall ensure that the purchaser is not put to any loss.</p> <p>12. The contractor shall have to provide proper lighting, barricading, signboards etc. at the work site as a necessary precautionary arrangement to avoid accident/ damage/ losses to the public /utilities/properties.</p> <p>13. Site Solution: It may be possible due to some reasons or others that it would not be possible to work as per the procedure. In such case/cases, the solution to the problem shall be achieved by the UPPCL with the consultation of contractor, and the contractor shall work as per procedure proposed by the UPPCL. Such cases shall in variably be informed to the engineer of the contract for which no extra payments shall be made.</p> <p>14. Space Constraints: While executing the job it is quite possible that some of the specified work may not be carried out due to space/land/ other technical constraints etc. In such case, approval of UPPCL/HITES shall be obtained for such diversion without any extra cost.</p> <p>15. The contractor shall ensure that the equipment under erection as well as the work area and the site are kept clean to the satisfaction of the Engineer. In case, the Engineer is not satisfied about the cleanliness he will have the right to carry out the cleaning operations and expenditure incurred in this regard will be to contractor's account. Packing cases and packing materials shall be promptly cleared from sites.</p>
Civil Works	<p>The contractor shall also be responsible for constructing all the plinths & foundations and other switchyard structures & equipments. In case of any modification required for these at existing 220KV substation, the contractor shall carry out the necessary work after taking due approval from UPPCL. No extra payment shall be made to contractor for these civil works.</p>
Schedule of work completion/ PERT Chart/Bar Chart	<p>1. The complete work mentioned in the specification shall be completed within completion period mentioned in Special Condition of Contract from the date of awarding the contract.</p> <p>The survey of each and every site of the work shall be completed within fifteen days time by the contractor.</p> <p>2. The contractor shall estimate the actual quantities of equipments / material required to complete the work to the full satisfaction of UPPCL and get it approved from UPPCL.</p> <p>3. The contractor shall submit the 'PERT' chart for complete execution of work at the time of signing the contract agreement as per completion schedule of contract.</p> <p>This PERT chart shall include all the activities such as design, engineering, approval of drawings and vendors, procurement, manufacturing, erection, testing and commissioning.</p>

Particular	Detail
	<ol style="list-style-type: none">4. After placements of the orders with the manufacturer, the delivery of equipments should be so regulated that it is received at the site nearly 15 days prior to its erection.5. The delivery of material/equipments being received at site, should be strictly regulated with the schedule of its erection.6. The payment of material shall be justified with the physical progress of the corresponding work.7. Precaution should be taken, not to increase the inventory of the owner without actually utilizing it at the site for a long time.

**GENERAL SPECIFICATION FOR CONSTRUCTION OF 33KV/11KV/
COMPOSITE/LT LINES**

Sl. No.	Particular	Detail
1.	Survey and Pole Spotting	<ol style="list-style-type: none"> 1. Before taking up the line construction work the contractor shall verify the proposed line route by jointly surveying with the representative of the UPPCL. 2. The exact spotting of the single and multiple structures have to be finalized by the contractor in consultation with UPPCL. Topographical maps of the survey of India shall not be provided for this purpose. 3. The final schedule indicating location of poles, angle of deviation, road crossing and other details shall be submitted for the approval to UPPCL 4. After approval the contractor shall submit four more sets of the approved reports along with one set of reproducible of final profile drawing to the Engineer of the Contract for record purpose.
2.	Span	The span of the line for 33kV shall be as per UPPCL/ PVVNL guidelines/specifications.
3.	Right of Way	Right of way and necessary way leave clearance shall be arranged by the contractor, in accordance with the work schedule. The contractor will arrange to secure way leave and Right of way in the restricted area as per requirements. Any expenditure to be incurred shall be borne by the contractor. Further, Required Statutory Approvals shall be obtained by the contractor and statutory fees shall be reimbursed to contractor on presenting receipt of the same.
4.	Road Crossing	At all important road crossing the poles shall be fitted with Disc type insulator but the ground clearance at the roads under maximum temperature and in still air shall be such that even with conductor broken in adjacent span, ground clearance of the conductor from the road surface will be as per IE rules 1956 as amended from time to time and proper cradle guarding to be provided across the road. Further, Required Statutory Approvals shall be obtained by the contractor and statutory fees shall be reimbursed to contractor on presenting receipt of the same.
5.	Railway Crossing	At the time of route survey, the railway crossings shall be finalized as per the regulation laid down by the Railway Authorities. The following are the important

Sl. No.	Particular	Detail
		<p>features of the prevailing regulations (revised in 1987):</p> <p>(i) The crossing shall normally be at right angle to the railway track.</p> <p>(ii) No crossing shall be located over a booster transformer, traction switching station, traction sub- station or a track cabin location in an electrified area.</p> <p>The approval for crossing railway track shall be obtained by the Contractor from the Railway Authority on behalf of UPPCL. The letter to this regard shall be obtained by the Contractor from officer concerned of Client/UPPCL and expenditure thereof will be paid by the contractor.</p>
6.	Power Line Crossing and Tele communication line crossing	<p>Where line is to cross over another line of the same voltage or lower voltage. Provisions to prevent the possibility of its coming into contact with other overhead lines shall be made in accordance with the Indian Electricity Rules, 1956 as amended from time to time.</p> <p>All the works related to the above proposal shall be deemed to be included in the scope of the contract except in case, if modifications are required in the line below or above, the line being crossed. In such cases, work shall be done on the conditions agreed upon.</p> <p>The angle of crossing shall be as near to 90 degree as possible. However, deviation to the extent of 30 degree may be permitted under exceptionally difficult situations.</p> <p>Also, in the crossing span, power line support will be as near the telecommunications lines as possible, to obtain increased vertical clearance between the wires.</p> <p>When the angle of crossing has to be below 60 degree the matter will be referred to the authority in charge of the telecommunication system. The contractor shall obtain the letter from of Client/UPPCL and permission of telecommunication authority shall be obtained by the contractor on behalf of Client/UPPCL.</p> <p>Methods ensuring that normal services may not be interrupted nor damage caused to property shall be used during stringing operations, where roads, channels, telecommunication lines, power lines and railway lines have to be crossed.</p> <p>However shut down shall be obtained when working at crossings of overhead power lines.</p>
7.	Clearance from Ground, Building, Trees etc.	<p>1. While constructing the 33 & 11 kV lines on roadside having inadequate electrical clearances between pole & buildings the feasibility of fixing projected bracket fabricated by suitable size of M.S. Angle &</p>

Sl. No.	Particular	Detail
		<p>Channel with its supporting bracing on the existing poles may be explored. In case it becomes feasible, the line may be erected on fittings & insulators to be fitted on such brackets.</p> <p>The cost of these brackets shall be charged as per the prices quoted in the relevant column of price schedule.</p> <ol style="list-style-type: none"> Clearance from ground, building, trees and telephone lines shall be provided in conformity with the Indian Electricity Rules, 1956 as amended upto date. Any way leave which may be required by the contractor shall be arranged by him on behalf of respective DISCOM. Payment of compensation if any towards the clearance etc. will be the responsibility of the contractor.
8.	Statutory Regulations And Standards	<ol style="list-style-type: none"> The contractor is required to follow local statutory regulations stipulated in Electricity (Supply) Act 1948, Indian Electricity Rules 1956, or as amended and other local rules and regulations referred in this specification. The codes and/ or standard referred to in the specifications shall govern. Such codes and/ or standard, referred to shall mean the interest revisions, amendments, changes adopted and published by the relevant agencies unless otherwise indicated. Other internationally accepted standards which ensure equal or better performances than those specified shall also be accepted, subject to prior approval by the Client/UPPCL.
9.	Erection of poles	<ol style="list-style-type: none"> The pits are excavated in the direction of line as this facilitates erection of pole in addition to giving natural stability. The depth of pit should be the 1/6 of the height of respective pole in all type of soil laterite / hard rock and 75 cm being in the direction of line. The size of stone pad should be 300x300x75 mm. The pole is to be erected in alignment with utmost care and the excavated earth should be back filled properly by ramming and concreting in the ratio of 1:4:8 concreting is to be measured separately. Concreting of the support is to done as per relevant drawing enclosed, by a mixture of 1:4:8 (by volume). The size of the pole plinth is kept as 450x450 mm and height 300 mm above ground level as per drawing. The top 100 mm is kept tapered so that no

Sl. No.	Particular	Detail
		<p>rainwater gets accumulated on the top. The underground portion of the concreting shall be 450 mm x 450 mm x depth of plantation of support.</p> <p>4. Every pole of new line is to be properly grouted by the contractor and plinth be made around it as per as per UPPCL norms. All the fittings, cross arms, insulators and stays are to be properly fitted/erected by the contractor.</p>
10.	Insulator Fixing	<p>Pin Insulators shall be used on all poles and disc Insulator on angle and dead end poles. Damaged insulators and fittings, if any, shall not be used. Prior to fixing, all insulators shall be cleaned in a manner that will not spoil, injure or scratch the surface of the insulator, but in no case shall any oil be used for that purpose. Torque wrench shall be used for fixing various line materials and components, such as suspension clamp for conductor, whenever required.</p>
11.	Earthing	<p>1. Each and every pole of the new 33 kV line and every third pole of LT line shall be properly earthed by the contractor by constructing electrode type earthing using 5 mm GI wire and 2500mmx20 mm dia MS earthing rod.</p> <p>2. The cost of the same shall be included in the price quoted for poles/supports as per standard practice of UPPCL. Detailed drawing no. DD&SO-27 are enclosed.</p>
12.	Stringing	<p>1. Stringing and sagging of the conductor and earth wires shall be done properly by the contractor so that all poles remain erected vertically and no insulator is tilted. Proper binding of conductor on the insulators and proper tightening of the nut bolts of the cross arms, bracings, guarding angle and clamps must be ensured by the contractor.</p> <p>2. It Includes spreading of conductors without any damage and stringing with proper tension without any kinks/damage including binding of conductor at pin points, jumpering at cut points etc.</p> <p>3. The stringing of the conductor shall be done by the standard stringing method.</p> <p>4. The contractor will discuss with the Client/HITES/UPPCL for the stringing methods he proposes to follow and obtain their consent to startup the work.</p> <p>5. Conductors or earth wires shall not be allowed to hang in the stringing blocks for more than 96 hours before being pulled to the specified sag.</p>
13.	Fixing of Conductors and	<p>1. Conductor and earth wire accessories shall be installed by the contractor / earthwire clamping.</p>

Sl. No.	Particular	Detail
	Earth Wire Accessories	<p>While installing the conductor as per the design requirement within 24 hours of the conductor and earthwire accessories.</p> <ol style="list-style-type: none"> 2. After installing the conductor and earthwire, its accessories shall be installed within 24 hours. 3. Proper care shall be taken to ensure that the surfaces are clean and smooth and that no damage occurs to any part of the accessories or of the conductors.
14.	Handling Of Conductor And Earthwire	<ol style="list-style-type: none"> 1. The contractor shall be entirely responsible for any damage to the pole or conductors during stringing. The conductors shall be run out of the drums from the top in order to avoid damage. 2. A suitable braking device shall be provided to avoid damaging, loose running out and kinking of the conductors. Care shall be taken that the conductors do not touch and rub against the ground or objects, which could scratch or damage the strands. 3. The sequence of running out shall be from the top to down. i.e. the top conductor shall be run out first, followed in succession by the side conductors. Unbalanced loads on poles shall be avoided as far as possible. Wherever applicable, inner phase of line conductors shall be strung before the stringing of the outer phases is taken up. 4. When lines being erected run parallel to existing energized power lines, the contractor shall take adequate safety precautions to protect personnel from the potentially dangerous voltage build up due to electromagnetic and electrostatic coupling in the pulling wire, conductors and earth wire during stringing operation. 5. The conductor shall also take adequate safety precautions to protect personnel from potentially dangerous voltage build up due to distant electrical storms. 6. The conductor shall be continuously observed for loose or broken strands or any other damage during the running out operations. 7. Repair to conductors, if necessary, shall be carried out with repair sleeves. 8. Repairing of the conductor surface shall be carried out only in case of minor damage, scuff marks, etc, 9. The final conductor surface shall be clean, smooth and free from projections, sharp points, cuts, abrasions etc.
15.	Replacement of conductor	<p>If any replacement is to be effected after stringing and tensioning or during maintenance e.g. replacement of</p>

Sl. No.	Particular	Detail
		cross arms, the conductor shall be suitably tied to pole at tension points or transferred to suitable roller pulleys at suspension points.
16.	Jointing	<ol style="list-style-type: none"> 1. When approaching the end of a drum length, at least three coils shall be left in place when the stringing operations are stopped. These coils are to be removed carefully, and if another length is required to be run out, a proper joint shall be made. 2. Conductor joints shall not crack or otherwise be susceptible to damage in the stringing operation. The Contractor shall use only such equipment /methods during conductor stringing which ensure complete compliance in this regard. 3. All the joints on the conductor and earthwire shall be of the compression type, for which all necessary tools and equipment like compressors, dies, etc. shall be obtained by the Contractor. Each part of the joint shall be cleaned by wire brush till it is free of rust of dirt, etc, and be properly greased with anti corrosive compound. If required and as recommended by the manufacture, before the final compression is carried out with the compressors. 4. All the joints shall be made at least 30 meters away from the pole. No joints or splices shall be made in spans crossing over main roads, railways and small river spans. Not more than one joint per conductor per span shall be allowed. The compression type fittings shall be of the self-centering type, care shall be taken to mark the conductor to indicate when the fitting is centered properly. During compression or splicing operation: The conductor shall be handled in such a manner as to prevent lateral or vertical bearing against the dies. After compressing the joint the aluminum sleeve shall have all corners rounded, burns and sharp edges removed and smoothened. 5. During stringing of conductor to avoid any damage to the joints the contractor shall use suitable protector for mid span compression joints in case they are to be passed over pulley blocks aerial roller. The pulley groove size shall be such that the joint along with protection can be passed over it smoothly.
17.	Tensioning And Sagging Operations	<ol style="list-style-type: none"> 1. The tensioning and sagging shall be done in accordance with the approved work programme by HITES/UPPCL. The conductors shall be pulled up to the desired sag

Sl. No.	Particular	Detail
		<p>and left in running blocks for at least one hour after which the sag shall be rechecked and adjusted, if necessary, before transferring the conductors from the running block to the suspension clamps.</p> <ol style="list-style-type: none"> The sag will be checked in the first and the last section span for section upto eight spans, and in one additional intermediate span for section with more than eight spans. The sag also be checked when the conductors have been drawn up and transferred from running block to the insulator clamps. At sharp vertical angle, conductor and earthwire sags and tensions shall be checked for quality on both sides of the angle and running blocks. The suspension insulators assemblies will normally assumed verticality when the conductor is clamped. Tensioning and sagging operation shall be carried out in calm weather when rapid changes in temperature or not likely to occur.
18.	Clipping In	<ol style="list-style-type: none"> Clipping of the conductor into position shall be done in accordance with the manufacturer's recommendations. Jumper at section and angle poles shall be formed to parabola shape to ensure maximum clearance requirements. Fasteners in all fittings and accessories shall be secured in position. The security clip shall be properly opened and sprung into position.
19.	33kV Guarding	<ol style="list-style-type: none"> Guarding along the line <ul style="list-style-type: none"> Two numbers parallel GI wires 6SWG (guarding wires) shall run below the conductor and shall be supported on M.S. angle of prescribed size. Cross lacings of GI wire 8 SWG shall be provided at every 4 M. interval throughout the crossings. The cross wires/ lacings shall be bent in U shape and their ends shall be clamped with the parallel guard wires by proper binding. Guarding across the road crossing/electric lines/telecommunication line (as Cradle guarding) <ul style="list-style-type: none"> Five numbers parallel GI wires 6SWG (guarding wires) shall run below the conductor and shall be supported on M.S. angle of prescribed size. Cross lacings of GI wire 8 SWG shall be provided at every 0.6 M. interval throughout the crossings. The cross wires/ lacings shall be bent in U shape and their ends shall be clamped with the parallel guard wires by proper binding.
21.	Final Checking,	After completion of the works, final checking of the line

Sl. No.	Particular	Detail
	Testing and Commissioning	<p>shall be carried out by the contractor to ensure that all foundation works, pole erection and stringing have been done strictly according to the specifications and as approved by the Client/HITES/UPPCL.</p> <p>All the works shall be thoroughly inspected in order to ensure that.</p> <ol style="list-style-type: none"> Sufficient backfield earth covers each foundation pit and is adequately compacted: All poles are used strictly according to final approved drawing and are free of any defect or damage whatsoever. The stringing of the conductors and earth wire has been done as per the approved sag and tension and desired clearance are clearly available. All conductor and earth wire accessories are properly installed. All other requirement for completion of works such as fixing of 33 KV danger plate and anti-climbing device (Barbed wire) have been fulfilled. Danger plates and route markers shall be fixed on entire route, as per UPPCL Norms/Specifications. Wherever required, the proper revetment (erosion protection) is provided. The insulation of the line as a whole is tested by the contractor through provision of his own equipment, labour etc, to the satisfaction of the Owner; All poles are properly grouted. The line is tested satisfactorily for commissioning purpose.
22.	Safe up keep and transportation of dismantled material to stores	<p>All dismantled material e.g. conductor, insulator, poles etc. requires proper handing and stacking. Dismantled conductor must be re-rolled on the wooden drums to avoid any damages. All such dismantled materials may be safely transported to Contractor store at IPC Complex/UPPCL store and handled over to the authorized representative HITES/UPPCL.</p> <p>Loses, damages or theft of material during erection, transformation and landing will be to the account of the contractor. The cost of such damages /losses/ theft will be recovered in full from the contractor's bill or in other bills.</p>

GENERAL SPECIFICATION FOR LAYING OF 11 KV & 33 KV XLPE CABLE

Sl. No.	Particular	Detail												
1.	General:	<div>1. The scope shall cover complete installation of all equipment and accessories covered under this contract.</div> <div>2. Installation work pertaining to equipment, cabling etc should be in accordance with the applicable standards, safety codes etc.</div> <div>3. Installation shall be carried out strictly in accordance with the approved drawings Modifications, if any, required to suit site conditions, shall be carried out only with the prior approval of the Engineer. All such changes shall be incorporated in “As built” drawings to be furnished by the contractor.</div>												
2.	Laying Of 33 KV & 11 KV Cables	<div>1. It is proposed to lay underground XLPE cable(s) conforming to IS: 692 or IS.7098 (Part-2) and any amendment thereof.</div> <div>The contractor shall intimate the actual rout(s) to the HITES within Two weeks.</div> <div>2. The given survey plan drawing is indicative and contractor shall carry out the survey for the proposed route and got approved from HITES/UPPCL.</div> <div>3. The scope of this specification covers loading transportation, unloading of cable drums, digging of trenches, laying in underground trenches, jointing terminations back filling of earth and testing & commissioning of sizes mentioned in schedule of work conforming to relevant ISS/technical particulars enclosed herewith.</div> <div>4. The following technical particulars for laying of cable shall be followed as per IS: 1255/1983 or latest amendment thereof.</div> <table><tr><th>S. No.</th><th>Item</th><th>For 33 kv</th><th>For 11 kv</th></tr><tr><td>1.</td><td>Depth of trench</td><td>1050 mm</td><td>900 mm</td></tr><tr><td>2.</td><td>Width of trench</td><td>750 mm</td><td>500 mm (For single cable)</td></tr></table>	S. No.	Item	For 33 kv	For 11 kv	1.	Depth of trench	1050 mm	900 mm	2.	Width of trench	750 mm	500 mm (For single cable)
S. No.	Item	For 33 kv	For 11 kv											
1.	Depth of trench	1050 mm	900 mm											
2.	Width of trench	750 mm	500 mm (For single cable)											

Sl. No.	Particular	Detail			
		3.	Size of stone slab	450x600 x50 mm	450x600x50 mm (For 3x185sq mm or above size cable)
		4.	No. of stone slab per meter	1.67	1.67
		5.	No. fo bricks per meter	9 x 2	9x2 for 3x185 mm ² or above
		6.	Local sand per meter	0.563 cubic meter	0.375 cubic meter
		7.	D.C voltage to which cable shall withstand for 5 minutes after completion of laying/jointing/termination (in kms) between any conductor and metallic sheath/ screen/ armour.	60 KV	18 KV
		8.	(HDD method)	As per UPPCL/PVVNL specification.	
		9.	Clearances- The desired minimum Clearances are as follows. a) Power cable to power cable b) Power cable to control cable c) Power cable to communication cable d) Power cable to water line	Clearance not necessary, however larger the clearance better would be current carrying capacity. 0.2 meter 0.3 meter 0.3 meter	Clearance not necessary, however larger the clearance better would be current carrying capacity. 0.2 meter 0.3 meter 0.3 meter
		Note:-			
		High voltage test to be conducted by contractor.			
3.	Cable Laying	The trenchless technology shall be used with HDPE casing for entire route. GI pipe of suitable size shall be used for road, railway, drain / nallah crossing. Cable route markers shall be placed on entire route. The outer diameter of the HDPE pipe shall be suitable for insertion			

Sl. No.	Particular	Detail
		<p>in an 8" diameter horizontally drilled bore and 2 Runs of 120 Sq mm HT Cables. The HDPE pipe shall be of PE 80 grade with pressure rating PN4 conforming to IS 4984/1995 and shall have suitable wall thickness. The HDPE pipes shall be joined by using Butt welding and a 7/20 G.I wire shall be provided along the entire length of each pipe duct.</p> <p>The Depth of horizontal drilling shall be between 2 to 3 meters or as required. The drilling shall be with a Directional drilling unit equipped with automated pipe handling system and all necessary accessories.</p> <p>Note:- In case of any damage/theft of material/ equipment of contractor/3rd party, all charges would be borne by the contractor</p>
4	Cable Trench	<ol style="list-style-type: none"> 1. The trenches for the cable laying shall be done as per standard practice The trenches shall be dug in such a manner so that soil etc once excavated does not fall back in the trench. <p>The cables (a) entry and exit in pipes etc should be according to relevant ISS.</p> <ol style="list-style-type: none"> 2. When more than one cable shall be laid in the same trench, a horizontal inter axial spacing for 0.25 to 0.40 meters for 33 KV and 0.15 to 0.25 meter for 11 KV in order to reduce the effect of mutual heating effect and also to ensure the fault occurring on one cable shall not damage to other cable. 3. Where two cables are laid in parallel in one trench, the separation - wall shall be provided by means of laying bricks throughout its length upto the height of top slab/bricks.
5.	Road and Railway crossing	<ol style="list-style-type: none"> 1. In case of roads, railway tracks and water pipeline crossing, the cable shall be laid in the cast iron/hume pipe etc as prescribed in clause 6.3.4 of IS:1255/1983. 2. In case of Railway crossing entire formality, including cost of attaining its permission shall have to be carried out by the contractor at its own cost. Also for the purpose of underground Railway crossing cast iron pipe of suitable size (4" minimum) shall be laid instead of cement hume pipe.
6.	Handling of cable	The contractor shall made adequate arrangement (particularly sufficient man power & equipment) for

Sl. No.	Particular	Detail
		proper handling of cables and putting the same direct on rollers and ensure that no twists etc. are made in the cable and cables are not damaged in any way whatsoever. Contractor shall also ensure that during entire working at site upto commissioning stage their responsible engineers/supervisor with trained crew shall be continuously available
7.	Road cutting and restoration	<ol style="list-style-type: none"> 1. Necessary permissions to lay the cable in ground after cutting the road(s) (Kuchha). Brick-pitched & Pucca. Crossing bridges railway tracks etc will be obtained by the contractor over the request from the engineer incharge of the work and necessary payment/charges of above shall be borne by the contractor. 2. The contractor should take notice of the fact that in case of cutting of roads etc. is required for laying cable; the contractor shall have to take prior permission from local authorities of PWD/ Municipalities /Nagar Nigam/Development authorities etc. or other owner of the road. 3. The road cutting charges payable to such agencies may be substantial and shall be borne by the contractor. The contractor shall take care of such charges while quoting his rate for laying of cables as no extra payment shall be made to the contractor on this account. All necessary clearance for such work from the respective agencies shall be responsibility of the contractor.
8.	Warning / notices	While the execution of work is in progress, the contractor shall have to provide necessary lighting arrangement/signboard/ road stoppers and other precautionary warnings/notices so that accidents/damages/losses to the public/manpower/ material etc are avoided.

IMPORTANT INSTRUCTIONS

- 1 The contract is an EPC contract and the work shall be executed as per the Design Basis Report.
- 2 Bidders are requested to go through the Tender Documents to understand all commercial, special & general Terms and Conditions, attached Drawings and Layouts, etc before quoting.
- 3 Bidders are requested to go through specifically the Special Terms and Conditions of Tender Documents very carefully before quoting.
- 4 Various data & information mentioned in this BOQs are approximate only and as per available information at the point of compilation subject to oversight. It may vary as per standard variance clause as per actual work.

Location and Route shall be decided as per final work plan to be submitted by prospective contractor jointly with the Executing Officer of this work, before the start of the work.

- 6 Number of Road crossings or extension of existing U/G cables for laying of underground 33/11 KV cables shall be decided as per final work plan to be submitted by prospective contractor before the start of the work.
- 7 All necessary material required for completion of above jobs shall be the responsibility of the prospective contractors at their own cost, irrespective of its specific mention in the price schedules
- 8 In Case of any ambiguity in Technical specifications, the prevailing RESSPO specifications and norms shall be binding. In case of absence of RESSPO specifications and norms , related IS shall be binding.
- 9 It is to be pointed that technical specifications given with the tender document, are prepared at a particular point . With technological upgradation, and actual ground conditions, and other issues like environment, these may be modified during execution stage.

Special Conditions of Design Basis Report

1. According to the electrical load, an electronic meter of appropriate capacity, which has the facility to store data for at least 35 days, shall be installed.
2. Entry way to the metering room will be free and the metering room will have UPPCL lock.
3. In case the transformers installed at the affected 400/220/132 KV sub-stations are loaded beyond the prescribed maximum loading limit, the unit's power supply will be cut.
4. Due to overloaded power system, there is every possibility that there may be a possibility of interruption in the power supply of the unit and scheduled and emergency rostering can be done as per the requirement.
5. Distance from 220 KV sub-station Bapudham to Metering room at IPC Complex is about 8.2 km. The contractor shall survey the route and quote on Lump Sum basis. Anticipated Quantity for some of the items, for reference only, are given below:

Sr. No.	Particulars	Unit	Quantity
	Material Lines & Cable-PVDP.GZ.DP5696.A		
1	Cable box ST. TH. 33KV 3X120 XLPE-230000047	No.	7
2	MS Nut & Bolt off Size 4x3' 250000097	Kg	50
3	STEEL TUBULAR POLE SP-55 11.00 MTR-15000007	No.	42
4	LUG ALU. 300SQM.M. 270000086	No.	130
5	A.C.S.E. DOG CONDUCTOR- 100000025	Mtr.	100
6	M.S. HOLDING CLAMP 5 1/2" 50X6M.M.- 250000023	No.	126
7	STONE PAD -140000362	No.	42
8	CABLE H.T. XPLE 33 KV 3X120 SQ.M.M. 1000000009	Mtr.	17730
9	MS CHANNEL 125X65 MM- 1800000107	KG	1418
10	EARTHING COMPLETE- 2700000150	No.	8
11	DANGER BOARD WITH CLAMP FOR 33 KV LINE- 1700000113	No.	21
12	ALUMINIUM PAINT- 1400000291	L	40
13	BARBED WIRE- 140000219	KG	42
14	RED OXIDE PAINT- 2700000158	L	40
15	G.I. PIPE 6" DIA.- 27000000061	No.	252
16	33 KV COMPOSITE POLYMER PIN INSULATOR- 2700000240	No.	63
17	EARTH ROD 2540X20 MM- 1700000133	No.	42
18	CABLE BOX O/D 33 KV 3 X 120 XLPE- 2300000043	No.	88
19	33KV TRENCHLESS U/G LINE SYST. HDPE-1000001733	Mtr.	16400

Note:

- 1. Contractor shall be responsible for transportation of materials, Dismantling of existing HT Lines, Concreting of poles, Termination of cables at all the points including metering rooms of Transmission and receiving ends, Number plate with clamps etc., as per requirements.**
- 2. The above quantities are indicative and may vary on either side as per actual requirement at site. Work should be done as per actual distances along the route of the cable and shall be paid accordingly.**
6. Contractor shall make required coordination/liasoning with UPPCL for completing the required activities by UPPCL.
7. Contractor shall obtain no-objection certificate from UPPCL as per requirements.
8. The said electrical load will not be released by tapping any truck line of the UPPCL under any circumstances.
9. All the conditions/formalities should be completed by following UPPCL guidelines and Electricity Supply Code 2005 (with amendments) from time to time.
10. Double metering should be ensured while releasing the load.
11. Metering arrangement at Tapping Point will be done as per UPPCL rules, all expenses of which will be payable by the consumer.
12. Metering of consumer will be done as per UPPCL rules.
13. Compliance of the following orders should be ensured for line work and purchase of store materials used in it-
 - a) 548-Work/Fourteen/Rawip/90-30B0/95 dated 24.04.1998
 - b) 757-Work/Fourteen/Rawip/2001-30B0/95 dated 28.08.2001
 - c) 308- Work / Fourteen / Ravip / 2001-3KB0/95 dated 13.03.2001
 - d) 385-Work/Fourteen/Rawip/90-B0/96 dated 13.03.2002
 - e) Managing Director, Paschimanchal Vidyut Vitran Nigam Ltd. Shop No. 1515/Pavividyaniliya/Equator/Electrification Dated 29.09.2003 of Victoria Park, Meerut
 - f) Managing Director, Paschimanchal Vidyut Vitran Nigam Ltd. Victoria Park, Meerut Memo No. 998 PVVNL/0/W/CAST/Data Book dated 13.02.2009/
 - g) Office of the Managing Director, Paschimanchal Vidyut Vitran Nigam, Victoria Park, Meerut. Memo No.-9641/Prni/Paviviniti/Meerut/Tk0/dated 10.03.2014
14. Necessary material and equipment used for line construction shall be purchased from the main manufacturer or their wholesaling agent or accredited representative who fulfills Respo and ISI / Corporation standards and is registered under Sales Tax, Income Tax and BAT rules.
15. The original purchase letter/invoice of the purchased materials and equipment shall be submitted to HITES/ UPPCL.
16. The contractor shall be responsible for replacing the material and re-commissioning the line in case of any disturbance in the material used in line construction / completed work within 18 months from the date of commissioning/ Handing over to UPPCL.

17. According to the approved drawing and layout, the specification of the material to be used in the work shall be approved by UPPCL and the invoice of the material purchased by the consumer will be made available to HITES/UPPCL.
18. The quality of the entire material and quality of work will be confirmed after testing by a committee nominated by UPPCL.
19. Construction of line and installation of equipment will be done by 'A' class registered contractor whose registration number which is registered in UPPCL or any other state construction unit.
20. It will be the responsibility of contractor to obtain safety approval from Electrical Inspector, Directorate of Electrical Safety, Government of U.P./Other statutory Authorities, as per requirements, for the completion and energization of 33 KV HT Line system.
21. Office Memorandum No. 1030/P.V.V. Ltd.-May/Equator (C) of Managing Director, P.V.V.N. Ltd. related to inspection and testing. Compliance of dated 14.06.2010 and 1688 / P.V.V.N.L.L.-May / Equator-C dated 13.09.2010 should be ensured.
22. The purchase of material used in the work for the construction of electrical system/necessary line will be done according to the Make, Technical Specification/GTP approved by UPPCL or their subsidiaries.
23. The Contractor shall be responsible for replacing the material and re-starting the line in case of any disturbance in the material used in the construction of the line / completed work within 18 months from the date of commissioning.
24. Pre-dispatch inspection of the material used in the work and on-site verification of the material and inspection of the quality of work will have to be ensured as per UPPCL Guidelines/Procedures.