VOLUME – IA
Part I & II

TECHNICAL CONDITIONS OF CONTRACT (TCC)

BHARAT HEAVY ELECTRICALS LIMITED

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VOLUME-IA PART-I CHAPTER-I
PROJECT INFORMATION

The Bidder shall acquaint himself by a visit to the site, if felt necessary, with the conditions prevailing at site before submission of the bid. The information given here in under is for general guidance and shall not be contractually binding on BHEL/Owner. All relevant site data /information as may be necessary shall have to be obtained /collected by the Bidder.

1.1.1.1.	Project Title	:	3 x 800 MW NLC Talabira Thermal Power Project
1.1.1.2.	Plant capacity	:	3 x 800 MW
1.1.1.3.	Type of project	:	Green Field
1.1.1.4.	Owner	:	NLC India Limited
1.1.1.5.	Plant site location	:	The plant and township of the project proposed to be located near Kumbhari and Tareikela villages on south west of Brijraj Nagar town on Sambalpur Rourkela highway in Jharsuguda district and ash disposal area is located near Thelkolai village in Sambalpur district.
1.1.1.6.	Location co-ordinates	:	21° 46' 56.11" N 83° 58' 50.54" E
1.1.1.7.	Nearest Village	:	Kumbhari and Tareikela villages on south west of Brijraj Nagar town
1.1.1.8.	Nearest Town & City	:	Sambalpur
1.1.1.9.	State Capital	:	Bhubaneswar (350 Km)
1.1.1.10.	Nearest Railway Station	:	Jharsuguda (11 Km)
1.1.1.11.	Nearest Airport	:	Raipur (290 Km)
1.1.1.12.	Nearest Seaport	:	Paradip (385 Km)
1.1.1.13.	Nearest Road access	:	Sambalpur – Jharsuguda highway after crossing Bedhan River via state PWD road
1.1.2.	Meteorological Condition		
1.1.2.1.	Altitude	:	203 M above MSL
1.1.2.2.	Ambient Temperature		
(a)	Annual Maximum Mean Temperature	:	33.1°C
(b)	Annual Minimum Mean Temperature	:	20.7°C
(c)	Mean Wet Bulb Temperature	:	26.3 °C
1.1.2.3.	Mean Relative humidity		66% at 8:30 Hrs
1.1.2.4.	Annual Rainfall		
	Average	:	1445 mm (avg.)

1.1.2.5.	Basic Design Wind Pressure	:	In accordance with IS-875 for a basic wind speed of 50 m/sec, up to a height of 10 meters above mean ground level.)
1.1.2.6.	Seismic zone	:	Zone III as per IS:1893 (latest edition)

VOLUME-IA PART-I CHAPTER-II
SCOPE OF WORKS

1.2.THE SCOPE OF THE WORK WILL COMPRISE OF BUT NOT LIMITED TO THE FOLLOWING

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.2.1. The scope of works covers Civil works involved in engineering, design, Construction of complete Township at 3x800MW Talabira Power project, Jharsuguda District., Odisha, including supply of all materials, labour, tools and plants.

1.2.2. The scope of work is given below, but not limited to the following:

1.2.2.1. Integrated Talabira township including site clearance, site levelling& grading, topographical survey, geotechnical investigation, establishing construction water supply, establishing construction power supply, internal electrification, fire safety, water supply, drainage & sewerage arrangements etc.

1.2.2.2. Executive hostel, Shopping complex, Guest house, Recreation club, Sports office, badminton court, swimming pool and Library, Auditorium, Community hall, Hospital, School, Township administration (TA) office, Estate store, Two wheeler parking shed, Four wheeler parking shed, Security building, Servant's quarters for Project head and VIP Guest House

1.2.2.3. Compound wall around township area

1.2.2.4. Entrance arch to township and indicative arch at SH-10 entrance

1.2.2.5. Main Approach road from Integrated township to SH-10

1.2.2.6. Main road & internal road within township

1.2.2.7. Dedicated approach road from Power plant to township

1.2.2.8. Main Drinking Water pipeline network from Power plant WTP to township

1.2.2.9. Water supply distribution network including Overhead water tank and sump within township

1.2.2.10. Storm water drainage network within township

1.2.2.11. Sewage network with STP within township including recycling of treated water

1.2.2.12. Rain water harvesting scheme

1.2.2.13. Street lighting and external electrification

1.2.2.14. HVAC and Air conditioning supply and Erection Works

1.2.2.15. Supply and Erection of Roof Top Solar Systems

1.2.2.16. Park and playground

1.2.2.17. Gardening & walkway inside Type I, II, III & IV Blocks area

1.2.2.18. Statue/logo/beautification near main entrance of township

1.2.2.19. Connection of all the external services like Water Supply, Sewerage, Drainage, Electric Supply, LAN/WAN, etc. to the main lines of the authorities / service providers

1.2.2.20. Obtaining all municipal & mandatory approvals required for occupation and completion of the project

Note: The above provided list is for the bidder's guideline. **Any other building / structure / foundation not mentioned above, but required for completion of the scope of work in total, deemed to have been included in the bidder scope under this contract**.

1.2.3. The works to be performed under this contract shall include providing all labour, supervision, material, scaffolding, construction equipment, tools and plants, temporary works, supplies including POL, transportation and all incidental items not shown or specified but reasonably implied or necessary for the proper completion of work in all respects. Testing of all materials, concrete, earthwork, other allied works, preparation of bar bending schedules on the basis of construction drawings, preparation of fabrication drawings etc. are included in the scope of work. Works shall only be carried out with approved structural fabrication drawings.

1.2.4. The area of work shall be cleared of all vegetation, rubbish and other objectionable matter. The materials removed shall be disposed of as directed by the Engineer-in-Charge. No separate payment for these operations shall be made. The cost of all these operations shall be deemed to have been included in the quoted price.

1.2.5. All the works areas shall be adequately flood lighted to the satisfaction of the Engineer-in-Charge when the work is in progress during the night shifts.

1.2.6. The price shall include all material, equipment, fixtures, labour, T&P's, temporary works and everything whether of permanent or temporary nature necessary for the completion of job in all respects.

1.2.7. The bidder should fully apprise himself of the prevailing conditions at the proposed site, climatic conditions including monsoon pattern, local conditions, soil strata and site specific parameters and shall include for all such conditions and contingent measures in the bid, including those which may have not been specifically brought out in the specifications.

1.2.8. The bidder shall be responsible for all statutory, obligatory, mandatory requirements of various authorities for the scope of work and take the same into account in the quoted contract price for the work.

1.2.9. Technical Vetting is to be taken from IIT before submission of drawings to BHEL/Customer. Vendor shall utilize the online system provided by BHEL for submission and comments for drawing approval

1.2.10. Hard copy of Drawings (Nos. as required) are to be submitted to BHEL/Customer for approval and work.

1.2.11. Special arrangements to be made for tackling pandemic – Contractor shall make arrangements for stay of workers within their premises as far as possible and/ or adjacent building and for implementation of STANDARD OPERATING PROTOCOL (SOP) as per government order. The transportation of workers to work place shall be arranged by the contractor in dedicated transport by ensuring social distance. Any person violating the pandemic measures published vide government order time to time will be liable for legal action as per the government order. Following shall be observed in work place:

1.2.11.1. All work places shall have adequate arrangements for temperature screening and provide sanitizers at convenient places.

1.2.11.2. Work places shall have a gap of one hour between shifts and will stagger the lunch breaks of staff, to ensure social distancing.

1.2.11.3. Use of AROGYA SETU will be encouraged for all employees both private and public.

1.2.11.4. Contractor shall sanitize their work place between shifts.

1.2.11.5. Large meetings to be prohibited. Spitting shall be strictly prohibited. Wearing of face cover is compulsory.

1.2.11.6. Government order (state/ center) being issued time to time for protective measures of pandemic shall be complied with strictly until government (state/ center) declares end of pandemic.

1.2.11.7. Standard operating procedure for social distancing for workplace and offices

1.2.11.8. The following measures shall be implemented by contractor for their office and workplaces:

1.2.11.9. All areas in the work premises including the following shall be disinfected completely using user friendly disinfectant mediums:

1.2.11.10. Entrance gate of work place, office, if any

1.2.11.11. Cafeteria and canteens, if any

1.2.11.12. Meeting room, conference halls/ open area available/ verandah/ entrance gate of site, bunkers, porta cabins, buildings, etc.

1.2.11.13. Equipment and lifts

1.2.11.14. Washroom, toilet, sink, water points, etc.

1.2.11.15. Wall/ all other surfaces

1.2.11.16. For workers coming from outside, special transportation facility shall be arranged without any dependency on the public transport system. These vehicles shall be allowed to carry man power as per existing Govt. norms.

1.2.11.17. All vehicles and machinery entering the premise should be disinfected by spray mandatorily.

1.2.11.18. Mandatory thermal scanning of everyone entering and exiting the work place to be done.

1.2.11.19. Medical insurance for the workers to be made mandatory.

1.2.11.20. Provision for hand wash & sanitizer preferably with touch free mechanism shall be made at all entry and exit points and common areas. Sufficient quantities of all the items should be available.

1.2.11.21. Large gatherings or meetings of 10 or more people to discouraged. Seating at least 6 feet away from others on job sites and in gatherings, meetings and training sessions.

1.2.11.22. Not more than 2/4 persons (depending on size) will be allowed to travel in lifts or hoists.

1.2.11.23. Use of staircase for climbing should be encouraged.

1.2.11.24. There should be strict ban of gutka, tobacco, etc. and spitting should be strictly prohibited.

1.2.11.25. There should be total ban on non-essential visitors at sites.

1.2.11.26. Hospitals/ clinics in the nearby areas, which are authorized to treat pandemic patients, should be identified and list should be available at work place all the times.

Note :

1. Vendor shall visit site and quote lump sum price after referring the relevant chapters of Technical Conditions of Contract.

2. FOR FURTHER DETAILED SCOPE OF WORKS REFER RELEVANT CHAPTERS IN THIS BOOK

VOLUME- IA PART-I CHAPTER – III
FACILITIES IN THE SCOPE OF CONTRACTOR / BHEL (SCOPE MATRIX)

Sl.No	Description PART I	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.1.1.	**ESTABLISHMENT**			
1.3.1.1.1.	FOR CONSTRUCTION PURPOSE:			
A	Open space for office	Yes		
B	Open space for storage	Yes		
C	Construction of bidder's office, canteen and storage building including supply of materials and other services		Yes	
D	Bidder's all office equipment's, office / store / canteen consumables		Yes	
E	Canteen facilities for the bidder's staff, supervisors and engineers etc.		Yes	
F	Firefighting equipment's like buckets, extinguishers etc.		Yes	
G	Fencing of storage area, office, canteen etc. of the bidder		Yes	
1.3.1.1.2.	FOR LIVING PURPOSES OF THE BIDDER			
A	Open space		Yes	
B	Living accommodation		Yes	
1.3.1.2.	**ELECTRICITY**			
1.3.1.2.1.	Electricity For construction purposes			
1.3.1.2.1.1.	Single point source		Yes	
1.3.1.2.1.2.	Further distribution for the work to be done which include supply of materials and execution		Yes	
1.3.1.2.2.	Electricity for the office, stores, canteen etc. of the bidder which include:		Yes	
1.3.1.2.2.1.	Distribution from single point including supply of materials and service		Yes	
1.3.1.2.2.2.	Supply, installation and connection of material of energy meter including operation and maintenance		Yes	

Sl.No	Description PART I	Scope to be taken care by BHEL	 Bidder	Remarks
1.3.1.2.2.3.	Duties and deposits including statutory clearances for the above		Yes	
1.3.1.2.2.4.	Electricity for electrical equipment inside office, canteen, stores etc.		Yes	
1.3.1.2.2.5.	Demobilization of the facilities after completion of works		Yes	
1.3.1.2.3.	Electricity for living accommodation of the bidder's staff, engineers, supervisors etc on the above lines.(in case BHEL provides this facility, the scope should be given without ambiguity)		Yes	
1.3.1.3.	WATER SUPPLY			
1.3.1.3.1.	For construction purposes:			
1.3.1.3.1.1.	Making the water available at single point		Yes	
1.3.1.3.1.2.	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.1.3.2.	Water supply for bidder's office, stores, canteen, etc.			
1.3.1.3.2.1.	Making the water available at single point		Yes	
1.3.1.3.2.2.	Further distribution as per the requirement of work including supply of materials and execution		Yes	
1.3.1.4.	LIGHTING			
1.3.1.4.1.	For construction work (supply of all the necessary materials) At office storage area At the preassembly area At the construction site / area		Yes	
1.3.1.4.2.	For construction work (Execution of the lighting work / arrangements) At office storage area At the preassembly area At the construction site /area		Yes	
1.3.1.5.	COMMUNICATION FACILITIES for site operations of the bidder	-		
1.3.1.5.1.	Telephone, Fax, internet, intranet, email etc		Yes	

Sl.No	Description PART II	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.2.	**CONSTRUCTION FACILITIES**			
1.3.2.1.	**Engineering works for construction**			
1.3.2.1.1.	Providing the construction drawings for all the equipment covered under this scope		Yes	Approval by BHEL
1.3.2.1.2.	Drawings for construction methods		Yes	In consultation with BHEL
1.3.2.1.3.	As-built drawings – wherever deviations observed and executed and also based on the decisions taken at site- example – routing of small bore pipes		Yes	”
1.3.2.1.4.	Shipping lists etc. for reference and planning the activities		Yes	”
1.3.2.1.5.	Preparation of site construction schedules and other input requirements		Yes	In consultation with BHEL, As per requirement of BHEL targets
1.3.2.1.6.	Review of performance (Form-14) and revision of site construction schedules in order to achieve the end dates and other commitments		Yes	
1.3.2.1.7.	Weekly construction schedules based on Sl No 1.3.2.1.5		Yes	
1.3.2.1.8.	Daily construction / work plan based on Sl No 1.3. 2.1.7		Yes	For daily monitoring meeting at site
1.3.2.1.9.	Periodic visit ofthe senior official of the bidder to site to review the progress so that works are completed as per schedule. It is suggested this review by the senior official of the bidder should		Yes	

Sl.No	Description PART II	Scope to be taken care by		Remarks
		BHEL	Bidder	
1.3.2.	**CONSTRUCTION FACILITIES**			
	be done once in every two months.			
1.3.2.1.10.	Preparation of preassembly bay		Yes	
1.3.2.1.11.	Laying of racks for gantry crane if provided by BHEL or brought by the contractor / bidder himself			Not applicable

1.3.3. OPEN SPACE:

1.3.3.1. Area for fabrication, batching plant, office, storage area etc. for construction purpose shall be provided as per availability free of cost. Land will be allocated with certain time frame and to the extent available/ considered necessary, and will be reviewed by BHEL depending upon the area availability. The contractor will be responsible for handing back all lands, as handed over to him by BHEL. Availability of land within plant boundary is very limited and the contractor has to plan and use the existing land considering the use of land by other Civil /mechanical/ electrical contractors and the storage of plant machineries and materials. The existing land shall be shared by all executing agencies.

1.3.4. CONSTRUCTION WATER:

1.3.4.1. The contractor shall make his own arrangements of water suitable for construction purpose till commissioning of the construction water intake system from River Bhedan by BHEL.

1.3.4.2. The contractor has to provide the pump at the sump of intake system, construct sump, at their own cost, for storage of water in the area allocated to contractor (preferably in working area), of adequate size (BHEL approval, for the size, shall be taken prior to construction). The required pumps & accessories, pipes for drawing water from the given point and further distribution will be arranged by the contractor at their cost to go on without interruptions.

1.3.4.3. All the tools and plants required for satisfactory completion of the work have to be arranged by the contractor.

1.3.5. ELECTRICITY:

1.3.5.1. Contractor shall make his own arrangements of Electricity at his own cost for construction purpose through DG sets till commissioning of the construction Power system by BHEL.

1.3.5.2. Construction power, as given by customer, shall be provided to the contractor at one single point by BHEL on chargeable basis. The contractor has to provide necessary meter for measuring the power consumption. The contractor shall make his own arrangement for further distribution with necessary isolator/LCB

etc. The scheme for Construction Power distribution shall be approved by BHEL before installation.

1.3.5.3. Necessary "Capacitor Banks" to improve the Power factor to a minimum of 0.9 shall be provided by the contractor at his cost. Penalty if any levied by customer on this account will be recovered from contractor's bills.

1.3.5.4. Any duty, deposit involved in getting the Electricity shall be borne by the bidder. As regards contractor's office shed also all such expenditure shall be borne by the contractor.

1.3.5.5. Provision for distribution of electrical power from the given single central common point to the required places with proper distribution boards, approved cables and cable laying including supply of all materials like cables, switch boards, pipes etc., observing the safety rules laid down by electrical authority of the State / BHEL / their customer with appropriate statutory requirements shall be the responsibility of the tenderer / contractor.

1.3.5.6. Contractor has to make their own arrangements for electricity requirement for labour colony at his own cost.

1.3.5.7. As there are bound to be interruptions in regular power supply, power cut/ load shedding in any construction sites, contractor should make his own arrangement for alternative source of power supply through deployment of adequate number of DG sets at their cost during the power breakdown / failure to get urgent and important work to go on without interruptions. No separate payment shall be made for this contingency.

1.3.6. MATERIAL SUPPLY:

All materials required for the work are in the scope of the contractor.

1.3.7. CONSUMABLES

The contractor shall provide all consumables required for carrying out the work covered under this scope of work.

1.3.8. LIGHTING FACILITY:

Adequate lighting facilities such as flood lamps, hand lamps and area lighting shall be arranged by the contractor at the site of construction, and contractor's material storage area etc. at his cost.

1.3.9. CONTRACTOR'S OBLIGATION ON COMPLETION:

On completion of work, all the temporary buildings, structures, pipe lines, cables etc. shall be dismantled and leveled and debris shall be removed as per instructions of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

1.3.10. LABOUR COLONY:

The contractor has to make their own arrangement for labour colony at their own cost.

The contractor shall make his own arrangements for electricity requirement for labour colony, water for labour colony and drinking water at their own cost.

1.3.11. DEWATERING

Contractor shall ensure at all times that his work area & approach/ access roads are free from accumulation of water, so that the materials are safe and the erection/ progress schedule are not affected. No separate claim in this regard shall be admitted by BHEL. No separate payments for dewatering of subsoil, surface water or catchments water, if required, at any time during execution of the work including monsoon period shall be considered by BHEL.

1.3.12. BID DRAWINGS

Plot plan drawing enclosed is only tentative & for information purpose and this may get revised during execution.

VOLUME-IA PART – I CHAPTER – IV
T&PS and MMEs TO BE DEPLOYED BY CONTRACTOR

1.4.1. All the tools and plants required for satisfactory completion of the work have to be arranged by the contractor.

VOLUME-IA PART – I CHAPTER - V
T&Ps AND MMEs TO BE DEPLOYED BY BHEL ON SHARING BASIS

1.5.1. BHEL will not provide any T & Ps for this scope of work.

1.5.2. All the tools and plants required for execution of the above work are in contractor's scope.

1.5.3. In case if the contractor fails to provide T&P and other equipment's, BHEL will arrange for the same and the cost will be recovered from the contractor's bill with BHEL overheads, as applicable from time to time which may vary during contract period.

VOLUME-IA PART – I CHAPTER-VI
TIME SCHEDULE

1.6.1. TIME SCHEDULE

1.6.1.1. The entire works of engineering, design, Construction of complete Township at 3x800MW Talabira Power project, Jharsuguda District., Odisha, as detailed in the Tender Specification shall be completed within 30 (Thirty) months from the date of LOI.

1.6.1.2. During the total period of contract, the contractor has to carry out the activities in a phased manner as required by BHEL.

1.6.2. MOBILISATION

1.6.2.1. The Contractor has to subsequently augment his resources in such a manner to achieve the COMPLETION SCHEDULES as stipulated in the tender and as per site requirement.

1.6.3. In order to meet above schedule in general, and any other intermediate targets set, to meet customer / project schedule requirements, contractor shall arrange & augment all necessary resources from time to time on the instructions of BHEL

1.6.4. SUBMISSION OF L3 SCHEDULE

The contractor shall submit a detailed area/structure wise L2 and L3 schedule within 15 days in consultation with BHEL. The detailed L2 and L3 schedule shall be approved by BHEL and same shall be implemented. Bidder shall submit L2 and L3 schedule to meet the agreed schedule covering various mile stone activities and their split up details such as construction, procurement of materials, fabrication & erection activities. This schedule shall also clearly indicate the interface facilities/inputs

1.6.5. GUARANTEE PERIOD

Guarantee period of 12 months shall commence from the date of completion of the work in the scope certified by the BHEL Engineer.

VOLUME-IA PART – I CHAPTER-VII
TERMS OF PAYMENT

1.7. TERMS OF PAYMENT

1.7.1. **Secured Advance**
Not applicable

1.7.2. Advance for Mobilization

1.7.2.1. Interest bearing advance for Mobilization, limited to 5% of the contract value will be paid against submission of bank guarantee of at least 110% of the advance valid for the contract period, which will be recovered from the first running bill onwards. The advance for mobilization shall be paid as under.

1.7.2.2. 2% of contract value after receipt of initial Security Deposit and additional security deposit as applicable if any, as per relevant clauses in the GCC/TCC along with unqualified acceptance of detailed letter of intent.

1.7.2.3. 1.5% of contract value on completion of site Mobilization of Machinery & T&P as given below and on certification by site in-charge for compliance.

1.7.2.3.1. 3 nos. excavator equivalent to capacity of Pocklain CK90

1.7.2.3.2. 5 nos. dumper (Min 15 cum each)

1.7.2.3.3. 2 Nos Chain dozer

1.7.2.3.4. 2 nos. Back hoe loader like JCB

1.7.2.4. 1.5% of contract value on completion of site Mobilization of Machinery & T&P as given below in addition to the above, and on certification by site in-charge for compliance.

1.7.2.4.1. 2 nos. excavator equivalent to capacity of Pocklain CK90

1.7.2.4.2. 5 nos. dumper (Min 15 cum each)

1.7.2.4.3. 2 Nos Chain dozer

1.7.2.4.4. 2 nos. Back hoe loader like JCB

1.7.2.5. Payment and recovery of the advance will be as per clause 2.13 of GCC. Option of availing the interest bearing mobilization advance is left with the bidder.

1.7.3. Interim Payment

1.7.3.1. Interim bills in the form of monthly running bills prepared by the contractor in soft as well as Hard copies shall be based on the quantities executed and measured.

1.7.3.2. Payment shall be as per mutually agreed Billing Break Up, and as detailed below:

- 85% progressive payment,
- 5% on Submission and acceptance of Final Bill,
- Balance 10% shall be retention amount

1.7.3.3. Refund of the above 10% Retention amount shall be made as follows:

The retention amount shall be retained towards 'Performance Guarantee for Workmanship' and shall become refundable after expiry of Guarantee Period, provided all the defects noticed during the guarantee period have been rectified to the satisfaction of BHEL Site Engineer/BHEL Construction Manager, and after deducting all expenses/other amounts due to BHEL under the contract/other contracts entered into by BHEL with them. This portion of the retention amount can be released on commencement of the Guarantee period, on submission of equivalent Bank Guarantee.

1.7.4. Royalty/Seigniorage Charges

1.7.4.1. The quoted price shall be inclusive of all Royalties and the bidders shall quote accordingly. The Royalty amount will not be reimbursed by BHEL. If there is a demand by statutory bodies at a later date for payment of any Royalties, the same will be deducted from the Contractor's Bills progressively, unless receipt in support of payment made to the concerned authorities is provided by the Contractor. Any penalty levied by Statutory bodies in this regard will be to the Contractor's account.

1.7.4.2. Royalty for any other materials is to the bidders account.

1.7.5. Method of Measurement

Mode of measurement shall be as per relevant clauses of technical specification of this tender. In case the same is not available the relevant IS 1200 in conjunction of IS code 3385 shall be adopted. In case the same is also not available, the standard procedure adopted in CPWD shall be adopted. In case the same is also not available in CPWD, the measurement of the work done will be based on the mutual agreement between BHEL and contractor. In all the above cases, the interpretation of BHEL will be final and binding to the contractor.

NO CLAIM WHAT SO EVER MAY BE, WILL BE ENTERTAINED UNDER THIS CONTRACT, AFTER DULY SIGNING THE FINAL BILL ALONG WITH MEASURMENT BOOKS AND ACCEPTED BY BHEL.

1.7.6. Escrow Account:

Payments to the contractor for the subject works shall be made through an Escrow Account.

VOLUME-IA PART – I CHAPTER-VIII
TAXES AND DUTIES

1.8.1. Goods and service Tax (GST) & Cess

1.8.1.1. The successful bidder shall furnish proof of GST registration under GST Law in the State in which the Project is being executed, covering the supply and services under this contract. Registration should also bear endorsement for the premises from where the billing shall be done by the successful bidder on BHEL for this project/ work. The bidder to specify in their offer the category of registration under GST i.e. Registered dealer and composite dealer.

1.8.1.2. Contractor's price/rates shall be exclusive of GST & Compensation Cess (if applicable) (herein after termed as GST). GST along with Cess (as applicable) legally leviable & payable by the successful bidder as per GST Law, shall be paid by BHEL. Hence Bidder shall not include GST along with Cess (as applicable) in their quoted price.

1.8.1.3. However, Seller / Contractor require to specify the applicable GST in the offer and require to ensure that GST mentioned, is as per the existing tariff on the date of the offer and all benefits as per existing laws have been considered.

1.8.1.4. Price quoted by the composite dealer shall be considered as inclusive of GST. In the event of any GST quoted separately by the composite dealer, the same shall be considered for evaluation and ordering purpose. In the event of any change in the status of vendor from composite to regular dealer after the submission of the bid but before the supply, no reimbursement of additional GST will be made. However, the vendor has to raise the invoice strictly, as per the law, by adjusting their ex-works price.

1.8.1.5. It is the responsibility of the seller/ Contractor to issue the Tax Invoice complying with GST Invoice Rules (Section 31 of GST Act & Rules referred there under) and comply to the timelines for issue of the same. Invoices shall be submitted on time to the concerned BHEL Engineer In Charge. Vendor to indicate the proper GSTN registration / HSN /SAC code in their TAX Invoice on the basis of which BHEL will claim the input tax credit in its return. In case of raising any Debit / Credit Note, bidder shall issue the same containing all the details as referred to in Section 34 read with Rule 53.

1.8.1.6. E-invoicing under GST has been implemented by GOI for all the taxable persons having turnover more than the threshold limit in any preceding financial year from 2017-18 onwards. Therefore, for all the taxable persons falling under the purview of E-invoice, it is mandatory to mention a valid unique Invoice Reference No. (IRN) and QR code as generated from E-Invoicing portal of the Government for the purpose of issuing a valid Tax Invoice. Only an E-invoice issued in the manner prescribed under rule 48(4) of CGST Rules shall be treated as valid invoice for reimbursement of GST amount. If the successful Bidder is not falling

under the preview of E-Invoicing, then he has to submit a declaration in that respect along with relevant financial statements. BHEL shall reimburse GST only if all the provisions of E-invoicing are complied with.

1.8.1.7. Bidder should mention the "Bill To "details as below in the Tax Invoice for the supply goods and supply of services respectively

Bill To:

---,

GSTN of BHEL : ----------

1.8.1.8. All payments against Tax Invoice to vendors/contractors shall be released only after:

i). Vendor/ contractor declaring such invoice in the returns as per GST law prevailing at appropriate times.

ii). The tax component charged by the vendor in the invoice should match with the details uploaded by vendor in the GST Returns.

iii). Confirmation of payment of GST and filing of Quarterly / Monthly returns as applicable by vendor on GSTN portal.

1.8.1.9. In case, any GST credit is delayed/denied to BHEL or BHEL has to incur any liability (like interest / penalty) due to non/delayed receipt of goods and/or tax invoice or expiry to timeline prescribed in the relevant GST Act for availing such ITC, or any other reasons not attributable to BHEL, tax amount shall be recoverable from the vendor/contractor along with interest levied/ leviable on BHEL.

1.8.1.10. Bidder shall declare the Invoices raised on BHEL in the GST returns and file returns within the prescribed time as given in the GST Act. Bidder shall note that in case of delay in declaring such invoice in your return and GST credit availed by BHEL is denied or reversed subsequently as per GST Law, GST amount paid by BHEL towards such ITC reversal as per GST law shall be recoverable from the bidder along with interest levied / leviable on BHEL.

1.8.1.11. E-way bills / Transit passes / Road Permits: Successful Bidder has make their own arrangement for E-waybill for any transfer of goods for the execution of the contract. The Bidder has to make their own arrangement at their cost for completing the formalities, if required, with Issuing Authorities, for bringing materials, plants & machinery at site for execution of the works under this contract, and BHEL will not issue any Road Permit/ Way Bill for this purpose.

1.8.1.12. BHEL shall not reimburse any amount paid towards any interest / penalty etc., incurred by contractor. Any additional claim at a later date due to issues such as wrong rates / wrong classification by contractor shall not be paid by BHEL.

1.8.1.13. Wherein GST liability arises on BHEL under reverse charge, any interest levied/leviable due to any reasons not attributable to BHEL shall be recovered

from the vendor/contractor.

1.8.1.14. The applicable TDS under GST/ Goods and Services (Compensation to States) Act will be deducted from the payments.

1.8.2. All taxes and duty other than GST & Cess and BOCW Cess

All taxes/ duties or other charges, except those specifically mentioned in the Contract (other than GST and BOCW (if applicable)) legally levied on the CONTRACTOR in connection with the contract work, shall be borne and paid by the CONTRACTOR and the same shall be deemed to be included in the offer Price.

The contractor shall pay all (except the specific exclusion viz GST &Cess and BOCW Cess both of which are dealt with separately) taxes, fees, license charges, deposits, duties, tools, royalty, commissions, Stamp Duties, or other charges / levies, which may be levied on the input goods & services consumed and output goods & services delivered in course of his operations in executing the contract and the same shall not be reimbursed by BHEL. In case BHEL is forced to pay any of such taxes, BHEL shall have the right to recover the same from his bills or otherwise as deemed fit.

1.8.3. Statutory Variations

1.8.3.1. In general, Statutory variation for GST is payable to the Seller during currency of the contract between Buyer and Seller. Further, for period beyond the currency of the contract, BHEL will reimburse the actual applicable tax even if the same is higher than the amount applicable within the contractual period in case BHEL is able to take the input tax credit. However, the decision of BHEL in this regard will be final and binding on the seller/contractor otherwise vendor/contractor has to bear the differential upward increase in tax and ex- works price is to be adjusted accordingly

1.8.3.2. No other variations (Except GST) including Custom Duty, exchange rate, minimum wages, prices of controlled commodities, any other input etc. shall be payable by the purchaser unless specifically agreed upon.

1.8.4. New Taxes/Levies –

In case Government imposes any new levy / tax after submission of bid during the tenure of the contract, BHEL shall reimburse the same at actual on submission of documentary proof of payment subject to the satisfaction of BHEL that such new levy / tax is applicable to this contract. The decision of BHEL in this regard will be final and binding on the seller/contractor.

Any benefit arising due to new Taxes or levies must be passed on to BHEL.

1.8.5. Direct Tax

1.8.5.1. Seller is required to update himself on its own and comply with provisions of Indian Income Tax Act as notified from time to time. Purchaser shall not be liable

towards liability of income tax accruing to the Seller of whatever nature including variations thereof, arising out of this Order/ Contract, as well as tax liability of the Seller/ Contractor and his personnel

1.8.5.2. Deductions of Tax at source at the prevailing rates shall be effected by the Purchaser before release of payment, as a statutory obligation, if applicable. TDS certificate will be issued by the Purchaser as per statutory provisions. The Seller/Contractor has to mention their Permanent Account Number (PAN) and GSTIN in all invoices.

1.8.6. TCS (Tax collected at Source) under Income Tax Act.

If the vendor is mandated to collect the TCS from BHEL (for sale of Goods) as per the newly inserted sub section(1H) under Section 206C of the Income Tax Act, then the below conditions need to be adhered to:

1.8.6.1. Vendors should mention their TAN and PAN number in the Invoice submitted to BHEL.

1.8.6.2. Where the tender conditions do not specify any PQC on financial parameters, then the reimbursement of IT TCS to the Vendor can be made only on submission of below undertaking on yearly basis.

"I/We_____ have made a total sale, gross receipts or turnover from our business carried exceeds ten crore rupees during the financial year_____ (should be immediate preceding financial year)"

And on submission of TCS paid challan and TCS certificate for the TCS payments made in the last quarter.

1.8.6.3. Amount of TCS and Assessable value on which TCS has been calculated should be specified clearly in the invoice

1.8.6.4. PAN No of BHEL is AAACB4146P, same need to be considered by vendor while filing their TCS returns.

1.8.6.5. Vendor shall issue a TCS Certificate for the amount collected at source within the due dates as per the IT Act.

1.8.6.6. In event of failure to comply with the provisions of the Act or proper certificate was not issued or if tax collected, not remitted to the Government or for any other reason and thereby causing loss to BHEL, the same shall be recoverable from the Vendor towards non- compliance of statutory provisions from the money's due to them with applicable interest.

1.8.6.7. Where the purchases are for one time based on absolute requirements, then the Vendor shall be eligible for reimbursement only upon submission of TCS certificate.

1.8.7. BOCW Act & BOCW Welfare Cess Act

1.8.7.1. The Contractor should Register their Establishment under BOCW Act 1996 read with rules 1998 by submitting Form I (Application for Registration of Establishment) and Form IV (Notice Of Commencement / Completion of Building

other Construction Work) to the respective Labour Authorities i.e.,

a. Assistant Labour Commissioner (Central) in respect of the project premises which is under the purview of Central Govt.–NTPC, NTPL etc.

b. Appropriate State authorities in respect of the project premises which is under the purview of State Govt.

1.8.7.2. The Contractor should comply with the provisions of BOCW Welfare Cess Act 1996 in respect of the work awarded to them by BHEL.

1.8.7.3. The contractor should ensure compliance regarding Registration of Building Workers as Beneficiaries, Hours of work, welfare measures and other conditions of service with particular reference to Safety and Health measures like Safety Officers, safety committee, issue of Personal protective equipments, canteen, rest room, drinking water, Toilets, ambulance, first aid centre etc.

1.8.7.4. The contractor irrespective of their nature of work and manpower (Civil, Mechanical, Electrical works etc) should register their establishment under BOCW Act 1996 and comply with BOCW Welfare Cess Act 1996.

1.8.7.5. Contractor shall make remittance of the BOCW cess as per the Act **only in consultation with BHEL** as per the rates in force (presently 1%). BHEL shall reimburse the same upon production of documentary evidence. Hence Bidder shall not include BOCW Cess (as applicable) in their quoted price. However, BHEL shall not reimburse the Fee paid towards the registration of establishment, fees paid towards registration of Beneficiaries and Contribution of Beneficiaries remitted.

1.8.7.6. Non-compliance to Provisions of the BOCW Act & BOCW Welfare Cess Act is not acceptable. In case of any non-compliance, BHEL reserves the right to withhold any sum as it deems fit. Only upon total compliance to the BOCW Act and also discharge of total payment of Cess under the BOCW Cess Act by the Contractor, BHEL shall consider refund of the amounts.

VOLUME-IA PART – I CHAPTER-IX
ACCOUNTING OF MATERIAL ISSUE

Void

VOLUME-IA PART –I CHAPTER –X
GENERAL

The scope of the work will comprise of but not limited to the following:

(All the works mentioned hereunder shall be carried out within the accepted rate unless otherwise specified.)

1.10.1. Contractors are requested to furnish the following documents at PSSR-HQ, Chennai immediately after release of Letter of Intent (LOI).

i. Security Deposit and additional Security Deposit.

ii. Unqualified Acceptance for Detailed LOI / Work Order.

iii. Rs.100/- Stamp Paper for preparation of Contract Agreement.

1.10.2. Contractors are requested to furnish the proof of documents for the following at PSSR- Site

i. Provident Fund Registration Number.

ii. Labour License Number.

iii. Workmen Insurance Policy Number.

1.10.3. In addition to the clause 2.8 of General Conditions of Contract (Volume-IC of Book-II) the contractor shall comply with the following.

1.10.3.1. **PROVIDENT FUND**

1.10.3.1.1. The contractor is required to extent the benefit of Provident Fund to the labour employed by you in connection with this contract as per the Employees Provident Fund and Miscellaneous Provisions Act 1952. For due implementation of the same, you are hereby required to get yourself registered with the Provident Fund authorities for the purpose of reconciliation of PF dues and furnish to us the code number allotted to you by the Provident Fund authorities within one month from the date of issue of this letter of intent. In case you are exempted from such remittance an attested copy of authority for such exemption is to be furnished. Please note that in the event of your failure to comply with the provisions of said Act, if recoveries therefore are enforced from payments due to us by the customer or paid to statutory authorities by us, such amount will be recovered from payments due to you.

1.10.3.1.2. The final bill amount would be released only on production of clearance certificate from PF / ESI and labour authorities as applicable.

1.10.3.2. **OTHER STATUTORY REQUIREMENTS**

1.10.3.2.1. The Contractor shall submit a copy of Labour License obtained from the Licensing Officer (Form VI) u/r25 read with u/s 12 of Contract Labour (R&A) Act 1970 & rules and Valid WC Insurance copy or ESI Code (if applicable) and PF code no. along with the first running bill.

1.10.3.2.2. The contactor shall submit monthly running bills along with the copies of monthly wages (of the preceding month) u/r78(1)(a)(1) of Contract Labour Rules, copies

of monthly return of PF contribution with remittance Challans under Employees Provident Fund Act 1952 and copy of renewed WC Insurance policy or copies of monthly return of ESI contribution with Challans under ESI Act 1948 (if applicable) in respect of the workmen engaged by them.

1.10.3.2.3. The Contractor should ensure compliance of Sec 21 of Contract Labour (R&A) Act 1970 regarding responsibility for payment of Wages. In case of "Non-compliance of Sec 21 or non-payment of wages" to the workmen before the expiry of wage period by the contactor, BHEL will reserve its right to pay the workmen under the orders of Appropriate authority at the risk and cost of the Contractor.

1.10.3.2.4. The Contractor shall submit copies of Final Settlement statement of disbursal of retrenchment benefits on retrenchment of each workmen under I D Act 1948, copies of Form 6-A (Annual Return of PF Contribution) along with copies of PF Contribution Card of each member under PF Act and copies of monthly return on ESI Contribution – Form 6 under ESI Act 1948 (if applicable) to BHEL along with the Final Bill.

1.10.3.2.5. In case of any dispute pending before the appropriate authority under ID Act 1948, WC Act 1923 or ESI Act 1948 and PF Act 1952, BHEL reserve the right to hold such amounts from the final bills of the Contractor which will be released on submission of proof of settlement of issues from the appropriate authority under the act.

1.10.3.2.6. In case of any dispute prolonged / pending before the authority for the reasons not attributable to the contractor, BHEL reserves the right to release the final bill of the contractor on submission of Indemnity bond by the contractor indemnifying BHEL against any claims that may arise at a later date without prejudice to the rights of BHEL.

1.10.3.3. **DEPLOYMENT OF SKILLED / SEMI-SKILLED TRADESMEN**

The following clause is applicable in case the contract value / contract price is Rs. Five crores and above.

The contractor shall, at all stages of work deploy skilled / semi-skilled tradesmen who are qualified and possess certificate in particular trade from CPWD Training Institute / Industrial Training. Institute / National Institute of Construction Management and Research (NICMAR), National Academy of Construction, CIDC or any similar reputed and recognized Institute managed / certified by State / Central Government. The number of such qualified tradesmen shall not be less than 20% of total skilled / semi-skilled workers required in each trade at any stage of work. The contractor shall submit number of man days required in respect of each trade, its scheduling and the list of qualified tradesmen along with requisite certificate from recognized Institute to Engineer-in-Charge for approval. Notwithstanding such approval, if the tradesmen are found to have inadequate skill to execute the work of respective trade, the contractor shall substitute such tradesmen within two days of written notice from

Engineer-in-Charge. Failure on the part of contractor to obtain approval of Engineer-in-Charge or failure to deploy qualified tradesmen will attract a compensation to be paid by contractor at the rate of Rs. 100 per such tradesman per day. Decision of Engineer-in-Charge as to whether particular tradesman possesses requisite skill and amount of compensation in case of default shall be final and binding.

1.10.3.4. **RECOVERY OF COMPENSATION PAID TO VICTIMS BY BHEL IN CASES OF DEATH/ PERMANENT INCAPACITATION OF PERSON DUE TO AN ACCIDENT DURING THE WORKS**

BHEL shall recover the amount of compensation paid to victim(s) by BHEL towards loss of life / permanent disability due to an accident which is attributable to the negligence of contractor, agency or firm or any of its employees as detailed below.

a. Victim: Any person who suffers permanent disablement or dies in an accident as defined below.

b. Accident: Any death or permanent disability resulting solely and directly from any unintended and unforeseen injurious occurrence caused during the manufacturing / operation and works incidental thereto at BHEL factories/ offices and precincts thereof, project execution, erection and commissioning, services, repairs and maintenance, trouble shooting, serving, overhaul, renovation and retrofitting, trial operation, performance guarantee testing undertaken by the company or during any works /during working at BHEL Units/ Offices/ townships and premises/ Project Sites.

c. Compensation in respect of each of the victims:
In the event of death or permanent disability resulting from Loss of both limbs: Rs. 10,00,000/- (Rs. Ten Lakh)

In the event of other permanent disability: Rs. 7,00,000/- (Rs. Seven Lakh)

Permanent Disablement: A disablement that is classified as a permanent total disablement under the proviso to Section 2 (I) of the Employee's Compensation Act, 1923.

1.10.4. GENERAL

1.10.4.1. **E way Bills to be arranged by contractor whenever required.**

1.10.4.2. All works shall be carried out in proper workmen like manner. Items of works covered by the following specification shall be carried out as per the best practices and according to the direction of the Engineer In-charge / BHEL, Site Engineer and to his satisfaction. Unless otherwise specified in this section or in the description of item, the cost of stage of works mentioned here under shall be deemed to have been included in the rates of items provided in the schedule.

1.10.4.3. Scope of work covered under this specification requires quality workmanship, engineering and construction management. The contractor shall ensure timely

completion of work. The contractor shall have adequate tools, measuring instruments, etc. in his possession. He shall also have adequate trained, qualified and experienced engineers, supervisory staff and skilled personnel. The manpower deployment identified by contractor shall match with above scope of works.

1.10.4.4. It is not the intent to specify herein all details of material. Any item related to this work not covered by this but necessary to complete the system will be deemed to have been included in the scope of the work.

1.10.4.5. Site testing wherever required shall be carried out for all items / materials installed by the contractor to ensure proper installation and functioning in accordance with drawings, specifications and manufacturer's recommendations.

1.10.4.6. The work shall be executed under the usual conditions without affecting the plant construction and in conjunction with other operations and contracting agencies at site. The contractor and his personnel shall co-operate with the personnel of other agencies, co-ordinate his work with others and proceed in a manner that shall not delay or hinder the progress of work as a whole.

1.10.4.7. The Contractor may have to execute work in such a place and condition where other agencies also will be under such circumstances. The contractor shall co-operate with other contractors and agencies so that various activities can be carried out simultaneously in order to achieve an early completion.

1.10.4.8. All the work shall be carried out as per instructions of BHEL engineer. BHEL engineer's decision regarding the correctness of the work and method of working shall be final and binding on the contractor.

1.10.4.9. The contractor will be responsible for the safe custody and proper accounting of all materials in connection with the work.

1.10.4.10. The contractor must obtain the signature and permission of the security personnel of the customer for bringing any of their materials inside the site premises. Without the Entry Gate Pass these materials will not be allowed to be taken outside.

1.10.4.11. Contractor shall retain all T&Ps, Material handling equipments etc at site as per advice of BHEL engineer and same shall be taken out from site only after getting the clearances from Engineer In charge.

1.10.4.12. The contractor at his cost shall arrange necessary security measures for adequate protection of his machinery, equipment, tools, materials etc. BHEL shall not be responsible for any loss or damage to the contractor’s construction equipment and materials. The contractor may consult the Engineer-in-Charge on

the arrangements made for general site security for protection of his machinery equipment tools etc.

1.10.4.13. Any wrong erection shall be removed and re-erected promptly to comply with the design requirements to the satisfaction of Site Engineer.

1.10.4.14. Contractor has to work in close co-ordination with other erection agency at site. BHEL engineer will co-ordinate area clearance. In a project of such magnitude, it is possible that the area clearance may be less / more at a particular given time. Activities and erection program have to be planned in such a way that the milestones are achieved as per schedule/ plans. Contractor shall arrange & augment the resources accordingly.

1.10.4.15. Contractor shall remove all scrap materials periodically generated from his working area in and around power station and collect the same at one place earmarked for the same. Failure to collect the scrap is likely to lead to accidents and as such BHEL reserves the right to collect and remove the scrap at contractor's risk and cost if there is any failure on the part of contractor in this respect. All the package materials, including special transporting frames, etc. shall be returned to the BHEL stores by the contractor.

1.10.4.16. The contractor is strictly prohibited from using BHEL's regular components like angles, channels, beams, plates, pipe / tubes, and handrails etc for any temporary supporting or scaffolding works. Contractor shall arrange himself all such materials. In case of such misuse of BHEL materials, a sum as determined by BHEL engineer will be recovered from the contractor's bill. The decision of BHEL engineer is final and binding on the contractor.

1.10.4.17. No member of the already erected structure / platform, pipes, grills, platform, other component and auxiliaries should be cut without specific approval of BHEL engineer.

1.10.4.18. Contractors shall ensure that all their Staff / Employees are exposed to periodical training programme conducted by qualified agencies/ personnel on ISO 9001 – 2015 Standards.

1.10.4.19. Crane operators deployed by the contractor shall be tested by BHEL before he is allowed to operate the cranes.

1.10.4.20. On completion of work, all the temporary buildings, structures, pipe lines, cable etc. shall be dismantled and leveled and debris shall be removed as per instruction of BHEL by the contractor at his cost. In the event of his failure to do so, the expenditure towards clearance of the same will be recovered from the contractor. The decision of BHEL Engineer in this regard is final.

1.10.4.21. It is the responsibility of the contractor to do the alignment, checking, etc. if necessary, repeatedly to satisfy BHEL Engineer with all the necessary tools and tackles, manpower etc. without any extra cost. Also the contractor should ensure that the alignment is not disturbed afterwards.

1.10.4.22. If any item or equipment not covered but requires being erected, same shall be carried out by the contractor. Equivalent or proportional unit rate shall be considered wherever possible from the BOQ. The rates quoted by the contractor shall be uniform as far as possible for similar items appearing in rate schedule / price bid.

1.10.4.23. The contractor shall ensure that his premises are always kept clean and tidy to the extent possible. Any untidiness noted on the part of the contractor shall be brought to the attention of the contractor's site representative who shall take immediate action to clean the surroundings to the satisfaction of the Engineer-in-Charge.

1.10.4.24. SITE INSPECTION

i). BHEL or his authorized agents may inspect various stages of work during the currency of the contract awarded to him. The contractor shall make necessary arrangements for such inspection and carry out the rectification pointed out by the owner / employer without any extra cost to the owner / employer. No cost whatsoever such duplication of inspection of work be entertained.

ii). BHEL will have full power and authority to inspect the works at any time, either on the site or at the contractor's premises. The contractor shall arrange every facility and assistance to carry out such inspection. On no account will the contractor be allowed to proceed with work of any type unless such work has been inspected and entries are made in the site inspection register by BHEL.

iii). Wherever the performance of work by the contractor is not satisfactory in respect of workmanship, deployment of sufficient labour or equipment, delay in execution of work or any other matter, BHEL shall have the right to engage labour at normal ruling rates and get the work executed through other agency and debit the cost to the contractor and the contractor shall have no right to claim compensation thereof. In such a case, BHEL shall have the right to utilize the materials and tools brought by the contractors for the same work.

1.10.4.25. DOCUMENTATION

i). Record of Quantity of FREE (if any) /Chargeable items issued by BHEL must be maintained during contract execution. Also reconciliation statement to be prepared at regular intervals.

ii). The under mentioned Records/ Log-books/ Registers applicable to be maintained,

a. Hindrance Register
b. Site Order Book.
c. Test Check of measurements.
d. Cement Supply and Consumption Daily Register

e. Records of Test reports of Field tests.

f. Records of manufacture's test certificates.

g. Records of disposal of scraps generated during and after the work completion.

h. List of MMEs deployed by the bidder.

iii). As built drawings:
After successful completion of installation work, drawings / documents shall be updated in line with the actual work carried out and as built drawings / documents shall be submitted by the contractor.

iv). Other documents as specified in PROGRESS OF WORK (VOLUME-IA PART- II CHAPTER-XI)

VOLUME-IA PART – I CHAPTER-XI
PROGRESS OF WORK

The scope of the work will comprise of following but not limited to the following:

PROGRESS AND MONITORING OF WORK

1.11.1. Refer forms F -14 to F-18 of volume I D. Plan and review will be done as per the formats.

1.11.2. Contractor is required to draw mutually agreed monthly construction programs in consultation with BHEL well in advance monthly as per the Form-14. Contractor shall ensure achievement of agreed program and shall also timely arrange additional resources considered necessary at no extra cost to BHEL. Progress review meetings will be held at site during which actual progress during the week vis-a-vis scheduled program shall be discussed for actions to be taken for achieving targets. Contractor shall also present the program for subsequent week. The contractor shall constantly update / revise his work program to meet the overall requirement. All quality problems shall also be discussed during above review meetings. Necessary preventive and corrective action shall be discussed and decided upon in such review meetings and shall be implemented by the contractor in time bound manner so as to eliminate the cause of nonconformities.

1.11.3. The contractor shall submit daily, weekly and monthly progress reports, manpower reports, materials reports, consumables report, T&Ps availability report and other reports as per Performa considered necessary by the Site Engineer as per the BHEL formats.

1.11.4. The contractor shall submit weekly / fortnightly / monthly statement report regarding consumption of all consumables for cost analysis purposes.

1.11.5. The monthly report ending on 24th of every month shall be submitted as a booklet and shall contain the following details :-

a) Colour Progress photographs to accompany the report should be submitted.

b) Construction progress in terms of quantity, CUM,etc., completed as relevant to the respective work areas against planned.

c) Site Organization chart of engineers & supervisors as on 24th of the month with further mobilization plan

d) Category- wise man hours engaged during the previous month under the categories like fitters, electricians, welders, riggers, khalasis, grinder-men, gas-cutters, crane operators, store keepers, lab technicians, helpers, security etc. Data will be spilt up under the work area .

e) Consumables report giving consumption of all types of gases and electrodes during the previous month.

f) Availability report of cranes/T&Ps

g) Safety implementation report in the format

h) Pending material and any other inputs required from BHEL for activities planned during the subsequent month.

1.11.6. The manpower reports shall clearly indicate the manpower deployed, category wise specifying also the activities in which they are engaged.

1.11.7. During the course of construction, if the progress is found unsatisfactory, or if the target dates fixed from time to time for every milestone are to be advanced, or in the opinion of BHEL, if it is found that the skilled workmen like fitters, operators, technicians etc employed are not sufficient BHEL will induct required additional workmen to improve the progress and recover all charges incurred on this account including all expenses together with BHEL overheads from contractor's bills.

1.11.8. It is the responsibility of the contractor to provide all relevant information on a regular basis regarding construction progress, labour availability, equipment deployment, testing, etc.

1.11.9. The progress reports shall indicate the progress achieved against plan, indicating reasons for delays, if any. The report shall also give remedial actions which the contractor intends to make good the slippage or lost time so that further works can proceed as per the original plan the slippages do not accumulate and affect the overall programme.

1.11.10. The contractor to reflect actual progress achieved during the month and will be submitted to BHEL, so that slippages can be observed and necessary action taken in order to ensure that the situation does not get out of control will update the construction schedule forming part of this contract each month.

VOLUME-IA PART – I CHAPTER-XII
MATERIAL HANDLING

1.12.1. Open land shall be provided by BHEL on free of cost basis. Contractor shall maintain one centralized fenced store cum bar bending yard. Hard surfacing of this yard and all round drain shall be carried out by the contractor at his own cost within the quoted rate. Batching plant area, shall be provided and contractor shall make use of the area for installation and operation of the Batching Plant at his own cost. The bidder shall make complete arrangement of necessary security personnel, to safeguard all such materials in his custody.

1.12.2. The system for receipt, storage & issue of materials shall be available with vendors for easy traceability.

1.12.3. Periodic audit of system of purchasing, storing and issue, etc. will have to be carried out by the vendors. BHEL will also audit the same.

1.12.4. The contractor shall construct waterproof cement store for storing and stacking of cement, CGI/ asbestos roofing (slope) with brick masonry wall, PCC flooring. Materials required for the same shall be provided by contractor at his own cost. Cement has to be kept over wooden raised platform. Stacking of cement is to be done as per IS codes with proper illumination and locking arrangements.

1.12.5. The contractor shall in no case be entitled for any compensation or damages on account of any delay in supply or non-supply thereof for all or any such material.

1.12.6. Materials shall not under any circumstances taken out of the project site unless otherwise permitted by BHEL.

VOLUME-IA PART – II CHAPTERS 1 and 2

Chapter 1 and 2 in next 1513 pages is as below:

Vol IA	Part-II: Technical specifications	Chapter	No. of pages
1	Corrections/Revisions pertaining to Chapter-2, Part-II, Volume-I	Chapter-1	217
2	Technical Specifications for Integrated Talabira Township and Associated Works	Chapter-2	1296

TABLE-IA (L&T)

S.No.	Bidder query no.	Section / Part / Chapter / Volume Clause No. Page no.	Bid Specification Stipulation	Statement of clarification sought	NLCIL's Reply	Reason
1.				Requested for the Auto cad drawing of the following Contour drawing of Plant and Greenbelt area.	Preliminary topographical survey contour drg. of power plant and greenbelt area attached in DWG format.(X1)	Drawing attached.
2.				Contour drawing, Soil investigation of Township and associated facilities like approach road, power lines corridor and utilities.	Preliminary topographical survey contour drg. of Township attached in AUTOCAD format.(refer tender drawing C26) Other works under bidder's scope.. For Route map. Ref (Corrigendum-3)	Drawing enclosed
3.				Route survey of 33 kV transmission line from proposed mine substation up to plant.	The Purchaser's 33kV DC feeder from Lapanga Grid Substation is proposed to be erected along the Coal Transport Road (As per Talabira/Electrical). The tentative location of 33kV Take off point will be approximately 2.4 Km	-

					from SH-10 (Ref. Section-A, Annexure Drawing C1). The route of 33kV transmission line shall be designed as per the availability for Right Of Way anywhere between SH-10 and this Take of point or at Take of point and upto the 2x6.3 MVA, 33kV/11kV Substation location near Gate Complex inside the plant. (Ref. Item No.: 71, Plot Plan, DRW No.:18A03-DWG-M-002A).	substation is inside plant area near gate complex.
4.				~~Route survey of 11 kV transmission line from plant to township~~	~~The 11kV transmission line route shall be designed as per the availability for Right Of Way from 2x6.3 MVA, 33kV/11kV Substation location near Gate Complex inside the plant (Ref. Item No.: 71, Plot Plan, DRW No.:18A03-DWG-M-002A) upto the entrance to Township location No.1 (Ref. Section-A, Tender Drawing B22).~~	-
5.				Area drainage study report	Relevant pages of Area drainage study report attached for reference.(	Document enclosed.

					X2) Refer Section A - Annexure drg no. B6 for embankment cross section	
6.				~~Contour survey drawing and soil investigation of embankment area along Bhedan river~~	~~Detailed survey and soil investigation of embankment area is in the scope of bidder. However for Talabira Mines, flood protection bund/embankment, preliminary soil investigation carried out by M/s Fargo Consultants pvt Ltd and relevant bore holes BH101 to BH106 are attached for reference.(X3)~~	~~Bidder's scope Reference drawing attached.~~
7.				AutoCAD copy of the Integrated Talabira Township drawings as provided in tender Chapter VI, Section A, Annexure Drawing Nos. C1 to C28	Required preliminary indicative drawings for power plant & integrated township are already given in along with tender document. AUTOCAD drawings C1-C28 and B1 to B21 can not be shared	PDF drawing enclosed.
8.				AutoCAD copy of the drawings as provided in tender Chapter VI, Section A, Annexure Drawing Nos. B1 to B21 for thermal power plant area		
~~9.~~	~~41.~~	~~Vol I A/ Section 2 (IFB) Cl. 2.1.0~~	~~**BRIEF SCOPE OF WORK**: ……~~	~~(i) We understand that clearances/approvals such as Environmental Clearances,~~	~~(i) Regarding getting of approval for right of way / use, it is informed that~~	~~For better clarity~~

SN	Volume	Clause	Page	Description	Query Raised	Reply
529	Volume IIA, Section IV	1.36.00	13 of 27	Initial site leveling & Area Grading works of the entire plant area, ash dyke, raw water reservoir, raw water intake system and all other areas under EPC Package shall be carried out by Bidder.	Area Grading for ash dyke, raw water reservoir and make up water piping corridor are not required. Please confirm.	Tender condition prevails.
530	Volume IIA, Section IV	3.00.00	21 of 27	Exclusion	The below mentioned activities are excluded from Bidder's scope. Please confirm. Owner is requested to furnish pointwise response. a) Land acquisition b) R&R Colony c) Tree cutting d) Statutory Approvals from forest authorities, if tree cutting included in EPC Scope. e) Right of Way wherever applicable including raw water intake piping, ash piping, construction water & power corridors and all other utility corridors for township. f) Approval from statutory authorities for drawl of water from hirakud dam for intake water pump house. g) Approval from statutory authorities for drawl of water from bedhan river for construction water. h) Approval from statutory authorities for discharge of storm water drain to Bedhan river. i) Approval from statutory authorities for construction of bund along bedhan river. j) Approval from statutory authorities for construction of two bridges over the bedhan river and crossing of electrical lines. k) Approval from statutory authorities for construction of approach road and drains & culvert from existing state highway.	Refer Annexure-A for (a), (b), (c) , (d), (e), (g), (h),(i) and (k) for f) and j) Please refer "Sr. No.547 reply (b)" .
531	Volume IIA . Section IV/B	2.12.00	20 of 27	Bidder has to facilitate the Owner in getting ROW wherever required in the areas coming under their scope including Raw water intake system scope. This facilitation will also cover the area required for the Raw water intake pipe lines, 33 KV Raw water intake Transmission lines and inspection road along the raw water intake pipe lines.	Technical input with respect to site survey, design and drawings etc. are acceptable to Bidder. Further, Owner is requested to define the responsibilities that the EPC Contractor is required to undertake for “Facilitation" purpose.	Tender condition prevails.

SN	Volume	Clause	Page	Description	Query Raised	Reply
547				General	With regards to obtaining statutory clearance which is kept in Bidder scope; a) Since Bidder is doing legwork on behalf of Customer, Bidder shall not be responsible for any delay in obtaining the permit(s). Delay in project, if happens due to delay in obtaining the permit, Bidder shall be compensated accordingly. b) In case of any fees charged by state and central government bodies/organisations for approving design, drawings or inspection etc. with respect to works outside plant boundary including intake system, transmission line, approach road, bridges, construction water and township shall be payable by Owner. Please confirm.	a) Bidder shall be totally responsible for any delay in obtaining the permit(s), statutory approvals as needed for the completion of the project. No compensation whatsoever will be entertained. b) Payment of necessary licence fee only to the State/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approvals is in the scope of successful bidder.
548	Tender drawing			Plant roads and drains Plot plan	Plot plan and plant roads & drains both drawings are not matching. Bidder requests Owner to clarify and issue updated drawing.	For layout of Plant roads and Drains, Plot plan shall be referred.
554	Tender drawing - Corrg1			Plot plan Scope of work related to approach road to ash pond	Bidder requests Owner to clarify scope related to approach road from Bridge on Bhedan river upto Ash pond and related specifications.	Refer Corridgendum.
556	Corrigendum 1			Plot Plan Drawing No. 18A03-DWG-M-002A Bridge (EPC Section B)	Single bridge is shown over Bhedan river for ash pipes, make up water pipes, utility lines to township etc. including four lane approach road. Bidder requests Owner to accept option of providing two Bridges wherein one bridge shall be for four lane approach road and another bridge will be utilized for carrying ash & make up water pipes, utility lines to township etc.	Refer Corridgendum. The requesty of L&T has been detailed in the Corrigendum.
557	Corrigendum 1			Plot Plan Drawing No. 18A03-DWG-M-002A Bridge (EPC Section B)	Bidder requests Owner to furnish the below mentioned details for design of bridges: a) Schematic drawing showing the top and bottom of the proposed bridge. b) Location coordinates @ both banks of the proposed Bridge in order to decide the alignment. c) Specifications of the bridge i.e. span, type of foundation, requirement of walkway etc. d) Maximum water level e) Soil investigation and Bathymetry survey	a) Under Bidder's Scope b) Available details already shared with the bidder c) Span and walkway requirements already given. Type of foundation will be finalised during detailed engineering based on Bidder's Soil investigation report. D) Refer area drainage study e) Under Bidder's Scope
559	Volume II - IB/1, Water intake and Transportation system	2.01.04	2 of 14	Gravity type intake channel to be constructed for drawing water into the intake pump house. The intake channel length within the Hirakud reservoir up to the pump house shall be about 1 km. Capital dredging shall be carried out for a stretch 1 km upstream to 1 km down of intake channel.	Intake scheme for drawing of plant water from Hirakud reservoir, shall be finalized by Bidder based on feasibility studies and field investigations which will be carried out during detail engineering. It is not mandatory for the Bidder to follow the intake structure specified in tender document. Please confirm Bidder's understanding.	Bidder to follow the tender specification for intake structure as a minimum requirement, further it shall be finalized based on the feasibility studies and field investigations done by Bidder
560	Volume II-G1/Section - I/General	4.25.02	73 of 118	Dimensions of precast concrete tiles M30 Grade laid over LDPE sheet shall be 300 x 300 x 50 mm – laid over 25 mm thick 1:4 cement mortar. The jointing and pointing between tiles shall be done with 1:3 cement mortar.	Alternatively Bidder shall have an option to provide 75 mm thick PCC over LDPE sheet instead of " 300 x 300 x 50 mm – laid over 25 mm thick 1:4 cement mortar". Please confirm. Owing to constructability issues, the aforesaid practice has being followed in existing projects including NTPC.	Tender condition prevails

SN	Volume	Clause	Page	Description	Query Raised	Reply
585	Vol. II-G1/Section-II / SECTION-B	3.00.00 LOADS	10 OF 38	h) Earth pressure Load Earth pressure for all underground structures shall be calculated using coefficients of earth pressure at rest, coefficient of active or passive earth pressure (whichever is applicable). However, for the design of sub-structure of pump house and underground liquid storage tanks earth pressure at rest shall be considered with coefficient of earth pressure at	Bidder understands that Coefficient of active earth pressure shall be considered for design of free standing retaining walls and coefficient of earth pressure at rest shall be considered for design of top propped retaining walls. Please confirm.	Tender condition prevails.
586	Vol. II-G1/Section-II / SECTION-B	3.00.00 LOADS	11 OF 38	k) Other Loads All Power House columns adjacent to first row of Boiler columns shall be designed for an additional load of 500 kN to account for piping/cable rack loads ....All Power House Columns along the transformer yard, shall be designed for an additional load of 50KN/m for horizontal pipe / cable rack in addition to conductor pull load from substation.	As Bidder proposes to connect the CD piperack to the Boiler and TG building with necessary PTFE connection to optimize on the plant space utilization, loads as per layout shall be considered. Bidder does not envisage any additional loads or blanket load to be considered. Please confirm.	Tender condition prevails.
587	Vol. II-G1/Section-III/ SECTION-B	4.00.00	6 of 14	PIPE AND CABLE RACK STRUCTURES It is envisaged that pipe/cable rack under this Package shall have to accommodate some additional pipes and cables, which are not in the scope of the Bidder. The Bidder shall keep reasonable margin for accommodating such additional pipes/cables in the rack structure, details of which shall be furnished to him during the detailed engineering stage	Bidder request to provide additional loads due to piping not in the scope of the Bidder.	Tender condition prevails.
588				General	Please provide the geotechnical investigation report of the following: a) Ash pond b) Township c) Access roads (from highways to plant, township, Intake) d) MUW pipe corridor e) MUW Intake structure	Under Bidder's Scope For (b) refer Annexure-A
589				General	Please provide the bathymetry survey report of the Bhedan river (Along the plant and Construction water) and Hirakud Dam (Intake area)	Under Bidder's Scope
591				General	Bidder does not envisage any requirement of fire rated glazing / glass partitions in the plant buildings. Please confirm.	Tender condition prevails.

S N	Volume	Clause	Page	Description	Query Raised	Reply
746	VOLUME: II-J,SECTION-IV, AIR CONDITIONING SYSTEM	5.21.02 Duct work	Page 58 of 67	All duct work for supply of air inclusive of accessories such as damper, vanes, access doors etc. shall be fabricated from G.I. sheet or aluminum sheet.	Bidder proposes to allow use of flexible circular duct for connection of diffusers or grills with main or branch ducts in air conditioned areas. Please confirm acceptance.	Tender conditions prevails
747	VOLUME: II-J,SECTION-IV, AIR CONDITIONING SYSTEM	5.22.01 Thermal Insulation	Page 62 of 67	Thermal Insulation: Entire chilled water piping, valves, chilled water circulating pumps, and chillers with 38 mm thick aluminum foil faced Nitrile rubber. The portion of Chilled water piping exposed to atmosphere shall be insulated with 50 mm thick EPS (TF quality) / Nitrile Rubber finished with 500 gauge Polythene sheet, chicken wire mesh,	Bidder proposes to provide aluminium cladding 30 gauge as final finishing instead of sand cement plaster. Please confirm Bidder's understanding.	Tender conditions prevails
748	Section B / Vol. I-B/Section-9 Performance Guarantees	9.5.2.14	Page 129 of 310	Air Conditioning and Ventilation System A Air Conditioning System (1 Duty factor for power consumption of A/C equipments of service building shall be 0.5.)	Owner is requested to note that the Power Consumption for Chiller for AC System for TG & Service Building is common, so it is difficult to differentiate in the Chillers & Pumps power consumption for Service Building & TG Building. Please clarify.	Tender conditions prevails
HVAC - TOWNSHIP						
761	VOLUME: II-J,SECTION-IV, AIR CONDITIONING SYSTEM vs VOLUME: I-A,SECTION-II, GENERAL PROJECT INFORMATION	4.01.00 Design Criteria - Ambient Design condition vs 2.0.0 General Project Information	Page 26 of 67 vs Page 5 of 574	Volume II-J: Following design outside conditions have been considered for the design of the Air Conditioning system in consideration of the site location near Kumbhari & Tareikela villages in Jharsuguda District, Odisha. Summer : DBT 41.3ºC & WBT 24.0 ºC Monsoon : DBT 29.0ºC & WBT 25.8 ºC Winter : DBT 16.7 ºC & 13.7 ºC Volume I-A: Mean Ambient temperature: Maximum - 33.1 ºC Minimum - 20.7 ºC Average - 27.5	The maximum and minimum outside temperature differs in both these clauses. Bidder understands that worst conditions as mentioned in AC specifications Volume II-J, Section-IV are to be followed for sizing of air conditioning system and same is considered by bidder. Please confirm.	Bidder understanding is correct.
Fire Protection & Detection System - PLANT						
763	Vol. II-J Section-II Fire Protection & Detection	3.00.00 System Description Clause / 3.01.02 High Velocity Water Spray System (HVW System)		System Description Nitrogen Injection Fire Extinguishing System shall be provided for GTs, STs, ICTs, IBTs, Bus reactors, line reactors, Raw water intake Transformer, 400/34.5kV switchyard transformer	Bidder understands that as per Clause 3.00.00 Nitrogen Injection Fire Extinguishing System shall be provided for GTs, STs, ICTs, IBTs, Bus reactors, line reactors, Raw water intake Transformer, 400/34.5kV switchyard transformer. However as per Clause 3.01.02 High Velocity Water Spray System (HVW System) is required for 9 Nos, GT and Spare Transformer,6.Nos UT. 3 Nos.ST,6 nos. UAT ,765 kV & 400 kV Bus Reactors and 765kV line reactors, 6 Nos. single phase Interconnecting transformers (765/400 kV-ICT), 2. Nos. 400/34.5kV Inter bus transformers (IBTs) and 2. Nos. Switchyard Transformer 400/33 kV . As per standards either Water based HVWS system or Nitrogen injection system is required, please clarify the type of Fire protection system required	Tender conditions prevails.
764	Vol. II-J Section-II Fire Protection & Detection	3.00.00 System Description Clause / 3.01.02 High Velocity Water Spray System (HVW System)		For all Roads/Rail crossing, Fire water pipe will be through RCC Box culverts.	As per Standard Engineering practice For Road/Rail Crossing relevant class of Hume pipe (NP2/NP3) is used & the same is also accepted as per TAC/relevant standard, Owner is requested to accept the same.	RCC Hume pipe shall be provided as per NP Class-3 as per IS:458.
765	Vol. II-J Section-II Fire Protection & Detection	3.01.02 High Velocity water spray system Category B , point no.d		d) Turbine generator under-deck area (Oil Canal)	This is not applicable in our case, hence the same shall not be provided.	Tender conditions prevails

S N	Volume	Clause	Page	Description	Query Raised	Reply
956	Vol. II-A/Section-IV Scope of Supply & Services, Terminal Points & Exclusions	SL NO.1 Raw Water Intake System	Page 22 of 27	Terminal Point Upstream of Raw water Intake Pump House forebay. Refer tender drawing no. 18A03-DWG-M-001R in this regard	Bidder requests Purchaser to provide the Drawing.	The terminal point is at Hirakud reservoir at the raw water intake drawl location. Entire work of raw water intake system from drawing water from Hirakud reservoir including dredging in reservoir, intake channel, forebay, pump house etc. to inplant raw water reservoir is in Bidder's scope. Drawing no. 18A03-DWG-M-001R is already available in tender specification.
General						
957	Vol. II-A/Section-IV Scope of Supply & Services, Terminal Points & Exclusions	Cl.2.03.00	Page 20 of 27	Services for construction, fabrication, equipment erection, testing as well as trial run & commissioning of various equipment and accessories under the contract. The details of such services are indicated in detailed elsewhere in this specification volume. Bidder shall arrange tower crane for erection and construction work, wherever necessary. Minimum three (3) numbers of 650T capacity tower cranes shall be arranged under the scope of service in addition to the required resources for erection and construction of boiler.	The methodology of Boiler erection is using jacks which is completely different and Bidder do not require high capacity crane. Bidder shall submitt the major cranes required for erection and construction works of bidder's scope. Bidder may not require to envisage the requirement of 650 T crane based on our adopted construction methods. Bidder will mobilize the higher capacity cranes as per the project requirements.	Noted as per bidder proven practice.
958	Section – B/ Vol. I-B/Section-2 Scope of Supply & Services	Cl.2.6.0 Construction Power	Page 22 of 310	To meet the construction power requirement of the project, the Contractor shall carry out the works as stipulated in Section – A of the tender specification up to Two Number 11kV power source in the plant boundary (As referred in plot plan) with a maximum capacity of 3 MVA each	Bidder understand Construction Power shall be arranged by EPC Contractor from a source near Coal mine Substation, from there Contractor has to bring the Power through 4 Km transmission tower crossing Bhedan River upto the plant boundary. As you aware, Construction power at site required from day one of the Project. The above proposal of bringing the Construction Power is time taking and which may not be feasible to complete before Construction Power requirement at site. Hence, we request Purchaser to arrange alternative Power source for Construction.	Construction power supply for section:B scope of work will be extented from this source. Till the availability of construction power supply (Section:A scope) bidder has to make his own arrangement for construction activities of scope under section:B.
959	Section – B/ Vol. I-B/Section-2 Scope of Supply & Services	Cl.2.6.0; point (b) Construction Power	Page 23 of 310	The charges for the actual energy consumed by the Contractor shall be payable to the Purchaser based on prevalent rate of DISCOM guidelines. Contractor is restricted to use maximum demand of 3 MVA only. For additional power demand beyond 3 MVA, Contractor may at his own cost arrange suitable back-up power by means of DG sets for uninterrupted power supply.	Bidder request purchaser to provide the present prevailing DISCOM rates. Also please clarify, whether demand charges to be paid by Bidder or purchaser? The maximum demand of 3 MVA is very less on peak construction works for 3 x 800 MW project. Considering construction work involved in 3x800MW project along with township work, Bidder request to provide maximum demand of 7.5 MVA.	Maximum demand for construction power supply(CPS) is fixed based on the previous project experiance of NLCIL. If the CPS demand is more than 3MVA, bidder has to make his own arrangement as per the tender condition.
960	Vol.: I-B (Section B) Annexure-XX	Cl.23.11 MATERIAL HANDLING AND STORAGE	Page 268 of 310	The Contractor shall be responsible for making suitable indoor storage facilities to store all equipment which require indoor storage. Normally all the electrical equipment, such as motors, control gears, generators, exciters and consumables like welding electrodes, lubricants, etc. shall be stored in the closed storage space. The Purchaser/Consultant in addition, may direct the Contractor to move certain other materials which in his opinion will require indoor storage, to indoor storage areas which the Contractor shall strictly comply with.	Bidder shall store the materials whichever is required in the indoor store as per OEM recommendation.	Tender specification prevails
961	Vol.: I-B (Section B) Annexure-XX	Cl 23.14	Page 270 of 310	All materials of Contractors should be received only during normal working hours.	Since project schedule itself is very stringent, This clause may delay the overall delay in construction of the project. Hence Bidder request Purchaser to allow to receive the materials at all times.	Tender specification prevails

S N	Volume	Clause	Page	Description	Query Raised	Reply
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1626	Vol-II/H2/CHP	4.35.00	9 of 114	Wind Barrier shall be provided throughout the stockpiles as indicated in Plot Plan (Drawing Number18A03-DWG-M-002A).	Bidder requests Owner to provide following detail for wind barrier. 1. Height 2. Material of wind barrier screen mesh 3. Design criteria for super structure (% mesh blockage).	Plz refer reply to point no.247
1627	Vol-II/G1/Civil/Section-1	4.23.1	57 of 118	Ash Dyke: WBM road on dyke top, 4.00m wide bituminous inspection road all around the periphery of dyke at ground level along with cross drainage structures, rock toe, toe drain & spillways (box culvert), overtaking zones & approach ramps.	Bidder requests Owner to clearly define scope related to bund protection work for nearby Nallah. Also provide details of Nallah, length to be protected, specification for bund protection, cross sectional details etc.	For scope details, Refer Corrigendum. Other details related to bund protection for nearby nallah shall be discussed with the successful bidder after the award of LOA.
1628	Vol-II/G1/Civil/Section-II	4.00.00	16 of 38	Ordinary Portland cement namely Grade 43 conforming to IS: 8112 (Latest Revision) shall be used for construction of all RCC structures and foundations. Higher grade 53 may be used in the work but the design restricted to Grade43 only.	Bidder requests Owner to allow Fly ash based Portland pozzolana cement conforming to IS: 1489 (Part-1) for all areas other than for the critical structures identified below. Other properties shall be as per IS code. Ordinary Portland Cement (OPC) shall necessarily be used for the following structures. a) TG foundation top deck b) All machine foundations such as TDBFP/ MDBFP / Fans / Coal Mills c) RCC for Chimney shell. The grade of cement shall be Grade 43 for OPC conforming to IS: 269. In place of fly ash based Portland pozzolana cement, OPC mixed with Fly Ash can be used. Batching plant shall have facility for mixing fly ash. Fly ash shall conform to IS: 3812(Part I & Part II). Percentage of fly ash to be mixed in concrete shall be based on trial mix. Mix design shall be done with varying percentage of fly ash mix with cement. This is in line with all NTPC Projects. This will also ensure utilization of fly ash for all construction works which in line with notification from ministry.	Tender Condition prevails.
1629	Vol-II/G1/Civil/Section-II	4.00.00	16 of 38	Ordinary Portland cement namely Grade 43 conforming to IS: 8112 (Latest Revision) shall be used for construction of all RCC structures and foundations. Higher grade 53 may be used in the work but the design restricted to Grade43 only.	Alternate to above, Bidder requests Owner to allow use of Fly ash based Portland pozzolana cement (PPC) conforming to IS: 1489 (Part-1) for all non critical structures like Roads, Drains, Non plant buildings, Integrated township, Bridge, PCC, Fill concrete. This will also ensure utilization of fly ash for all construction works which in line with notification from ministry.	Tender Condition prevails.
1639				General	Please confirm that "Area Drainage Study Report" is excluded from Bidder's scope. Please confirm.	Confirmed. Owner has conducted Area Drainage Study Report and the same is furnished.
1640				General	Clearance from Airport Authority for Chimney is excluded from Bidder's scope.	Bidder's understanding is in order.
1641	Vol II-IA/Section - IV	4.06.01	6 of 40	Cooling tower fill shall be made of material as specified in Annexure enclosed with this section. The fills shall be of film type.	Whether Trickle grid fills are acceptable. Please confirm	Tender Condition prevails.

1676	Vol II-G1/ Section IV	2.04.00	32	Workshop building	Please provide the size or area of Workshop building, as in tender drawings only section is provided.	Refer to tender drawing 18A03-DWG-M-007
1683	Vol. II-G1/Section-II	7.00.00	27 of 38	A Table is provided in Vol-II G 1 / Section-I showing Carriageways, shoulder widths etc.	Bidder understands that road layout and cross section shall be as per 18A03-DWG-C-0006 Rev 0. Please confirm.	Bidder may go through the specification in detail. The table stands deleted.
1684	Geotechnical investigation	11.1	27 of 372	The type, size, depth of the foundation / pile shall be based on the approved soil investigation report of Bidder/**Owner's**	Geotechnical report included in the Tender provides Bearing capacities for 25mm settlement only. As lightly loaded structures and raft foundation may be permitted to settle upto 40mm, soil bearing capacities for the same shall be included in the investigation report. If Owner is not able to provide the aforesaid information then Bidder should be allowed to consider bearing capacities as per the approved soil investigation report to be carried out during detail engineering.	For Section-B buildings & structures' foundations, only 25 mm total permissible settlement permitted. Tender Condition prevails. Bidder's clarification - not agreed to.
1685	Geotechnical investigation	11.1	27 of 372	The type, size, depth of the foundation / pile shall be based on the approved soil investigation report of Bidder/**Owner's**	Geotechnical report included in the Tender provides Bearing capacity recommendation for upto 6m. Owner is requested to provide such recommendation for size greater than 6m (raft foundation). If Owner is not able to provide the aforesaid information then Bidder should be allowed to consider as per the approved soil investigation report to be carried out during detail engineering.	This will be discussed during detailed engineering. However conservative value as per the discretion of owner / consultant shall be binding upon the successful bidder.
1686	Geotechnical investigation	11.1	27 of 372	The type, size, depth of the foundation / pile shall be based on the approved soil investigation report of Bidder/**Owner's**	Geotechnical report included in the Tender provides Bearing capacity values for open foundation resting on rock on a very conservative size. Higher values are anticipated as sound rock is available at shallow depth. Also soil investigation is not available at bridge, intake, piping corridor and township location. Owner is requested to provide realistic bearing capacities in line with the soil stratification. If Owner is not able to provide the aforesaid information then Bidder should be allowed to consider as per the approved soil investigation report to be carried out during detail engineering.	Tender Condition prevails. Bidder's clarification not agreed to. Owner's geo tech report is based on actual geo tech lab/site values. For bridge, intake, piping corridor, bidder shall do the geo tech investigation and submit the draft report for Owner/Consultant Approval. This will be dealt seperately during Detailed engineering. For Township location, refer Annexure-A.
1687	Geotechnical investigation	11.1	27 of 372	The type, size, depth of the foundation / pile shall be based on the approved soil investigation report of Bidder/**Owner's**	Bidder requests pile capacities for 900mm and 1000mm diameters. If Owner is not able to provide the aforesaid information then Bidder should be allowed to consider Pile capacities as per the approved soil investigation report to be carried out during detail engineering.	Owner / Consultant is of the opinion that the various pile diameters given in TS / owner's soil investigation report is sufficient for the said project. Higher pile dia requirement if any will be discussed during detailed engineering. However conservative value as per the discretion of owner / consultant shall be binding upon the successful bidder for the higher pile dia if suggested by the successful bidder.

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	work Vol-IB Part-I			Upon completion of Defect Liability period for civil works and Warranty/ Guarantee for electrical works.	release the necessary payment to his sub-contractor/vendor/sub-vender for labour, material, etc., retention of Final Payment by Purchaser will require huge working capital to be arranged by the Contractor leading to severe financial stress on the Contractor. Further, since the CPG is valid up to end of Defect Liability period, we request Purchaser to kindly release the Final Payment (10%) on completion of respective Infrastructural works. Kindly confirm Alternatively, we request Purchaser to kindly release the Final Payment (10%) against submission of Retention Bank Guarantee.	
64.	Section-A work Vol-IB Part-I	3.5.1	9 of 280	……In case the CONTRACTOR fails to complete the Works within the stipulated period, then, unless such failure is due to Force Majeure or due to PURCHASER'S defaults, the total Contract price (section-A) shall be reduced by ½% (Half percent) of the Total Contract Price (section-A)…….	For all the work under Section-A the Price Reduction clause shall be applicable on the value of the respective portion of work delayed and not on the Total Contract Price (of Section-A) i.e. delay in Integrated Talabira Township should not lead to reduction of price component of "Thermal Power Plant Area" and vice versa. We request the Purchaser to kindly	Tender conditions prevails

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					consider our above request.	
65.	ITB/Vol-1A/Section-3 Volume: I-A / Sch:F1 Summary of Price Schedule / Table 1	3.29.0.ii) Note for Table 1 (Section B) : Note no. 7	86 of 574	Signing of Contract Bidder to note that the Scope of Work covered is a "Works Contract" as defined under Sec.2 (119) of the CGST Act, 2017 and the supply of all goods and services together would be taxable at the rate of 18%, i.e., the rate applicable to works contract service as per Notification No. 8/2017-Integrated Tax (Rate) dated 28.07.2017. Accordingly, Bidder to indicate GST for all applicable items on ceiling basis in this Price table.	Upon reading of clause 10.55 (transfer of ownership), we understand that the ownership under offshore supply will transfer to the Purchaser at the time of delivery to the carrier (i.e. HSS basis) and that for onshore supply will be transferred on Ex-works basis. Therefore, the contracts have to be dealt with independently from taxation point of view and cannot be merged with civil and service contract to form a single works contract. Hence, we suggest Purchase to kindly split the Total Contract (for Section-A) in to following manner : 1) Supply (Section-A) 2) Installation Services including Civil works (Section-A) Similarly the Total Contract Price (for Section-B) may kindly divided in to following manner: 1) Supply (Section-B) 2) Installation Services including Civil works (Section-B)	Tender condition prevails.

SN	Volume	Clause	Page	Description	Query Raised	Reply
					Purchaser. The Contractor shall not claim any be entitled for time extension on this ground.	
70.	Section-B/ Vol. I-B / Section -4 Time Schedule	4.9.2	43 of 310	Compensation for Overstay Compensation for overstay shall be applicable only for delays not attributable to the Contractor. In such a case, compensation for overstay shall be mutually discussed and agreed at the end of completion time (i.e. 59 months from the date of LOA).	We request Purchaser to modify the clause as follows : "Compensation for overstay shall be applicable only for delays not attributable to the Contractor. In such a case, compensation for overstay shall be mutually discussed and agreed at the end of completion time (i.e. 30 months for Section-A & 59 months for Section-B from the date of LOA)."	Tender Condition prevails.
71.	Section-B/ Vol. I-B / Section -4 Time Schedule	4.14	47 of 310	Extension of Time : …… (c) Any other circumstance of any kind whatsoever which may occur, making the Contractor entitled to an extension of time which, however, shall be at the absolute discretion of the purchaser	Extension of Time We request Purchaser to modify the clause as follows: ……. (c) Any other circumstance of any kind whatsoever which may occur, making the Contractor entitled to an extension of time which, however, shall be at the absolute discretion of the purchaser mutually discussed and agreed. the provision of the Contract	Tender condition prevails
72.	Vol-IB (Section B) Annexure-XX	15.0	264 of 310	Facilities to be Provided by Purchaser	We request Purchaser to modify the clause as below: 15.1 Space Refer Section-2 of this Volume-IB, Draft Contract Purchaser shall provide Encumbrance	Tender Condition Prevails

SN	Volume	Clause	Page	Description	Query Raised	Reply
					free land for Power Plant, Embankment Area, Raw Water Pump house, Access Roads, Bridges, Corridors, Township & Ash Dyke location as per agreed schedule 15.2 Electricity Refer Section-2 of this Volume-IB, Draft Contract Purchaser shall provide construction power tapping point near mines as per agreed schedule. 15.2 Water Refer Section-2 of this Volume-IB, Draft Contract Purchaser shall provide Right of Way for laying of Pipeline for Construction water from Bhedan River as per agreed schedule.	
73.	Section-B/ Vol. I-B / Section- 10 : General Terms & Conditions of Contract	Clause 10.30	185-187 of 310	New Clause "Suspension by Contractor" at the end of 10.30	Kindly insert following paras at the end of viii) : ix) Suspension by Contractor: If (a) the Purchaser has failed to pay the Contractor any sum due under the Contract within the specified period, has failed to approve any invoice or supporting documents without just cause pursuant to terms and	Not acceptable.

ANNEXURE – C2I

Change in specification based on resolution for the Pre bid bidder queries received

Sl. No.	Sl. No as in pre bid query	TENDER SPEC. REFERENECE	Description as in Specification	Description To be read as
1	-	Vol-II-G1/ Clause 3.00.00 SCOPE OF CIVIL WORKS & Volume-IIA, Clause 1.36.00		Construction of Compound wall all around the acquired boundary of Raw water pump house located in close vicinity of Hirakud reservoir is also in the Scope of the successful EPC bidder. The compound wall shall be constructed in line with the Technical specification for Compound wall of Township as given in section –A. For the Toilets in the Raw Water pump house located in close vicinity of Hirakud Reservoir, Modular STP of adequate capacity shall be provided.
		Vol. II-G1/Section-I General 4.23.10 **Ash Dyke** Design of Embankment		Dyke separation embankment / bund : i) Top width of dyke separation embankment / bund shall be minimum 4m or as per the design requirement and considering the future 2 raisings which ever is more stringent. ii) Free board to be considered shall be minimum 1.5 m. iii) Minimum 1000 micron HDPE lining shall be provided on both sides of separation embankment / bund with anchorage of HDPE lining at the bund with any approved proven method. All other requirements are same as outer embankment / bund.
2	-	Vol. II-G2/Part-A/Section-VI Cement Concrete (Plain & Reinforced)	In case of unavailability of normal specified river sand, the M sand (Crushed stone sand) shall be used with the approval of the	In case of unavailability of normal specified river sand, the M sand (Crushed stone sand) conforming to Zone 2 shall also be permitted as per given criteria/specifications

			……			
13.	358	Section A Infrastructure Works/ Chapter V - External Electrification work Vol. II-F1/Section-I General Electrical Specification Cl. 1.11.35 Page 125 of 280 Page 10 of 83	Scope of Work: The Purchaser's scope is to extend Two number 33kV lines from Lapanga Substation with a maximum capacity of 15 MVA each, through dedicated Double Circuit feeders upto the location, near Mines entrance which is approximately 4 Kms from Thermal Power Project Main Gate. Construction Power To meet the construction power requirement of the project, the Purchaser will provide two Numbers of 11 kV feeder with a Total maximum capacity of 3MVA on chargeable basis, at single location, near Main Gate-3 (As referred in Plot plan) to	There is discrepancy between referred clauses of specification. As per scope of work in Section A, Construction Power that is to be provided by purchaser is at 33kV Voltage grade and Contractor has to lay 33kV OH line to the construction power S/S inside Plant boundary. However as per referred clause 1.11.35, Construction power provided by purchaser is at 11kV. Please clarify the Contractor scope, construction power voltage level and construction power kVA rating.	The 33kV outlet at Mines entrance is the source of supply common for Mines, Integrated Talabira Township, Miscellaneous Non Plant Buildings and Construction Power to be extended upto 33kV indoor Switchgear of 2x6.3MVA, 33/11kV Construction Power Supply Substation in Bidder's scope under Section-A Package. Construction power needs for Section-B Package, 2 Nos dedicated outlets at 11kV voltage level with a Total maximum capacity of 3MVA on chargeable basis (Ref. Cl. 1.11.35, Pg. 10 of 83, Section-B, Vol. II-F1/Section-I General Electrical Specification) will be provided from	-

			meet the construction power requirements.		11kV indoor Switchgear of 2x6.3MVA, 33/11kV Construction Power Supply Substation in Bidder's scope under Section-A Package. Section-B Package Bidder shall extend the above 11kV power supply to meet the construction power requirements at various locations of inside thermal power plant. Also ref. Cl. 4.00.00 General Scope, 4.00.01 pg. No.: 130 of 280.	
14.	359	Section A Infrastructure Works/ CHAPTER V EXTERNAL ELECTRIFICATION WORKS Vol. II-A/Section-IV Scope of Supply & Services, Terminal Points & Exclusions	The 33kV Double Circuit feeding arrangement shall be designed to handle a Maximum Capacity of 15 MVA each. The Double Circuit feeding arrangements and the Substation shall be permanent infrastructure and will be used for maintaining	As per referred clauses, Bidder understands following: 1. 33kV GIS will be provided in Power Plant Switchyard. 2. 33kV and 11kV indoor switchgear will be provided as part of Construction power substation. The supply from this switchgear will feed construction power requirement of plant, township, non plant building loads etc till the commissioning of	PERMANENT SUPPLY for township, Miscellaneous Non Plant Buildings (Cl. 1.11.41, Pg. 12 of 83) shall be from 11kV indoor Switchgear of Construction Power Supply Substation (2x6.3MVA, 33/11kV SS in Bidder's scope under Section-A package) inside Thermal Power Project	-

		Vol-II F1/Section-1, General Electrical Specification, Document3 Section A Infrastructure Works/ CHAPTER V EXTERNAL ELECTRIFICATION WORKS Cl 1.02.00 Page 24 of 27 Cl 7.0, a Page 126 of 280 Cl 1.11.41 Page 12 of 83 Cl 1.2.00 Page 126 of 280	power supply to Mines & Township from Thermal Power Plant Switchyard in future. 33 kV supply to Township:33 kV: Incomer terminal of 33 kV RMU Switchgear provided by Section-A Contractor 1) From 33kV GIS Switchgear 2 Nos of 33 kV power supply shall be extended (33kV UG cable)to 33kV indoor Switchgear of construction power supply substation after phasing out of the 33kV State TRANSCO power, in turn will feed power to integrated township and above listed buildings. From 33kV GIS Switchgear 2 nos. of 33kV power supply shall	permanent feeding arrangements. 3. Permanent supply for township shall be from 33KV GIS. There will be four pole structure substation/RMU at township to receive this 33kV supply which will be further step down to lower voltage level as per requirement of township. 4. 33kV transmission lines used for taking construction power from Mines to construction substation inside Power plant will be permanent arrangement. The same line will be used to supply power from Power Plant to Mines after phasing out of 33kV State TRANSCO power. 33kV Power supply from 33kV GIS to mines area shall be taken from 4-pole structure available at construction power SS facility. 5.For feeding intake 33kV lines/cables as required will be connected from 33kV GIS. Owner may please confirm Bidder's understanding.	site. 1. From 33kV GIS Switchgear 2 Nos of 33 kV power supply (Township feeder) shall be extended (33kV cable) to 33kV indoor Switchgear of Construction Power Supply Substation after phasing out of the 33kV State TRANSCO power. 2. From 33kV GIS Switchgear 2 nos. of 33kV power supply shall be extended (33kV cable) up to 33kV cable intake gantry structure of 33kV transmission line (Ref. Cl. 5.01.00, pg. No.: 132 of 280 in Bidder's scope under Section-A Package) located near Construction Power Supply Substation inside Thermal Power Project site in turn will feed power to the Mines.	

			be extended (33kV UG cable) up to 4 pole structure (located near construction power substation) of 33kV transmission line in turn will feed power to the Mines. 2) The Bidder scope is to construct the 2x6.3 MVA, 33kV/11kV Substation complete with all associated supplies & services still commissioning of the substation for the Township, Miscellaneous Non Plant Buildings and Construction power supply at suitable location inside Thermal Power Project site.			
15.	361	VOLUME: I-B,SECTION-A, PART-II, Chapter II, Site grading Cl. 1.1 Page 35 of 280	Finished ground level (FGL) for Main plant area is +202.50.	Bidder understands that the finished **GRAVEL** level of switchyard will be above +202.50. Owner may please confirm.	Finished gravel level of switchyard shall be above +202.50.Hence confirmed.	As per standard practice

16.	362	Section A Infrastructure Works/ VOLUME: I-B,SECTION-A, PART-II, Chapter IV, Internal Electrification Works Cl. 1.4.1 Page 94 of 280	PVC insulated, multi stranded, Heat resistant fire retardant (HRFR), low smoke, flexible copper conductor cables of 1.1kVgrade, conforming to IS:694/1990, ISI marked shall beused.	Bidder would like to clarify that the latest edition of IS 694 is 2010 (Reaffirmed 2015). As per scope of this standard, it is limited for rated voltages up to and including 450/750V. Bidder understands that the applicable voltage grade as per latest standard is acceptable to Owner. Owner may please confirm Bidder's understanding.	The applicable voltage grade as per latest standard is acceptable to Owner.	
17.	363	Section A Infrastructure Works/ VOLUME: I-B,SECTION-A, PART-II, Chapter IV, Internal Electrification Works, Chapter-5: Cable laying Cl. 5.2 Page 113 of 280	Cables of different voltage grading shall be generally laid in different trenches. In case it is not possible to lay them in separate trenches, due to site constraint, the same trench may be used, but adequate separation within the trench shall be ensured. Specific approval shall be obtained from the engineer.	Bidder understands that separation between segregation as per IS 1255, clause 6.3.3 is acceptable. Owner may please confirm Bidder's understanding.	Separation between segregation as per IS 1255, clause 6.3.3 is acceptable.	
18.	364	Section A Infrastructure Works/ VOLUME: I-B,SECTION-A, PART-II, Chapter IV, Internal Electrification Works, Chapter-5: Cable	Wherever the cable is to cross road/railway track/Bridge, Nalla etc. the cable shall be laid **through suitable size of pipes** as per instructions of the	Bidder understands that wherever road/railway track/bridge crossing, cable shall be laid through 350mm dia pipes. Owner may please confirm Bidder's understanding.	Wherever road/railway track/bridge crossing, cable shall be laid through 350mm dia pipes.	

		laying Cl. 5.7 , a) Page 113 of 280 Cl. 5.7 , c) Page 114 of 280	Engineer. Minimum width of cable trench: Under Railway Track/road = 350mm approx. (Through pip)			
19.	365	Section A Infrastructure Works/ VOLUME: I-B,SECTION-A, PART-II, Chapter V, External Electrification Works Cl. 1.01.00 Page 126 of 280	..33kV Takeoff point at Mines entrance to inside thermal Power Project site up to the 2x6.3 MVA, 33kV/11kV substation.	Bidder requests Owner to provide following: a) 33kV Mine substation layout b) 33kV Take off point at Mine substation for bidder terminal c) ROW corridor for 33kV/11kV double circuit transmission lines from Mines, raw water area and Township.	Area levelling, site preparation & marking, Route survey and finalization of transmission line Right of way is under bidder's Scope. (Ref.: Cl. 1.00.00, Pg. No.: 125 of 280 & Cl. 2.00.02, Pg. No.: 128 of 280). The tentative location of 33kV Take off point (at Mines entrance) will be approximately 2.4 Km from SH-10 (Ref. Corrigendum-3, Approach Road Layout Drawing B22). The route of 33kV transmission line shall be designed as per the availability of ROW anywhere between SH-10 and this Take of point or at Take of point and upto the 2x6.3 MVA, 33kV/11kV Construction	

					Power Supply Substation location (Ref. Item No.: 71, Plot Plan, DRW No.:18A03-DWG-M-002A). The 11kV transmission line route shall be designed as per the availability for ROW from 2x6.3 MVA, 33kV/11kV Substation as above up to Township entrance Location No.1. (Ref.: Section-A, Chapter-VI, Drawings, Township Layout Drawing C1).	
20.	366	Section A Infrastructure Works/ VOLUME: I-B,SECTION-A, PART-II, Chapter IV, Internal Electrification Works, Section A Infrastructure Works/ VOLUME: I-B,SECTION-A, PART-II, Chapter V, External Electrification Works Cl. 1.4.1, (d) Page 94 of 280 Cl. 5.12.00, 7.0 Page 137 of 280	(d) Minimum size of wiring cable/s for light and power points shall be as below: ➢ Light/Fan/6Amp Plug point wiring -2Run of 2.5 Sqmm& 1Run of 1Sqmm. The wiring cable shall be of FR PVC insulated, stranded, copper conductor of size not less than 1.5sq.mm for lighting circuit, fan, etc. and 2.5sq.mm for power circuits.	There is discrepancy between the referred clauses of Tender. Bidder requests Owner to clarify the minimum size of lighting wire.	No discrepancy Chapter IV for internal electrifications and Chapter V for External electrifications For internal electrification works Light/Fan/6Amp Plug point wiring -2Run of 2.5 Sqmm& 1Run of 1Sqmm shall be used.	

					Tender condition prevails. For Substation Control Room & other buildings covered under External Electrification works the wiring shall be as per 5.12.00, Sl. No.: 7, pg. No. 137 of 280.	
21.	367	Section A Infrastructure Works/ VOLUME: I-B, SECTION-A, PART-II, Chapter V, External Electrification Works Cl. 5.16.00, 7.0 to 12.0 Page 141 of 280	7.0 Neutral earth electrodes of the respective transformers shall be interconnected and connected to the grid using GI flat as per specification. 8.0 GI earth wire shall run all along the wire fencing and shall be connected to the grid at 20m interval.	There is discrepancy of material type for Earthing between referred clauses of Tender and Thermal Main plant requirement. Bidder requests Owner to clarify the material type GS or GI for earthing.	Tender condition prevails. For equipments covered under External Electrification works such as 2x6.3MVA, 33/11kV Substation, RMU's etc., GI flats shall be provided for Earthing unless otherwise specified.	
22.	368	Section A Infrastructure Works/ VOLUME: I-B, SECTION-A, PART-II, Chapter VI, Drawings Annexure Drg. No. B1	Forest land in front of 765kV and 400kV outgoing lines.	Bidder requests Owner to indicate preliminary location of takeoff tower in the marked forest area for 400kV and 765kV lines for considering suitable loading on take off gantry. Owner may please confirm Bidder's understanding.	It will be finalised during detailed engineering	

		Page 01 of 01				
23.	396	Section A Infrastructure Works/ Chapter V External Electrification Works Cl. 1.01.00 Page 126 of 280	The Bidder scope is to provide 33kV Double Circuit Transmission line across the Bhedan River, through lattice type steel structure with all accessories, supplies & services, from 33kV Takeoff point at Mines entrance to inside thermal Power Project site up to the 2x6.3 MVA, 33kV/11kV substation.	Bidder requests Owner to provide Route survey and Tower spotting drawing for 33kV Double Circuit Transmission line from Talabira Mines Entrance to Plant Area.	Ref.: Remarks for Query Sl. No.: 365	
24.	397	Section A Infrastructure Works/ Chapter V External Electrification Works Cl. 1.04.00 Page 127 of 280	Bidder shall provide 11kV Double Circuit Transmission line across the Bhedan River, from 11kV switchgear of 2x6.3MVA, 33/11kV Substation to construct 11kV Ring Main Distribution Network within Township and other associated provisions.	Bidder requests Owner to provide Route survey and Tower /pole spotting drawing for 11kV Double Circuit Transmission line from Plant Area to Township.	Ref.: Remarks for Query Sl. No.: 365	

25.	398	Section A Infrastructure Works/ Chapter V External Electrification Works Cl. 1.02.00 Page 24 of 27	The 33kV Double Circuit feeding arrangement shall be designed to handle a Maximum Capacity of 15 MVA each. The Double Circuit feeding arrangements and the Substation shall be permanent infrastructure and will be used for maintaining power supply to Mines & Township from Thermal Power Plant Switchyard in future.	Bidder requests Owner to provide Route survey and Tower spotting drawing for 33kV Double Circuit Transmission line from 33kV GIS to Talabira Mines.	Ref.: Remarks for Query Sl. No.: 365	
26.	399	Section A Infrastructure Works/ Chapter V External Electrification Works Cl. 1.02.00 Page 24 of 27	The 33kV Double Circuit feeding arrangement shall be designed to handle a Maximum Capacity of 15 MVA each. The Double Circuit feeding arrangements and the Substation shall be permanent infrastructure and will be used for maintaining power supply to Mines	Bidder requests Owner to provide Route survey and Tower spotting drawing for 33kV Double Circuit Transmission line from 33kV GIS to Township.	Repetition of above Query Sl. No. 398	

			& Township from Thermal Power Plant Switchyard in future.			
27.	448	Section-A Infrastructure Works/ Chapter-III Cl. 3. Page 78 of 280	A schematic STP network with STP details shall be designed and constructed inclusive of all civil, mechanical, electrical and instrumentation…	Instruments and LCP based controls shall be provided as per proven and standard practice of STP vendor. Owner to please confirm Bidder's understanding.	confirmed	
28.	449	Section-A Infrastructure Works/ Chapter-IV/ PART -7 CCTV system Cl. 7.0 Page 118 of 280	CCTV IP Based low wattage CCTVs and Access Control systems using open and nonproprietary standards powered by the network switch (PoE), Hybrid energy efficient Road Blockers and boom barriers for outdoor access control, Metal Detection Systems, Perimeter Intrusion Detection Systems, Events based Remote Site Monitoring and storage.	BOQs and technical requirements for CCTV, access control system etc. are not specified for infrastructure works. Owner to please clarify.	Establishing Surveillance system for the required locations along with Surveillance data recording and monitoring facilities at required locations with access control and security. Minimum 5MP Resolution IP Camera with NVR & NVR shall have all basic analytics feature with storage of minimum 30 days (camera shall be fixed at main entrance gate ,VIP house ,TA office entrance, guest house entrance & for township area .	For better clarity

29.	450	Section-A Infrastructure Works/ Chapter-IV/ PART -7 CCTV system Cl. 7.1 Page 118 of 280	The EPC Contractor should design a suitable capacity telecommunication/ EPBAX/ TV/ LAN system shall be provided.	BOQs and technical requirements for telecommunication/ EPBAX/ TV/ LAN system are not specified for infrastructure works. Owner to please clarify.	1. Establishing a telecom centre building in township. (TA) 2. Establishing EPABX system with Duplicate control system and telephone cable network at Township telecom centre and provide official intercom phones.(AO building ,TA office,VIP house,Guest House ,Community hall ,PH house,Hospital & Sub station) 3. Establishing OFC and radio links to provide redundant connectivity between AO, Thermal and Mines. 4. Establishing facilities for extending intranet from computer services division.(AO,TA,PH house, VIP house, Hospital) 5. Networking the telephony system with other NLCIL projects, JVs and regional offices using BSNLMPLS and SIP trunking. (VIP House, Guest House ,TA,AO Building ,PH House)	For better clarity

					6.LAN Facility shall be provided(AO,TA,PH house, VIP house, Guest house ,Hospital ,Library & Industrial training centre.)	
30.	484	VOLUME - IB, Part II, Chapter II Cl. 1.1 Page 35 of 280	Site grading work involves cutting and filling entire power plant area & green belt area to following finished levels. Levels have been finalized keeping in view the Highest Flood Level (HFL) of Bhedan River and Area drainage study recommendations (Area drainage study for the power plant conducted by National Institute of Hydrology, Roorkee).	Owner is requested to provide Highest Flood Level (HFL) of Bhedan River and Area drainage study report. Bidder request owner to allow changes in FGL levels based on cut/fill volume but meeting the plant functional requirements.	Relevant pages of Area drainage study report conducted by NIH, Roorkee is attached for reference. (X2) Bidder may refer Table 5.8 of Area drainage study report for Maximum water level along the course of Bhedan river. FGL mentioned in technical specification shall be followed by the bidder without change.	Plant FGL as per MOEF requirements.
31.	485 Page 36 of 280	VOLUME - IB, Part II, Chapter II Cl. 1.1	Talabira Mines overburden earth can be transported after ensuring its suitability for filling if excess earth is required.	Bidder understand that overburden earth of Talabira mines is available free of cost to the Bidder. Please confirm.	Overburden earth will be provided at free of cost at NLCIL Talabira mine (Regarding royalty refer commercial conditions). However, the bidder need to make his own arrangement at his cost for the required	Discussed with Talabira site and added.

					machineries, loading, transportation and unloading.	
32.	487	VOLUME - IB, Part II, Chapter II Cl. 1.12 Page 41 of 280	Suitable lining along embankment using fly ash brick shall be provided	Bidder understand that embankment to the river Bhedan shall be constructed as per Annexure drawing no B06 which shows stone pitching and grass turfing. Please clarify.	Bidder has to follow annexure drawing number B6 for construction of river side embankment (Flood protection bund). However, lining for embankment mentioned in Page 41 of 280 refers to power plant site grading work.	For better clarity
33.	488	VOLUME - IB, Part II, Chapter II Cl. 2 Page 42 of 280	Interlocking paver block for road side walkways	Bidder understand that Shoulder shall be considered as walkway for which 75 mm PCC paver block shall be provided.	Walkways shall be provided with heavy duty 75 mm (minimum) thick anti-skid interlocking concrete paver blocks with a minimum compressive strength of 30MPa of approved design and top colour	For better clarity
34.	489	VOLUME - IB, Part II, Chapter II Cl. 3 Page 42 of 280	For Preliminary drawing indicating compound wall cross section and tentative layout, Refer Annexure drg no. B3 (Sheet 1 and sheet 2	Bidder understand that Plaster is not required over brickwork for compound wall	Plastering of thickness 15 mm in CM 1:5 shall be provided over compound wall on both sides.	For better clarity
35.	490	VOLUME - IB, Part II, Chapter II Cl. 6.1	Township compound wall of 2.4 m height covering a length of 6.5	Bidder understand that Township area compound wall may not be 6.5 km long. Owner to check and	Integrated talabira township comprises of two plots on either side	For better clarity

		Page 86 of 280	km (approx)	clarify.	of road. Total compound wall length is approximately 6.5 km	
36.	491	VOLUME - IB, Part II, Chapter II Cl. 6.1 Page 86 of 280	For preliminary architectural drawing (of compound wall), Refer Annexure Drg no. C21	Bidder understand that Plaster is not required over brickwork for compound wall.	Plastering of thickness 15 mm in CM 1:5 shall be provided over compound wall on both sides.	For better clarity
37.	492	VOLUME - IB, Part II, Chapter II	Raw water intake system	Owner is requested to provide the following: a) Route map of raw water intake. Location of raw water intake area. b) Route map Survey report of township approach c) Route map of construction power for powerplant d) Route map of construction power for township e) Route map survey for construction water source. f) Route map of Ash dyke. g) Bathymetry study of Bhedan river and Intake area Hirakund reservoir.	b) Main approach road to township and dedicated approach road from township to power plant deleted from scope of bidder. c) Under bidder's scope d) Under bidder's scope e) Construction water for power plant shall be drawn from Bhedan river. Refer technical specification. Construction water for township is in bidder scope.	
38.	493	Section A/ Chapter II Cl. 5.12.	Protection of river side embankment slope ...Only minimum technical requirements	Owner is requested to provide the IIT/ IISc recommendations so that the considerations may accounted in the Bid.	Detailed construction drawing of embankment shall be prepared by bidder and the same shall	For better clarity

			for Embankment formation along Bhedan River are mentioned in Section A-Chapter II - Cl 5.0. However, the same can be modified suitably (if required) based on the technical recommendation of IIT/IISc during approval stage, ensuring safety of bund during its life period.		be validated by design calculations. Design and construction drawings shall be got vetted from IIT/IISc by the bidder.	
39.	494	Section A/ Chapter I Cl. 5.8 Page 34 of 280	INTERFACE WITH STRUCTURES UNDER OTHER'S SCOPE	Owner to identify the structures under others scope within the Township and Plant area, where interface of Bidder engineered structures are envisaged.	No interface issues are identified as on date as entire scope of work lies with Single package EPC. However, if any interface problems arise, the same shall be resolved by the bidder.	
40.	530	Volume IIA, Section IV Cl. 3.00.00 Page 21 of 27	Exclusion	The below mentioned activities are excluded from Bidder's scope. Please confirm. Owner is requested to furnish point wise response. a) Land acquisition b) R&R Colony c) Tree cutting d) Statutory Approvals from forest authorities, if tree cutting	a) Not covered in bidder's scope in Section_A. b) Not under bidder's scope c) Under bidder's scope	For better clarity

				included in EPC Scope. e) Right of Way wherever applicable including raw water intake piping, ash piping, construction water & power corridors and all other utility corridors for township. f) Approval from statutory authorities for drawl of water from hirakud dam for intake water pump house. g) Approval from statutory authorities for drawl of water from bhedan river for construction water. h) Approval from statutory authorities for discharge of storm water drain to Bhedan river. i) Approval from statutory authorities for construction of bund along bhedan river. j) Approval from statutory authorities for construction of two bridges over the bhedan river and crossing of electrical lines. k) Approval from statutory authorities for construction of approach road and drains & culvert from existing state highway. Owner is requested to share the total list of approvals required for	d) Obtaining statutory approval is in the scope of the bidder (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.) e) Right of way(ROW) is in the scope of the bidder. (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.)	

				this project and identify the approvals to be taken either by Bidder and Owner.	g) Approval for raw water drawl from Bhedan river is available from authority. h) Obtaining statutory approval is in the scope of the bidder (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.) i, k) Obtaining statutory approval is in the scope of the bidder (Payment of necessary license fee only to the state/Central Govt. authority for obtaining	

					statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.) Bidder to identify the list of approvals required for successful completion of the complete package which are all under Bidder's scope.	
41.	532	Chapter VI/ Drawings Section A - Infrastructure works Thermal Power Plant Area - Annexure Drgs Nos B1 to B21 Annex Drg no. B6	Embankment for NTTPP Note: For Bund construction necessary statutory clearance shall be obtained from the state government/WRD which is under EPC Scope	a) In regards to obtaining the statutory clearance, Bidder understands that, necessary legwork for facilitating Owner to take necessary approval, shall be carried out by the Bidder. Please confirm. b) Also as these permissions are on the name of Customer, statutory fees if any applicable to state government/ WRD for approval of drawings, inspection etc. shall be payable by Owner. Please confirm. c) Bidder understands that area drainage study for deciding the extent of embankment, its width	a)& b) Obtaining statutory approval is in the scope of the bidder (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder. c) Area drainage study	For better clarity

				and height etc. has been already carried out by Owner and need not be done by Bidder again during detail engineering. Therefore Bidder shall follow the details mentioned in tender drawings. Kindly confirm Bidder's understanding.	need not be conducted by the bidder again. Relevant pages of Area drainage study report conducted by NIH, Roorkee is attached for reference.(X2) Section A - Annexure drg No. B6 is only indicative. Detailed construction drawing of embankment shall be prepared by bidder and the same shall be validated by design calculations.	
42.	533	Chapter VI/ Drawings Section A - Infrastructure works Thermal Power Plant Area - Annexure Drgs Nos B1 to B21 Annex Drg no. B3	Compound wall drawing Compound wall at filling area (fly ash masonary) with concertina coil 9 NTTPP Note: Minimum depth of Pile foundation below NGL shall be 2000 MM	Pile foundation, dia and minimum depth requirement are mentioned in the tender drawing. Bidder understands that the type of foundation (open/pile), pile dia and min. depth can be changed based on the soil investigation report during detail engineering. Owner to kindly confirm.	Bidder can change foundation for compound wall supported by soil investigation report and detailed design calculations. Approval shall be obtained for construction drawing from NLCIL.	For better clarity
43.	534	Volume IIB/Section A Cl. 6.3 Page 87 of 280	Main approach shall be laid from SH-10 to integrated township. Its approximate length is about 1.60KM.	Owner to furnish the following: a) Route survey of the corridor for 1.6 km approach road. b) Location coordinates of integrated township.	a)Main approach road to township and dedicated approach road from township to power plant DELTED from scope of bidder.	

				c) Soil investigation.	b) refer township contour drawing . c)Soil investigation is under bidder's scope	
44.	535	Section A - Infrastructure works Cl. 2, 3 c) and f) Page 14 of 280	Integrated Talabira Township **c) Main Approach road from Integrated township to SH-10 (4 lane)** d) Internal main road within township (4 lane) e) Internal road within township (Single lane) **f) Dedicated approach road from Power plant to township (2 lane)**	Owner to furnish the following pertaining to approach road to Township: a) Route survey of the corridor for approach road from SH-10 upto Township b) Route survey of the corridor for dedicated approach road from Power Plant to township. c) Top of Road level to be kept for the aforesaid roads. d) Route survey of the corridor for approach road from SH-10 upto Township e) Route survey of the corridor for dedicated approach road from Power Plant to township. c) Soil report	Main approach road to township and dedicated approach road from township to power plant DELTED from scope of bidder. Route map of approach road to power plant is attached in Corrigendum-3. Route survey works are under bidder scope.	For better clarity
45.	536	Section A - Infrastructure works Cl. 2, 3 c) and f) Page 14 of 280	Integrated Talabira Township **c) Main Approach road from Integrated township to SH-10 (4 lane)** d) Internal main road within township (4 lane) e) Internal road within township (Single lane) **f) Dedicated approach**	Bidder requests Owner to clarify the below mentioned activities pertaining to the approach road from SH-10 upto Township and dedicated approach road from Power Plant to township a) Land acquisition and ROW are in Owner's scope. Please confirm. b) Statutory approval for Tree cutting in Owner's scope. Please	Main approach road to township and dedicated approach road from township to power plant DELTED from scope of bidder. Ref corrigendum. ROW is in the bidder scope. Land acquisition is owner's scope. Statutory approvals in Bidder scope.	For better clarity

			road from Power plant to township (2 lane)	confirm. c) Statutory approval for dismantling of existing approach road, culvert and drain shall be taken by Owner prior to dismantling work. Please confirm. d) Land for disposal of dismantled concrete debris, rebar etc. shall be provided by Owner within a lead of 2 km. Please confirm.	Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder	
46.	537	Section A - Infrastructure works Cl. 2, 3 c) and f) Page 14 of 280	Integrated Talabira Township **c) Main Approach road from Integrated township to SH-10 (4 lane)** d) Internal main road within township (4 lane) e) Internal road within township (Single lane) **f) Dedicated approach road from Power plant to township (2 lane)**	a) Bidder understands that in order to construct new approach road from SH-10 to township, the existing approach, drains and culvert needs to be dismantled. Please clarify whether this dismantling is in Bidder's scope or not? b) Statutory approval for dismantling of existing approach road, culvert and drain shall be taken by Owner prior to start of construction work. Please confirm. c) Land for disposal of dismantled concrete debris, rebar etc. shall be provided by Owner within a lead of 2 km. Please confirm. d) Land for diversion road during construction period shall be provided by Owner. Please confirm.	Main approach road to township and dedicated approach road from township to power plant DELTED from scope of bidder. – Corrigendum-3	As per corrigendum-3
47.	538	Section-A, Chapter-III Scope of work	Site Grading & Levelling	a) Please provide contour drawing no C26 in autocad	a) AUTOCAD drawing of C26A attached.	Survey drawing attached.

		Cl. 1.2 Page 66 of 280		version to work out the site grading quantities – cutting & filling. b) Please also mention the proposed FGLs of township area as the area has substantial variation in RLs from RL 199M to RL216M. c) Bidder understands that terrace grading with more than one FGL will be allowed for Township. Please confirm.	b & c) Bidder can conduct detailed topographical survey of township area, adopt site grading with multiple terrace levels (FGL) optimizing cutting and filling in the area itself. Multiple FGLs can be fixed by the bidder.	
48.	539	Section-A, Chapter-III Scope of work Cl. 1.3 Page 66 of 280	Geotechnical Investigation	Though it is clearly mentioned in NIT document that detail Geotechnical Investigation report to be carried out by successful bidder of proposed site but please provide us some basic soil report of proposed township area so that bidder can assess the type of foundation of proposed structures.	The foundation shall be designed and provided as per detailed soil investigation which is under bidder scope. However for township area Net safe bearing capacity of soil for township may be limited to 15 t/sq.m at 1.50 m below NGL if SBC is ≥ 15t/sq.m. If SBC at 1.5 m below NGL ≤ 15t/sq.m, actual value shall be taken for design calculations.	Clarifications based on previous experience of R&R colony

49.	540	Section-A, Chapter-III Scope of work Cl. 3 Page 77 of 280	Design basis – Drainage & Rainwater Harvesting system	Please provide the harvesting pond location, size & spec of construction. Please also specify the final discharge point of storm water from harvesting pond.	Bidder shall study the site conditions and select suitable location for rain water harvesting pond and storm water drain. Size and specification as per design requirement with approval of NLCIL.	For better clarity
50.	541	Section-A, Chapter-III Cl. 3 Page 73 of 280	Design basis – Roofing	Please provide the detail specification of roof water proofing treatment of all buildings having RCC flat roof.	For Roof water proofing bidder shall refer Vol II-G1/ Section IV. Clause 4.00.00.13.a. In addition to the above for Township buildings , Ceramic Weather proof tiles to be provided.	For better clarity
51.	542	Section-A, Chapter-III Scope of work Cl. 4 & 5 Page 79 to 86 of 280	Furniture	Please confirm about the scope of supply of furniture in all type of residential & non residential buildings. If supply in bidder's scope then provide the detail spec of furniture and number in each type of buildings.	Supply of furniture not in scope of bidder	
52.	543	Section-A, Chapter-III Scope of work Cl. 5.4 Page 83 of 280	Recreation Club	Please confirm about the scope of supply of all type of game equipment in different indoor game rooms. If supply in bidder's scope then provide the detail spec of equipment and number in each type of game rooms.	Supply of game equipment for different indoor games not in scope of bidder	
53.	544	Section-A, Chapter-III Scope of work Cl. 5.8	Hospital	Please confirm about the scope of supply of all type of medical equipment in different rooms of	Supply of medical equipments in hospital not in scope of bidder	

		Page 84 of 280		hospital. If supply in bidder's scope then provide the detail spec of equipment and number in each type of rooms.		
54.	545	Section-A, Chapter-III Scope of work Cl. 5.9 Page 85 of 280	school	Please confirm about the scope of supply of all type of lab equipment in laboratory room of school. If supply in bidder's scope then provide the detail spec of equipment and number.	Supply of lab equipment for school not in scope of bidder	
55.	546	TOWNSHIP Vol IB- Section B Chapter III Page 90	Play ground with audience gallery	Please confirm the type of construction of gallery – steel or RCC and also confirm the scope of supply of 250 no. of audience sitting chairs. Request to provide conceptual drawing for the same.	Construction gallery for stadium shall be closed at top, side open with tubular curved steel truss arrangement with aesthetic appearance. Seating arrangement for 250 No. shall be in RCC platforms with steps of standard width for accommodating chair in future. Top of RCC platform shall be finished with Matt. Sitting chairs are not in scope of bidder. Bidder shall come up with innovative arrangement for Construction of audience gallery.	For better clarity
56.	547		General	With regards to obtaining	a) & b) Obtaining	For better clarity

				statutory clearance which is kept in Bidder scope: a) Since Bidder is doing legwork on behalf of Customer, Bidder shall not be responsible for any delay in obtaining the permit(s). Delay in project, if happens due to delay in obtaining the permit, Bidder shall be compensated accordingly. b) In case of any fees charged by state and central government bodies/organizations for approving design, drawings or inspection etc. with respect to works outside plant boundary including intake system, transmission line, approach road, bridges, construction water and township shall be payable by Owner. Please confirm.	statutory approval is in the scope of the bidder (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.)	
57.	549	Vol-IB, Section A, Part II Technical Cl. 2 Page 12 of 280	Scope of work CISF – Barracks (G+2), Armoury and quarter guard, Canteen, security check post and toilet block	Bidder requests Owner to provide location of CISF – Barracks (G+2), Armoury and quarter guard, Canteen, security check post and toilet block in plot plan.	Location marked in plot plan.	Refer Plot plan
58.	550	Vol-IB, Section A, Part II Technical Cl. 2 Page 12 of 280	Scope of work Parking lot	Bidder requests Owner to provide location of parking lot in plot plan. (Inside plant boundary or outside plant boundary near main gate#1).	Main parking lot for power plant shall be outside and near to Main gate complex (Gate #1). However, exact location shall be finalised during detailed engineering as	-

					per the approved layout.. Parking lot for Thermal project office building shall be provided adjacent to the building itself.	
59.	551	Tender drawing - Corrg1	Plot plan Scope of work related to Boundary wall	Scope of work regarding boundary wall around forest land (as marked in plot plan with Orange colour line) is very ambiguous. Bidder understands that boundary wall is not required around forest land (as marked in plot plan with Orange colour line). Please clarify.	Please refer Annex-B3 drawing. However, actual boundary wall location/ Alignment shall be decided based on site conditions during execution based on latest plot plan.	Required detail furnished
60.	552	Tender drawing	Site grading layout Forest land and Jal bandharan land	Bidder understands that site levelling and grading is not required in area marked as Forest land and Jal bandharan land. It is excluded from Bidder's scope. Please clarify. If required, please provide FGL for the same.	Site levelling and grading is not required in Forest land and Jal Bhandaran land. Refer Section A - Annexure Drg No. B1	-
61.	553	Tender drawing	Plant roads and drains & Plot plan	There is contradiction regarding scope and spec (4mt wide vs 4 lane) for peripheral road around fencing as per both drawings.	Details will be furnished shortly.	-
62.	555	Tender drawing - Corrg1	Plot plan Scope of work related	Bidder requests Owner to provide corridor details for road to township along with	a) Main approach road to township and dedicated approach road from	As per corrigendum-3

			to approach road to township.	specifications.	township to power plant DELTED from scope of bidder. (ref corrigendum 3)	
63.	558	Corrigendum 1 Section A - Infrastructure works/Chapter I Cl. 2 Page 12 of 280	Plot Plan Drawing No. 18A03-DWG-M-002A Scope of work, Thermal Power Plant area 4 CISF – Barracks (G+2), Armoury and quarter guard, Canteen, security check post and toilet block	Township/ CISF Barracks is shown in the Plot Plan @ E810200/ N 2411450 Bidder understands that the particular area marked in the Plot Plan shall be utilized for construction of CISF Barracks (C+2), Armoury and Quarter guard, as per the scope of work of thermal power plant area mentioned in clause no. 2, Section A- Infrastructure, page 12 of 280. Canteen, security check post, toilet block and Integrated township are not envisaged in that area. Owner to please confirm Bidder's understanding.	Tentative Location indicated in North Eastern side of power plant (RHS of forest land) shall be used only for CISF Barracks (G+2), Armoury and quarter guard, Canteen, Security check post and toilet block. Exact location will be finalized during detailed engineering. Integrated Talabira township is not located in that area. For location of Integrated Talabira township refer key plan in Section A-Annexure Drg No. C1	Clarifications furnished
64.	564	TOWNSHIP Vol IB- Section B Chapter III Page 69	Layouts, design and drawings : ➢ Township layout with state of the art facilities and incorporating green building concept/features. For Indicative township	Bidder understands GRIHA, IGBC or similar Green building certification shall not be obtained. If 'Yes', please provide the rating.	Certification is not required. However, green building concepts shall be adopted in Integrated talabira township. In township area VIP Guest House, Type-I, Type-II, Type-III and Type-	As per requirement

			layout- Refer Annexure Drg no. C1		IV, Executive hostel shall be provided with roof top solar. For works covered in Section A, Thermal project office building shall be provided with rooftop solar as mentioned in technical specification.	
65.	565	TOWNSHIP Vol IB- Section B Chapter III Page 69	Architectural drawing including floor plans, elevations, cross sections with good aesthetic appearance and perspective view in colour for all buildings along with **3D Revit models** for all residential buildings, Auditorium, library, Guesthouse, VIP Guest house & community hall.	Bidder request to accept 3D models in other formats like Naviswork, Sketchup.	Acceptable	
66.	566	TOWNSHIP Vol IB- Section B	Tender drawings	Bidder requests Owner to provide autocad file of all Power plant and Township Tender drawings.	Bidder to refer Annexure drawing pdf files provided in tender document.	
67.	567	TOWNSHIP Vol IB- Section B Chapter III Page 72	Door /Windows	Bidder understands, that the detail specification of door, windows, partition and glazing shall be referred from specification Vol II-G1/ Section IV	Agreed.	

68.	568	TOWNSHIP Vol IB- Section B Chapter III Page 72	➢ Partition wall (partly panelled & partly glazed with pre-painted steel frame)-UPVC.	Generally partition walls are of brick, gypsum and wooden. Owner to provide detail specification of UPVC partition. Moreover where it will be applicable.	Partition wall shall be provided using powder coated steel frame of standard cross section . Bottom panel shall be particle Board/ MDF board of minimum 12 mm thick. Top panel shall be tinted glass of minimum 4 to 5 mm thickness . This shall be provided in all NRBs wherever required.	Detailed specifications attached
69.	569	TOWNSHIP Vol IB- Section B Chapter III Page 73	Roofing In case of flat RCC roof - Ceramic weather proof roof tiles	For Roof water proofing Bidder understands that detail shall be referred from Vol II-G1/ Section IV. Clause 4.00.00.13.a. However instead of Pressed clay tiles to be used in Power plant buildings, Ceramic Weather proof tiles to be used for Township buildings.	For Roof water proofing bidder shall refer Vol II-G1/ Section IV. Clause 4.00.00.13.a. Agreed for Buildings covered in section-A	As per standard practice
70.	570	TOWNSHIP Vol IB- Section B Chapter III Page 75	Each house shall be provided with individual tank and individual outlet lines.	Bidder understands the mentioned condition is applicable for individual bungalows. However for multistorey apartment common OHT shall be given. Owner to clarify.	For multi storey buildings also, each apartment/house shall be provided with separate tank (Minimum 1000 litres each) located on roof and separate pipelines.	As per tender specification.
71.	571	TOWNSHIP Vol IB- Section B	Type I Quarter	Owner to provide drawings of Type-1, in line of other types	Drawing attached C31.	

		Chapter III Page 80		already provided.		
72.	572	TOWNSHIP Vol IB- Section B Chapter III Page 82	VIP GUEST HOUSE	Owner to provide drawings of VIP Guest house, in line of other types already provided.	Bidder can propose VIP Guest house adhering the requirements of technical specification with innovative design.	-
73.	573	TOWNSHIP Vol IB- Section B Chapter III Page 82	CISF HOUSING	Owner to provide drawings of CISF house/Apartment, in line of other types already provided.	Drawing attached C31.	Details furnished
74.	574	TOWNSHIP Vol IB- Section B Chapter III	Furniture and sports / gym equipments	Bidder understands that Furniture, Gym Equipments, Sports and leisure / recreation equipments, school / hospital equipments and any other loose furnishing items shall not be supplied by Bidder. Owner to clarify	Furniture, Gym Equipments, Sports and leisure / recreation equipments, school / hospital equipments and any other loose furnishing items are not in scope of bidder.	
75.	577	Corrigendum1	Plot Plan	Please clarify the following in the Plot plan provided in the corrigendum : 1. Extent and layout of boundary wall 2. Please provide location of outfall at Bhedan river required	1. Refer Annex-B3 drawing. 2. Size, number of sluice gates and discharge locations/outfall etc; shall be decided by successful bidder based on intensity of rainfall and catchment area to be drained, natural drains available at site and also based on the design requirement. However, minimum of following number of sluice gates shall be	

					provided across flood protection bund : Power plant side (Right bank) – 5 Nos. Ash pond side (Left bank) – 2 Nos.	
76.	588		General	Please provide the geotechnical investigation report of the following: a) Ash pond b) Township c) Access roads (from highways to plant, township, Intake) d) MUW pipe corridor e) MUW Intake structure	b) The foundation shall be designed and provided as per detailed soil investigation which is under bidder scope. However For township area Net safe bearing capacity of soil may be limited to 15 t/sq.m at 1.50 m below NGL if SBC is ≥ 15t/sq.m. If SBC at 1.5 m below NGL ≤ 15t/sq.m, actual value shall be taken for design calculations.	

77.	590		Owner's response : Preliminary topographical survey contour drg of Township attached in AUTOCAD format. For Township main approach road and dedicated road from township to power plant, Refer corrigendum Detailed survey of township area is in scope of bidder. PDF format for township contour already attached in Tender document, Section A - Annexure drg No. C26 Net safe bearing capacity of soil at 1.5 m below NGL shall be considered as 15t/sq.m. However, foundation shall be designed and provided as per detailed soil investigation which is under bidder scope. Net safe bearing capacity of soil will be limited to 15 t/sq.m at 1.50 m below NGL if	Bidder proposes to provide foundation system considering actual soil parameters provided in the geotechnical investigation reports for township. Please confirm.	The foundation shall be designed and provided as per detailed soil investigation which is under bidder scope. However for township area Net safe bearing capacity of soil may be limited to 15 t/sq.m at 1.50 m below NGL if SBC is ≥ 15t/sq.m. If SBC at 1.5 m below NGL ≤ 15t/sq.m, actual value shall be taken for design calculations.	

			SBC is ≥ 15t/sq.m.			
78.	758	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-V EXTERNAL ELECTRIFICATION WORK Cl. 17.0 Internal electrification works for the control room and other auxiliary buildings (Substation) Page 224 of 280	17.4.8. Control switches for battery room lights, **exhaust fan**, etc. shall be kept outside the battery room	As scope of HVAC (air conditioning and ventilation), bidder envisage only exhaust fans and air intake arrangement for battery rooms coming under 33/11kV, 6.3 MVA Substation. Please confirm Bidder's understanding.	Tender condition prevails. The scope of HVAC of main plant package does not covers the 33/11kV, 6.3 MVA Substation which comes under Infrastructure works, Section-A Package.	
79.	759	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-V EXTERNAL ELECTRIFICATION WORK	17.4.9. Sufficient number of split A/C units shall be provided for the SCADA room, EMS room, Computer room, etc.	As scope of HVAC (air conditioning and ventilation), bidder envisage Split AC units for SCADA room, EMS room, Computer room, etc coming under 33/11kV, 6.3 MVA Substation.	Tender condition prevails. The scope of HVAC of main plant package does not covers the 33/11kV, 6.3 MVA Substation which comes under Infrastructure works,	

		Cl. 17.0 Internal electrification works for the control room and other auxiliary buildings (Substation) Page 224 of 280		Please confirm Bidder's understanding.	Section-A Package.	
80.	787	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER V EXTERNAL ELECTRIFICATION WORKS Section 6.00.00 TECHNICAL SPECIFICATIONS (ELECTRICAL), Sub section 8.0. Automatic Emulsifying System For Fire Protection Page 143 of 280 & Page 179 of 280	The following specification specifies the hydraulically controlled automatic emulsifying system for fire protection of 2x6.3 MVA Transformers, 33/11kV, outdoor type, oil immersed cable box type both on HV and LV side.	Bidder understands that the Transformer protection indicated here shall be located at main plant boundary and fire protection & Detection system required for the same shall be covered from main plant fire protection facility. Also, technical requirement related to fire protection system and equipment shall be inline with the mail plant system specification. Owner to confirm.	Tender Condition prevails. The scope of fire protection & Detection system in main plant fire protection facility is under Section-B Package, does not covers the 33/11kV, 6.3 MVA Substation which comes under Infrastructure works under Section-A Package	

81.	788	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER V EXTERNAL ELECTRIFICATION WORKS Section 6.00.00 TECHNICAL SPECIFICATIONS (ELECTRICAL), Sub section 8.0. Automatic Emulsifying System For Fire Protection Page 180 of 280	The System Shall Consist Of The Following: Automatic Electric Motor Driven Centrifugal Pump Set:	Bidder understands that Transformer protection indicated here shall be located at main plant boundary and pumping system required shall be from main plan, hence separate pump and pumping system including fire water tank indicated in the section is not applicable. Owner to confirm.	Tender Condition prevails. The main plant pumping system is under Section-B Package, as the 33/11kV, 6.3 MVA Substation comes under Infrastructure works, Section-A Package	
82.	1319		Integrated Township - Township Contour drawing	Currently autocad copy of contour file has been provided. However, Bidder requests Owner to also share AutoCAD file showing Spot levels for the plant area.	a) Preliminary topographical survey contour drg. of Township attached in AUTOCAD format.(refer tender drawing C26A) Detailed survey of township area is in scope of bidder.	Required details attached
83.	1324	Corrigendum 1Section A - Infrastructure works Cl. 5 Page 44 of 80	The overall completion period of the scope of work in Section-A is 30 months from the date of	Formation of embankment can be constructed with borrowed earth/overburden soil, available from talabira mines. However till	Time schedule for section-A is revised as per Annexure TS.	Considering bridge construction time, the overall

			LOAFORMATION OF EMBANKMENT FORMATION ALONG BHEDAN RIVER ALONG WITH SLOPE PROTECTION AND TOE DRAINS AS PER RECOMMENDATION OF AREA-DRAINAGE STUDY	river bridge work is completed, earth cannot be transported to project site.Hence Bidder requests Owner to link the schedule for completion of embankment formation with thermal power plant work, as 30 months schedule indicated in Section A infrastructure works is very stringent.		time schedule is revised.
84.	1326	Section A - Infrastructure works Cl. 6 Page 57 of 280	Suitable intake structure, preferably barge mounted pumps shall be erected along with pump room, pipelines shall be laid and storage unit shall be constructed.	Construction water will be required by Bidder for their site execution work and hence Bidder should be free to explore other sources like water tanker etc. Hence Bidder understands that it is not mandatory to install barge mounted pumps for construction water, if bidder is able to Please confirm.	Bidder can make his own arrangements for construction water supply to meet peak demand ensuring uninterrupted construction water supply. However, owner prefers that bidder adopts Barge mounted pumps in Bhedan river for meeting peak demand for uninterrupted construction water supply.	For better clarity
85.	1327	Volume - II - 1B/1, Section B	General	Bidder understands that construction water shall be made available by Owner for the below mentioned location:	Construction water supply for Township is in the bidder scope until the completion of all	For better clarity

				a) Township b) Intake pump house area In case construction water arrangement is in Bidder's scope then Owner to specify the source of construction water.	construction works. For the power plant Construction water shall be drawn by the bidder from Bhedan River as per the technical specification.	
86.	1332	Section A - Infrastructure works Integrated Talabira Township	Soil Investigation Report	Please provide the soil test Report to enable us to do the design engineering.	The foundation shall be designed and provided as per detailed soil investigation which is under bidder scope. However for township area Net safe bearing capacity of soil may be limited to 15 t/sq.m at 1.50 m below NGL if SBC is ≥ 15t/sq.m. If SBC at 1.5 m below NGL ≤ 15t/sq.m, actual value shall be taken for design calculations.	For better clarity
87.	1333	Section A - Infrastructure worksIntegrated Talabira Township	Drawing	1.Please provide the Autocad Drawings for all the Buildings.2. PDF Drawings for the following Buildings are Missing.A.Type I Quarter(NLCIL)B.Type I	1) Required PDF drawings already shared for tendering purpose. AUTOCAD drawings cannot be shared.2) A,B)	For better clarity

				Quarter(CISF)C.VIP Guest HouseD.STP(Along with Capacity)	Type I Quarters (NLCIL & CISF) - Both are same type of building and preliminary tender drawing is attached (C31)C) Bidder shall propose VIP Guest house adhering the requirements of technical specification with innovative design.D) Sewage Treatment Plant of minimum capacity 1.00 MLD shall be provided at lowest level within township area. STP shall be designed for the required capacity based on the general principles covered in VOLUME: IIIB/4, SECTION II.	
88.	1334	Section A - Infrastructure works Integrated Talabira Township	SLD	Please provide the SLD for Electrical Works	Preparation of SLD under bidder scope for internal electrifications. SLD for External Electrification Works is annexed.	-
89.	1335	Section A - Infrastructure works Integrated Talabira Township	Approved Make List	Please provide the Approved Make List for Civil, Structural, Electrical, Plumbing & Fire Fighting, Lift.	Successful bidder shall submit list of preferred makers/suppliers .Refer Vol: II-A, section IV under Section B	Clarifications as per technical specifications

90.	1336	Section A - Infrastructure works Integrated Talabira Township	Technical Specification	Please provide the Detailed Technical specification for Civil, Structural, Electrical, Plumbing & Fire Fighting, Lift.	For Civil, Structural, Plumbing technical specification - Refer Volume I-B (Section A), Chapter III. Refer Vol II - G1 & G2 under section B for Detailed specification & for details not available in Volume I-B (Section A). For technical specifications of lift refer Vol.II K-section IV of Section B	Clarifications as per technical specifications
91.	1337	Section A - Infrastructure works Integrated Talabira Township	False Ceiling At Sports Office	In the drawing of Sports office, it is mentioned that False Ceiling works to be executed in all rooms excluding Toilet Portion, but the type of False Ceiling not mentioned. Please specify the type of False ceiling works to be executed.	Gypsum board false ceiling of approved design /size with aluminum framed supports and all necessary fittings shall be provided by bidder.Refer Vol-II/G2-Part B-section XIV under section B	Clarifications as per technical specifications
92.	1338	Section A - Infrastructure works Integrated Talabira Township	Railing	Type of Railing used for Recreation Club, Sports Office Not mentioned. Please specify.	Stainless steel railing 304 grade. Refer vol-II -G1/section IV clause 4.00.00 Sl.No-17 under section B for detailed specification	
93.	1339	Section A - Infrastructure works	Specification of Polycarbonate Sheet	Please specify the thickness of Polycarbonate sheet to be used	Refer Vol. II-G1/Section-IV - Cl. 4.00.00, Sl No. 16	

		Integrated Talabira Township		for Atrium Portion of Shopping Complex.	for detailed specification of polycarbonate sheet	
94.	1340	Section A - Infrastructure works Integrated Talabira Township	Specification for Galvalume Sheet	Please specify the thickness of Galvalume Sheet (Thickness & TCT).	For detailed specification refer Vol-IIB-section-I-clause 3.22 para-2 under section B	
95.	1341	Section A - Infrastructure works Integrated Talabira Township	Wooden Flooring at Badminton Court	Please provide the detailed specification of Wooden Flooring at Badminton Court Portion.	Refer annexure X5 attached	
96.	1342	Section A - Infrastructure works Integrated Talabira Township	Painting Specification for Structural Steel	It is mentioned in the drawing that Anticorrosive paint over a coat of primer to used in the structural steel. Please specify the type of Primer to be used along with the DFT of the total Paint.	Zinc rich primer 75 micron DFT (minimum). For anticorrosive paint refer Vol. II-G1/Section-IV Cl. 4.00.00, Sl No. 14 (h) & (m) under section B. DFT of total paint shall be 200 micron (minimum)	For better clarity
97.	1343	Section A - Infrastructure works Integrated Talabira Township	Waterproofing	Please provide the specification for waterproofing works for Roof, Toilet, Water retaining structure. As the type of waterproofing has a significant impact in terms of costing.	For Roof water proofing bidder shall refer Vol: II-G1/ Section IV. Clause 4.00.00.13.a. However instead of Pressed clay tiles, Ceramic Weather proof tiles to be used for Township buildings.	For better clarity

					For toilet ,bathrooms (floor slab) & water retaining structures,20 mm thick cement plastering shall be provided in 1:3 mixed with water proofing compound of approved make by owner. The waterproofing material shall confirm to water permeability test (Depth of penetration at 5 bar pressure) where no leakage should occurred after 24 hours as per EN 12390,part 8:2000 or as per IS 2645:2003 test methods	
98.	1344	Section A - Infrastructure works Integrated Talabira Township	Specification for Flush Door	a) Please provide the type of flush door to be used, like Decorative/Non decorative. As you will appreciate the fact type of flush door has a significant impact in costing. b) Please provide the thickness of Flush Door.	Refer annexure X5 attached	
99.	1345	Section A - Infrastructure works Integrated Talabira Township	Aluminium Works	a) Please provide the type of aluminium sections to be used for aluminium Door Window works. As you will appreciate that there is an significant impact in terms	Refer Vol-II/G2-Part B-section VII,cl.2.02.02 under section B for Aluminum doors and windows	

				of costing if the thickness of aluminium section changes. b) Please provide the type & thickness of glass sections to be used in aluminium works.		
100.	1346	Section A - Infrastructure works Integrated Talabira Township	Statutory Approval	We presume all the statutory approval is in the scope of Employer/EPC Contractor. Please confirm.	Obtaining statutory approval is in the scope of the bidder (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.)	For better clarity
101.	1347	Section A - Infrastructure works Integrated Talabira Township	Swimming Pool Area	1. Please specify the size of Glass Mosaic Tiles. 2. We presume of Supply of Locker is not in Bidder Scope 3. Specification of Railing to be provided.	1. Tile Shall be of approved size and colour confirming to IS 15622 2. Locker is not in scope of bidder. 3. Stainless steel railing 304 grade	For better clarity
102.	1348	Section A - Infrastructure works Integrated Talabira Township	Auditorium	1. Please specify the type of False Ceiling Works. 2. We presume that supply of Furniture, Curtains etc. not in the	1. Gypsum board false ceiling of approved design /size with aluminium framed	For better clarity

				scope of the Bidder. 3. Please provide the detailed specification of Galvanume Sheet. 4. Please provide the specification of Carpet flooring for Auditorium Portion. 5. Please provide the details of Acoustics works for Auditorium Portion. 6. Please provide the specification for **Parquet Tiles** flooring for stage portion. 7. Please specify HVAC works is in our scope or Not.	supports and all necessary fittings shall be provided by bidder.Refer Vol-II/G2-Part B-section XIV under section B 2. Not in scope of bidder. 3. For detailed specification of galvalume sheet refer Vol-IIB-section-I- clause 3.22 para-2 under section B 4 to 6. Bidder is free to choose based on best engineering practices. Refer Vol:II - G1 & G2 under section B for detailed specification for details not available in Volume I-B (Section A). 7. HVAC system (Centralised AC) shall be provided for auditorium, the design calculation for the same shall be submitted by contractor for approval by NLCIL before execution. For other internal electrification specifications bidder may	

					refer Vol. II section A chapter IV	
103.	1349	Section A - Infrastructure works Integrated Talabira Township	Community Hall	Please provide the type of False ceiling works to be used.	1. Gypsum board false ceiling of approved design /size with aluminium framed supports and all necessary fittings shall be provided by bidder.Refer Vol-II/G2-Part B-section XIV under section B	Additional Details furnished
104.	1350	Section A - Infrastructure works Integrated Talabira Township	Hospital	1. Please share the type of False ceiling to be used in OT area. 2. Please specify whether HVAC works for OT area is in our scope or Not.	1. Gypsum board false ceiling of approved design /size with aluminium framed supports and all necessary fittings shall be provided by bidder. Refer Vol-II/G2-Part B-section XIV under section B 2.Sufficient no of split AC with suitable capacity from reputed manufacturer shall be provided as per design requirement. The design calculation for the same shall be submitted by contractor for approval. For other internal electrification specifications bidder may	

					refer Vol. II section A chapter IV	
105.	1351	Section A - Infrastructure works Integrated Talabira Township	School	We presume that Loose Furniture is not in the scope of JMC	Furniture not in scope of EPC	
106.	1352	Section A - Infrastructure works Integrated Talabira Township	Two wheeler parking shed	Please specify the thickness of Galvalum Sheet (Thickness & TCT).	For detailed specification refer Vol-IIB-section-I-clause 3.22 para-2 under section B	
107.	1353	Section A - Infrastructure works Integrated Talabira Township	Four wheeler parking shed	Please specify the thickness of Galvalum Sheet (Thickness & TCT).	For detailed specification refer Vol-IIB-section-I-clause 3.22 para-2 under section B	
108.	1357	Section A - Infrastructure works Integrated Talabira Township	Land For Labour Hutment	We presume land for labour hutment will be available within the site premises. Please confirm.	Bidder has to make his own arrangements for labour colony.	
109.	1358	Section A - Infrastructure works Integrated Talabira Township	Scope of Work	We presume that our scope of work is restricted within the Township area. Any road from township to main plant or SH10 will be done by the client. Please confirm.	Main approach road to township and Dedicated approach road from township to power plant DELETED from scope of bidder.Refer corrigendum	

110.	1359	Section A - Infrastructure works Integrated Talabira Township	Diversion of water line, Power Cable	If any water line or power line encountered during execution of job, diversion cost towards the same will be borne by the client as per actual. Please confirm.	Under bidder's scope	
111.	1360		General	Specification asks for statutory approvals at number of places. Owner is requested to share the comprehensive list of such approvals, Bidder needs to take for Talabira Thermal Power Project.	The list of clearances/ approvals that are needed to be obtained is to be ascertained by the bidder wherever necessary.	
112.	1361	Section A - Infrastructure works Integrated Talabira Township		Township drawing Owner is requested to furnish AutoCAD copy of Integrated Township	PDF drawings of works under Section A given in Volume IB-Part II-Chapter VI (Drawings). AUTOCAD drawing will not be shared with bidder.	
113.	1602	General - -	-	Bidder requests Owner to provide the SLD for Electrical Distribution in Talabira Township for Section-A Infrastructure Works.	As entire scope of work lies with single point responsibility EPC contract, the Electrical Distribution shall be designed as per site load requirements and got purchaser's approval during detailed engineering.	

114.	1620	SECTION A INFRASTRUCTURE WORKS Cl. 1.05.00 Cl. 5.06.00 Page 127 of 280 Page 134 of 280	11kV Ring Main System: The Ring Main System shall be equipped with sufficient number (minimum Nine) of Ring Main Unit's (3 / 4 unit RMUs & Bus-Coupler unit) with 11kV/415V, 500 kVA Transformer (minimum eight) connected with each RMU for providing 415V, 3phase, 4 wire power supply at suitable locations within Township to maintain uniform distribution at LT level as well as at 33kV/11kV substation end.) 11/0.415kV, 500KVA Station Transformers: Supply, erection, testing and commissioning of two numbers 11/0.415kV, 500KVA station transformer as	There is contradiction in No. of transformers specified in technical Specification. Owner may please clarify the same.	No contradiction in no. of transformers. The no. of transformers as per pg. No.: 127 of 280 are the minimum specified quantity for Township Ring main Distribution Network. However the exact no. shall be designed as per site load requirements and got purchaser's approval during detailed engineering. Two no. of transformers mentioned in pg. No.: 134 are the Station Transformers to be provided exclusively for 2x6.3MVA, 33/11kV Substation inside plant area near Gate complex.	

			per the technical specification			
115.	1621	SECTION A INFRASTRUCTURE WORKS Bill Of Quantity For Electrical Work Page 268 of 280	9 11/0.415kV, 500kVA cable box type Station transformer - 2 11 11/0.415kV, 630kVA cable box type Station transformer - 2	500kVA and 630kVA transformers are specified for Township. Bidder understands that both rating of transformers can be used in Township area as per Loading requirement. Owner may please clarify the same.	Two no. of transformers mentioned in Sl. No.:9, pg. No.: 268 are the Station Transformers to be provided exclusively for 2x6.3MVA, 33/11kV Substation inside plant area near Gate complex. Two no. of transformers mentioned in Sl. No.:11, pg. No.: 268 are the Distribution transformers to be provided exclusively for Miscellaneous Non Plant Building SWGR inside plant area. The exact no. of transformers in Sl. No.:10, pg. No.: 268 shall be designed as per site load requirements and got purchaser's approval during detailed engineering.	

116.	1622	SECTION A INFRASTRUCTURE WORKS Cl. 3.00.08 Page 130 of 280	Supply, erection, testing and commissioning of four number 250kVA DG set for Hospital, Guest House, Community Hall & Shopping Complex Township.	Bidder proposes to provide common Diesel Generator set for Hospital, Guest House, Community Hall & Shopping Complex Township. Owner may please confirm the same.	Ref.: Corrigendum-3, Sl. No.:15, Cl. 1.06.00 modified as 1.07.00. The no. of DG sets mentioned is the minimum exclusive requirements. The exact no. shall be designed as per site load requirements including 2x6.3MVA, 33/11kV Substation, Hospital, Guest House, Community Hall, Auditorium, Shopping Complex & Quarters etc., and got purchaser's approval during detailed engineering.	
117.	1623	SECTION A INFRASTRUCTURE WORKS Cl. 3.00.08 Page 130 of 280	Supply, erection, testing and commissioning of four number 250kVA DG set for Hospital, Guest House, Community Hall & Shopping Complex Township.	Bidder understands that DG set Emergency supply is not required for Quarters. Owner may please confirm the same.	Ref.: Corrigendum-3, Sl. No.:15, Cl. 1.06.00 modified as 1.07.00. The no. of DG sets mentioned is the minimum exclusive requirements.	

					The exact no. shall be designed as per site load requirements including 2x6.3MVA, 33/11kV Substation, Hospital, Guest House, Community Hall, Auditorium, Shopping Complex & Quarters etc., and got purchaser's approval during detailed engineering.	
118.	1631	Section A/ Infrastructure works Cl. 5.3 Page 32 of 280	For reinforced concrete structures and foundations detailed bar bending schedules with approximate quantity involved (both reinforcement and concrete in grade wise) in approved format shall accompany each detailed drawing.	Bar bending schedules shall be prepared at site and get approved from NLCIL Site In charge. Drawing submittal is not envisaged for the same.	Agreed	
119.	1632	Section A/ Infrastructure works Cl. 1.1	Approval for suitability of available earth for grading from Talabira Mines OB/Power plant area/Raw water	a) Bidder understands that incase Talabira mines OB/Raw water reservoir earth are not suitable for filling then Owner shall specify alternate nearby source.	a) Under Bidder's scope b) Tender conditions prevail c) Bidder shall ascertain the suitability of earth for	For better clarity

		Page 35 of 280	reservoir area/Other sources for filling from IIT/IISc shall be obtained by contractor and submit to NLCIL for review, before commencement of work.	Please confirm. b) Also any royalty implication due to use of borrowed earth other than Talabira mines OB shall be payable by Owner. Please confirm. c) Owner is requested to share lab test for Talabira mines OB in order to study the suitability of using the same soil for construction of embankment and area filling.	filling and approval shall be obtained for the same by successful bidder as per tender conditions. For Power Plant & Raw water reservoir area, refer preliminary soil report given in Section B. For Mines overburden, indicative soil sample test reports is attached in (X4).	
120.	1633	Section A/ Infrastructure works Cl. 1.1 Page 36 of 280	However, by constructing bridge across Bhedan River on western side of power plant, Talabira Mines overburden earth can be transported after ensuring its suitability for filling if excess earth is required.	Bridge required for transporting OB earth will take time and substantial earthwork is involved in plant area including construction of embankment. Owner is requested to confirm whether earth can be transported from mines through SH-10.	Embankment can be constructed after completion of bridge construction. Getting necessary approval for transporting earth through SH-10 is under bidder's scope. However, the bidder shall adhere to the time schedule attached in Annexure-TS	For better clarity
121.	1634	Section A/ Infrastructure works	This work shall consist of cutting, removing and disposing of all	Tree cutting will require forest clearance and hence not included in Bidder's scope. Please confirm.	Tree cutting is in bidder's scope. Obtaining statutory	For better clarity

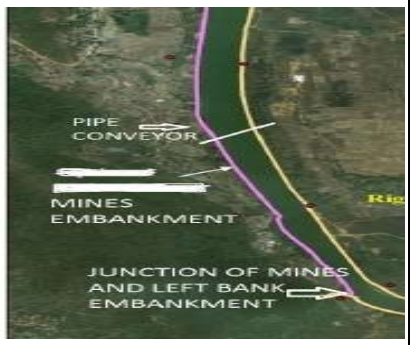
		Cl. 5.5.1 Page 51 of 280	materials such as trees, bushes, shrubs, stumps , roots, grass, weeds, soil not exceeding 150 mm in thickness,		approval is in the scope of the bidder. (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.)	
122.	1635	Section A/ Infrastructure works Cl. 4.6 Page 80 of 280	Detail specification and preliminary drawings of township area.	Bidder understands that architectural drawings needs to be further developed during detail engineering and needs to be approved from Owner. However, Bidder understands that Overall Building Dimensions, Number of buildings and facilities listed in the tender and number of floors & Room size shall be as per specification and drawings. Please confirm.	Confirmed/Bidder understanding is correct.	-
123.	1636	Section A/ Infrastructure works Cl. 4.6	Details of workstation, furnitures, tools and equipment, safety equipment are	Owner to note that loose furnitures, medical equipment, computers, work station, safety & sports equipment, electronic	Furniture, medical equipment, computers, work station, safety & sports equipment,	-

		Page 80 of 280	mentioned in the specification.	items & goods, mobile equipment, printer, telephones etc. if explicitly not mentioned (in tender specification) for any building/facility/common areas, then the same shall not be considered by Bidder. Please confirm.	electronic items & goods, mobile equipment, printer for buildings in section-A are not in scope of bidder.	
124.	1637	Section A/ Infrastructure works Page 91 of 280	LIST OF CIVIL FIELD QUALITY ASSURANCE LABORATORY APPARATUS FOR TOWNSHIP QUALITY CONTROL LAB	Bidder understands that the field quality laboratory equipment can be taken back by the Bidder after handover of township. Please confirm.	Confirmed/Bidder understanding is correct.	
125.	1638	Section A/ Infrastructure works	Page 278 of 280	Two pages are missing in the document. Owner is requested to furnish the same.	Available. Titles-chapter VI drawings and contents-Annex drawings of thermal power plant area and integrated talabira township area are included in the pages mentioned.	As per tender conditions
126.	1639		General	Please confirm that "Area Drainage Study Report" is excluded from Bidder's scope.	Confirmed/Bidder understanding is correct.	

				Please confirm.		
127.	1645	General	The site is having existing villages with houses, buildings, school, temple, electrical and plumbing lines and pond	Demolishing of the existing facilities within the plant area like houses, buildings, schools, temple, electrical and plumbing lines, pond etc. shall be carried out by Owner and encumbrance free land shall be provided to Bidder before issuance of LOA.	under bidder's scope	
128.	1646	General		a) In case "Demolishing of the existing facilities within the plant area like houses, buildings, schools, temple, electrical and plumbing lines, pond etc.to be carried out by Bidder" then Owner shall intimate Bidder in writing that they can proceed with demolition work and also furnish separate timelines over and above the schedule provided in the specification. Owner to kindly confirm Bidder's understanding. b)Also Bidder understands that dismantled items (after demolishing houses, building, school etc.) including debris, rebar, structural items, pipes, pumps etc. shall be Owner's property and space for stacking shall be provided by Owner within plant premises. Please	a) Under bidder's scope and tender conditions prevails b) Space for stacking dismantled items shall be identified by the bidder within the plant premises.	

				confirm.		
129.	1655	Vol 1-B/Section 2/Section B Section A, Infrastructure works Cl. 2.5.0 Page 22 of 310 Cl. 6 Page 57 of 280	**Construction water shall be at free of cost.** Contractor to make arrangement for transferring water from the construction water source to the plant area as detailed in Section A. Suitable intake structure, **preferably barge mounted pumps** shall be erected along with pump room, pipelines shall be laid and storage unit shall be constructed.	Suppose Bidder do not uses barge mounted pumps and draws water from Bhedan river through other arrangement, then also water charges shall be borne by Owner. Please confirm.	Tender conditions prevails.	
130.	1671	Corrigendum 1, dated 01.12.2020 Page 1 of 8	The overall completion period of the scope of work in Section-A is 30 Months from the date of LOA. However the following time schedule shall be adhered by the contractor.	Please refer to the Annexure - A attached with our query, regarding the revised schedule proposed by the Bidder. Annexure-A	Time schedule revised. Annexure TS enclosed.	Considering interlinking of many activities in township construction.

131.	1672	Corrigendum 1	Plot Plan	Two approach roads to Main Plant area are shown, i.e. one from SH-10 and another approach (north direction) is shown adjacent to SMC Power Plant. Owner to clarify the below mentioned points regarding approach road adjacent to SMC Power Plant: a) Whether this road as shown in Plot Plan included in Bidder's scope? If yes then specify the width and type of road i.e Bitumen or concrete? b) Bidder to indicate the start point coordinates/terminal point of that road, as the same shall merge with existing road of SMC. c) Whether drains are required on either side of this road? d) Does either side drains are also required for Approach road from SH-10 to plant?	Details regarding approach roads will be furnished shortly.	-
132.	1675	Section A/ Infrastructure works Scope of work , Thermal Power Plant	CISF BARRACK , ARMORY & QUARTER OFFICE , TOILET BLOCK FOR CISF NTTPP,	Owner is requested to provide Master Plan of CISF/ Barrack area indicating location of the buildings.	Master plan is in bidder's scope. Location is already	For better clarity

		Area Cl.2,4) Page 12 of 280	CANTEEN FOR CISF		marked in plot plan.	
133.	1677	VOLUME - IB SECTION A INFRASTRUCTURE WORKS Page 44 of 280	FORMATION OF EMBANKMENT FORMATION ALONG BHEDAN RIVER	Area drainage study Fig 5.24, page no. 58 shows portion of the embankment(bank on mine side) to be optional. Same is indicated in tender Dwg. No. B06 which is reproduced as below in pink colour.  Bidder understands that the aforesaid **"Mines embankment"** on mine side as per area drainage study report and Drg No. B06 is not included in Bidder's scope. Please confirm.	Confirmed/Bidder understanding is correct.	

134.	1678	VOLUME - IB SECTION A INFRASTRUCTURE WORKS Page 44 of 280	FORMATION OF EMBANKMENT FORMATION ALONG BHEDAN RIVER	a) Bidder understands that toe wall shall be prepared on the bed of river. Please confirm b) The slope/ slope protection (2:1) shall be provided only on soil surface. Natural river bank profile (side slope) shall be maintained if rock is encountered. Please confirm.	a) Drawing is Indicative only Toe wall shall be decided based on site conditions and design considerations. B) confirmed.	
135.	1679	VOLUME - IB SECTION A INFRASTRUCTURE WORKS Page 44 of 280	FORMATION OF EMBANKMENT FORMATION ALONG BHEDAN RIVER	Owner is requested to provide the following details in Bhedan river along the embankments: a) Scouring depth b) river stream velocity c) Geotechnical data for design of toe walls	under bidder's scope	
136.	1680	VOLUME - IB SECTION A INFRASTRUCTURE WORKS Page 44 of 280	Starting and terminating points of bund shall be designed suitably to prevent entry of water into the plant area by suitable means such as connecting to some high ground or nearby embankment as per site	Owner is requested to provide the terminal points for the embankments with proposed arrangement.	Tentative alignment is already given. However, terminal points shall be based on actual site conditions.	

			condition.			
137.	1681	VOLUME - IB SECTION A INFRASTRUCTURE WORKS	Annexure Drawing B07 Note 4: All facilities shown in the drawing are indicative only and shall be finalized during detailed engineering on Approval of NLCIL.	Bidder understands that the overall building dimensions (Area and volume) will remain same. Only internal arrangement of rooms are subject to minor modification during Detail engineering. This is applicable for all Tender drawings.	Minimum area and facility requirements are shown in Annexure tender drawings. Bidder can propose better schemes meeting the minimum area requirement and providing all facilities indicated in tender drawings adopting the same overall design concept.	For better clarity
138.	1682	Vol. II-G1/Section-II 4.00.00 15 of 38 VOLUME - IB SECTION A INFRASTRUCTURE WORKS 7.1 58 of 280	DESIGN OF REINFORCED CONCRETE STRUCTURES i) Reinforced concrete for super structure and foundation - M30 THERMAL PROJECT OFFICE BUILDING RCC Grade shall be M25 and steel reinforcement grade Minimum Fe500	As the Thermal Project office building is within the plant, please confirm the concrete grade to be provided for this building.	For works covered in section A, minimum grade of concrete for RCC works shall be M25.	As per tender specification.

139.	1686	Geotechnical investigation Cl. 11.1 Page 27 of 372	The type, size, depth of the foundation / pile shall be based on the approved soil investigation report of Bidder/Owner's soil investigation report whichever is conservative.	Geotechnical report included in the Tender provides Bearing capacity values for open foundation resting on rock on a very conservative size. Higher values are anticipated as sound rock is available at shallow depth. Also soil investigation is not available at bridge, intake, piping corridor and township location. Owner is requested to provide realistic bearing capacities in line with the soil stratification. If Owner is not able to provide the aforesaid information then Bidder should be allowed to consider as per the approved soil investigation report to be carried out during detail engineering.	All foundations shall be designed and provided as per detailed soil investigation which is under bidder scope. However for township area, Net safe bearing capacity of soil may be limited to 15 t/sq.m at 1.50 m below NGL if SBC is ≥ 15t/sq.m. If SBC at 1.5 m below NGL ≤ 15t/sq.m, actual value shall be taken for design calculations.	
140.	1688	Section A - Infrastructure works	General	Owner is requested to provide geotechnical investigation report for the flood protection bund (both on plant side and far side)	Detailed survey and soil investigation of embankment area is in the scope of bidder. However for Talabira Mines, flood protection bund/embankment,	

					preliminary soil investigation carried out by M/s Fargo Consultants pvt Ltd and relevant bore holes BH101 to BH106 are attached for reference.(X3)	
141.	1691	Annexure Drawing No. B1	Talabira Thermal Power Project Site Grading Layout	Approx. 45 to 50 lac cubic meters of earth work (net filling) is estimated just for filling green belt area outside the compound wall of Thermal Power Plant area. Bidder would like Owner to review the area grading requirement for Greenbelt area, as flood protection bund is already being constructed along Bhedan river. In case the same is still to be graded by Bidder, then Owner to ensure availability of borrowed earth and revise project schedule after discussion with Bidder.	Details will be furnished shortly.	
142.	1696	VOLUME - II - IB / 4 Section - II 1.10.00 (General Information) 1 of 10	The anticipated no. of users shall be 2000 persons. The sewage treatment plants shall be designed to handle a total flow of	As per "Section A - Infrastructure works Integrated Talabira Township / Part- II/Chapter- III" the minimum capacity of STP is mentioned as 1.00 MLD while as per "VOLUME -	Sewage Treatment Plant of minimum capacity 1.00 MLD shall be provided at lowest level within township area. STP shall be designed for the	

		Section A - Infrastructure works Integrated Township 78 of 280	75m3/day considering average per capita consumption of 45 lpcd with 80% of used water generated as sewage Sewage Treatment Plant of minimum capacity 1.00 MLD shall be provided	II - IB / 4 Section - II" the total flow is mentioned as 75m3/day. Please clarify about the capacity to be considered for STP for integrated township.	required capacity based on the general principles covered in VOLUME: II IB/4, SECTION II. .	
143.	1697	Section A - Infrastructure works Integrated Talabira Township	General	The bidder requests to provide the population of integrated township to calculate the water demand or else provide the water demand.	Refer Vol IB, Part II, Chapter III, Cl. 3.0, Water supply from power plant to township - Contractor shall ascertain the total water requirement for integrated township based on number of quarters/house/NRB's given in tender document. water demand calculation is under the bidder's scope as per the standards.	

144.	1698	Section A - Infrastructure works Integrated Talabira Township	General	The bidder understands that a water treatment plant will be required for township area. The tender document doesn't mentions about the WTP. Kindly provide information about the WTP.	Separate water treatment plant is not envisaged for township. Treated water from WTP in power plant shall be conveyed to township area by laying pipeline through route indicated in Annexure drg No. C30.	
145.	1699	Section A - Infrastructure works Integrated Talabira Township - -	General	The bidder requests to provide information regarding the requirement for provision of solar power inside the township area.	In township area VIP Guest House, Type-I, Type-II, Type-III and Type-IV, Executive hostel shall be provided with roof top solar. For works covered in Section A, Thermal project office building shall be provided with rooftop solar as mentioned in technical specification.	
146.	1700	Section A - Infrastructure works Integrated Talabira Township / Part-II/Chapter- III 3 (GENERAL	Sanitary fittings	The bidder understands that WC, washbasins, overhead showers and other provisions not mentioned in the specifications are not to be considered. Please confirm.	Details mentioned in the annex-c drawings shall be followed. The WC, washbasins, overhead showers and other provisions are under	As per standard practice.

		TECHNICAL REQUIREMENTS FOR TOWNSHIP CIVIL INFRASTRUCTURE WORKS) 76 of 280			bidder's scope. However for items /provisions for which specifications are not mentioned, the best engineering practices shall be followed.	
147.	1701	Section A - Infrastructure works Integrated Talabira Township / Part-II/Chapter- III 3 (GENERAL TECHNICAL REQUIREMENTS FOR TOWNSHIP CIVIL INFRASTRUCTURE WORKS) Page 76 of 280	Sanitary fittings	The bidder requests to provide approved vendor list for sanitary fittings.	Tender conditions prevail.	
148.	1702	Section A - Infrastructure works Integrated Talabira Township - -	General	The bidder understands that GRIHA rating is not to be considered for integrated township. Please confirm.	Certification is not required. However, Green building concepts shall be adopted in integrated Talabira township area.	

					In township area VIP Guest House, Type-I, Type-II, Type-III and Type-IV, Executive hostel shall be provided with roof top solar. For works covered in Section A, Thermal project office building shall be provided with rooftop solar as mentioned in technical specification.	
149.	1705	Section A - Infrastructure works Integrated Talabira Township / Part-II/Chapter- III - Page 64 of 280	Residential buildings & Non-residential buildings	The bidder understands that provision for air-conditioners(window/split/VRF) is not required for recreational club,quarters,guesthouse,hospital and all other buildings where not specifically mentioned. Please confirm.	In township NRB's buildings split AC shall be provided in Guest house, Community hall, Hospital, Library ,TA, ITC, VIP Guest house and In RB for 3 Nos. of PH house only Total No. of split AC with 2 Ton capacity – 109 Nos. For Auditorium Centralised AC shall be provided as per design	For better clarity

150.	1706	Section A - Infrastructure works Integrated Talabira Township - -	General	The bidder understands that for integrated township the bulk services are to be designed and provided for construction proposed in tender document only and not for any future provision. Please confirm.	Bidder's scope only includes works covered in Tender document and relevant drawings. Bidder is not expected to design structures for any future provision	
151.	1708	Corrgendum - 3, Clarificaiton no. 5 Approach road layout shall be as per Annexure Drg No. B22 Page 10 of 40	Approach road to main plant	Bidder requests Owner to confirm the following: a) Road shown in pink colour (NLCIL Coal transportation road) shall be constructed by Owner. Please confirm b) As per Corrigendum 3, Approach Road from SH-10 after crossing existing bridge of Bhedan river, as shown in Corrigendum 1 Plot Plan is now deleted from scope. Please confirm. c) As per Corrigendum 3, Approach Road from adjacent to SMC plant at north side as shown in Corrigendum 1 Plot Plan is now deleted from scope. Please confirm.	a) NLCIL Coal transportation road indicated in pink colour is not in Bidder's scope b) Main Approach road to power plant shall be from NLCIL coal transportation road to Main gate complex of power plant crossing the proposed bridge over Bhedan river is in bidder's scope. c) Details will be furnished shortly. d) 4 lane Main approach road to power plant is in bidder's scope. Refer annexure B22 (Green	

				d) As per Corrigendum 3, Owner is requested to clarify whether the road shown in Blue colour as per Annexure Drg No. B22 i.e. from SH-10 upto township (in south direction) is included in Bidder's scope or not? 	colour) Dedicated approach road from power plant to township and Main approach road to township is Deleted from scope of bidder. Blue colour indicated in C30 refers to water pipeline route from WTP in power plant to OHT in township.	
152.	1709	Corrgendum - 3, Clarificaiton no. 1 Page 1 of 40	Obtaining all statutory approvals	a) Bidder understands that statutory approval from forest department for tree cutting shall be included in Owner's scope. Please confirm. b) All approvals required with respect to land acquisition shall be included in Owner's scope of work. c) Bidder understands that apex level approval from State and Central authorities shall be considered by Owner. Please	a) & c) Obtaining statutory approval is in the scope of the bidder. (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.) b)Land acquisition is in	For better clarity

				confirm.	owners scope	
153.	1710	Corrigendum - 3, Clarificaiton no. 3 Page 7 of 40		Source of construction power for Township may please be specified by Owner.	Under bidder's scope	
154.	1711	Corrigendum - 3, Clarificaiton no. 4 Page 10 of 40	Necessary ROW and approval for laying temporary approach road shall be obtained by Contractor from various govt department	Bidder understands that in case of private land, necessary ROW shall be obtained by Owner including statutory approvals, payment of compensation etc. complete. Please confirm.	Under bidder's scope Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder	For better clarity
155.	1713	Corrigendum - 3, Clarification no. 9 Page 13 of 40	Necessary ROW and approval for laying the pipe along NH/SH shall be obtained by contractor from various government.	a) Bidder understands that in case of private land, necessary ROW shall be obtained by Owner including statutory approvals, payment of compensation etc. complete. Please confirm. B) Bidder understands that route for 33 KV power line from plant upto township shall be	a) under Bidder's scope (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory	For better clarity

				considered same as water line as shown in Annexure Drg no.C30. Please confirm.	approval is in the scope of successful bidder B) The power line from plant upto Township is only 11kV and not 33kV. For all other things Tender condition prevails.	
156.	1714	Corrigendum - 3, Clarification no.18 Page 18 of 40	Necessary ROW and approval for providing the transmission lines shall be obtained by contractor from various government departments.	Bidder understands that in case of private land, necessary ROW shall be obtained by Owner including statutory approvals, payment of compensation etc. complete. Please confirm.	under bidder's scope	
157.	451	Section-A Infrastructure Works/ Chapter-V 14.0 e 217 of 280	..Twisted pair 0.5sq.mm copper cable shall be used for DDCMIS interface.	Plant DDCMIS is far away from Integrated Talabira Township. Bidder understands that DDCMIS interface shall not be applicable for infrastructure works. Please confirm Bidder's understanding.	Bidder understanding is in order. The DDCMIS communication related points shall be deleted pertain to equipments in Chapter V, External Electrification Works under Infrastructure Works, Section-A	

					package.	
158.	452	Section-A Infrastructure Works/ Chapter-V F.7 & F.9 256 of 280	Communication.. The relays shall be provided with dual redundant protocol IEC61850 compatible communication ports at front for communication to RMS / DDCMIS and one rear port suitable for laptop connection Control.. Close / open control of breakers through laptop from the front port / through key pad (Built in) / through rear port connection from DDCMIS	Plant DDCMIS is far away from Integrated Talabira Township. Bidder understands that numerical relays shall have provision for DDCMIS interface, however numerical relays for infrastructure works shall not be interfaced with DDCMIS. Please confirm, Bidder's understanding.	Bidder understanding is in order. The DDCMIS communication related points shall be deleted pertain to equipments in Chapter V, External Electrification Works under Infrastructure Works, Section-A package.	

TABLE-IB -BHEL QUERIES

CLARIFICATIONS FOR THE PREBID QUERIES OF BHEL FOR THEIR LR. NO MS-1-20-E-0007 DT 02.12.2020

Sl. No	Bidder ref. No	QUERY	Reply	Reason
1	**1**	**Topographical survey (Auto Cad format) :**		
		a) Integrated Township area including approach road from plant to Township	Preliminary topographical survey contour drg of Township attached in AUTOCAD format C26A . For Township main approach road and dedicated road from township to power plant, Refer corrigendum Detailed survey of township area and approach road to power plant area are in scope of bidder. PDF format for township contour already attached in Tender document, Section A - Annexure drg No. C26	Attachment
		c) Embankment formation area along Bhedan river	Refer cross sections of Bhedan river available in attached drainage study report (X2). Refer Tender document, Section A - Annexure drg no. B6 for embankment cross section. Detailed Survey of embankment area in the scope of bidder.	Surveying is in bidder's scope. However, reference drawing is attached.
		e) Plant area including office building, CISF Barracks, CISF Armoury and quarter guard, CISF security check post etc.	Preliminary topographical survey contour drawing details of power plant and greenbelt area attached in AUTOCAD format(X1). Detailed survey of power plant and greenbelt area in scope of bidder CISF Barracks, CISF Armoury and quarter guard, CISF Security checkpost etc… located in power plant area in North eastern side (RHS of Forest area) shown in latest power plant layout.	Attachment

		g) Peripheral fencing around acquired land (General layout drawing in Auto Cad)	Preliminary topographical survey contour drawing details of power plant and greenbelt area attached in AUTOCAD format(X1). Refer latest power plant layout given in Section B.	Attached the entire area topography.
2	**2**	**Integrated Township** area including approach road from plant to Township:		
		a) Geotechnical Investigation data	The foundation shall be designed and provided as per detailed soil investigation which is under bidder scope. However Net safe bearing capacity of soil may be limited to 15 t/sq.m at 1.50 m below NGL if SBC is ≥ 15t/sq.m. If SBC at 1.5 m below NGL ≤ 15t/sq.m, actual value shall be taken for design calculations.	The work is in bidder's scope. Values given are for quoting purpose
		(bore logs, NGL, lab test results of soil/rock samples, Chemical analysis of water, Electrical resistivity test results etc).		
3	**4**	**Embankment formation along Bhedan river along with slope protection and toe drains for plant side and ash dyke side**		
		a) Area drainage study report	Relevant pages of Area drainage study report attached for reference(X2). Refer Section A - Annexure drg no. B6 for embankment cross section	Attachment
		(conducted by customer through National Institute of Hydrology, Roorkee as mentioned in the specification)		
		b) Geotechnical Investigation	Detailed soil investigation of embankment area is in the scope of bidder. However for Talabira Mines, flood protection bund/embankment, preliminary soil investigation carried out by M/s Fargo Consultants pvt Ltd and relevant bore holes BH101 to BH106 are enclosed for reference.(X3)	Bidder's scope. Only reference details are attached.
		(bore logs, NGL, lab test results of soil/rock samples, Chemical analysis of water)		
4	**6**	**Peripheral fencing around acquired land, peripheral road and**		

		Boundary wall of plant area		
		a) Geotechnical Investigation data including bore logs, NGL, lab test results of soil/rock samples, Chemical analysis of water, Electrical resistivity test results	Peripheral fencing around acquired land, peripheral road & compound wall of Plant area as per latest power plant layout and the approximate length to refer technical specification.(Pl. refer NLCIL's clarifications) Refer latest power plant layout and preliminary soil report attached in Section B	Already available with tender document.
5	**7**	**Thermal Project office building, CISF Barracks, CISF Armoury and quarter guard, CISF security check post and toilet block, Gate complex along with security and time office, Parking lot, Watch Tower area**		
		a) General layout drawing	Location as per plot plan.	-
		b) Geotechnical Investigation data including bore logs, NGL, lab test results of soil/rock samples, Chemical analysis of water, Electrical resistivity test results	Refer latest power plant layout and preliminary soil report attached in Section B	-

Sl. No	**Bidder ref. No**	***BHEL Unit***	***Volume/Section/ Clause No./ Sheet No.***	***Specification Requirement***	***Pre-Bid Queries/ Clarifications***	***Reason for Clarification***	***NLCIL REPLY***	**Reason**
	STP							
6	1.	PEM	Volume-IB/Section A/ Clause-3/Sheet no-78 of 280	Sewage Treatment Plant of minimum capacity 1.00 MLD shall be provided at lowest level within township area. STP	It is not clear from the Tender document that, how many Sewage Treatment Plant and of what capacity are	Sewage treatment Plants nos. and Capacity is	Integrated Township -1 STP & its capacity already mentioned in the technical specification	Already available

			Volume-II – IB/4/Section II/ Clause-1.10.00/Sheet no-1 of10 Volume-II - E/Section-V Clause-7.02.00/ Sheet no-45 of 53	shall be designed for the required capacity based on the general principles covered in Section B, VOLUME: II IB/4, SECTION II. Both the sewage treatment plant shall be designed as per guidelines of CPHEEO Manual. The anticipated no. of users shall be 2000 persons. The sewage treatment plants shall be designed to handle a total flow of 75m3/day considering average per capita consumption of 45 lpcd with 80% of used water generated as sewage. Two (2) separate Sewage Treatment Plants shall be provided for collection and conveying sanitary waste from various facilities of three units to ensure sewage or excreta is properly collected from different building toilets within plant boundary and	to be provided for power plant including Township.	not clear.	For plant area, refer Section-B and its corrigendum	

				treatment by modular type sewage treatment method and finally disposed without causing any health hazard or environmental problem.				
	CIVIL							
7	9	PEM	Vol. IB/Section-A/ Page 35 of 280/ 1.1	Preliminary topographical survey drawing for entire power plant area is attached in Section B.	Drg is given in pdf format. Please furnish Topographical survey drawing in Auto Cad format.		AUTOCAD drawing for preliminary contour of Power plant area is attached (X1)	Attachment
8	10	PEM	Vol. IB/Section-A/ Page 35 of 280/ 1.1	Approval for suitability of available earth for grading from Talabira Mines OB/Power plant area/Raw water reservoir area/Other sources for filling from IIT/IISc shall be obtained by contractor and submit to NLCIL for review, before commencement of work.	Approval for suitability of available earth for grading from Talabira Mines OB/Power plant area/Raw water reservoir area/Other sources for filling from IIT/IISc shall be arranged by customer at tender stage so that estimation can be done.		As per tender condition, approval for suitability of earth for filling shall be obtained by successful bidder. Power Plant & Raw water reservoir area to refer soil report given in Section B For Mines overburden, indicative soil sample test reports is attached now (X4)	Bidder's scope. Reference documents are attached.
9	12	PEM	Vol. IB/Section-A/ Page 36 of 280/ 1.1	Levels have been finalized keeping in view the Highest Flood Level (HFL) of Bhedan River and Area	Please furnish the Area drainage study report.		Relevant pages of area-drainage study report attached (X2)	Attachment

				drainage study recommendations (Area drainage study for the power plant conducted by National Institute of Hydrology, Roorkee).				
10	13	PEM	Vol. IB/Section-A/ Page 36 of 280/ 1.1	Contractor shall work out grading requirements from the existing ground level to finished level as mentioned in site grading layout (Refer Annexure B1).	Please furnish site grading layout in Auto Cad format		AUTOCAD drawing of plant layout shared under Section-B	Attachment
11	14	PEM	Vol. IB/Section-A/ Page 36 of 280/ 1.1	However, by constructing bridge across Bhedan River on western side of power plant, Talabira Mines overburden earth can be transported after ensuring its suitability for filling if excess earth is required.	Please furnish the test results of Talabira mines overburden earth for deciding its suitability for filling.		For Mines overburden Sample soil test reports is attached now (X4)	-
12	16	PEM	Vol. IB/Section-A/ Page 38 of 280/ 1.8	The excavated earth may be used for the Site grading after ensuring suitability vide clause 1.1 above. The soil shall be	For grading works, excavated earth shall be compacted in layers of 200 mm loose thickness to		Confirmed	-

				compacted at OMC as layers of not more than 200mm loose thickness. The excavated earth not suitable for forming embankment and containing vegetable matters, debris etc shall be disposed off in locations indicated by Engineer within a lead of 3 KM.	achieve at least 95% Standard Proctor density as per IS 2720 Part-VII. Please confirm.			
13	17	PEM	Vol. IB/Section-A/ Page 39 of 280/ 1.10	A test fill section of approximately 15 m x 8 m x 2m height shall be carried out. By trials, a definite compaction procedure, lift thickness, moisture application and number of passes required to achieve 95% of standard proctor maximum dry density should be obtained.	The referred clauses are contradictory. Please confirm the compaction requirement in embankment.		Referred clauses are not contradictory. Trial operation is to be done on this test area to arrive at roughly number of passes of the equipment required to achieve 95 % compaction for guideline	-
				Each layer is to be watered and properly compacted before the succeeding layer is				

				laid. Each layer shall be compacted to obtain 95% of Modified Proctor Density at optimum moisture content with (–) 1% deviation.				
14	18	PEM	Vol. IB/Section-A/ Page 40 of 280/ 1.11	For design of drains, the rainfall intensity shall be taken as per meteorological report.	Please furnish the design rainfall intensity in mm/hr for design of drains.		For drain design, rainfall intensity shall be considered as 100 mm/hr (minimum). Refer Pg 39 of Volume II – G1/Section-I- General under Section B	In section-B also, rainfall intensity is given as 100mm/hr (Minimum)
15	19	PEM	Vol. IB/Section-A/ Page 46 of 280/ 5	Based on the soil investigation report, design document, construction drawings, design basis and design calculations including suitability of filling earth from various sources shall be vetted by IIT/IISc and submitted to NLCIL for review, before commencement of work.	Please clarify which document is to be vetted from IIT/IISc.		For construction of flood protection bund Design document, drawings and suitability of earth for embankment formation pertaining shall be got vetted by IIT/IISc by the successful bidder.	Design and drawings are to be vetted by IIT/IISC.
16	20	PEM	Vol. IB/Section-A/ Page 46 of	Suitable materials for embankment or filling	Please provide the area details (location/co-		Mines overburden earth will be available from NLCIL	-

			280/ 5.1.2	low lying areas shall be obtained from approved sources with preference given to NLCIL Talabira Mines Overburden earth.	ordinate) from where the suitable material for filling shall be obtained.		Talabira mines. Bidder can visit the site & get required details, before bid submission	
	21	PEM	Vol. IB/Section-A/ Page 66 of 280/ 1.2	Contractor shall carry out site grading for integrated township area suitably after conducting topographical survey and finalizing finished ground level for different zones to optimize cutting and filling quantity.	Please furnish HFL of the area. Also please furnish the Topographical survey drawing in Auto Cad format.		Bidder shall optimize cutting and filling for township area adopting multiple graded levels. HFL of Hirakud Reservoir is +192.024 Preliminary contour drawing for Integrated Talabira township is attached in AUTOCAD format (C26A)	Attachment
			Vol. IB/Section-A/ Page 66 of 280/ 1.2	Finished ground level for each zone shall be finalised considering Highest Flood level (HFL) of the area.				-
17	22	PEM	Vol. IB/Section-A/ Page 76 of 280/ 3	The Rain water from hard courts and landscaped area shall be collected by catch basins through a RCC pipe network / or open drains with gratings and connected to the rain water harvesting pits in the township	Please furnish the main drainage outlet location/co-ordinates for Township area.		Bidder shall study the site conditions and select suitable location for storm water outlet Size and specification as per design requirement with approval of NLCIL	-

				complex and finally over flow from rain water harvesting will be led out to main drainage outlet.				
18	35	PEM	-	General	Please furnish Geotechnical Investigation Report and Topographical survey drawings for following areas outside plant area 1. Embankment formation along Bhedan river 2. Bridge locations on Bhedan river		(1) Under bidder's scope Detailed soil investigation is in the scope of bidder. However for Talabira Mines, flood protection bund, preliminary soil investigation carried out by M/s Fargo Consultants Pvt Ltd and relevant bore holes BH101 to BH106 are enclosed for reference.(X3)	Bidder's scope. Reference documents are attached.
19	36	PEM	-	Integrated Township area including approach road from plant to Township:	Please furnish the following details a) Topographical survey drawing in Auto Cad format b) Geotechnical Investigation data including		a) Preliminary topographical survey contour drg. of Township attached in AUTOCAD format.(refer tender drawing C26A) Detailed survey of township area is in scope of bidder. b) The foundation shall be designed and provided as per detailed soil	(a) Drawing attached (b) Under bidder's scope.

					bore logs, NGL, lab test results of soil/rock samples, Chemical analysis of water, Electrical resistivity test results etc.		investigation which is under bidder scope. However Net safe bearing capacity of soil may be limited to 15 t/sq.m at 1.50 m below NGL if SBC is ≥ 15t/sq.m. If SBC at 1.5 m below NGL ≤ 15t/sq.m, actual value shall be taken for design calculations.	
20	38	PEM	-	Embankment formation along Bhedan river along with slope protection and toe drains for plant side and ash dyke side	Please furnish the following details a) Area drainage study report conducted by National Institute of Hydrology, Roorkee as mentioned in the specification b) Topographical survey drawing in Auto Cad format for the area along plant side and ash		a) Relevant pages of Area drainage study is attached. (X2) b) Under bidder's scope c) Detailed soil investigation is in the scope of bidder. However for Talabira Mines, flood protection bund, preliminary soil investigation carried out by M/s Fargo Consultants Pvt Ltd and relevant bore holes BH101 to BH106 are enclosed for reference.(X3)	(a) Attached (b) & (c) in bidders scope. Reference documents attached

					dyke side ***c)*** Geotechnical Investigation data including bore logs, NGL, lab test results of soil/rock samples, Chemical analysis of water			
21	40	PEM	-	Peripheral fencing around acquired land, peripheral road and Boundary wall of plant area	Please furnish the following details a) General layout drawing in Auto Cad b) Geotechnical Investigation data including bore logs, NGL, lab test results of soil/rock samples, Chemical analysis of water, Electrical resistivity test results		Please refer plot plan.	-
22	41	PE	-	Thermal Project office	Please furnish the		a) Preliminary architectural	Attachment

		M		building, CISF Barracks, CISF Armoury and quarter guard, CISF security check post and toilet block, Gate complex along with security and time office, Parking lot, Watch Tower area	following details a) General layout drawing b) Topographical survey drawing in Auto Cad format c) Geotechnical Investigation data including bore logs, NGL, lab test results of soil/rock samples, Chemical analysis of water, Electrical resistivity test results		drawings attached in Volume I-B (Section A) – Chapter VI. b) Preliminary Topographical survey drawing of power plant area attached in AUTOCAD format. (X1) c) Refer power plant soil investigation report under Section B	
23	42	PEM	-	Plant area	Topographical Survey drawing is provided in pdf format. Please arrange the Auto Cad drawing		Preliminary Topographical survey drawing of power plant area attached in AUTOCAD format (X1)	-

	MPL							
24	2	PEM	Vol. I-B/Section-A/ Clause no. 2.0/Page 64 of 280	Main approach to power plant shall be from SH-10 crossing Bhedan River on eastern side of power plant area.	Kindly provide suggestive route/path.		Refer corrigendum-3 Dt. 18.12.2020	Already details are available in Corrigendum-3.
25	3	PEM	Vol. I-B/Section-A/ Chapter-III/Page 64 of 280	Township Location	Kindly provide the boundary coordinates of proposed township.		To refer tender document C26, wherein UTM coordinates marked in contour drawing	-
26	4	PEM	Vol. I-B/Section-A/ Clause no. 6.3/Page 87 of 280	Main Approach road from Integrated township to SH-10	Kindly provide suggestive route/path.		Deleted Refer corrigendum-3 Dt. 18.12.2020	-
27	5	PEM	Vol. I-B/Section-A/ Clause no. 6.3/Page 88 of 280	Dedicated Approach road from Integrated township to Power plant	Kindly provide suggestive route/path.		Deleted Refer corrigendum-3 Dt. 18.12.2020	-

Sl. No	Bidder ref No	**BHEL Unit**	**Volume/Section/ Clause No./ Sheet No.**	**Specification Requirement**	**Pre-Bid Queries/ Clarifications**	**Reason for Clarification**	**NLC Reply**	**Reason**
	CIVIL							
28	12	PEM	Vol. IB/Section-A/ Page 45 of 280/ 5	The left bank (Ash pond side) is to be merged with the proposed NLCIL	The 5Km length of bund of Ash pond side (left bank) is		Confirmed.	-

Sl. No	Bidder ref No	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLC Reply	Reason
				Talabira Mines protection bund with a suitable gradient avoiding any vertical joints.	up to the proposed NLCIL Talabira Mines protection bund. Please confirm.		5Km length is approximate.	
29	13	PEM	Vol. IB/Section-A/ Page 45 of 280/ 5	The length of the embankment to be formed on the plant side (Right bank) is 13KM(approx.)and ash pond side (Left bank) is 5km(approx.)				
30	14	PEM	Vol. IB/Section-A/ Page 45 of 280/ 5	Starting and terminating points of bund shall be designed suitably to prevent entry of water into the plant area by suitable means such as connecting to some high ground or nearby embankment as per site condition.	The 13Km length of bund of plant side (right bank) is up to the high ground or nearby embankment. Please confirm.		The length of bund on plant side is 13km (approx.) The both ends of the bund shall be finalized based on the actual survey by successful bidder and as per site conditions and bund joints shall be designed to prevent entry of river water.	-
31	15	PEM	Vol. IB/Section-A/ Page 45 of 280/ 5	The length of the embankment to be formed on the plant side (Right bank) is 13KM(approx.)and ash pond side (Left bank) is 5km(approx.)				
32		PEM	Vol. IB/Section-A/ Page 45 of	Necessary one way sluices with regulating	Bidder understands that the plant storm		Confirmed	Bidder's

Sl. No	Bidder ref No	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLC Reply	Reason
	16		280/ 5	arrangement and supporting structures shall be provided in the country side/plant side for controlled discharge of water into riverside .The size and number of sluice gates shall be designed suitably based upon the intensity of rainfall and catchment area to be drained.	water drainage to be discharged into the river by providing sluice gate arrangement. Please confirm. Also please furnish the no. and location of discharge points to be provided.		Size, number of sluice gates and discharge locations etc; shall be decided by successful bidder based on intensity of rainfall and catchment area to be drained, natural drains available at site and also based on the design requirement. However, minimum of following number of sluice gates shall be provided across flood protection bund : Power plant side (Right bank) – 5 Nos. Ash pond side (Left bank) – 2 Nos.	scope.

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
33	4	PS SR	Section B Volume IB Section A Clause No. 6 Page 57 of 280	Construction Water Supply	Kindly inform whether the Construction Water supply shall be temporary or permanent in nature.	Has Commercial implications	Construction water supply for Township is in the bidder scope until the completion of all construction works.	-
34	6	PS SR	Volume IB Section A Clause No. 5.5.4 Page 52 of 280	All materials arising from top soil removal operations shall be the property of NLCIL and shall be disposed of by the Contractor as hereinafter provided or directed by the Engineer	Kindly inform the distance of place of disposal from the power plant	Has Commercial implications	All materials arising from top soil removal operations shall be disposed at the places shown by the NLCIL during execution upto a lead of 3 KM.	Confirmed with Talabira site.

Sl. No	Bidder ref No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
35	7	PSSR	Volume IB Section A Clause No. 5.5.4 Page 52 of 280	Stacking of stumps, boulders, stones, etc. shall be done at specified spots with all lifts and up to a lead of 3 KM.	Kindly confirm whether sufficient space is available at the specified spots. If not available, the distance of further spots from the power plant.	Has Commercial implications	During execution, the location will be identified within 3 KM lead. Bidder can also visit the site and assess the condition.	Confirmed with Talabira site.
36	16	PSSR	Volume IIA Section IV Annexure-I Page 25 of 27 Volume IB Section A Chapter V Clause 1.00.00	2 nos of 11 kV feeder shall be provided to EPC bidder from Owner's Construction Power supply kiosk near power plant boundary gate. The Purchaser will provide two number 33 kV take off points at	1. As per 1st referred clause, construction power supply shall be provided near power plant boundary gate and as per 2nd referred clause, power supply point shall be provided near Mines entrance. It is understood that construction power supply point shall be provided by Customer at power plant boundary gate. Kindly confirm. 2. Kindly inform whether the Construction Power supply shall be temporary or permanent in nature.		The 33kV outlet at Mines entrance is the source of supply common for Mines, Integrated Talabira Township, Miscellaneous Non Plant Buildings and Construction Power. For Construction power needs of the Bidder, 2 Nos dedicated outlets at 11kV voltage level with a Total maximum capacity of 3MVA on chargeable basis (Ref. Cl. 1.11.35, Pg. 10 of 83) will be provided from 11kV indoor Switchgear of 2 x 6.3 MVA, 33/11kV Construction Power Supply Substation, in	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
				single location, near Mines entrance as mentioned above with a Total Maximum Capacity of15 MVA to meet the Township, Miscellaneous Non Plant buildings and Construction Power requirements.			Bidder's scope under Section-A Package. For Section-B Package, Bidder shall extend the above 11kV power supply to meet the construction power requirements at various locations of inside thermal power plant. Also ref. Cl. 4.00.00 General Scope, 4.00.01 pg. No.: 130 of 280, Tender Specification For Infrastructure Works Volume – IB.	
37	1	EDN	VOLUME – IB SECTION A INFRASTRUCTURE WORKS PART-6 AUDIO SYSTEM 6.0	6.0. General Audio system shall be used for TA Community hall , AO building & Auditorium 6.1. Wiring The wiring shall be	Customer is requested to furnish the technical specification/ details bringing out the features of the system, the Wattage (Power) of the Audio system, No of Speakers required in each building and wattage of the speakers for our estimation purpose.	Clarification	Depending upon the area of building number of speakers shall be decided & based on the RMS output of speaker the sound level shall be designed in terms of decibel.	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
			6.1 6.2 PAGE 118 OF 280	used with 2 core, 0.75 mm speaker cable 6.2. Speaker Ceiling mounting audio speaker with suitable rating in Watts shall be used.				
38	2	EDN	VOLUME – IB SECTION A INFRASTRUCTURE WORKS PART-7 CCTV System 7.0	CCTV IP Based low wattage CCTVs and Access Control systems using open and non-proprietary standards powered by the network switch	Kindly provide us the Technical specification for the CCTV system to be provided under Infrastructure Works. CCTV IP Based low wattage: Clarify what is low wattage CCTV Access Control System: Kindly furnish the features, type (whether Biometric, RF Type, Proximity Type or Magnetic Type) & Quantity of the Access Control system required. Hybrid Energy Efficient Road Blockers: Kindly clarify what is Hybrid Energy efficient Road Blockers. Kindly Provide us the technical details.	Clarification	Establishing Surveillance system for the required locations along with Surveillance data recording and monitoring facilities at required locations with access control and security. Minmum 5MP Resolution IP Camera with NVR & NVR shall have all basic analytics feature with storage of minimum 30 days (camera shall be fixed at main entrance gate ,VIP house	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
			PAGE 118 OF 280	(PoE), Hybrid energy efficient Road Blockers and boom barriers for outdoor access control, Metal Detection Systems, Perimeter Intrusion Detection Systems, Events based Remote Site Monitoring and storage.	Boom Barriers: Kindly provide the required quantity and Technical details of Boom Barriers. Metal detection Systems: Kindly provide us the quantity of metal detection system required. Perimeter Intrusion Detection Systems: Kindly provide the quantity and Technical features of the Perimeter Intrusion Detection Systems. Events: Kindly clarify what is events.		,TA office entrance,,guest house entrance & AO.	
39	3	EDN	VOLUME – IB SECTION A INFRAS	7.1 TELECOMMUNICATION SYSTEM & TV CABLE	Telecommunication System: Kindly clarify whether it is BSNL cabling required to be provided in each building and Technical details for the required system.	Clarification	1. Establishing a telecom centre in township. (TA Building) 2. Establishing EPABX system with Duplicate	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
			TRUCTURE WORKS PART-7 CCTV System 7.1 PAGE 118 / 119 OF 280	/LAN CABLE The EPC Contractor should design a suitable capacity telecommunication /EPBAX/TV /LAN system shall be provided.	EPABX System: Kindly specify the no of EPABX system and the no of lines required. Kindly clarify whether intercom in each house is envisaged. LAN System: Kindly clarify type of LAN required ie.for Internet in each house with Fibre Optic or Cu (Broadband)		control system and telephone cable network at Township telecom centre and provide official intercom phones.(AO building ,TA,VIP house, Guest House ,Community hall ,PH house ,Hospital &Sub station) 3. Establishing OFC and radio links to provide redundant connectivity between AO, Thermal and Mines. 4. Establishing facilities for extending intranet from computer services division. (AO,TA,PH house, VIP house, Hospital) 5. Networking the telephony system with other NLCIL projects, JVs and regional offices using BSNLMPLS and SIP trunking. (VIP House, Guest House ,TA, AO Building ,PH House) 6.LANFaciility shall be provided(AO,TA,PH house,	

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
							VIP house, Guest house ,Hospital ,Library & Industrial training centre.)	
40	2	PEM	Vol. IB/Section -A/ Page 36 of 280/ 1.1	However, by constructing bridge across Bhedan River on western side of power plant, Talabira Mines overburden earth can be transported after ensuring its suitability for filling if excess earth is required.	(a) It is indicated that the Borrowed earth from Talabira mines shall be used for filling purpose. Bidder understands that the soil is technically suitable for filling and sufficient quantity to take care of entire filling work of the project is available, so that BHEL does not require to bring the soil from other sources (b) Also please mention the lead distance from Talabira mines to plant through existing bridge along SH-10 and also lead distance to Integrated township.		(a) Bidder shall ascertain the suitability of earth for filling and approval shall be obtained for the same by successful bidder. For Power Plant & Raw water reservoir area, refer preliminary soil report given in Section B. For Mines overburden Indicative soil sample test reports is attached in (X4). (b) Bidder to ascertain site conditions and assess lead distance to transport earth from NLCIL Talabira mines to power plant area.	a)Reference attached. b) Bidder's scope

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
41	3	PEM	Vol. IB/Section -A/Page 66 of 280/ 1.2	Contractor shall carry out site grading for integrated township area suitably after conducting topographical survey and finalizing finished ground level for different zones to optimize cutting and filling quantity.	Please furnish the finished ground level to be adopted for Township area.		For Site grading of township area, bidder shall optimize cutting and filling and propose multi-level grading.	Bidder's scope
42	4	PEM	Vol. IB/Section -A/ Page 76 of 280/ 3	Rain water pipes and drainage network : The Rain water from hard courts and landscaped	Please furnish the drainage outlet location.		Bidder shall study the site conditions and select suitable location for storm water outlet	Bidder's scope

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
				area shall be collected by catch basins through a RCC pipe network/ or open drains with gratings and connected to the rain water harvesting pits in the township complex and finally over flow from rain water harvesting will be led out to main drainage outlet.				
43	10	PEM	---	General	Please confirm whether green belt development and horticulture is in bidder's scope or not. If it is in bidder's scope, please furnish the detailed specification and handing over criteria for the same.		Site Grading of greenbelt area is bidder scope. However, greenbelt development and horticulture is not in bidder's scope.	-
44	11	PEM	Vol. II-	The sewage shall be	Since plant area and township area is very large, conveying of sewage from individual		Only one STP exclusively for	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
			G1/Section-I/ Page 85 of 118/ 4.28.02	conveyed to Sewage Treatment Plant at suitable location through gravity. Sewerage system shall be provided with adequate ventilation for the pipe work as well as manhole.	buildings to Sewage Treatment Plant is not feasible through gravity. Hence, pumping of sewage from common collection pits to Sewage treatment plant shall be done. Please confirm.		Township area has to be located in township at low lying area based on contours. It is preferable to convey sewage by gravity flow. Wherever not possible, necessary pumping arrangements shall be made. Conveying sewage by gravity/pump shall be finalized with the approval of NLCIL and it is under bidder's scope.	
45	12	PEM	Tender drawings	Flow Diagram – Sewage Treatment Plant Drg No. 18A03-DWG-M-001Y				
		PEM	VOLUME IB Page No. 65 of 665	LAN /WAN	Following details to be furnished for assessment: 1. Number of LAN / WAN points 2. Number of points for each location		4. For Township : LAN/WAN facilities shall be provided at NRBs-Like TA, VIP house, guest house, Hospital, Library , ITC and	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
46					3. Geographical location of LAN / WAN points 4. Please clarify if Township LAN / WAN will be connected with Plant Network. 5. LAN / WAN Architecture(Configuration)		PH house. For others, refer Section-B.	
47	2	PEM	**VOLUME: I-B SECTION - A** 7.) THERMAL PROJECT OFFICE BUILDING: Page 57 of 280	Necessary air conditioning system shall be provided for all office rooms, meeting halls/conference rooms.	Pl inform type of Air conditioning system to be envisaged for Thermal Project office Building. We are Considering Air conditioning system as per clause 1.02.00 of Vol. II-J/Section-IV Page 3 of 67. According to which, Air Conditioning System for various buildings shall be done as follows: * For all standby units quantity, refer to scope of supply clause 2.02.00 * Precision air conditioners shall be provided if the capacity requirement of that premises is greater than 8 T.R (Water cooled Precision AC of 3x50% configuration). *Water cooled Packaged screw chiller, along with Chilled water pump, condenser water pumps, cooling towers		Confirmed	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
					and Air Handling unit etc. having standby unit to be considered if capacity requirement of the premises is greater than 80 TR. Pl confirm			
48	3	PEM	**VOLUME: I-B SECTION - A** 5.6 Auditorium Page 84 of 280	Air Conditioning (AC) for Auditorium	Pl inform type of Air conditioning system to be envisaged for Auditorium We are Considering Air conditioning system as per clause 1.02.00 of Vol. II-J/Section-IV Page 3 of 67. According to which, Air Conditioning System for various buildings shall be done as follows: * For all standby units quantity, refer to scope of supply clause 2.02.00 * Precision air conditioners shall be provided if the capacity requirement of that premises is greater than 8 T.R (Water cooled Precision AC of 3x50% configuration). *Water cooled Packaged screw chiller, along with Chilled water pump, condenser water pumps, cooling towers and Air Handling unit etc. having standby unit to be considered if capacity requirement of the premises is greater than 80 TR.		Confirmed	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
					Pl confirm			
49	4	PEM	**VOLUME: I-B SECTION - A** 5.3 VIP Guest House Page 82 of 280	Board room with false ceiling, wall paneling and air conditioning	Pl inform type of Air conditioning system to be envisaged for VIP Guest House We are Considering Air conditioning system as per clause 1.02.00 of Vol. II-J/Section-IV Page 3 of 67. According to which, Air Conditioning System for various buildings shall be done as follows: * For all standby units quantity, refer to scope of supply clause 2.02.00 * Precision air conditioners shall be provided if the capacity requirement of that premises is greater than 8 T.R (Water cooled Precision AC of 3x50% configuration). *Water cooled Packaged screw chiller, along with Chilled water pump, condenser water pumps, cooling towers and Air Handling unit etc. having standby unit to be considered if capacity requirement of the premises is greater than 80 TR. Pl confirm		In VIP Guest house Sufficient number of split A/C with suitable capacity from reputed manufacturer shall be provided.	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
50	7	PS-Mktg	IB/3.3.4/ 8 of 280	3.3.4 Final Payment (Retention): 10% Upon completion of Defect Liability period for civil works and Warranty/ Guarantee for electrical works.	Kindly clarify the start point and the end point of Defect Liability period for civil works and Warranty/Guarantee for electrical works.		Refer the defect liability clause pertaining to civil works in section-B	-
51	11	PS-Mktg /General	Tender Drawings	Tender Drawings	We understand that the tender drawings provided along with the tender specifications are tentative only and the same shall be finalized during detailed engineering meeting the requirements.		Tender conditions prevails	-
52	4	PSSR	Section A Volume IB Clause No. 6 Page 57 of 280	Construction Water Supply	In case arrangement of Construction Water is temporary in nature, kindly inform 1. Whether the specification mentioned for Construction Water needs to be strictly adhered to by the bidder without any deviations 2. or the bidder shall make		1,2,3. Bidder can make his own arrangements for construction water supply to meet peak demand ensuring uninterrupted construction water supply. However, owner prefers that bidder adopts Barge mounted pumps in Bhedan	-

Sl. No	Bidder ef No.	BHEL Unit	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL Reply	Reason
					arrangements as per its own specification and requirements 3. or Customer may kindly inform the specifications to be followed by bidder and the balance arrangements shall be taken care by the bidder as per its own specification and arrangements.		river for meeting peak demand for uninterrupted construction water supply.	

53	64	7.1 TBG	VOLUME : II-A SECTION -IV SCOPE OF SUPPLY AND SERVICES, TERMINAL POINTS ANDEXCLUSIONS Clause -	**33kV Gas Insulated Substation (GIS)** 33 kV supply to Township: Complete 33 kV Gas Insulated Substation (GIS) and outgoing 33 kV Cable up to the incomer of 33 kV RMU Switchgear (Section-A) is in Bidder's scope.	i) Please confirm route length of 33kV cable between 33kV GIS substation in 765/400/33kV GIS switchyard area and Township. ii) Please confirm if 33kV RMU switchgear (Section-A bidder scope) is located in "Substation Sl. No. -13" located in township area indicated in Volume-1B , Chapter-VI Drawings C1 Township Layout. iii) We understand that NLC Talabira integrated township is located outside plant boundary – therefore we understand that obtaining any Right of Way, land acquisition, diversion of any existing transmission lines/rail/roads/crossings, tree cutting , co-ordination with any external agency shall be in NLC scope only – please confirm.		i) 33kV cable is between 33kV GIS substation and 33kV indoor switchgear located in 2x6.3 MVA, 33kV/11kV Substation, near Gate Complex inside the plant. i) 33kV switchgear located in 2x6.3 MVA, 33kV/11kV Substation, near Gate Complex inside the plant. (Ref. Item No.: 71, Plot Plan, DRW No.:18A03-DWG-M-002A). ii) Under Bidder's Scope. iii) Tender condition prevails. 33kV cable inter-connection	**Reason**

			4.00.00 – 7.0 a) Page 20 of 27		iv) Considering significant distance between 33kV GIS room in plant and township, feasibility of 33kV cable inter-connection appears difficult – therefore request M/s. NLC to arrange 33kV supply for township from nearest local distribution substation of Distribution utility on its own, otherwise request to include same in Section-A scope.		is between 33kV GIS substation and 33kV indoor switchgear located in 2x6.3 MVA, 33kV/11kV Substation (Building No.71 in Plot Plan), near Gate Complex inside the plant.	
				iv) 33 kV Supply to Mines : Complete 33 kV Gas Insulated Substation (GIS), outgoing 33 kV Cables, 33kV transmission line and terminal 4 Pole structure near 33 kV RMU switchgear (Section-A) is in bidder's scope.	i) Please confirm route length of 33kV cable, 33kV Transmission Lines between 33kV GIS substation in 765/400/33kV GIS switchyard area and terminal 4 Pole structure near 33 kV RMU switchgear(Section-A). ii) Please confirm location of 33kV RMU switchgear indicated in subject clause. iii) We understand that mines is located outside plant boundary – we understand that obtaining any Right of Way, land acquisition, diversion of any existing transmission lines / rail / roads / crossings, tree cutting, co-ordination with any external agency shall be in NLC scope only – please confirm. iv) Considering significant distance between 33kV GIS room in plant and mines, feasibility of 33kV cable, Transmission Line inter-connection appears difficult – therefore request M/s. NLC to arrange 33kV supply for mines from nearest local distribution substation of Distribution utility on its own, otherwise request to include same in Section-A scope.		i) The location of 33kV GIS substation & 33 kV Construction Power substation is already shown in the plot plan. It is the responsibility of the bidder to assess the route length for bidding purpose. Actual routing shall be done during detailed engineering stage. ii) 33 kV RMU / switchgear is located in 33/11 kV construction power substation (Building No.71 in Plot plan). iii) From 33kV GIS Switchgear, 2 nos. of 33kV mines power supply shall be extended (33kV UG cable) up to 33kV cable intake gantry structure of 33kV transmission line (Ref. Cl. 5.01.00, pg. No.: 132 of 280 in bidder's scope under Section-A package) located near Construction Power Supply Substation inside	

							Thermal Power Project site in turn will feed power to the Mines. iv) Tender condition prevails. 33 kV RMU switchgear referred in Volume-IIA-A, Section-IV, Cl.4.00.00, S.No. 7(3) refers to 33 kV Switchgear in 33/ 11 kV construction Power substation (Building No.71 in Plot Plan).	
54	66	TBG	Corrigendum	Plot Plan Dwg. No. – 18A03-DWG-M-002A, Rev-0	i) We understand that 33/11kV Construction Power substation Sl. No. 71 indicated in Plot Plan shall be in Section-A contractor scope as indicated in Volume-1B and not Main Plant Scope (Section-B) – please confirm. ii) Please provide SLD of 33/11kV Construction Power substation for reference.		i) Bidder understanding is in order. ii) SLD will be provided as corrigendum.	

Table II (L&T and BHEL)					
S.No.	**Bidder query no.**	**Section / Part / Chapter / Volume Clause No. Page no.**	**Bid Specification Stipulation**	**Statement of clarification sought**	**NLCIL's Reply**
1.	63	Section-A work Vol-IB Part-I Cl. 3.3.4 Page 8 of 280	Final Payment (Retention): 10% Upon completion of Defect Liability period for civil works and Warranty/ Guarantee for electrical works.	Please note that the Contractor has to release the necessary payment to his sub-contractor/vendor/sub-vender for labour, material, etc., retention of Final Payment by Purchaser will require huge working capital to be arranged by the Contractor leading to severe financial stress on the Contractor. Further, since the CPG is valid up to end of Defect Liability period, we request Purchaser to kindly release the Final Payment (10%) on completion of respective Infrastructural works. Kindly confirm Alternatively, we request Purchaser to kindly release the Final Payment (10%) against submission of Retention Bank Guarantee.	Tender condition prevails
2.	64	Section-A work Vol-IB Part-I Cl. 3.5.1 Page 9 of 280	……In case the CONTRACTOR fails to complete the Works within the stipulated period, then, unless such failure is due to Force Majeure or due to PURCHASER'S defaults, the total Contract price (section-A) shall be reduced by ½% (Half percent) of the Total Contract Price (section-A)……	For all the work under Section-A the Price Reduction clause shall be applicable on the value of the respective portion of work delayed and not on the Total Contract Price (of Section-A) i.e. delay in Integrated Talabira Township should not lead to reduction of price component of "Thermal Power Plant Area" and vice versa. We request the Purchaser to kindly consider our above request.	Tender condition prevails

3.	81	Section-B / Vol. I-B/ Section-10 Cl. 10.1.3 xi) Page 146 of 310	The Contract Performance Bank Guarantee shall be released on application by the Contractor within ninety (90) days after the expiry of the warranty period and after the Contractor has discharged all his obligations under the Contract including release of Custom Bond and produced a "No Demand Certificate" from the Purchaser. The Purchaser shall not unreasonably withhold the issue of "No Demand Certificate" after receipt of request for the same.	As per prevailing Industry practice, we request Purchaser to kindly introduce necessary provisions for reduction in the value of CPG on prorate basis upon completion of DLP period of individual unit(s).	Tender conditions prevail
4.	1127	SECTION A INFRASTRUCTURE WORKS CHAPTER V EXTERNAL ELECTRIFICATION WORKS Cl. 5.13.01 Page no. 137 of 280	Lighting Mast Supply, erection, testing and commissioning of required numbers of lighting masts, in different locations as given below. Sl.no Locations Minimum No 1 Each Sub station 1 No 2 Entrance Arch 1 No 3 School 1 No 4 Hospital 2 Nos 5 Play Ground 2 Nos 6 Residential Complex 10 Nos 7 STP area 1 No 8 Park 1 No 9 Recreation Club 1 No 10 Swimming Pool 1 No	Since this is a EPC specification, hence Owner is requested to allow bidders to decide on the number, location of High masts based on the requirement, and layout finalization. Owner may please accept.	Tender conditions prevails

			11 Road junctions 5 Nos		
5.	1321	Section A - Infrastructure works	Any building work in a single contract agreement/work order of completed value not less than 80% of the value quoted by the main contractor for building works.	Subcontractor's work order value for a completed project executed 7 years ago, if converted to present time will be higher. Also most of the times civil subcontractors work with cement and steel as free issue from Owner. Bidder request Owner to consider provenness criteria as below: Any building work in a single contract agreement/work order of completed value not less than **50%** of the actual work awarded to the agency.	Tender condition prevails
6.	1322	Section A - Infrastructure works	Any embankment formation work/Road work/Water supply work/Drain formation work in a single contract involving earth work for a volume of minimum 15 Lakhs cubic meter using Machineries.	Considering the significant quantum of earthwork, multiple agencies will have to be engaged in order to meet project timelines. Bidder request Owner to consider provenness criteria as below: Any building work in a single contract agreement/work order of completed value not less than **5 lac cubic meters** using Machineries.	Tender condition prevails
7.	1323	Section A - Infrastructure works	Any road work in a single contract agreement/work order of completed value not less than 80% of the value quoted by the main contractor for the road works.	Considering the various stretches of road at different locations, multiple agencies will have to be engaged in order to meet project timelines. Also local contractors from the vicinity area might have to be engaged for such type of works Bidder request Owner to consider provenness criteria as below: Any road work in a single contract agreement/work order of completed value not less than **50%** of the actual work awarded to the agency.	Tender condition prevails
8.	1325	Section A - Infrastructure works	Site grading work involves cutting and filling entire power plant area & green belt area to following finished levels:	Since embankment is already being constructed along bhedan river as a flood protection measure, Bidder requests Owner to re consider area grading of green belt outside the compound wall as substantial quantum of	Will be clarified shortly

			Greenbelt area (LHS), FGL +201.00 m Greenbelt area (RHS), FGL +201.00 m	borrowed earth is involved for backfilling the said area and also to construct embankment along bedhan river.	
9.	1354	Volume IA	3% of CV. The CPG shall be valid till the end of 'Warranty Period' of all systems covered under the EPC package (viz. Main plant with FGD and BOP systems) plus three (3) months grace period.	We would request Owner to return the CPG after completion of warranty period of Infrastructure work including Township under section A. Please confirm.	Tender Condition prevails
10.	1355	Section A - Infrastructure works Integrated Talabira Township	Water & Electricity	We presume that water & power for construction works will be provided at a single point at free of cost. Necessary distribution will be done by us.	Tender Condition prevails
11.	1356	Section A - Infrastructure works Integrated Talabira Township	Cost towards Power supply at township	Cost towards Power supply in the township part will be borne by the Client. Please confirm.	Tender Condition prevails
12.	1630	Section A/ Infrastructure works Cl. 4 Page 30 of 280	All RCC works shall be with OPC Cement.	Alternative Bidder can use OPC+Fly ash or PPC cement as per codal requirements. Please confirm	Tender condition prevails
13.	1655	Vol 1-B/Section 2/Section B Section A, Infrastructure works Cl. 2.5.0 Page 22 of 310	**Construction water shall be at free of cost.** Contractor to make arrangement for transferring water from the construction water source to the plant area as detailed in Section A.	Suppose Bidder do not uses barge mounted pumps and draws water from Bhedan river through other arrangement, then also water charges shall be borne by Owner. Please confirm.	Tender condition prevails.

		Cl. 6 Page 57 of 280	Suitable intake structure, **preferably barge mounted pumps** shall be erected along with pump room, pipelines shall be laid and storage unit shall be constructed.		
14.	1701	Section A - Infrastructure works Integrated Talabira Township / Part-II/Chapter- III Cl. 3 (GENERAL TECHNICAL REQUIREMENTS FOR TOWNSHIP CIVIL INFRASTRUCTURE WORKS) Page 76 of 280	Sanitary fittings	The bidder requests to provide approved vendor list for sanitary fittings.	Tender condition prevails.
15.	1703	Section A - Infrastructure works Integrated Talabira Township / Part-II/Chapter- III Cl. 3 (GENERAL TECHNICAL REQUIREMENTS FOR TOWNSHIP CIVIL	Water supply within township	The bidder suggests to use heavy duty pipes instead of UPVC pipes as they are not recommended for huge volume of water. Kindly consider.	Tender condition prevails

		INFRASTRUCTURE WORKS) Page 75 of 280			
16.	1704	Section A - Infrastructure works Integrated Talabira Township	General	Bidder request NLC to specify the source of water to be used, whether municipal water will be provided or there is a need for provision of tube well for integrated township.	Tender condition prevails
17	-	-	33kV Gas Insulated Substation (GIS) i) 33 kV supply to Township: Complete 33 kV Gas Insulated Substation (GIS) and outgoing 33 kV Cable up to the incomer of 33 kV RMU Switchgear (Section-A) is in Bidder's scope.	Considering significant distance between 33kV GIS room in plant and township, feasibility of 33kV cable inter-connection appears difficult – therefore request M/s. NLC to arrange 33kV supply for township from nearest local distribution substation of Distribution utility on its own, otherwise request to include same in Section-A scope.	Tender condition prevails. 33kV cable inter-connection is between 33kV GIS substation and 33kV indoor switchgear located in 2x6.3 MVA, 33kV/11kV Substation (Building No.71 in Plot Plan), near Gate Complex inside the plant.

18	366	Section A Infrastructure Works/ VOLUME: I-B,SECTION-A, PART-II, Chapter V, External Electrification Works Cl. 5.12.00, 7.0 Page 137 of 280	The wiring cable shall be of FR PVC insulated, stranded, copper conductor of size not less than 1.5sq.mm for lighting circuit, fan, etc. and 2.5sq.mm for power circuits.	There is discrepancy between the referred clauses of Tender. Bidder requests Owner to clarify the minimum size of lighting wire.	Tender condition prevails. For Substation Control Room & other buildings covered under External Electrification works the wiring shall be as per 5.12.00, Sl. No.: 7, pg. No. 137 of 280.
19	367	Section A Infrastructure Works/ VOLUME: I-B,SECTION-A, PART-II, Chapter V, External Electrification Works Cl. 5.16.00, 7.0 to 12.0 Page 141 of 280	7.0 Neutral earth electrodes of the respective transformers shall be interconnected and connected to the grid using GI flat as per specification. 8.0 GI earth wire shall run all along the wire fencing and shall be connected to the grid at 20m interval.	There is discrepancy of material type for Earthing between referred clauses of Tender and Thermal Main plant requirement. Bidder requests Owner to clarify the material type GS or GI for earthing.	Tender condition prevails. For equipments covered under External Electrification works such as 2x6.3MVA, 33/11kV Substation, RMU's etc., GI flats shall be provided for Earthing unless otherwise

					specified.
20	758	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-V EXTERNAL ELECTRIFICATION WORK 17.0 Internal electrification works for the control room and other auxiliary buildings (Substation) Page 224 of 280	17.4.8. Control switches for battery room lights, exhaust fan, etc. shall be kept outside the battery room	As scope of HVAC (air conditioning and ventilation), bidder envisage only exhaust fans and air intake arrangement for battery rooms coming under 33/11kV, 6.3 MVA Substation. Please confirm Bidder's understanding.	Tender condition prevails. The scope of HVAC of main plant package does not covers the 33/11kV, 6.3 MVA Substation which comes under Infrastructure works, Section-A Package.
20	759	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-V EXTERNAL ELECTRIFICATION WORK17.0 Internal electrification works for the control room and other auxiliary buildings (Substation) Page 224 of 280	17.4.9. Sufficient number of split A/C units shall be provided for the SCADA room, EMS room, Computer room, etc.	As scope of HVAC (air conditioning and ventilation), bidder envisage Split AC units for SCADA room, EMS room, Computer room, etc coming under 33/11kV, 6.3 MVA Substation. Please confirm Bidder's understanding.	Tender condition prevails. The scope of HVAC of main plant package does not covers the 33/11kV, 6.3 MVA Substation which comes under Infrastructure

					works, Section-A Package.
21	787	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER V EXTERNAL ELECTRIFICATION WORKS Section 6.00.00 TECHNICAL SPECIFICATIONS (ELECTRICAL), Sub section 8.0. Automatic Emulsifying System For Fire Protection Page 143 of 280 & Page 179 of 280	The following specification specifies the hydraulically controlled automatic emulsifying system for fire protection of 2x6.3 MVA Transformers, 33 / 11kV, outdoor type, oil immersed cable box type both on HV and LV side.	Bidder understands that the Transformer protection indicated here shall be located at main plant boundary and fire protection & Detection system required for the same shall be covered from main plant fire protection facility. Also, technical requirement related to fire protection system and equipment shall be inline with the mail plant system specification. Owner to confirm.	Tender Condition prevails. The scope of fire protection & Detection system in main plant fire protection facility is under Section-B Package, does not covers the 33/11kV, 6.3 MVA Substation which comes under Infrastructure works under Section-A Package
22	788	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER V EXTERNAL ELECTRIFICATION WORKS	8.2 The System Shall Consist Of The Following: 8.2.1 Automatic Electric Motor Driven Centrifugal Pump Set:	Bidder understands that Transformer protection indicated here shall be located at main plant boundary and pumping system required shall be from main plan, hence separate pump and pumping system including fire water tank indicated in the section is not applicable. Owner to confirm.	Tender Condition prevails. The main plant pumping system is under

		Section 6.00.00 TECHNICAL SPECIFICATIONS (ELECTRICAL), Sub section 8.0. Automatic Emulsifying System For Fire Protection Page 180 of 280			Section-B Package, as the 33/11kV, 6.3 MVA Substation comes under Infrastructure works, Section-A Package
23	PEM	Vol. IB/Section-A/ Page 35 of 280/ 1.1	Site grading work involves cutting and filling entire power plant area & green belt area to following finished levels:	Please confirm whether the mentioned FGLs for different areas are fixed or can be suitably decided to balance the cutting & filling quantities	Tender conditions prevails.
24	PEM	Vol. IB/Section-A/ Page 36 of 280/ 1.1	Work can be planned in phased manner to cover grading of main plant area in first phase and greenbelt in second phase, considering overall project timeline	Bidder proposes to do the grading works up to FGL after construction of foundations. Please confirm whether this methodology can be adopted.	Tender condition prevails.
25		Vol. IB/Section-A/ Page 37 of 280/ 1.4	Initially the grading should be done of the Power plant area by matching the cut and fill of earth as per the RL mentioned in the drawings. Contractor may utilize the earth from the reservoir area as per the need. However the excavation shall not go beyond the sub soil		

			water table level. Any RCC/masonry culverts/pipes inside the reservoir area shall be dismantled and disposed off.		
26	PEM	Vol. IB/Section-A/ Page 35 of 280/ 1.1	Site grading work involves cutting and filling entire power plant area & green belt area to following finished levels: Main plant area NGL - varies from +194.4 to +209.1 FGL - +202.50 Coal handling area NGL - varies from +192.5 to +211.0 FGL - +202.50 Cooling tower area Varies from +195.8 to +206.4 FGL +202.00 Greenbelt area (LHS) NGL - Varies from +192.4 to +198.8 FGL +201.00 Greenbelt area (RHS) NGL - Varies from +194.7 to +207.6 FGL - +201.00	As per Topographical survey drgs of Plant area, most of the areas are low lying and huge quantity of borrowed earth will be required to achieve the FGL of the different areas. Customer is requested to review the FGLs of different areas and applicability of grading in Green belt area as River protection bund of approx. 13 Km length is also to be constructed along plant side. .	Will be clarified shortly
27	PS-	IA/2.1.0.0/3	Section – A: INFRASTRUCTURE	The scope mentioned under Section-A is purely civil works. As ample number of civil contractors having	Tender conditions

	Mktg		WORKS	expertise in the civil works defined under Section-A are available, we propose to exclude the scope covered under Section-A, from this tender. NLCIL may please accept our proposal.	prevails
28	-	-	33 kV Supply to Mines : Complete 33 kV GasInsulated Substation (GIS),outgoing 33 kV Cables, 33kV transmission line andterminal 4 Pole structurenear 33 kV RMUswitchgear(Section-A) is inbidder's scope.	Considering significant distance between 33kV GIS room in plant and mines, feasibility of 33kV cable, Transmission Line inter-connection appears difficult – therefore request M/s. NLC to arrange 33kV supply for mines from nearest local distribution substation of Distribution utility on its own, otherwise request to include same in Section-A scope.	Tender condition prevails. 33 kV RMU switchgear referred in Volume-IIA-A, Section-IV, Cl.4.00.00, S.No. 7(3) refers to 33 kV Switchgear in 33/ 11 kV construction Power substation (Building No.71 in PlotPlan).

810100E
810500E
811000E
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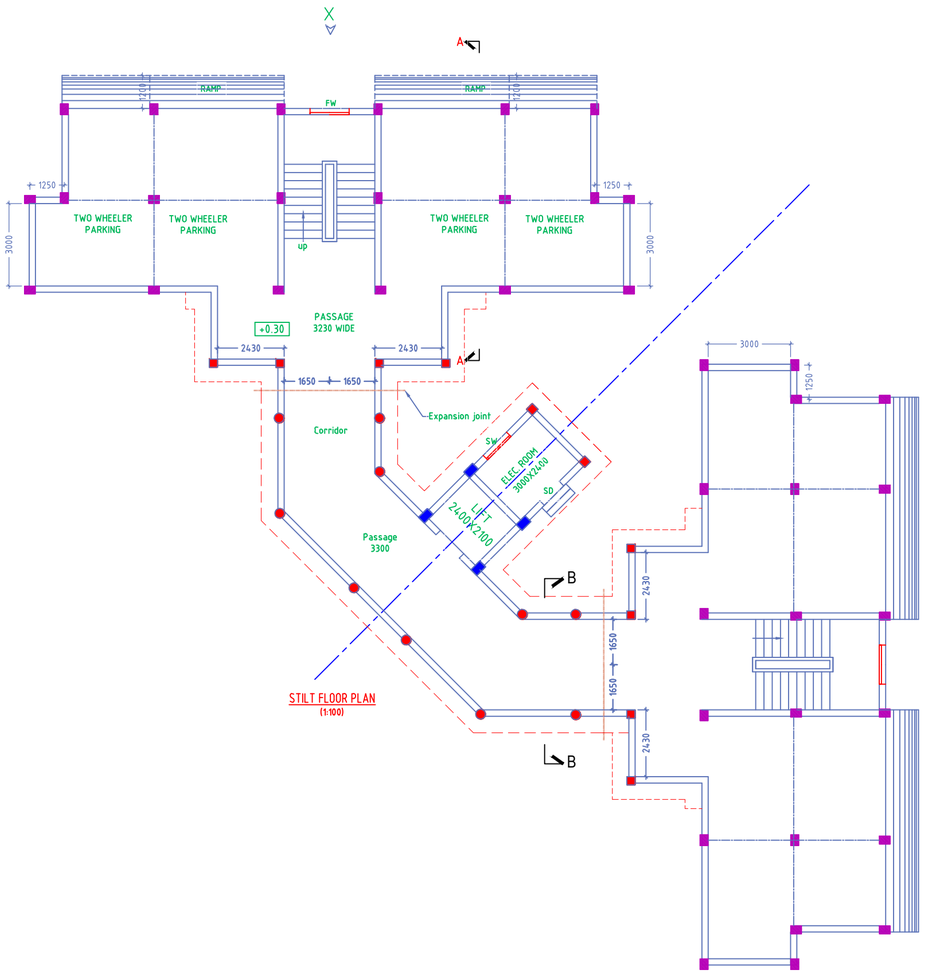
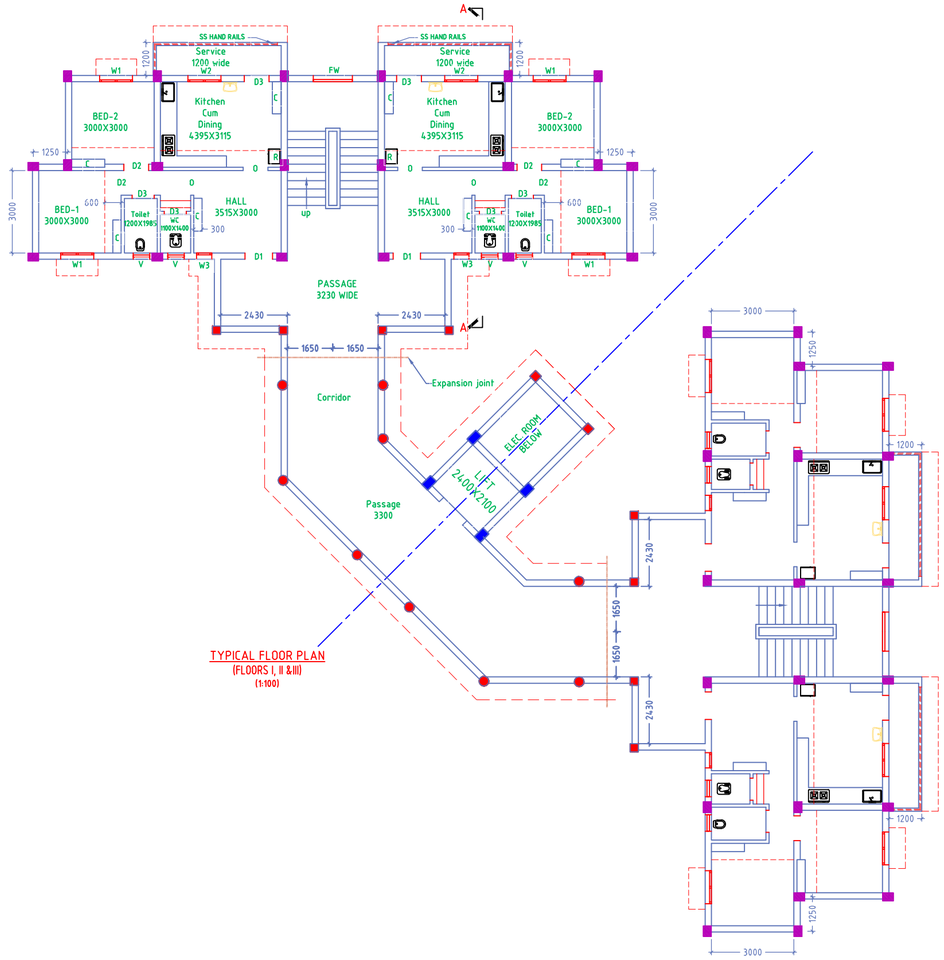
Plan Showing the Contour layout of proposed Integrated talabira township of Talabira Project, NLCIL
Scale:1:1000





NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. 3.DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE FOR STILT+4 WITH HEADROOM AND MACHINE ROOM FOR LIFT. MINIMUM HEIGHT OF EACH FLOOR SHALL BE 3000 MM (FLOOR TO FLOOR). ZONE-3 SHALL BE TAKEN FOR SEISMIC DESIGN OF BUILDING. BASIC WIND SPEED SHALL BE AS PER IS 875 PART III.
8. SUFFICIENT SPACE FOR PARKING 16 CARS SHALL BE AVAILABLE IN EACH BUILDING IN STILT FLOOR.
9. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES. 3D REVIT MODEL SHALL BE SUBMITTED ALONGWITH ARCHITECTURAL DRAWING.
10. LOADING CALCULATION, STAAD DESIGN, DESIGN DOCUMENT SHALL BE SUBMITTED FOR NLCIL APPROVAL.
11. ALL PARAPET WALLS, SERVICE AREAS, BALCONY AND CORRIDORS SHALL BE PROVIDED WITH 900 HT BRICK WALL WITH 300 HT SS HANDRAILS OVER IT.
12. NECESSARY SERVICE DUCTS SHALL BE PROVIDED FOR ROUTING WATER/DRAINAGE PIPELINES. SERVICE DUCTS SHALL BE EASILY ACCESSIBLE FROM MAINTENANCE POINT OF VIEW.
13. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN AND TOILET FIXTURES.
14. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
15. 1 NO. OF ELEVATOR/LIFT SHALL BE PROVIDED PER BUILDING TO ACCOMODATE MINIMUM OF 16 USERS.
16. ANTI-TERMITE TREATMENT SHALL BE PROVIDED FOR ALL BUILDINGS.

INDICATIVE FINISHING SCHEDULE:
PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, BALCONY & CORRIDOR - ANTISKID CERAMIC FLOORING (#)
- STAIRCASE - ANTISKID STEP TILES (#)
- STILT FLOOR/PARKING AREA - ANTISKID EUROCON TILES FLOORING (#)

DADODING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADODING 2100 HT WITH CERAMIC BATH ROOM TILES
- KITCHEN TABLE WITH GRANITE FINISH AND WALL TILES UPTO 600 HT ABOVE WORKING TABLE
- CORRIDOR - 900 HT.
- STILT FLOOR - 115 BW AROUND COLUMN FOR 900 MM HT.

ROOFING :
- IN CASE OF FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES
- IN CASE OF SLOPED RCC ROOF - TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

ALL KITCHEN AND BEDROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

INDICATIVE JOINERY SCHEDULE:

AGD-----	ALUMINIUM GRILL DOOR 1200X2100
MD-----	TW MAIN DOOR (DL) 1200X2100
D1 -----	TW DOOR (SL) 1000X2100
D2-----	FRP SINGLE LEAF DOOR 750X2100
D3-----	TW DOOR (SL).(HEAD ROOM) 900X2100
SD -----	STEEL DOOR (DL).(Electrical room) 1000X2100
O -----	OPENING 1235X2100
O1 -----	OPENING 900X2100
W1-----	TW WINDOW WITH GRILL PROTECTION 1200X1350
W2-----	TW WINDOW WITH GRILL PROTECTION 1200X900
W3-----	TW WINDOW WITH GRILL PROTECTION 1000X1350
ASW---	AL. SLIDING WINDOW WITH GRILL PROTECTION 1200X1350
SW-----	STEEL WINDOW WITH GRILL PROTECTION 1200X1350
FW -----	FIXED GLASS WINDOW WITH GRILL PROTECTION 1500X2400
V------	TW VENTILATOR 600X450
EX-----	EXHAUST FAN

SPECIAL NOTE-
1. CHAMBER BURNT BRICK WALL 230 THK UPTO BASEMENT IN CM 1:5
2. FLY ASH BRICK WALL 230 THK ABOVE BASEMENT IN CM 1:5
3. CHAMBER BURNT BRICK WORK 115 THK ABOVE AND BELOW BASEMENT IN CM 1:4

ANNEXURE DRG NO.
C31

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

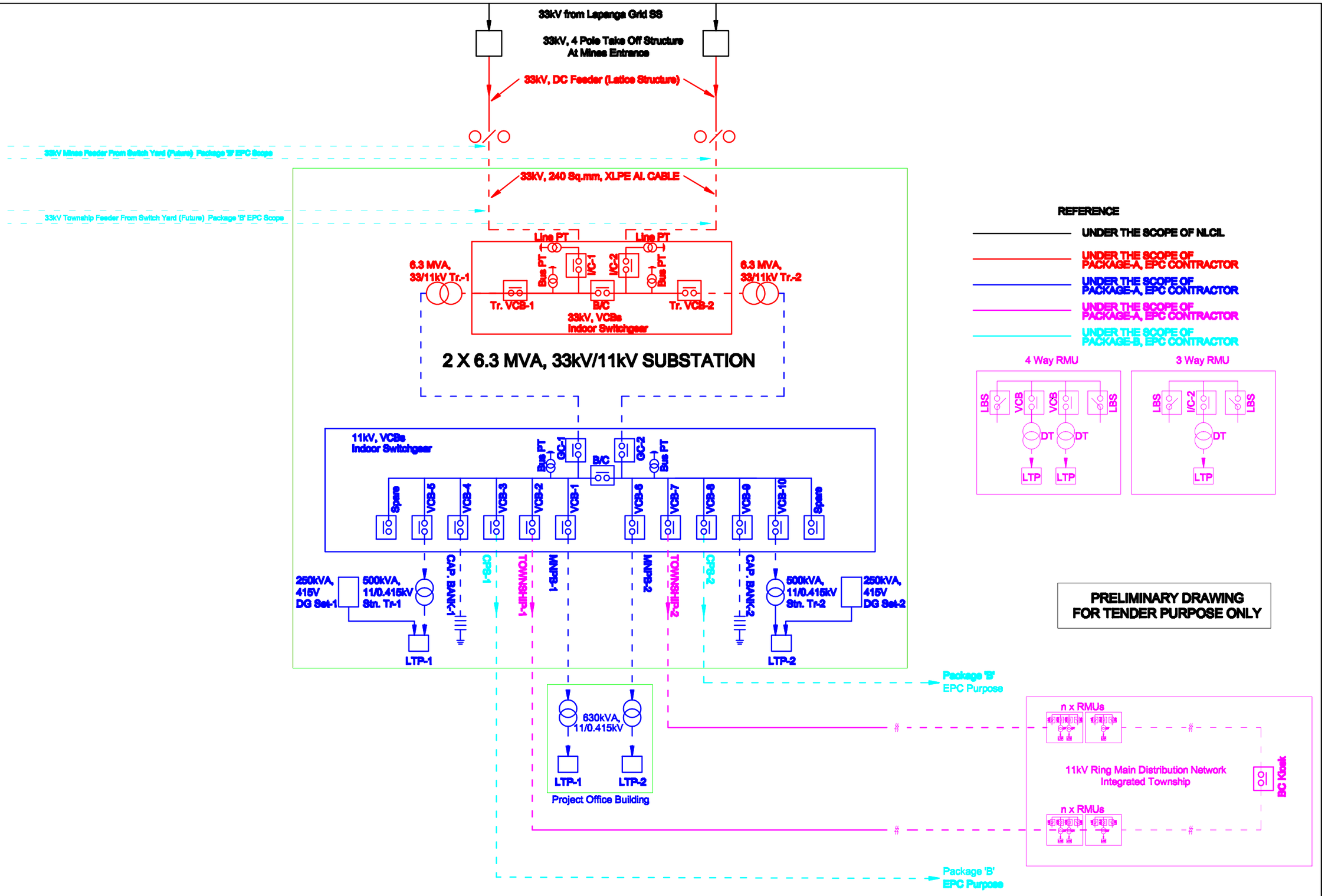
	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/D		
DGM/C		

NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

TYPE I TOWER
INTEGRATED TOWNSHIP,
TALABIRA

A1	SCALE: 1:100, 1:25	ARCHITECTURAL DETAILS	DRG No:

07/10/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C31 Type-1 Quarters.dwg



DRG. NO.: EGZ/EEW - 001	NLC India Limited (Formerly Neyveli Lignite Corporation Limited) ('Navratna' - A Government of India Enterprise) NEYVELI-607807, TAMIL NADU
DATE: 19.12.2020	3X800MW NLC TALABIRA THERMAL POWER PROJECT
NOT TO SCALE	EXTERNAL ELECTRIFICATION WORKS - SLD

Annexure TS

Vol. I-A/ Section-2 Page 54 of 574

Description	Time schedule in months from the date of LOA.
Completion of entire scope of work in Thermal power plant area	45 months.
Completion of entire scope of work in Integrated Talabira township	45 months
Completion of entire scope of work in external electrical works	27 months

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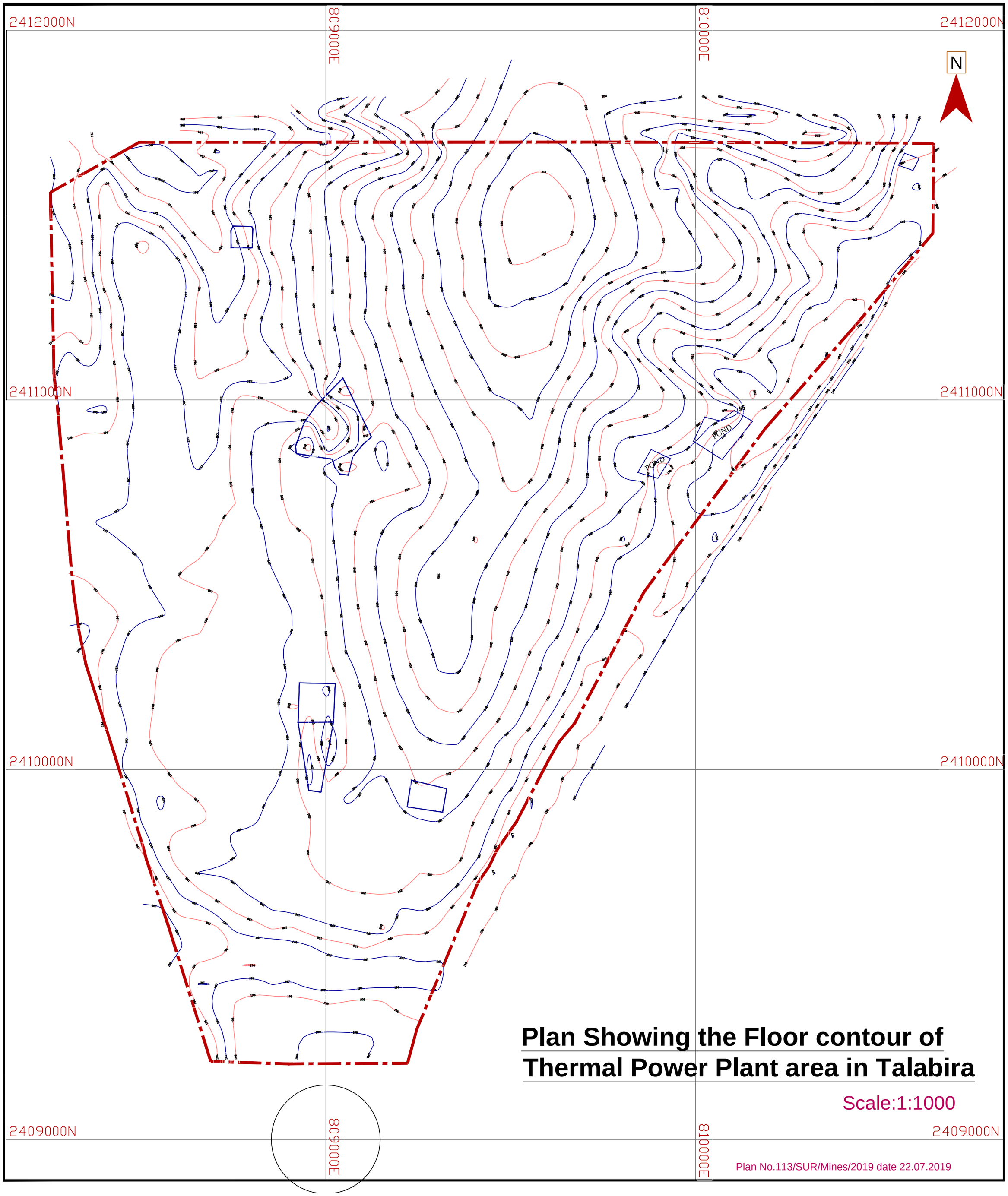
Vol. I-B/ Section-A Part-I Commercial Clause 3.2.3 Page 6 & 7 of 280

3.2.3	The overall completion period of the scope of work in Section-A is 45 **Months** from the date of LOA. However the following time schedule shall be adhered by the contractor ..	
	DESCRIPTION	**Time Schedule in Months from the date of LOA .**
	THERMAL POWER PLANT AREA	
	SITE GRADING IN MAIN PLANT AREA (except green belt)	Before commencement of civil foundation works under Section-B i.e before 8 months
	CONSTRUCTION OF COMPOUND WALL	18 Months
	THERMAL PROJECT OFFICE BUILDING	18 Months
	GATE COMPLEX , SECURITY AND TIME OFFICE	18 Months
	CISF- BARRACKS	18 Months
	COMPLETION OF OTHER CIVIL INFRASTRUCTURE WORKS **(Except Site grading of Green belt Area and Formation of Embankment along Bhedan river**)	27 Months
	Site grading of Green belt Area and Formation of Embankment along Bhedan river	45 Months
	INTEGRATED TALABIRA TOWNSHIP	
	Completion of 50% of the quarters as per requirement of Purchaser including all services required for occupation	27 months
	Completion of entire scope of work in integrated Talabira township	45 Months
	COMPLETION OF ENTIRE SCOPE OF WORK IN EXTERNAL ELECTRICAL WORKS	
	POWER PLANT AREA	
	33k.V transmission line upto 2X6.3 MBA substation , 2X6.3 MBA substation	12 Months
	Remaining scope	27 Months
	IN TOWNSHIP AREA	
	11k.V transmission line and RMU network	12 Months
	Remaining scope	27 Months

Note: If construction power supply is needed even before completion of providing Construction power supply the bidder has to make his own arrangements for power supply.



Plan Showing the Floor contour of Thermal Power Plant area in Talabira

Scale:1:1000

Plan No.113/SUR/Mines/2019 date 22.07.2019

S N						**NLCIL DCPL R**
			In Flow diagram of PTP available in tender specification, DM and CW clarifiers are indicated with double slopped bottom			
2.	PEM	Vol. II-IB/2/Section-I/Annexure-I /Page 19 of 46	Raw water Turbidity at PT plant inlet is mentioned as 7.55 to 14.9 NTU	Please mention Design suspended solid in ppm for PT plant.		Suspended solids to be considered as 3.0 ppm to 6.0 ppm.
STP						
1.	PEM	Volume-IB/Section A/ Clause-3/Sheet no-78 of 280 Volume-II – IB/4/Section II/	Sewage Treatment Plant of minimum capacity 1.00 MLD shall be provided at lowest level within township area. STP shall be designed for the required capacity based on the general principles covered in Section B, VOLUME: II IB/4, SECTION II. Both the sewage treatment plant shall be designed as per guidelines of CPHEEO Manual. The anticipated no. of users	It is not clear from the Tender document that, how many Sewage Treatment Plant and of what capacity are to be provided for power plant including Township.	Sewage treatment Plants nos. and Capacity is not clear.	<u>Section-A:</u> Refer Annexure A <u>Section-B:</u> Two (2) separate Sewage Treatment Plants at **thermal plant** premises of total handling capacity shall be designed to handle a total flow of

S N						**NLCIL DCPL R**
			SHALL BE DECIDED ACCORDINGLY.			
64.	TBG	VOLUME: II-A SECTION-IV SCOPE OF SUPPLY AND SERVICES, TERMINAL POINTS ANDEXCLUSIONS Clause - 4.00.00 – 7.0 a) Page 20 of 27	**I** **S IS** i) 33 kV supply to Township: Complete 33 kV Gas Insulated Substation (GIS) and outgoing 33 kV Cable up to the incomer of 33 kV RMU Switchgear (Section-A) is in Bidder's scope.	i) Please confirm route length of 33kV cable between 33kV GIS substation in 765/400/33kV GIS switchyard area and Township. ii) Please confirm if 33kV RMU switchgear (Section-A bidder scope) is located in "Substation Sl. No. -13" located in township area indicated in Volume-1B , Chapter-VI	Clarification from customer	i) 33kV cable is between 33kV GIS substation and 33kV indoor switchgear located in 2x6.3 MVA, 33kV/11kV Substation, near Gate Complex inside the plant ii) 33kV switchgear located at 33kV/11kV Substation location near Gate Complex inside the plant. (Ref. Item No.: 71, Plot Plan, DRW No.:18A03-DWG-M-002A)

S N						NLCIL DCPL R
				iii) Drawings C1 Township Layout. iii) We understand that NLC Talabira integrated township is located outside plant boundary – therefore we understand that obtaining any Right of Way, land acquisition, diversion of any existing transmission lines / rail / roads/ crossings, tree cutting , co-ordination with any external		iii) Under Bidder's Scope. iv) Tender condition prevails. 33 kV RMU switchgear referred in Volume-IIA-A, Section-IV, Cl.4.00.00, S.No. 7(3) refers to 33 kV Switchgear in 33/ 11 kV construction Power substation (Building No.71 in Plot Plan).

S N						NLCIL DCPL R
				iv) agency shall be in NLC scope only – please confirm. Considering significant distance between 33kV GIS room in plant and township, feasibility of 33kV cable inter-connection appears difficult – therefore request M/s. NLC to arrange 33kV supply for township from nearest local distribution substation of		

S N						NLCIL DCPL R
				diversion of any existing transmission lines / rail / roads / crossings, tree cutting, co-ordination with any external agency shall be in NLC scope only – please confirm.		
65.	TBG	VOLUME: II-F/1 SECTION-I GENERAL ELECTRICAL SPECIFICATION	1.11.41 **Miscellaneous Electricals**: From 33kV GIS Switchgear 2 Nos of 33 kV power supply shall be extended (33kV UG cable) to 33kV indoor Switchgear of construction power supply substation after phasing out of the 33kV State TRANSCO power, in turn will feed power to integrated	Please note that subject clauses are contradictory to clauses mentioned in VOLUME: II-A , SECTION-IV - SCOPE OF SUPPLY AND SERVICES, TERMINAL POINTS AND EXCLUSIONS, Clause - 4.00.00 – 7.0 a), Page 20 of 27 – request to please confirm actual scope accordingly.	Clarification from customer	There is no contradiction. 33kV RMU switchgear referred in Volume-IIA-A, Section-IV, Cl.4.00.00, S.No. 7(3) refers to 33 kV Switchgear in 33/ 11 kV construction Power substation (Building No.71 in

S N						
			township and above listed buildings. From 33kV GIS Switchgear 2 nos. of 33kV power supply shall be extended (33kV UG cable) up to 4 pole structure (located near construction power substation) of 33kV transmission line in turn will feed power to the Mines.			Plot Plan).
66.	TBG	Corrigendum	Plot Plan Dwg. No. – 18A03-DWG-M-002A, Rev-0	i) We understand that 33/11kV Construction Power substation Sl. No. 71 indicated in Plot Plan shall be in Section-A contractor scope as indicated in Volume-1B and not Main	Clarification from customer	i) Bidder understanding is in order. ii) SLD Will be Provided as corrigendum.

S N						
E						
318	General	-	-	-	Bidder understands that dismantling or re-routing of any EHV/HT/LT lines passing through power plant area including boundary, Township, Intake system etc. shall be in Owner`s scope. Please confirm. Further, Bidder understands that existing 220kV line passing through proposed power plant area shall be rerouted outside plant boundary before handing over the land for construction to Bidder.	1.Re-routing of EHV/HT/LT lines passing through power plalnt area is in owner scope. 2.Exisitng 220kV line Passing through the proposed power plant area will be re-routed without hinderence to the construction activities.
319	Vol-II F1/Section-1, General Electrical Specification	1.11.20	7 of 83	To cater the power supply to DC loads, 2x100% 220V DC batteries shall be provided for each unit and common auxiliaries with a back up time of three(3) hours. 2x100%, 220V DC batteries shall be provided for catering DC loads of each BOP system including but not limited to Coal Handling System, Ash Handling System, Plant Water System, PT plant, Fire Water System, 765/400/33kV GIS, FGD system, Intake System with three (3) hours back-up.	Bidder proposes battery back-up time as 30 minutes considering that at the instance of complete blackout, EDG will start within 30 seconds and Emergency AC supply will be available to feed battery charger hence Battery is not required to be oversized. This is also a standard practice with NTPC/Other SEBs.	Tender condition prevails.
320	Vol-II F1/Section-1, General Electrical Specification	1.11.20	7 of 83	2x100%, 220V DC batteries shall be provided for catering DC loads of each BOP system including but not limited to Coal Handling System, Ash Handling System, Plant Water System, PT plant, Fire Water System, 765/400/33kV GIS, FGD system, Intake System with three (3) hours back-up. For other areas separate battery system of similar type and configuration or tapping from nearby DCDB shall be considered. Each set of battery system shall be provided with 1 x 100% Float Charger (FC) and 1 x 100% Float Cum Boost Charger (FCBC).	Bidder proposes to have separate 220V DC system for Coal handling, Ash handling, GIS, FGD and Intake only. For other offsite/BOP systems, DC system may be provided as per system requirement or else can be fed from main plant DC systems.	Tender condition prevails.
321	Vol-II F1/Section-1, General Electrical Specification	1.11.20	7 of 83	Battery shall be of storage type plante lead acid for Main Plant & Switchyard and Ni-Cd type for BOP systems.	Bidder suggests to provide option of selecting type of battery (Nickel Cadmium or Lead acid) to bidders. Both nickel cadmium and Lead acid batteries are equally used & accepted in the power industry and both the type of battery delivers the required performance. Also Nickel cadmium for main plant and switchyard is followed by NTPC and state utilities hence has proven track record.	Tender condition prevails.
322	Vol-II F1/Section-1, General Electrical Specification	1.11.21	7 of 83	Each Main Plant UPS shall have dedicated 2x100% Lead Acid Plante battery with a back-up time of 1 hour.	Bidder suggests to provide option of selecting type of battery (Nickel Cadmium or Lead acid) to Bidders. Both nickel cadmium and Lead acid batteries are equally used & accepted in the power industry and both the type of battery delivers the required performance. Also Nickel cadmium for main plant and switchyard is followed by NTPC and state utilities hence has proven track record.	Tender condition prevails.

323	Vol-II F1/Section-1, General Electrical Specification	1.11.22	8 of 83	33kv System: Cables shall be 19/33kV, 3 x 150 sqmm	Bidder requests to allow the bidder's to select the required cable sizes for 33KV system based on system engineering instead of specifying one particular size.	For 33kV Incomer cable (from 30MVA Transformer) shall be sized as per requirement. For Township & Raw Water PH feeders from 33kV GIS, Single Run of 3Cx150 sqmm shall be provided as minimum For Mines feeder from 33kV GIS, Two Runs of 3Cx150 sqmm shall be provided as minimum
324	Vol-II F1/Section-1, General Electrical Specification	1.11.22	8 of 83	For GIS equipment, high frequency earth grid shall be provided. Dedicated Copper Earth mat of adequate size embedded in the concrete i.e. below FFL of GIS building shall be provided. Same shall be connected to below ground earth mat of GIS building. In the proposed HF earthing grid, welding of copper bars shall be made to ensure the proper continuity. The connection between below ground mat & HF earthing grid shall be made in such a way that the connection of earth grid conductors shall be intact for 30 years.	GIS earthing should be as per recommendation of OEM. Owner may please accept.	Tender Condition Prevail
325	Vol-II F1/Section-1, General Electrical Specification	4.07.03	18 of 83	For each unit, Two (2) nos. 16 MVA (min.), 11/3.45KV Unit Auxiliary Transformers (UAT) shall be provided to feed 3.3 KV Unit Switchgears.	Bidders proposes to allow bidder to decide the transformer rating based on load requirements and as per sizing criteria defined in the specification. Owner may please accept.	Tender Condition Prevail
326	Vol-II F1/Section-1, General Electrical Specification	4.07.05	19 of 83	Motors up to 160KW shall be connected to 415V LT switchboard	Bidder would like to propose LV Motor upto and including 200kW to be fed from LV Switchgear except for CHP. For CHP, motor upto and including 160kW shall be fed from LV Switchgear. Owner may please accept.	Tender Condition Prevail
327	Vol-II F1/Section-1, General Electrical Specification	4.09.00	20 of 83	The intake switchgear shall receive power from 33kV GIS through a 33kV Double circuit Transmission Line on lattice steel structure.	Bidder understands that 33kV transmission lines on steel poles as an alternative to lattice steel structure is also acceptable. Owner may please confirm bidder's understanding.	This requirement is not applicable now. Bidder shall refer to corrigendum in this regard.
328	Vol-II F1/Section-1, General Electrical Specification	4.14.01	23 of 83	In addition, the main plant battery provides for the following emergency loads/services on failure of A.C. supply. a) Emergency Lube Oil Pump b) Jacking Oil Pump c) Seal Oil Pump	Selection of power supply for motors i.e. whether AC or DC should be as per OEM recommendations. Owner may please confirm.	Tender condition prevails.
329	Vol-II F1/Section-1, General Electrical Specification	4.14.03	24 of 83	The starting sequence of DC motors as per product specific requirement and sizing of 220V DC system is in accordance to the above. a) For duration 0 minute to 1 minute Tripping breakers. Starting current of all automatically started DC drives. Solenoid valves. Indicating lamps, protective relays, auxiliary relays on switchgears and control panels Emergency lighting b) For duration 1 minutes to 179 minutes duration Running currents of DC motors. Indicating lamps, protective relays, auxiliary relays on switchgears and control panels Emergency lighting c) For duration 179 minutes to 180 min duration Closing and spring charging of breakers Indicating lamps, protective relays, auxiliary relays on switchgears and control panels Running currents of DC motors.	Switching (Start/Stop) Cycle of all DC motor shall be as per OEM recommendation and battery sizing shall be done accordingly. Owner may please accept.	Tender condition prevails.
330	Vol-II F1/Section-1, General Electrical Specification	4.14.03	24 of 83	Minimum rating of Main plant battery shall be considered as 2000AH for Unit DC System	Bidder suggests that Bidder should be allowed to select suitable rating of the battery meeting all the sizing criteria defined in IEEE standards and in the specification. Owner may please accept.	Tender condition prevails.

356	Vol. II-A/Section-V, General Technical Requirements, Annexure-II	4.4.xvi	44 of 46	Suitable rolling shutter shall be considered in the equipment layout to be developed by the bidder on A-row to facilitate the movement of Generator transformer, station & Unit transformers to the maintenance bay.	Bidder understands that only transformer tank movement is envisaged up to the maintenance bay. Owner may please confirm Bidder's understanding.	Noted.
357	Report on Geotechnical investigation	-	4145 of 6472	-	Bidder requests Owner to provide soil investigation report for complete plant indicating soil resistivity and soil thermal resistivity values required for earthing and cable sizing calculation.	Already available along with the tender document. Sucessful Bidder to acertain the value by conducting the required test
358	Section A Infrastructure Works/ Chapter V - External Electrification work Vol. II-F1/Section-I General Electrical Specification	_ 1.11.35	125 of 280 10 of 83	Scope of Work: The Purchaser's scope is to extend Two number 33kV lines from Lapanga Substation with a maximum capacity of 15 MVA each, through dedicated Double Circuit feeders upto the location, near Mines entrance which is approximately 4 Kms from Thermal Power Project Main Gate. Construction Power To meet the construction power requirement of the project, the Purchaser will provide two Numbers of 11 kV feeder with a Total maximum capacity of 3MVA on chargeable basis, at single location, near Main Gate-3 (As referred in Plot plan) to meet the construction power requirements.	There is discrepancy between referred clauses of specification. As per scope of work in Section A, Construction Power that is to be provided by purchaser is at 33kV Voltage grade and Contractor has to lay 33kV OH line to the construction power S/S inside Plant boundary. However as per referred clause 1.11.35, Construction power provided by purchaser is at 11kV. Please clarify the Contractor scope, construction power voltage level and construction power kVA rating.	The 33kV outlet at Mines entrance is the source of supply common for Mines, Integrated Talabira Township, Miscellaneous Non Plant Buildings and Construction Power to be extended upto 33kV indoor Switchgear of 2x6.3MVA, 33/11kV Construction Power Supply Substation in Bidder's scope under Section-A Package. Construction power needs for Section-B Package, 2 Nos dedicated outlets at 11kV voltage level with a Total maximum capacity of 3MVA on chargeable basis (Ref. Cl. 1.11.35, Pg. 10 of 83, Section-B, Vol. II-F1/Section-I General Electrical Specification) will be provided from 11kV indoor Switchgear of 2x6.3MVA, 33/11kV Construction Power Supply Substation in Bidder's scope under Section-A Package. Section-B Package Bidder shall extend the above 11kV power supply to meet the construction power requirements at various locations of inside thermal power plant. Also ref. Cl. 4.00.00 General Scope, 4.00.01 pg. No.: 130 of 280.
359	Section A Infrastructure Works/ CHAPTER V EXTERNAL ELECTRIFICATION WORKS Vol. II-A/Section-IV Scope of Supply & Services, Terminal Points & Exclusions Vol-II F1/Section-1, General Electrical Specification, Document3 Section A Infrastructure Works/ CHAPTER V EXTERNAL ELECTRIFICATION WORKS	Cl 1.02.00 Cl 7.0, a Cl 1.11.41 Cl 1.2.00	Page 24 of 27 Page 126 of 280 Page 12 of 83 Page 126 of 280	The 33kV Double Circuit feeding arrangement shall be designed to handle a Maximum Capacity of 15 MVA each. The Double Circuit feeding arrangements and the Substation shall be permanent infrastructure and will be used for maintaining power supply to Mines & Township from Thermal Power Plant Switchyard in future. 33 kV supply to Township:33 kV: Incomer terminal of 33 kV RMU Switchgear provided by Section-A Contractor 1) From 33kV GIS Switchgear 2 Nos of 33 kV power supply shall be extended (33kV UG cable)to 33kV indoor Switchgear of construction power supply substation after phasing out of the 33kV State TRANSCO power, in turn will feed power to integrated township and above listed buildings. From 33kV GIS Switchgear 2 nos. of 33kV power supply shall be extended (33kV UG cable) up to 4 pole structure (located near construction power substation) of 33kV transmission line in turn will feed power to the Mines. 2) The Bidder scope is to construct the 2x6.3 MVA, 33kV/11kV Substation complete with all associated supplies & services still commissioning of the substation for the Township, Miscellaneous Non Plant Buildings and Construction power supply at suitable location inside	As per referred clauses, Bidder understands following: 1. 33kV GIS will be provided in Power Plant Switchyard. 2. 33kV and 11kV indoor switchgear will be provided as part of Construction power substation. The supply from this switchgear will feed construction power requirement of plant, township, non plant building loads etc till the commissioning of permanent feeding arrangements. 3. Permanent supply for township shall be from 33KV GIS. There will be four pole structure substation/RMU at township to receive this 33kV supply which will be further step down to lower voltage level as per requirement of township. 4. 33kV transmission lines used for taking construction power from Mines to construction substation inside Power plant will be permanent arrangement. The same line will be used to supply power from Power Plant to Mines after phasing out of 33kV State TRANSCO power. 33kV Power supply from 33kV GIS to mines area shall be taken from 4-pole structure available at construction power SS facility. 5.For feeding intake 33kV lines/cables as required will be connected from 33kV GIS. Owner may please confirm Bidder's understanding.	PERMANENT SUPPLY for township, Miscellaneous Non Plant Buildings (Cl. 1.11.41, Pg. 12 of 83) shall be from 11kV indoor Switchgear of Construction Power Supply Substation (2x6.3MVA, 33/11kV SS in Bidder's scope under Section-A package) inside Thermal Power Project site. 1. From 33kV GIS Switchgear 2 Nos of 33 kV power supply (Township feeder) shall be extended (33kV UG cable) to 33kV indoor Switchgear of Construction Power Supply Substation after phasing out of the 33kV State TRANSCO power. 2. From 33kV GIS Switchgear 2 nos. of 33kV power supply shall be extended (33kV cable) up to 33kV cable intake gantry structure of 33kV transmission line (Ref. Cl. 5.01.00, pg. No.: 132 of 280 in Bidder's scope under Section-A Package) located near Construction Power Supply Substation inside Thermal Power Project site in turn will feed power to the Mines.

360	Vol. II-F2/Section-VII Illumination System	Table Sl No. 1.24	Page 37 of 41	Bulkhead LED luminaire, pressure die cast aluminium housing (IP66), powder coated, passive heat sink for better thermal dissipation, injection molded diffuser made of special polycarbonate material, delivering superior light output, 5600K color temperature having minimum lifetime of 50,000 burning hours (at L70), System efficacy ≥ 100 lm/W. - DC Emergency lighting in dusty area.	As per Tender Clause, LED Fixture is to be provided for DC Lighting in strategic areas. Please note that in case DC LED Fixture is not available from Fixture manufacturer, DC Incandescent fixture will be provided for DC Lighting in strategic locations. Owner may please confirm.	Tender Conditions Prevails
361	VOLUME: I-B,SECTION-A, PART-II, Chapter II, Site grading	Cl. 1.1	Page 35 of 280	Finished ground level (FGL) for Main plant area is +202.50.	Bidder understands that the finished **RA EL** level of switchyard will be above +202.50. Owner may please confirm.	Bidder shall refer to plot plan for RL level of switchyard. And FGL shall be considered from RL inline with the specification. Further bidder to refer Vol.II-G1/Section-I ,4.21.02/ Sheet 37 of 118, The entire Switchyard area shall be provided with chain-link fencing. Switch yard area shall be filled with 150 mm thick layer of 20 mm to 40 mm size BG metal. Vol. II-G1/Section-I,4.31.03, pg 97of 118, Stone filling: Stone filling with 40mm downgraded BG metal shall be provided in entire switch yard area with thickness as per the electrical specification requirement. Below that 150mm thick PCC of Grade M20 with 230mm (consolidated thick)layer of Stone boulders soling shall be provided
369	VOLUME: II-A,SECTION-IV, Scope of Supply & Services, Terminal Points & Exclusions	Cl. 4.00.00 , 7.0	Page 24 of 27	Terminal point : 765KV, 400KV & 33KV Switchyard outgoing line gantries.	Bidder understands that terminal point as 33kV switchyard outgoing line gantry is typo error as the 33kV lines to township/Mine/Raw water to be terminated at take off gantries for 33kV is by Bidder only. Owner may please confirm Bidder's understanding.	Particular terminal point is menioned for section -B scope, balance work has mentioned by bidder is convered in section -A
370	VOLUME: II-A,SECTION-IV, Scope of Supply & Services, Terminal Points & Exclusions	Cl. 4.00.00 , 7.0	Page 24 of 27	Connecting Package and it's scope: Terminations of outgoing lines at the switchyard line take off gantries for 765kV&, 400kV) are not in Bidder's scope.	Bidder will consider take off gantries of 765kV & 400kV with 30 degree deviation angle in horizontal and vertical direction as per standard practice.	Stringing Angle 30 Degree may vary , Take off tower will be positioned based on the layout & route restriction . Bidder to consider this case also.
371	VOLUME: II-A,SECTION-V, General Technical Requirements	Cl. 7.00.00 , c)	Page 12 of 46	Clear Head room within Main Plant Building for pipes, ducts, structures & cable trays etc. : 2.4 m (Minimum)	Bidder understands that the required head room may not be applicable for Cable vaults areas as per TG building floor requirement as per OEM recommendation. Owner may please confirm Bidder's understanding.	Tender condition prevails
372	VOLUME: II-A,SECTION-V, General Technical Requirements	Cl. 7.00.00 , r)	Page 14 of 46	The minimum clear height available between two consecutive floor slabs shall not be less than 4.50 meters for Plant buildings	Bidder understands that the required floor height may not be applicable for Cable vaults areas as per TG building floor requirement as per OEM recommendation and tender floor level requirements in Annexure-II. Owner may please confirm Bidder's understanding.	Bidder understanding for cable vault height is noted & confirmed
373	VOLUME: II-A,SECTION-V, General Technical Requirements	Cl. 7.00.00 , s)	Page 14 of 46	There shall be at least two (2) nos. main access doors, one on either side of each building, of which one shall be minimum 3 meters wide with rolling shutters for equipment entry.	Bidder understands that door height and/or rolling shutter requirements shall be as per equipment requirement only. Owner may please confirm Bidder's understanding.	Tender condition prevails
374	VOLUME: II-A,SECTION-V, General Technical Requirements	Cl. 7.00.00 , s)	Page 14 of 46	For multistoried buildings(G+2 and above), at least two (2) nos. regular staircases diagonally opposite to each other shall be provided connecting all the floors and roof.	Bidder requests a clarification for number of stairs upto roof. As per standard practice one regular staircase and another cage ladder is provided. Bidder requests a clarification on this.	Tender condition prevails

SN						
479	Vol. II-G1/Section-II	4.00.00 - e	17 of 38	All Concrete tanks/liquid retaining structures/liquid conveying structures shall be designed in accordance with the recommendation of IS-3370 (Latest Revision) as un-cracked section.	IS 3370 part 2 Cl 4.4.1.2 stipulate that crack shall not exceed 0.2 mm. Bidder understand that as per this clause crack width shall limit to 0.2 mm for all liquid retaining / conveying structures.	Tender condition prevails
480	Vol. II-G1/Section-II	3.02.00	14 of 38	(For RCC design) Appropriate allowable increase in permissible stresses as per IS codes, may be taken only under normal loads along with wind and seismic conditions. However, members which are designed primarily to resist wind, no increase in permissible stresses shall be permitted.	Bidder understand that this clause is applicable for steel design only.	Bidder understanding is in order
481	Vol. II-G1/Section-III	5.00.00	9 of 14	Horizontal deflection a) Single story building - H/300 b) Multistoried building including JT - H/500	Bidder propose to consider horizontal deflection limit as per IS 800-2007 table 6 for industrial building. a) Single story building - Elastic Cladding - H/150 Masonry Cladding - H/240 b) Multistoried building Elastic Cladding - H/150 Masonry Cladding - H/240	Tender condition prevails
482	Vol. II-G1/Section-III	5.00.00	12 of 14	STAAD Pro. file along with editable excel sheets with active formulae to be submitted.	Bidder may use other analytical software like SAP 2000, SAFE, ETAB etc for analysis and design of various structures. Bidder shall provide self explanatory sample calculation with all formulae mentioned.	Tender condition prevails
483	Vol. II-A/Section-IV	4.00.00	26 of 27	Plant main storm network is under Bidder's scope. Carrying the storm water of the entire plant Rain water harvesting pond with over flow of pond connected to Bhedan river is within the scope of EPC Bidder. EPC Bidder shall note that if there are minor changes in the coordinates of the terminal points and elevations during detailed engineering, same shall be accepted without any commercial implication to the Owner (Minor changes to be mentioned).	Owner is requested to provide the terminal points with connecting invert level for storm drain network for following, a) For Township b) For Ash pond area c) For intake area d) For approach roads to Township, Ash pond area and intake area.	This clause is limited to inside powerplant (scope of Section B) only. Storm Water network within power plant shall be connected to harvesting pond which will be in bidder's scope during layout development stage after award of LOA. For (a) &(d) , Section A may be referred.
486	Section B, Volume IB/Section - 6, Terms of Payment	5.6.0	51 of 310	Royalty for excavation which will be reimbursed by NLCIL based on documentary evidence submitted by the Contractor for making such payments as per statutory provisions and this reimbursement shall be over and above the Contract Price.	Bidder understand that Royalty and other charges, if levied by State mining department for the below mentioned activities will also be reimbursed by NLCIL based on documentary evidence as per clause 5.6.0 a) For using overburden earth from Talabira mines for area grading of thermal power plant, green belt area and construction of embankment along bedhan river etc. b) For construction of embankment of raw water reservoir and ash pond by using earth from within the land area acquired by NLCIL. c) Cutting and filling within the land acquisition boundary for Area Grading purpose. d) Cutting, filling and construction of embankment for approach road and other areas outside the plant boundary using borrowed earth.	Tender Condition Prevails

L&T LOT-2/3 Missing Points reply

S.no.	Bidder query no.	reference	reference	reference	Specifications	Clarification	NLCIL Reply
1	749	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-III INTEGRATED TALABIRA TOWNSHIP	4. Residential Building	Page 79 to 81 of 280	Residential Building under Township: 1. Project Head quarters & Servant House 2. Living Quarters (Type-I, II, III, IV) 3. Executive Hostels	Bidder envisages **no scope related to HVAC** (air conditioning and ventilation) for residential areas of township. Only listed building are identified under residential facilities. Please confirm Bidder's understanding.	Each Project Head Quarters Split AC shall be provided.
2	750	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-III INTEGRATED TALABIRA TOWNSHIP	5. Non-Residential Building	Page 81 of 280	Non-Residential Building under Township: 1. Shopping complex– G+1 structure 2. Guest house – G+1 RCC framed structure 3. VIP Guest House – G+1 RCC framed structure 4. Recreation club 5. Sports office, badminton court and swimming pool 6. Auditorium 7. Community Hall 8. Hospital 9. School 10. Township Administrative office (TA Office) and Estate store room 11. Library	Bidder envisages **no scope related to HVAC** (air conditioning and ventilation) for following non-residential building of township: 1. Shopping complex– G+1 structure (It is understood that occupants of respective shops or restaurants will be completing HVAC requirement for respective areas) 2. Guest house – G+1 RCC framed structure 4. Recreation club 5. Sports office and swimming pool 7. Community Hall 9. School	1.In Auditorium HVAC system shall be provided. 2. The Following buildings Split AC shall be provided. i).Guest House ii).VIP guest house iii).Community hall iv).Hospital v) TA vi)Library.

					& **CISF Barracks**	11. Library & CISF Barracks Only provision for power points as stipulated under Chapter-IV Internal Electrification Works is to be provided. Please confirm.	
3	751	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-III INTEGRATED TALABIRA TOWNSHIP	5. Non-Residential Building	Page 81 of 280	Non-Residential Building under Township: 1. Shopping complex– G+1 structure 2. Guest house – G+1 RCC framed structure 3. VIP Guest House – G+1 RCC framed structure 4. Recreation club 5. Sports office, badminton court and swimming pool 6. Auditorium 7. Community Hall 8. Hospital 9. School 10. Township Administrative office (TA Office) and Estate store room 11. Library	Bidder envisage below mentioned **scope related to HVAC** (air conditioning and ventilation) for following non-residential building of township only: 3. VIP Guest House – G+1 RCC framed structure 5. Badminton court (roof ventilator) 6. Auditorium 8. Hospital (Operation Theatre) 10. Township Administrative office (TA Office) and Estate store room Please confirm Bidder's understanding.	In Auditorium HVAC system shall be provided.
4	752	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-III	5. Non-Residential Building	Page 82 of 280	5.3. VIP Guest House – G+1 RCC framed structure: - Board room with false ceiling, wall paneling and air conditioning - Total 10 Nos. of Air conditioned VIP	Bidder understands that only Board room and VIP suite rooms are mentioned here shall be provided with air conditioning. No other facilities are envisaged under HVAC	Split AC shall be provided.

		INTEGRATED TALABIRA TOWNSHIP			Suite rooms (Min 30 sq.m) with living room, dressing lounge, attached toilet and balcony (Min 7.5 sqm).	(air conditioning and ventilation) requirement. Bidder considers Hi-wall or Ceiling suspended type Split AC unit (N working + 0 standby) for Suit rooms. Bidder considers Ducted or Cassette type Split AC unit (N working + 0 standby) for Board room. Please confirm Bidder's understanding.	
5	753	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-III INTEGRATED TALABIRA TOWNSHIP	5. Non-Residential Building	Page 83 of 280	5.5. Sports office, badminton court and swimming pool: **Badminton court**: The badminton court shall be a RCC framed structure of sloped roof ht 12.80M from FGL with galvalume roofing with tubular truss and turbo ventilator. The badminton court shall consist of minimum 02 courts with wooden flooring.	Bidder understands that Badminton court shall be provided with turbo ventilators (natural roof extractor fans) for ventilation. No other requirement of AC or Ventilation is envisaged. Please confirm Bidder's understanding.	confirmed
6	754	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-III INTEGRATED TALABIRA TOWNSHIP	5. Non-Residential Building	Page 84 of 280	5.6. Auditorium: **Air conditioning (AC) for auditorium**	Bidder identifies that only Auditorium space is required to be provided with AC system. Bidder proposes to provided Package type air conditioners or DX-AHU with Air cooled condensing units for air conditioning of Auditorium	Confirmed

						Please confirm Bidder's understanding.	
7	755	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-III INTEGRATED TALABIRA TOWNSHIP	5. Non-Residential Building	Page 84 of 280	5.8. Hospital : For preliminary architectural drawing, Refer Annexure **Drg no. C15**	Bidder understands that for Hospitals HVAC (air conditioning and ventilation) system is not under scope of work of this project. Installation of Air conditioning and ventilation system for hospital shall be by Occupant / Purchaser. Please confirm Bidder's understanding.	In Hospital Split AC shall be provided.
8	756	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-IV INTERNAL ELECTRIFICATION WORK	PART-2 2.8 Exhaust fans	Page 109 of 280	Exhaust fans shall be heavy-duty type, suitable sweep, 900 rpm , noise free with fibre/steel body, star rated (if available in India), double ball bearing and conforming to IS 2312-1967. Exhaust fan shall be complete with copper wound motor, capacitor and louver/shutter, frame and mounting bracket and shall be suitable for operation on 230 volt +/- 10 %, 50 Hz, single phase AC supply system. The color of the exhaust fan shall be	Bidder understands that mentioned exhaust fans are propeller type exhaust fans for toilets of Township Administrative office (TA Office) Please confirm Bidder's understanding.	Confirmed

					preferably matching with the wall. 2.9A suitable hole shall be provided in the wall to suit the size of the frame, which shall be fixed by means of rag bolts embedded in the wall. The size of the rack bolt and spacing shall match with the holes on the frame of exhaust fans. The hole shall be neatly finished to the original shape of the wall.		
9	757	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-IV INTERNAL ELECTRIFICATION WORK	PART-10 HVAC system& fire detection system (For AO building)	Page 119 of 280	10.0. The HVAC (Heat Ventilation Air conditioning) & fire detection system shall be designed by EPC contractor with approval of NLCIL engineer**.(for AO building)**	Bidder understands that **AO building mentioned under this clause is same as Township Administrative office (TA Office) for which AC and Ventilation is to be provided.** Bidder has considered Hi-wall type or cassette type or ducted Split AC units for Offices and meeting room in TA / AO office. Bidder considered propeller exhaust fans for toilet exhaust of TA office building. Please confirm Bidder's understanding.	Here AO means Thermal Project Office Building
10	760	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, Part-I	Drawing B07 vs 1.01.00	-	THERMAL PROJECT OFFICE, NTTPP	Volume-IB drawing number B-07 shows, Thermal project office with air conditioned offices and meeting rooms. Type of AC is not defined in the specifications.	Thermal project Office building HVAC system Shall be provided .

		vs VOLUME: II-J,SECTION-IV, AIR CONDITIONING SYSTEM	Building under AC			Volume-II-J Sec-IV Air conditioning specifications, does not include this building under list. Bidder follows Volume-II-J Section-IV Air conditioning specifications and considers **no scope of HVAC in Thermal Project Office** by Bidder. Same shall be by Purchaser. Incase this building Air conditioning is to be considered, Bidder proposes to provide Hi-wall / Cassettes or Ducted type Split AC units for this Building. Please confirm.	

11	761	VOLUME: II-J,SECTION-IV, AIR CONDITIONING SYSTEM vs VOLUME: I-A,SECTION-II, GENERAL PROJECT INFORMATION	4.01.00 Design Criteria - Ambient Design condition vs 2.0.0 General Project Information	Page 26 of 67 vs Page 5 of 574	Volume II-J: Following design outside conditions have been considered for the design of the Air Conditioning system in consideration of the site location near Kumbhari & Tareikela villages in Jharsuguda District, Odisha. Summer : DBT 41.3ºC & WBT 24.0 ºC Monsoon : DBT 29.0ºC & WBT 25.8 ºC Winter : DBT 16.7 ºC & 13.7 ºC Volume I-A: Mean Ambient temperature: Maximum - 33.1 ºC Minimum - 20.7 ºC Average - 27.5	The maximum and minimum outside temperature differs in both these clauses. Bidder understands that worst conditions as mentioned in AC specifications Volume II-J, Section-IV are to be followed for sizing of air conditioning system and same is considered by bidder. Please confirm.	Bidder understanding is correct.
12	762	VOLUME: II-J,SECTION-IV, AIR CONDITIONING SYSTEM and VOLUME: II-J,SECTION-III, VENTILATION SYSTEM	4.00.00 Design Criteria - AC System and 4.00.00 Design Criteria - Ventilation System	Page 26 of 67 and Page 18 of 40	4.00.00 Design Criteria and 5.00.00 Design Criteria	Bidder considers Design criteria as mentioned under Volume II-J as design basis for air conditioning system and ventilation system sizing for Town ship area/building as and wherever applicable for similar facilities.. Please confirm.	Confirmed
13	786	VOLUME: I-B,SECTION-A,	Integrated Talabira	Page 13 to 14 of 280	fire safety requirement of the building and facility listed in the section.	Bidder understands that all buildings and facilities listed in the section shall	Confirmed

		INFRASTRUCTURE WORKS, CHAPTER-I INTEGRATED TALABIRA TOWNSHIP	Township 2. Design, engineering and construction of following buildings including internal electrification, fire safety, water supply, drainage & sewage arrangements within Township area:			be provided with fire safety system and equipment inline with the NBC 2016, no other system and requirement listed in the main plant specification is applicable. Owner to confirm.	
14	789	VOLUME: I-B,SECTION-A, INFRASTRUCTURE WORKS, CHAPTER-IV INTERNAL ELECTRIFICATION WORK	PART-10 HVAC system& fire detection system (For AO building)	Page 119 of 280	10.0. The HVAC (Heat Ventilation Air conditioning) & fire detection system shall be designed by EPC contractor with approval of NLCIL engineer**.(for AO building)**	There is no clarity related to AO building in the specification, Owner to please elaborate the Type of building and system required.	Here AO Building means Thermal Project Office Building & HVAC system shall be provided.

15	1712	Corrgendum - 3, Clarificaiton no. 5		11 of 40	Approach road shall be 4 lane road with median, shoulders and side drains	Except 4 lane road all other requirement are not applicable for the Bridge portion. Please confirm.	For bridge portion only - follow Tender condition / Corrigendum given for bridge. **Regarding approach road cross section in other areas, Refer Section A Annexure drawing.**

S.no.	Bidder query no.	reference	reference	Specifications	Clarification	NLCIL Reply
1	1	PSSR	General	General	It is understood that all underground structures, overhead lines and any other structures in the project work area shall be cleared from Customer after which the land shall be handed over to the Bidder for execution. M/s NLCIL may kindly confirm	In bidder's scope

Sl. No	BHEL Unit	Volume/Section / Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL / DCPL Reply
1.	TBG	SECTION A INFRASTRUCTURE WORKS CHAPTER V EXTERNAL ELECTRIFICATION WORKS Page 127 of 280	Bidder shall provide 11kV Double Circuit Transmission line across the Bhedan River, from 11kV switchgear of 2x6.3MVA, 33/11kV Substation to construct 11kV Ring Main Distribution Network within Township and other associated provisions.	i) Please provide Technical specification of subject 11kV Double Circuit Transmission line as same is not available in tender documents. ii) Please confirm type of poles to be used for subject 11kV Double Circuit Transmission line – shall it be steel tubular poles or Rail pole or PSC poles or Lattice type Towers.	Clarification from customer	i) Bidder's Scope. ii) Bidder's Scope.
2.	TBG	VOLUME: II-A SECTION-IV SCOPE OF SUPPLY AND	**S EPC B** 33 kV Supply to Mines : Complete 33 kV Gas Insulated Substation (GIS), outgoing 33 kV Cables, 33 kV transmission line and terminal 4 Pole structure near 33 kV RMU	Please confirm if instead of 33kV Transmission Line to Mines, 33kV cable can be routed on proposed Ash Pipeline to mines on pipe cum cable trestle thus avoiding	Clarification from customer	Tender conditions prevail.

Sl. No	BHEL Unit	Volume/Section / Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL / DCPL Reply
		SERVICES, TERMINAL POINTS AND EXCLUSIONS Clause – 7.0 a) Page 20 of 27	switchgear (Section-A) is in bidder's scope. **C P kage and it's** Further Transmission (beyond the 4 pole structure) of 33 kV Line to Mining is in Section-A package scope.	right of way issues & delays usually associated with transmission line construction. Acceptance confirmation required in this regard from M/s. NLC.		Ref. Corrigendum-5, Dt. 08-01-2021
		Corrigendum-III dtd. 18.12.2020 Page-78 of 83	**P N SUR TALA II III PURPOSE O T E PLAN TENTATI E ROUTE OR AS PIPELINE RO PO ER PLAT TO TALABIRA II III OCP**			
3.	TBG	SECTION A INFRASTRUCTURE WORKS CHAPTER V EXTERNAL ELECTRIFICATION WORKS Page 127 of 280	Bidder shall provide 11kV Double Circuit Transmission line across the Bhedan River, from 11kV switchgear of 2x6.3MVA, 33/11kV Substation to construct 11kV Ring Main Distribution Network within Township and other associated provisions.	Please confirm if instead of 11kV Transmission Line to Township, 11kV cable can be routed on Water Pipeline Route from WTP via 4 lane approach road to power plant, NLCIL Coal Transportation Road, Pipeline route from power plant WTP to Township	Clarification from customer	Design & specification shall get purchaser's approval during detailed engineering. Also for 11kV

Sl. No	BHEL Unit	Volume/Section / Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	NLCIL / DCPL Reply
31.	TBG	VOLUME: II-F/2 SECTION-XII 765KV, 400KV & 33KV GIS	CT and VT parameters	Request for GIS CT and VT parameters – Please provide.	Clarification from customer	CT & VT parameters shall be finalized during detailed engineering stage as per system requirement subject to Purchaser's review and approval.
32.	TBG	SECTION A INFRASTRUCTURE WORKS CHAPTER V EXTERNAL ELECTRIFICATION WORKS Clause- 1.04.00 Page 127 of 280	Bidder shall provide 11kV Double Circuit Transmission line across the Bhedan River, from 11kV switchgear of 2x6.3MVA, 33/11kV Substation to construct 11kV Ring Main Distribution Network within Township and other associated provisions.	For subject 33 kV / 11kV Transmission lines, we request M/s. NLC to take care of obtaining any Right of Way, land acquisition, diversion of any existing transmission lines / rail / roads/ crossings, tree cutting etc. Co-ordination with any external agency in this regard is not envisaged by BHEL. Acceptance confirmation required from M/s. NLC in this regard.	Clarification from customer	Tender conditions prevail. Ref. Corrigendum-5, Dt. 08-01-2021
33.	TBG	SECTION A INFRASTRUCTURE WORKS CHAPTER V EXTERNAL ELECTRIFICATI	The Bidder scope is to provide 33kV Double Circuit Transmission line across the Bhedan River, through lattice type steel structure with all accessories, supplies & services, from 33kV Takeoff point			

ADDITIONAL PRE-BID QUERIES

Sl. No	Name	Volume/Section/ Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications (Proposed amendment)	NLCIL reply
1.	Ref: L&T/ EPC-Coal/ NLC Talabira - EPC/20-21/07 Date: 28th Dec 2020 Email dt Dec 28, 2020	"clause 2.12.00 of Volume HA/Section IV, Scope of Supply & services, Terminal Points & Exclusion".	-	We would like to state that, NLCIL have asked for **facilitation and/or obtaining ROW (Right of way),** wherever required in the areas coming under EPC scope including Raw water intake pipe lines, temporary approach road, transmission line for construction power and township, laying of water pipeline upto township, inspection road along ash pond etc. The requirement of obtaining ROW has been specified in the tender specification "clause 2.12.00 of Volume HA/Section IV, Scope of Supply & services, Terminal Points & Exclusion". Also the same has been reiterated in Corrigendum 3 dated 18.12.2020.	**For ROW (Right of way),** required in the areas coming under EPC scope (Section-B) including Raw water intake pipe lines – "Refer Corrigendum 5" (Sr. No. 531 / Page 924 of 1336)

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

	2.0 SCOPE OF WORK, DOCUMENT 2 Page 14 & 15 of 280 <u>CORRIGENDUM</u> Corrigendum 3 dtd 18-12-2020, Sl No. 3	…… **3. Design, engineering and construction/ development /laying of :** a) Compound wall around township area b) Entrance arch to township and indicative arch at SH-10 entrance c) Internal main road within township (4 lane) d) Internal road within township (Single lane) e) Main Drinking Water pipeline network from Power plant WTP to township f) Water supply distribution network including Overhead water tank and sump within township g) Storm water drainage network within township h) Sewage network with STP within township including recycling of treated water i) Rain water harvesting scheme j) Street lighting and external electrification k) Park and playground l) Gardening & walkway inside Type I, II, III & IV Blocks area m) Statue/logo/beautification near main	check post and toilet block …… …… **3. Design, engineering and construction/ development /laying of :** a) Compound wall around township area b) Entrance arch to township and indicative arch at SH-10 entrance c) Internal main road within township (4 lane) d) Internal road within township (Single lane) e) Main Drinking Water pipeline network from Power plant WTP to township f) Water supply distribution network including Overhead water tank and sump within township g) Storm water drainage network within township h) Sewage network with STP within township including recycling of treated water i) Rain water harvesting scheme j) Street lighting and external

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

<table>
<tr>
<td></td>
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<td>entrance of township</td>
<td>
electrification
k) Park and playground
l) Gardening & walkway inside Type I, II, III & IV Blocks area
m) Statue/logo/beautification near main entrance of township
4. DESIGN, ENGINEERING, MANUFACTURE, INSPECTION AT SUPPLIER'S WORKS, SUPPLY, FABRICATION, INSURANCE, TRANSPORT, STORAGE, ERECTION, TESTING, COMMISSIONING OF ROOF TOP SOLAR OF MINIMUM 900 KW (AC) AS PER SPECIFICATION DETAILED IN SECTION-B (INCLUDING CIVIL, ELECTRICAL AND ALL OTHER RELATED WORKS ETC, COMPLETE) FOR FOLLOWING BUILDINGS IN TOWNSHIP :
<table>
<tr><th>Sl Nos</th><th>Building name</th><th>Effective roof area (sq. m) - 80%</th><th>Estimated Generated power (KW) (Min)</th></tr>
</table>
</td>
</tr>
</table>

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

				1	Type IV Quarters	3373	240
				2	Type III Quarters	3331	230
				3	Type II Quarters	1747	125
				4	Type I Quarters (NLCIL)	1236	80
				5	Type I Quarters (CISF)	618	40
				6	Executive hostel	2172	150
				7	VIP Guest house	528	35
					TOTAL	**13005 m^2**	**900 KW**
		C. EXTERNAL ELECTRICAL WORKS: Design, engineering, manufacture, inspection, testing at manufacturer's work, packing, assembling, and forwarding to site, transportation, unloading, storage at site, erection, painting, civil and structural works, insurance, supervision, testing, obtaining					
			C. EXTERNAL ELECTRICAL WORKS: Design, engineering, manufacture, inspection, testing at manufacturer's work,				

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

		statutory approvals and 1. Commissioning of 33kV Double Circuit Transmission line across the Bhedan River to Thermal Project Site. 2. Commissioning of 2x6.3 MVA, 33kV/11kV Substation. 3. Providing all related Civil Works for External Electrical Works <u>THERMAL POWER PLANT AREA:</u> 1. Providing Distribution Transformer & LT Switchgear for Thermal Project office building. 2. Providing LT Power supply for Miscellaneous Non Plant Buildings. 1. Gate complex along with security and time office & other gates. 2. Parking lot. 3. Watch tower.	packing, assembling, and forwarding to site, transportation, unloading, storage at site, erection, painting, civil and structural works, insurance, supervision, testing, obtaining statutory approvals and 1. Commissioning of 33kV Double Circuit Transmission line across the Bhedan River to Thermal Project Site. 2. Commissioning of 2x6.3 MVA, 33kV/11kV Substation. 3. Providing all related Civil Works for External Electrical Works <u>THERMAL POWER PLANT AREA:</u> 1. Providing Distribution Transformer & LT Switchgear for Thermal Project office building. 2. Providing LT Power supply for Miscellaneous Non Plant Buildings. a) Gate complex along with security and time office & other gates.

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

		4. CISF Barracks, Armoury and quarter guard, Canteen, security check post and toilet block. 5. Providing Street lighting for Main Approach road to power plant. 6. Providing Street lighting for Peripheral inspection road. <u>INTEGRATED TALABIRA TOWNSHIP</u> 1. 11kV Double Circuit Transmission line across the Bhedan River from Substation to Integrated Talabira Township. ... ... <u>COMMUNICATION NETWORK SYSTEM</u> 1. Establishing WAN connectivity. 2. Establishing LAN connectivity.	b) Parking lot. c) Watch tower. d) CISF Barracks, Armoury and quarter guard, Canteen, security check post and toilet block. e) Providing Street lighting for Main Approach road to power plant Main gate Complex. f) Providing Street lighting for Peripheral SINGLE LANE Road (Outside Fencing). g) Providing Street lighting for TWO LANE ROAD. <u>INTEGRATED TALABIRA TOWNSHIP</u> 1. 11kV Double Circuit Transmission line across the Bhedan River from Substation to Integrated Talabira Township. ... ... <u>COMMUNICATION NETWORK SYSTEM</u>

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

	CORRIGENDUM Corrigendum 3 dtd 18-12-2020, Section A - Sl No. 4		building, Refer Annexure Drg No. B25. Security building shall be designed and constructed as per specification provided in preliminary drawing.
6	TENDER DOCUMENT Volume IB – PART II – TECHNICAL CHAPTER III INTEGRATED TALABIRA TOWNSHIP 3. GENERAL TECHNICAL REQUIREMENTS FOR TOWNSHIP CIVIL INFRASTRUCTURE WORKS Under point "Water supply from power plant to township"	…… …… • Necessary Right of Way (ROW) and approval for laying the pipe along NH/SH shall be obtained by contractor from various government departments. However, letters to concerned govt. departments for obtaining ROW& other statutory approvals will be issued by NLCIL in its letter pad on request of contractor. It is the responsibility of contractor to follow up and get necessary approvals in time. In this regard, all payments including statutory payments for getting ROW/approval shall be borne by the contractor and the quoted rates shall be inclusive of all. …… ……	…… …… Necessary Right of Way (ROW) and approval for laying pipe along NH/SH shall be obtained by contractor from various government departments. Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder. …… ……

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

	DOCUMENT 2 Page 73 & 74 of 280 <u>CORRIGENDUM</u> Corrigendum 3 Dtd. 18-12-2020, Section A - Sl No. 9		
7	<u>TENDER DOCUMENT</u> Volume IB – PART II – TECHNICAL CHAPTER VI (DRAWINGS) DOCUMENT 2 Page 282 of 665 <u>CORRIGENDUM</u> Corrigendum 3 dtd 18-12-2020, Section A - Sl No. 17	-	*Following drawings are updated and enclosed:* B1 – Site grading layout (R1) B2 – Main approach road to power plant – C/S (R1) B4 – Peripheral chain link fencing (R1) *Following drawings are added :* B23, Sheet 1 – Peripheral single lane road cross section B23, Sheet 2 –Two lane road cross section B24 – Other steel gates across compound wall B25 – Security building near Gate #2 and Gate #3 *Following drawings are deleted :* B5 – Peripheral village road cross section

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

			B22 – Power plant Approach road layout
8	TENDER DOCUMENT Volume IA – SCHEDULE F1 – TABLE 1 & TABLE 1.1 DOCUMENT 1 Page 396, 403 to 408 of 665 CORRIGENDUM Corrigendum 3 dtd 18-12-2020, Section A - Sl No. 19	(PRICE SCHEDULE)	*Modified and enclosed.*
9	Volume IB – PART II – TECHNICAL CHAPTER V (EXTERNAL ELECTRIFICATION WORKS) DOCUMENT 2	1.06.00 Illumination system Illumination system for Substation, Ring Main Unit yards, the plant inspection road, Main approach road to power plant from NLCIL Coal Transportation Road (CTR) to main gate complex of power plant crossing bridge across Bhedan river, entire Township campus including internal main roads, internal roads, Park, playground and Garden & walkway inside Type I, II, III & IV Blocks are in the	*Existing clause modified as* Illumination system for Substation, Ring Main Unit yards, Main approach road to power plant main gate complex, Peripheral SINGLE LANE Road (Outside Fencing), TWO LANE ROAD, entire Township campus including internal main roads, internal roads, Park, playground and Garden & walkway inside Type I, II, III & IV Blocks are in the bidder's scope.

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

	Page 128 of 280 Corigendum-3 Page 17 of 40.	bidder's scope.	
10	Volume IB – PART II – TECHNICAL CHAPTER V (EXTERNAL ELECTRIFICATION WORKS) DOCUMENT 2 Page 138 of 280 Corigendum-3 Page 17 of 40.	5.13.02 Road Lighting: 2.0 Supply, erection and providing lighting for Substation, Ring Main Unit yards, the plant inspection road, Main approach road to power plant from NLCIL Coal Transportation Road (CTR) to main gate complex of power plant crossing bridge across Bhedan river, entire Township campus including internal main roads, internal roads, Park, playground and Garden & walkway inside Type I, II, III & IV Blocks as per the technical specification.	*Existing clause modified as* 5.13.02 Road Lighting: 2.0 Supply, erection and providing lighting for Substation, Ring Main Unit yards, Main approach road to power plant main gate complex, Peripheral SINGLE LANE Road (Outside Fencing), TWO LANE ROAD, entire Township campus including internal main roads, internal roads, Park, playground and Garden & walkway inside Type I, II, III & IV Blocks as per the technical specification.

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

REPLIES FOR THE PRE BID QUERIES CORRESPONDING TO GREEN BELT AREA, ROADS & FENCING

S.No.	Bidder query no.	Section / Part / Chapter / Volume Clause No. Page no.	Bid Specification Stipulation	Statement of clarification sought	NLCIL REPLY
11	553	Tender drawing	Plant roads and drains & Plot plan	There is contradiction regarding scope and spec (4mt wide vs 4 lane) for peripheral road around fencing as per both drawings.	Refer clause 4.2 of Section A corrigendum-6 and Annexure drawings B1-R1 & B23-Sheet-1
12	1672	Corrigendum 1	Plot Plan	Two approach roads to Main Plant area are shown, i.e. one from SH-10 and another approach (north direction) is shown adjacent to SMC Power Plant. Owner to clarify the below mentioned points regarding approach road adjacent to SMC Power Plant: a) Whether this road as shown in Plot Plan included in Bidder's scope? If yes then specify the width and type of road i.e Bitumen or concrete? b) Bidder to indicate the start point coordinates/terminal point of that road, as the same shall merge with existing road of SMC. c) Whether drains are required on either side of this road?	Refer Section A corrigendum-6 , revised site grading Layout B1-R1 and main approach road drawing B2-R1

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

PRICE SCHEDULE
VOLUME: I-A
SCHEDULE: F1
TABLE-1 for SECTION-A
SUMMARY OF PRICE SCHEDULE FOR INFRA STRUCTURE WORKS
(TO BE FILLED IN THE ONLINE PORTAL)

SL. NO.	DESCRIPTION	PRICE IN INR
1.0	LUMPSUM PRICE FOR ENTIRE SCOPE OF WORK OF THERMAL POWER PLANT AREA AS PER THE TECHNICAL SPECIFICATIONS AND DRAWINGS AS DETAILED IN 1.0 OF TABLE 1.1	
1.1	GST for 1.0 above	
1.2	SUB TOTAL (Sl.No.1.0+1.1)	
2.0	LUMPSUM PRICE FOR ENTIRE SCOPE OF WORK OF INTEGRATED TALABIRA TOWNSHIP AS PER THE TECHNICAL SPECIFICATIONS AND DRAWINGS AS DETAILED IN 2.0 OF TABLE 1.1	
2.1	GST for 2.0 above	
2.2	SUB TOTAL (Sl.No.2.0 +2.1)	
3.0	LUMPSUM PRICE FOR ENTIRE SCOPE OF WORK OF EXTERNAL ELECTRICAL WORKS AS PER THE TECHNICAL SPECIFICATIONS AND DRAWINGS AS DETAILED IN 2.0 OF TABLE 1.1	
3.1	GST for 3.0 above	
3.2	SUB TOTAL (Sl.No.3.1+3.2)	
4.0	GRAND TOTAL OF SECTION-A INFRA STRUCTURE WORKS (Sl.No.1.2+2.2+3.2)	

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

2.0 INTEGRATED TALABIRA TOWNSHIP

2.1	PRELIMINARY WORKS AS PER TECHNICAL SPECIFICATION	
2.1.1	TOPOGRAPHICAL SURVEY OF TOWNSHIP AREA	
2.1.2	SITE GRADING AND LEVELLING OF TOWNSHIP AREA	
2.1.3	GEOTECHNICAL INVESTIGATION OF TOWNSHIP AREA	
2.1.4	**SUBTOTAL (2.1.1+2.1.2+2.1.3)**	
2.2	DESIGN, ENGINEERING AND CONSTRUCTION OF RESIDENTIAL AND NON RESIDENTIAL BUILDINGS WITHIN TOWNSHIP AREA AS PER TECHNICAL SPECIFICATION INCLUDING STATUTORY APPROVAL, ELECTRICAL WORKS, FIRE SAFETY, WATER SUPPLY, DRAINAGE, SEWAGE ARRANGEMENTS ETC., COMPLETE	
2.2.1	PROJECT HEAD (PH) QUARTERS	
2.2.2	TYPE IV QUARTERS	
2.2.3	TYPE III QUARTERS	
2.2.4	TYPE II QUARTERS	
2.2.5	TYPE I QUARTERS	
2.2.6	EXECUTIVE HOSTELS	

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

2.2.7	SHOPPING COMPLEX	
2.2.8	GUEST HOUSE	
2.2.9	RECREATION CLUB, SPORTS OFFICE, BADMINTON COURT, SWIMMING POOL AND LIBRARY	
2.2.10	AUDITORIUM WITH CENTRALIZED AIR CONDITIONING	
2.2.11	COMMUNITY HALL	
2.2.12	HOSPITAL	
2.2.13	SCHOOL	
2.2.14	TOWNSHIP ADMINISTRATION (TA) OFFICE	
2.2.15	ESTATE STORE	
2.2.16	TWO WHEELER PARKING SHED	
2.2.17	FOUR WHEELER PARKING SHED	
2.2.18	SECURITY BUILDING	
2.2.19	SERVANT'S QUARTERS FOR PH	
2.2.20	VIP GUEST HOUSE	
2.2.21	INDUSTRIAL TRAINING CENTRE	

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

2.2.22	SUBTOTAL (2.2.1 TO 2.2.21)	
2.3	DESIGN, ENGINEERING AND CONSTRUCTION/DEVELOPMENT/LAYING OF FOLLOWING FACILTIES AS PER TECHNICAL SPECIFICAION INCLUDING STATUTORY APPROVAL (IF ANY) ETC., COMPLETE	
2.3.1	COMPOUND WALL AROUND TOWNSHIP AREA	
2.3.2	ENTRANCE ARCH AT TOWNSHIP AND INDICATIVE ARCH AT SH-10 JUNCTION	
2.3.3	INTERNAL MAIN ROAD WITHIN TOWNSHIP (4 LANE) INCLUDING CULVERTS AS PER TECHNICAL SPECIFICATION	
2.3.4	INTERNAL ROAD WITHIN TOWNSHIP AREA (SINGLE LANE) INCLUDING CULVERTS AS PER TECHNICAL SPECIFICATION	
2.3.5	MAIN DRINKING WATER PIPELINE NETWORK FROM POWER PLANT WTP TO TOWNSHIP	
2.3.6	WATER SUPPLY DISTRIBUTION NETWORK INCLUDING OVERHEAD WATER TANK AND SUMP WITHIN TOWNSHIP	
2.3.7	STORM WATER DRAINAGE NETWORK WITHIN TOWNSHIP	
2.3.8	SEWAGE NETWORK WITH STP WITHIN TOWNSHIP INCLUDING RECYCLING OF TREATED WATER	
2.3.9	RAIN WATER HARVESTING SCHEME	
2.3.10	PARK AND PLAYGROUND	

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

2.3.11	GARDENING AND WALKWAY INSIDE TYPE I, II, III & IV BLOCKS AREA	
2.3.12	STATUE/LOGO/BEAUTIFICATION NEAR MAIN ENTRANCE OF TOWNSHIP	
2.3.13	SUBTOTAL (2.3.1 TO 2.3.12)	
2.4	DESIGN, ENGINEERING, MANUFACTURE, INSPECTION AT SUPPLIER'S WORKS, SUPPLY, FABRICATION, INSURANCE, TRANSPORT, STORAGE, ERECTION, TESTING, COMMISSIONING OF ROOF TOP SOLAR OF MINIMUM 900 KW (AC) AS PER SPECIFICATION DETAILED IN SECTION-B (INCLUDING CIVIL, ELECTRICAL AND ALL OTHER RELATED WORKS ETC, COMPLETE) FOR BUILDINGS IN TOWNSHIP AS PER SCOPE OF WORK	
2.5	OTHER WORKS (PLEASE SPECIFY, IF ANY)	
2.6	TOTAL (2.1.4+2.2.22+2.3.13+2.4+2.5)	

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

3.0 EXTERNAL ELECTRICAL WORKS:

3.0	EXTERNAL ELECTRICAL WORKS: DESIGN, ENGINEERING, MANUFACTURE, INSPECTION, TESTING AT MANUFACTURER'S WORK, PACKING, ASSEMBLING, AND FORWARDING TO SITE, TRANSPORTATION, UNLOADING, STORAGE AT SITE, ERECTION, PAINTING, CIVIL AND STRUCTURAL WORKS, INSURANCE, SUPERVISION, TESTING, OBTAINING STATUTORY APPROVALS AND COMMISSIONING OF:	
3.1	33KV/11KV SUBSTATION FOR THE INTEGRATED TOWNSHIP AND CONSTRUCTION POWER SUPPLY.	
3.1.1	2X6.3 MVA 33KV/11KV TRANSFORMER, NGR, CAPACITOR BANK, CONTROL ROOM, 33KV & 11KV PANEL BOARD ROOM ETC.,	
3.1.2	2X500KVA, 11/0.415KV STATION TRANSFORMER AND ASSOCIATED SWGR, ACDB, ETC.,	
3.1.3	BATTERY, BATTERY CHARGER & ASSOCIATED DCDB, DC LIGHTING ETC.,	
3.1.4	SCADA & EMS FOR SUBSTATION & CONNECTED LOADS CENTRES.	
3.1.5	EMULSIFIER FIRE PROTECTION SYSTEM FOR SUBSTATION	
3.1.6	1X250KVA DG SET FOR SUBSTATION	
3.1.7	INTERNAL ELECTRIFICATION FOR SUBSTATION BUILDINGS.	
3.1.8	EXTERNAL ELECTRIFICATION FOR SUBSTATION YARD INCLUDING ROAD LIGHTING & LIGHTING MAST.	
3.1.9	OTHER ELECTRICAL EQUIPMENTS & ASSOCIATED POWER FEEDING ARRANGEMENTS.	
3.1.10	SUBTOTAL (3.1.1 + 3.1.2 + 3.1.3 + 3.1.4 + 3.1.5 + 3.1.6 + 3.1.7 + 3.1.8 + 3.1.9)	
3.2	33KV DOUBLE CIRCUIT TRANSMISSION LINE ACROSS THE BHEDAN RIVER TO EXTEND POWER TO SUBSTATION AT THERMAL PROJECT SITE.	
3.3.	PROVIDING POWER SUPPLY FOR THERMAL PROJECT OFFICE BUILDING (ADMINISTRATIVE BUILDING)	
3.3.1	2 X 630 KVA, 11/0.415 KV TRANSFORMER	
3.3.2	LT SWITCHGEAR & ASSOCIATED CABLE INTERCONNECTION BETWEEN TRANSFORMERS, SWGR & PDBS OF OFFICE BUILDING.	
3.3.3	SUBTOTAL (3.3.1 + 3.3.2)	

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

3.4.	PROVIDING POWER SUPPLY FOR OTHER MISCELLANEOUS NON PLANT BUILDINGS FROM THERMAL PROJECT OFFICE BUILDING LT SWGR.	
3.4.1	MAIN GATE COMPLEX ALONG WITH SECURITY AND TIME OFFICE	
3.4.2	OTHER SECURITY BUILDINGS INCLUDING GATES AS PER SPECIFICATION	
3.4.3	PARKING LOT	
3.4.4	WATCH TOWER	
3.4.5	CISF – BARRACKS (G+2), ARMOURY AND QUARTER GUARD, CANTEEN, SECURITY CHECK POST AND TOILET BLOCK	
3.4.6	SUBTOTAL (3.4.1 + 3.4.2 + 3.4.3 + 3.4.4+3.4.5)	
3.5.	PROVIDING STREET LIGHTING, LIGHTING MAST INCLUDING LIGHTING PANELS, INTERCONNECTING CABLES TO EXTEND POWER SUPPLY FOR THERMAL PROJECT ROADS FROM NEAREST LT SWGR.	
3.5.1	MAIN APPROACH ROAD TO POWER PLANT MAIN GATE COMPLEX	
3.5.2	PERIPHERAL SINGLE LANE ROAD (OUTSIDE FENCING)	
3.5.3	TWO LANE ROAD	
3.5.4	SUBTOTAL (3.5.1 + 3.5.2+3.5.3)	
3.6	PROVIDING 11KV RING MAIN DISTRIBUTION NETWORK FOR INTEGRATED TALABIRA TOWNSHIP.	
3.6.1	11KV DOUBLE CIRCUIT TRANSMISSION LINE ACROSS THE BHEDAN RIVER FROM SUBSTATION UP TO TOWNSHIP.	
3.6.2	PROVIDING & INTERCONNECTING FIELD RMUS FOR INTEGRATED TALABIRA TOWNSHIP.	
3.6.3	SUBTOTAL (3.6.1 + 3.6.2)	
3.7	PROVIDING LT DISTRIBUTION NETWORK INCLUDING INTERCONNECTING CABLES FROM DTS UP TO PDBS OF TOWNSHIP RBS & NRBS.	
3.7.1	500 KVA, 11/0.415 KV DISTRIBUTION TRANSFORMERS WITH CABLE INTERCONNECTION TO RMUS.	
3.7.2	250KVA DG SET FOR HOSPITAL, GUEST HOUSE, SHOPPING COMPLEX, AUDITORIUM & COMMUNITY HALL	
3.7.3	PROVIDING SINGLE / DOUBLE ARM STREET LIGHTING INCLUDING LIGHTING PANELS,	

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

	INTERCONNECTING CABLES TO DT YARDS.	
3.7.4	SUBTOTAL (3.7.1 + 3.7.2 + 3.7.3)	
3.8	PROVIDING STREET LIGHTING, LIGHTING MAST INCLUDING LIGHTING PANELS, INTERCONNECTING CABLES TO EXTEND POWER SUPPLY FROM NEAREST LT SWGR FOR MAIN, INTERNAL & APPROACH ROADS OF TOWNSHIP	
3.8.1	INTERNAL MAIN ROAD WITHIN TOWNSHIP	
3.8.2	INTERNAL ROADS WITHIN TOWNSHIP AREA	
3.8.3	SUBTOTAL (3.8.1+3.8.2)	
3.9	CIVIL WORKS FOR EXTERNAL ELECTRICAL WORKS	
3.10	OTHER WORKS (PLEASE SPECIFY, IF ANY)	
3.11	TOTAL FOR EXTERNAL ELECTRICAL WORKS (3.1.10 + 3.2 + 3.3.3 + 3.4.6 + 3.5.4+3.6.3 + 3.7.4 + 3.8.3+3.9+3.10)	

NOTE: 1. Bidder need to ensure correctness of prices in Table1 and Table1.1 for section-A are same as below:

TABLE-1 for Section A	TABLE-1.1of Section A
1.0	1.9
2.0	2.6
3.0	3.11

2. Price shall be quoted for the entire scope of work as in technical specification.

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

Table 1.2 of Section A

UNIT PRICE FOR INFRA STRUCTURE WORKS- SECTION-A.

The Unit Rates of some of the items mentioned below need to be furnished by the bidder. Bidder need to quote these unit rates relevant to the Technical Specification and the lump sum prices quoted in Schedule- F1, Table 1 and price break up quoted in Tables 1.1 of Section A-Infrastructures.

These unit rates shall be used for contract price adjustment on account of quantity variation.

Bidder shall confirm that the unit rates quoted by them below are consistent with the lump sum bid price and they shall furnish all necessary justification to establish the reasonableness of these rates/prices, if required by the Purchaser. However, the bidder may note that the acceptance of their proposal for the subject package shall not mean automatic acceptance of these rates/prices and that these rates/ prices shall be adopted only if their reasonableness has been established by the bidder and accepted by the Purchaser.

Table 1.2.1

SL NO.	ITEM OF WORK	UNIT RATE (INR)
(A) THERMAL POWER PLANT AREA		
1	LAYING OF MAIN APPROACH ROAD TO POWER PLANT MAIN GATE COMPLEX AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF ≃ 5.0 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND TABLE 1.1)	...../ KM
2	PROVIDING TWO LANE ROAD AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF ≃ 6.0 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND TABLE 1.1)	...../ KM

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

3	CONSTRUCTION OF COMPOUND WALL AROUND PLANT AREA AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF ≃ 6.5 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND TABLE 1.1)	...../ KM
4	PROVIDING PERIPHERAL FENCING AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF ≃ 11.75 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND TABLE 1.1)	...../ KM
5	PROVIDING SINGLE LANE ROAD AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF ≃ 4.5 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND TABLE 1.1)	...../ KM
(B) INTEGRATED TALABIRA TOWNSHIP		
1	CONSTRUCTION OF COMPOUND WALL AROUND TOWNSHIP AREA AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF ≃ 6.5 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND TABLE 1.1)	...../ KM
2	CONSTRUCTION OF INTERNAL MAIN ROAD WITHIN TOWNSHIP (4 LANE) AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF ≃ 2.0 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND TABLE 1.1)	...../ KM
3	CONSTRUCTION OF INTERNAL ROAD WITHIN TOWNSHIP AREA (SINGLE LANE) AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF ≃ 5.0 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND	...../ KM

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

	TABLE 1.1)	
4	DESIGN, ENGINEERING AND CONSTRUCTION/DEVELOPMENT/LAYING INCLUDING STATUTORY APPROVAL OF MAIN DRINKING WATER PIPELINE NETWORK FROM POWER PLANT WTP TO TOWNSHIP AS PER TECHNICAL SPECIFICATION (FOR TOTAL OF $\simeq$ 8.5 KM MENTIONED IN TECHNICAL SPECIFICATION, PRICE QUOTED IN TABLE 1 AND TABLE 1.1)	...../ KM

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

Table 1.2.2
SITE GRADING OF POWER PLANT AREA
(COAL HANDLING AREA, MAIN PLANT AREA, & COOLING TOWER AREA)

Sl No.	Item of work	Unit rate (INR)
1	Earthwork – Cutting in power plant area as per technical specification	...../ m^3
2	Earthwork – Filling in power plant area as per technical specification	...../ m^3

Note:

The above unit rate for the Cutting/Filling in power plant area shall be used for contract price adjustment on account of variation arising between:

a) Quantity arrived based upon the Preliminary contour drawing of power plant area given in Section B using Autodesk CIVIL 3D/Kubla Cubed software tool.

AND

b) Quantity arrived based upon the joint pre-levels taken by NLCIL & Bidder before commencement of site grading work using Autodesk CIVIL 3D/Kubla Cubed software tool.

However, these unit rates will not be applicable for Site grading of Integrated Talabira Township.

Table 1.2.3
SITE GRADING OF GREEN BELT AREA

Sl No.	Item of work	Unit rate (INR)
1	Earthwork – Cutting in Green belt area as per technical specification	...../ m^3
2	Earthwork – Filling in Green belt area as per technical specification	...../ m^3

Note:

The above unit rate for the Cutting/Filling in power plant area shall be used for contract price adjustment on account of variation arising between:

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

a) Quantity arrived based upon the Preliminary contour drawing of power plant area given in Section B using Autodesk CIVIL 3D/Kubla Cubed software tool.

AND

b) Quantity arrived based upon the joint pre-levels taken by NLCIL & Bidder before commencement of site grading work using Autodesk CIVIL 3D/Kubla Cubed software tool.

However, these unit rates will not be applicable for Approach road embankment outside greenbelt area.

Table 1.2.4

FORMATION OF EMBANKMENT ON EITHER SIDE OF BHEDAN RIVER WITH SLOPE PROTECTION AND TOE DRAINS

Sl No.	Item of work	Unit rate (INR)
1	Formation of embankment on either side of Bhedan river (Inclusive of slope protection, toe drains, chute, inspection road, turfing etc., complete as specified in technical specification.)	...../ m^3 of earth

Note:

The above unit rate for Formation of embankment on either side of Bhedan river shall be used for contract price adjustment on account of variation arising between:

a) Quantity arrived based upon details furnished in Tender Drg. No.B6.

AND

b) Quantity arrived based upon the joint pre-levels taken by NLCIL & Bidder before commencement of work using Autodesk CIVIL 3D/Kubla Cubed software tool.

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

Table -1.2.5

EXTERNAL ELECTRICAL WORKS:

Sl No.	Item of work	Unit rate (INR)
	(**A) THERMAL POWER PLANT AREA**	
1.0	Supply, erection, Testing & commissioning of 1x250kVA DG set for Substation including interconnection with designated system obtaining statutory approvals etc., (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
2.0	Supply, erection, Testing & installation of Road Lighting for Substation yard. (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
3.0	Supply, erection, Testing & installation of Road Lighting for Main approach road to power plant Main Gate complex (As per technical specification & price quoted in Table 1 and & Table 1.1from 3.0 to 3.11)	...../ Set
4.0	Supply, erection, Testing & installation of Road Lighting for Peripheral SINGLE LANE Road (Outside Fencing) including interconnecting Cables to extend Power supply from nearest Lighting Panel / LT SWGR. (As per technical specification & price quoted in Table 1 and & Table 1.1 from 3.0 to 3.11)	...../ Set
5.0	Supply, erection, Testing & installation of Road Lighting for TWO LANE ROAD including interconnecting Cables to extend Power supply from nearest Lighting Panel / LT SWGR. (As per technical specification & price quoted in Table 1 and & Table 1.1 from 3.0 to 3.11)	...../ Set
6.0	Supply, erection, Testing & installation of High Lighting Mast at road Junctions for Main approach road to power plant Main Gate complex, Peripheral SINGLE LANE Road (Outside Fencing), TWO LANE ROAD including interconnecting Cables to extend Power supply from nearest Lighting Panel / LT SWGR. (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
7.0	33kV Transmission system including double circuit transmission line, Lattice Tower structures / Cables and its associated Electrical, Civil & Structural works.	
7.1	Lattice Tower structure (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ MT

Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

7.2	AAAC / ACSR Conductor (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ km
7.3	Insulators (3 or 4) string (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ set.
7.4	Suspension / Tension Fittings (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ set.
7.5	Cable (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ km
	(B) INTEGRATED TALABIRA TOWNSHIP	
1.0	Supply, erection, Testing & commissioning outdoor type, weather and vermin proof, metal-clad, plinth mounted 3 phase, 12kV, 3 Unit Kiosks with 2 No. load break switches and 1 No. draw out type VCB including interconnection with designated system obtaining statutory approvals etc., (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
2.0	Supply, erection, Testing & commissioning outdoor type, weather and vermin proof, metal-clad, plinth mounted 3 phase, 12kV, 4 Unit Kiosks with 2 No. load break switches and 2 No. draw out type VCBs including interconnection with designated system obtaining statutory approvals etc., (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
3.0	Supply, erection, Testing & commissioning of 1x500kVA, 11/0.415 kV Distribution Transformer for Integrated Talabira Township including interconnection with RMUs, LT Panels of Ring Main Distribution Network system obtaining statutory approvals etc., (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
4.0	Supply, erection, Testing & commissioning of 1x250kVA DG set for critical locations inside Township boundary including interconnection with designated system obtaining statutory approvals etc., (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
5.0	Supply, erection, Testing & installation of Single Arm Road Lighting for Internal Main Road & Internal Roads within Township including interconnecting Cables to extend Power supply from nearest Lighting Panel / LT SWGR.	...../ Set

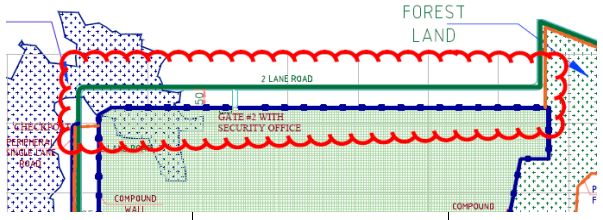
Name of Work:	Single EPC package of NLC Talabira Thermal Power Project in two Sections for 3x800 MW NLC Talabira Thermal Power Project(hereinafter referred to as NTTPP) near Kumbhari & Tareikela villages in Jhasurguda District, Odisha

	(As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	
6.0	Supply, erection, Testing & installation of Double Arm Road Lighting for Internal Main Road & Internal Roads within Township including interconnecting Cables to extend Power supply from nearest Lighting Panel / LT SWGR. (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
7.0	Supply, erection, Testing & installation of High Lighting Mast at road Junctions for Internal Main Road & Internal Roads within Township including interconnecting Cables to extend Power supply from nearest Lighting Panel / LT SWGR. (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ Set
8.0	11kV Transmission system including double circuit transmission line, Lattice Towers/Steel Tubular Poles / Rail Poles / PSC Poles / Cables and its associated Electrical, Civil & Structural works	
8.1	Lattice Tower structure (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ MT
8.2	Steel Tubular Poles / Rail Poles / PSC Poles (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ No
8.3	AAAC / ACSR Conductor (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ km
8.4	Insulators (1 or 2) string (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ set.
8.5	Suspension/Tension Fittings (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ set.
8.6	Cable (As per technical specification & price quoted in Table 1 and & 1.1 from 3.0 to 3.11)	...../ km

ANNEXURE - D

(Reply to Civil Technical queries for Section A - Infrastructure works by M/s L&T - LOT 4 received vide email dtd 22-01-2021)

Sr. No.	Query No.	Section / Part / Chapter / Volume	Clause No.	Page no.	Bid Specification Stipulation	Statement of clarification sought	NLCIL/DCPL Reply vide Corrigendum No. 5 and Corrigendum No. 6	Statement of clarification sought_22.01.2021	Purchaser's Reply
MECHANICAL - TOWNSHIP									
1	1773	SECTION A INFRASTRUCTURE WORKS	3.00	78 of 280	GENERAL TECHNICAL REQUIREMENTS FOR TOWNSHIP CIVIL INFRASTRUCTURE WORKS: ✓ Additional requirements : o Solid Waste Management system	-	-	Since technical specification for solid waste management of Township is not available in tender, Owner is requested to provide technical specification (including scheme, sizing criteria...etc) for solid waste management system of Township.	Bidder's scope includes design, supply, erection and commissioning of all infrastrucrural facilities required for segregation of waste at source, collection of waste, transporation, recycling and disposal of waste. Integrated Solid Waste Management System (ISWMS) shall be provided for township meeting requirements of SWM Rules 2016 and as per Manual on Municipal Solid Waste Management - 2016 published by CPHEEO. Maximum population for township may be considered as 5000 for design of ISWMS. Approval shall be obtained from NLCIL for ISWMS Scheme during detailed engineering. Necessaary statuory approval shall be obtained by bidder from Govt agencies/Statutory bodies. NLCIL will pay all statutory fees for obtaining Statory approvals/licenses fixed by the District administration / any other Govt agencies /Statutory agencies against the official receipts. All other expenses shall be borne by the Bidder.
CIVIL									
2	1814	Vol I-A/ Section-2 (IFB) Prebid response vide Corrigendum No. 5, Sr. No. 9, 40, 154, 155, 156 L&T Query No. 41,530, 1711, 1713, 1714	2.1.0	3 of 574	BRIEF SCOPE OF WORK:	(i) We understand that clearances/approvals such as Environmental Clearances, Consent to establish, Consent to Operate, Right of Way/Use etc. shall be in the Employer's scope. Please confirm. (ii) We request Purchaser to kindly provide the list of clearances/approvals that are needed to be obtained by Contractor.	(i) Regarding getting of approval for right of way / use, it is informed that it is in the scope of the bidder wherever necessary. (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.) (ii)The list of clearances/ approvals that are needed to be obtained is to be ascertained by the bidder wherever necessary.	As per the latest corrigendum (Corr. 5), the scope of Right of Way (ROW)/Use (ROU) has been mentioned in contractor's scope and Owner's responsibilities shall be limited to payment of necessary license fee to the state/Central Govt. authority for obtaining statutory approval. It may be kindly noted that, being project developer, Owner is already in the process of land acquisition for Main Plant and other areas outside the plant boundary; thus it will be appropriate that Owner undertakes the responsibilities of ROW/ROU as well. Please appreciate that as EPC Contractor, it is not feasible for us to take-up the responsibilities of acquiring ROW/ROU for the project. Hence, we once again request Owner to take out the ROW/ROU from bidder's scope.	It is once again reiterated that the Facilitation, co-ordination & Liasoning for timely acquiring Right of Way (ROW), Right of use (ROU) and obtaining necessary approvals for the same is in the scope of Bidder. NLCIL will pay all statutory fees and compensation for land acquisition on ROW basis fixed by the District administration / any other Govt agencies /Statutory agencies against the official receipts. All other costs associated with timely acquisition of the ROW shall have to be borne by the Bidder. Bidder's scope also include all facilitation for the ROW/ROU including co-ordination with Govt / private parties and getting the ROW/ROU within the overall time schedule of the Project. No time extension for the delayed completion of work due to the delay in acquisition of ROW/ROU will be permitted to the successful Bidder.
3	1815	Section A/ Infrastructure works Prebid response vide Corrigendum No. 5, Sr. No. 121, L&T Query No. 1634	5.5.1	51 of 280	This work shall consist of cutting, removing and disposing of all materials such as trees, bushes, shrubs, stumps , roots, grass, weeds, soil not exceeding 150 mm in thickness,	Tree cutting will require forest clearance and hence not included in Bidder's scope. Please confirm.	Tree cutting is in bidder's scope. Obtaining statutory approval is in the scope of the bidder. (Payment of necessary license fee only to the state/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approval is in the scope of successful bidder.)	Bidder understands that as the Land is acquired by Owner, trees within the acquired land are also in the possession of Owner. Hence subsequent forest approval shall be taken by Owner and tree cutting shall be carried out by forest department. This aforesaid information was also shared by NLCIL Officials during the site visit. **Therefore Bidder do not envisage their role in taking approval and cutting of trees. However uprooting of roots and clearing of bushes etc. shall be in EPC Scope.** **Owner to kindly confirm Bidder's**	Since no forest land is envisaged within the power plant and integrated township area. Hence, no forest clearance is applicable. However, for cutting and uprooting of trees within the acquired revenue land (Private & Govt.), permission from the forest department would be necessary and obtaining same from the forest department is in the scope of successful bidder. With regard to Trees in Govt.Non-Forest land, Tree enumeration will be done by Forest dept. and cutting of Trees shall be carried out by OFDC of Govt. of Odisha. However facilitation, co-ordination & liasoning with with Govt / private parties for obtaining necessary permissions shall be in the scope of the bidder In case forest land is involved for transmission line for Power Evacuation and Make up

Sr. No.	Query No.	Section / Part / Chapter / Volume	Clause No.	Page no.	Bid Specification Stipulation	Statement of clarification sought	NLCIL/DCPL Reply vide Corrigendum No. 5 and Corrigendum No. 6	Statement of clarification sought_22.01.2021	Purchaser's Reply
								understanding.	water pipeline corridors, then obtaining the forest clearance and permission for cutting of trees shall be taken by the bidder. NLCIL will pay all necessary statutory fees fixed by the Forest department/ other statuary bodies.
5	1817	Prebid response vide Corrigendum No. 5, Sr. No. 9, 40, 154, 155, 156 L&T Query No. 41,530, 1711, 1713, 1714				a) In case "Demolishing of the existing facilities within the plant area like houses, buildings, schools, temple, electrical and plumbing lines, pond etc.to be carried out by Bidder" then Owner shall intimate Bidder in writing that they can proceed with demolition work and also furnish separate timelines over and above the schedule provided in the specification. Owner to kindly confirm Bidder's understanding. b)Also Bidder understands that dismantled items (after demolishing houses, building, school etc.) including debris, rebar, structural items, pipes, pumps etc. shall be Owner's property and space for stacking shall be provided by Owner within plant premises. Please confirm.	a) Under bidder's scope and tender conditions prevails b) Space for stacking dismantled items shall be identified by the bidder within the plant premises.	As per standard industry practice, Owner 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 and clearances. Owner shall give full encumbrance free possession of and accord all rights of access thereto on or before the date(s) LOA. In the current tender conditions no such provision is available, we request Owner to incorporate necessary provision in line with above.	Tender conditions prevails. Owner will handover the acquired land for Power project and approach road to the successful bidder for carrying out site grading and execution of the project including construction of approach roads. Accordingly demolishing of all the existing structures / facilities shall be carried out by the bidder. Space for stacking dismantled items (after demolishing houses, building, school etc.) including debris, rebar, structural items, pipes, pumps etc shall be identified by the bidder within the plant premises.
6	1827	Drawing B1, Corrigendum 6 Rain water harvesting pond: All the rain water from road rains/ buildings shall be conveyed and let into Rain harvesting pond						1. Please furnish the storm water outfall points for b) Peripheral single lane road (at NGL), main plant approach road, peripheral double lane road (Marked in green colour in area grading drawing B1-R1) c) Approach roads from township	b)Storm water outfall points of Peripheral single lane road, double lane road and Approach to be finalized by bidder during detailed engineering with approval of NLCIL. c) Dedicated approach road and Main Approach road to township is deleted from scope.Refer corrigendum-3.
7	1828	Drawing B1, Corrigendum 6						Owner to furnish the extent of area grading requirement in the "Jal Bandharan Land" (Blue marked area) area as per the latest area grading drawing in Annexure B1_Rev 1. Also provide cross sectional details of area marked as below.	Grading shall be carried out in Jal Bhandaran area as per grading layout Two lane road (Green colour) shall be maintained at minimum FGL of +201.00. It is preferable to avoid cutting. In areas of higher ground level along two lane road, maintaining longidinal slope as per IRC norms.
8	1829	Drawing B1, Corrigendum 6						Owner to confirm the toe drain and PCC chute requirements for embankment slopes as per the Sections A-A, B-B & C-C in latest area grading drawing in Annexure B1_Rev 1. and also the grading requirements between parallel drains where NGL is shown presently.	Toe drain, PCC chute and lining requirements for embankment slopes shall be provided as per technical specification and Notes 7, 8 and 15 given in Annexure Drg B1, Rev R2 (attached) Peripheral village road shall be constructed on NGL following IRC norms.

Sl. No	BHEL Unit	Volume/Section / Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	NLCIL REPLY
		POINTS AND EXCLUSIONS Clause – 7.0 a) Page 24 of 27		addition to the bays mentioned in Clause- 5.03.00 , Page 133 of 280, 33kV VCB Panel Board of SECTION A INFRASTRUCTURE WORKS - CHAPTER V - EXTERNAL ELECTRIFICATION WORKS. – Please confirm. ii) Please confirm status of 33kV Transmission Line across Bhedan river to 33/11kV Construction Power Sub-station after phasing out of the 33kV State TRANSCO power since 33kV GIS shall feed power to integrated township then – shall it be dismantled by M/s. NLC.	08-01-2021, Sl. No.: 13 & 14 (Bid query No.: 358 &359) Pg.: 7 to 9 of 1335. ii) 33kV Transmission Line across Bhedan river to 33/11kV Construction Power Sub-station will be permanent infrastructure which will feed 33kV to mines from 33kV GIS Mines feeder after phasing out of the 33kV State TRANSCO. Ref.: Clause – 7.0 a), 33kV Gas Insulated Substation (GIS), (ii) 33 kV Supply to Mines.
		VOLUME: II-F/1 SECTION-I GENERAL ELECTRICAL SPECIFICATION Page 12 of 83	1.11.41 **Miscellaneous Electricals**: From 33kV GIS Switchgear 2 Nos of 33 kV power supply shall be extended (33kV UG cable) to 33kV indoor Switchgear of construction power supply substation after phasing out of the 33kV State TRANSCO power, in turn will feed power to integrated township and above listed buildings.		
12	TBG	VOLUME: II-A	**33kV Gas Insulated Substation (GIS)** i) 33 kV supply to Township:	i) Subject clauses are	Ref.

ANNEXURE –E
EXTERNAL ELECTRICAL WORKS

Sl. No	BHEL Unit	Volume/Section / Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	NLCIL REPLY
		SECTION-IV SCOPE OF SUPPLY AND SERVICES, TERMINAL POINTS AND EXCLUSIONS Clause – 7.0 a) Page 24 of 27	Complete 33 kV Gas Insulated Substation (GIS) and outgoing 33 kV Cable up to the incomer of 33 kV RMU Switchgear (Section-A) is in Bidder's scope.	ii) contradictory in nature – please confirm whether 33kV cable from 33kV GIS shall be terminated at 33kV indoor VCB of 33/11kV Construction Power Substation or shall be terminated at "incomer of 33 kV RMU Switchgear (Section-A)". "33 kV RMU Switchgear (Section-A)" – Please confirm location/ utility of this 33 kV RMU Switchgear since it is not clear from tender documents.	Corrigendum-5, 08-01-2021, Sl. No.: 14 (Bid query : 359) Pg.: 8 & 9 of 1335. 33kV indoor VCB of 33/11kV Construction Power Substation and "incomer of 33 kV RMU Switchgear are one and the same.
		VOLUME: II-F/1 SECTION-I GENERAL ELECTRICAL SPECIFICATION Page 12 of 83	1.11.41 **Miscellaneous Electricals**: From 33kV GIS Switchgear 2 Nos of 33 kV power supply shall be extended (33kV UG cable) to 33kV indoor Switchgear of construction power supply substation after phasing out of the 33kV State TRANSCO power, in turn will feed power to integrated township and above listed buildings.		
13	TBG	SECTION A INFRASTRUCTURE WORKS CHAPTER V EXTERNAL ELECTRIFICATIO	Bidder shall provide 11kV Double Circuit Transmission line across the Bhedan River, from 11kV switchgear of 2x6.3MVA, 33/11kV Substation to construct 11kV Ring Main Distribution Network within Township and other associated provisions.	We request customer M/s. NLC to arrange on its own entire construction power supply for Township area from local State Electricity Distribution Board feeder/other sources and not to derive any construction power requirement from 11kV VCB of 33/11kV Construction Power Substation through 11kV Transmission	Tender conditions prevail.

ANNEXURE –E
EXTERNAL ELECTRICAL WORKS

Sl. No	BHEL Unit	Volume/Section / Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	NLCIL REPLY
		N WORKS Page 127 of 280		Line across Bhedan river to Township – this is because 33/11kV Construction Power Substation shall be drawing power from 33kV Transmission Line (Section-A works) sourced from 33kV Takeoff point at Mines entrance (M/s. NLC Scope) and construction of 33kV and 11kV Transmission Lines including RoW issues involves significant time implications which may jeopardise township construction. In future, 11kV Transmission Line can feed Township when Township/11kV Transmission line is constructed. Acceptance confirmation required from M/s. NLC in this regard.	
20	TBG	SECTION A INFRASTRUCTURE WORKS CHAPTER V EXTERNAL ELECTRIFICATION WORKS Page 127 of 280	Bidder shall provide 11kV Double Circuit Transmission line across the Bhedan River, from 11kV switchgear of 2x6.3MVA, 33/11kV Substation to construct 11kV Ring Main Distribution Network within Township and other associated provisions.	i) We request M/s. NLC to convert subject 11kV Transmission Line from 11kV indoor VCB of 33/11kV Construction Power Sub-station into 11kV cable since 11kV cable can be routed entirely inside Thermal Power Plant and further via pipe cum cable trestle on New RCC bridge to be constructed over Bhedan River, thus avoiding RoW issues till RCC bridge –	i) Accepted. Ref. Corrigendum-6, 18-01-2021, BHEL Lot-4, TBG Sl. No.: 3, Pg.: 14 -15 of 112.

ANNEXURE –E
EXTERNAL ELECTRICAL WORKS

Sl. No	BHEL Unit	Volume/Section / Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	NLCIL REPLY
				please confirm. ii) In case above proposal is confirmed by M/s. NLC, please confirm distance between end of new RCC Bridge to Township and mode of routing i.e. 11kV cable or 11kV Transmission line considering remaining distance involved.	ii) Under Bidder's scope

M/L&T

Sr. No.	Section / Part / Chapter / Volume	Clause No.	Page no.	Bid Specification Stipulation	NLCIL/DCPL Reply vide Corrigendum No. 5 and Corrigendum No. 6	Statement of clarification sought_22.01.2021	NLCIL Reply
Civil							

1820	Corrigendum 6 Table 1.2.5 External Electrical Works Sl. No. 7 Corrigendum 6 Table 1.2.5 External Electrical Works Sl. No. 8		43 of 46 and 101 of 112 45 of 46 and 103 of 112	33kV Transmission system including double circuit transmission line, Lattice Tower structures / Cables and its associated Electrical, Civil & Structural works.	33kV Transmission system including double circuit transmission line, Lattice Tower structures / Cables and its associated Electrical, Civil & Structural works. 11kV Transmission system including double circuit transmission line, Lattice Towers/Steel Tubular Poles / Rail Poles / PSC Poles / Cables and its associated Electrical, Civil & Structural works	For transmission lines, Owner is requested to incorporate separate line items for Civil works. Example - Increase/decrease in concrete quantity ……/cubic meters.	Civil portion being very minor, the same can be included in the unit prce of Tower / Pole etc.,

1796	Corrigendum 5, point no. 3, Page 2 of 1335 ANNEXURE- A (INFRASTRUCTURE WORKS - SECTION A)	-	-	-	Route survey of 33 kV transmission line from proposed mine substation up to plant.	The Purchaser's 33kV DC feeder from Lapanga Grid Substation is proposed to be erected along the Coal Transport Road (As per Talabira/Electrical). The tentative location of 33kV Take off point will be approximately 2.4 Km from SH-10 **(Ref.Section- A, Annexure Drawing C1).** The route of 33kV transmissionline shall be designed as per the availability for Right Of Way anywhere between SH-10 and this Take of point or at Take of point and upto the 2x6.3 MVA, 33kV/11kV Substation location near Gate Complexinsidethep	Location of 33kV take off point is not indicated in Section-A, Annexure Drawing C1. Owner may please issue drawing indicating location of take off point with coordinates.	Drawing will be provided in Corrigendum.

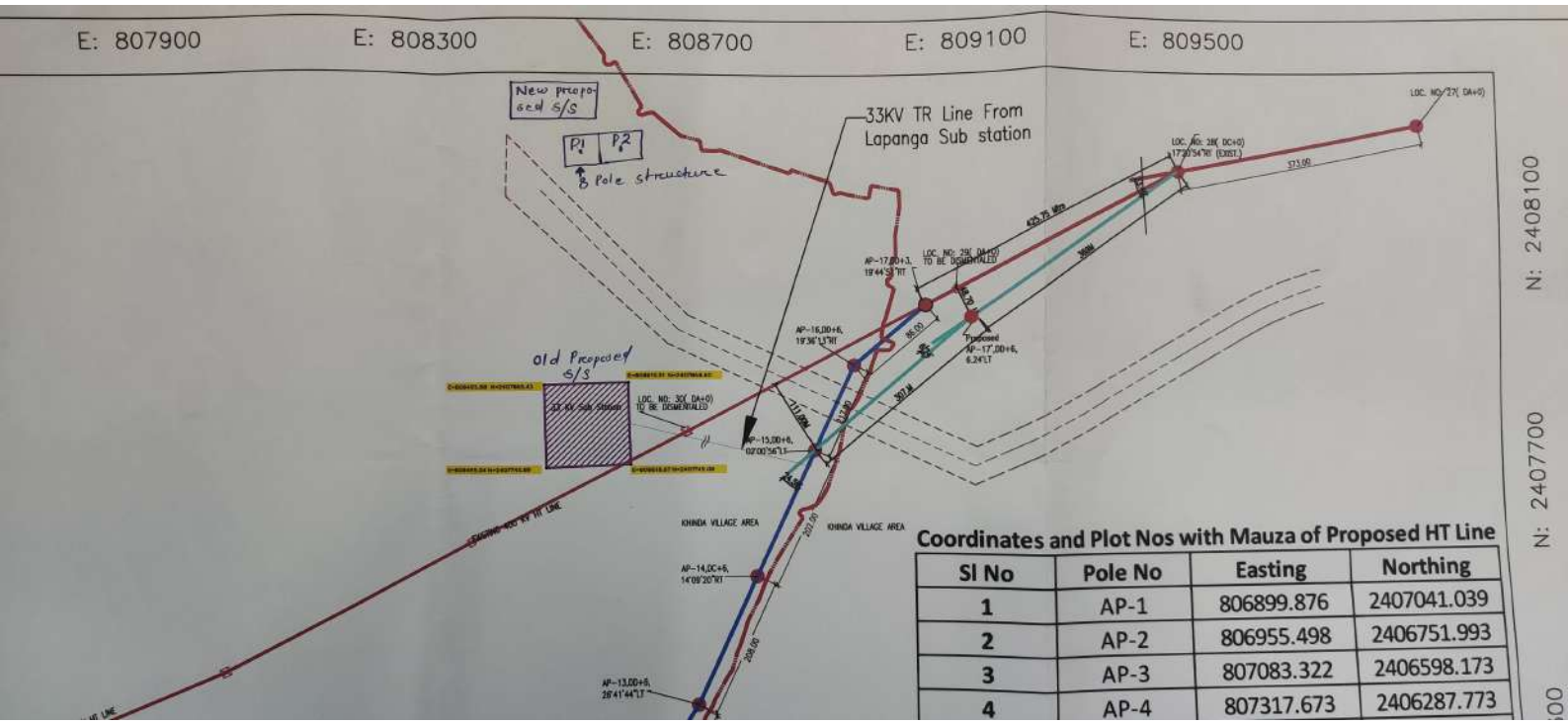
						lant. (Ref. Item No.: 71, Plot Plan, DRW No.:18A03-DWG-M-002A).		
1797	Corrigendum 5, point no. 4, Page 2 of 1335 ANNEXURE- A (INFRASTRUCTURE WORKS - SECTION A)	-	-	-	Route survey of 11 kV transmission line from plant to township	The 11kV transmission line route shall be designed as per the availability for Right Of Way from 2x6.3 MVA, 33kV/11kV Substation location near Gate Complex inside theplant (Ref. Item No.: 71, Plot Plan, DRW No.:18A03- DWG-M-002A) upto the entrance to Township location No.1 **(Ref. Section-A, Tender Drawing B22).**	Tentative location of 33kV take off point is not marked on Drawing no.B22 of section-A. Owner may please revise drawing and indicate coordinates of take off point.	Drawing will be provided in Corrigendum.

1798	Corrigendum 5, point no. 19, Page 13 of 1335 Query reference: Section A Infrastructure Works/ VOLUME: IB, SECTION-A, PART-II, Chapter V, External Electrification Works Cl. 1.01.00 Page 126 of 280	-	-	..33kV Takeoff point at Mines entrance to inside thermal Power Project site up to the 2x6.3 MVA, 33kV/11kV substation.	Bidder requestsOwner toprovide following: a) 33kV Mine substation layout b) 33kV Take off point at Mine substation for bidder terminal c) ROW corridor for 33kV/11kV double circuit transmission lines Section A from Mines, raw water area and Township.	Area levelling, site preparation & marking, Route survey and finalization of transmission line Rightof way is under bidder's Scope.(Ref.:Cl.1.00.00, Pg.No.:125of280& Cl. 2.00.02, Pg. No.: 128 of 280). **The tentative location of 33kVTake off point (at Mines entrance)will be approximately 2.4 Km from SH-10(Ref. Corrigendum-3, Approach Road Layout Drawing B22).** The route of 33kV transmissionline shall be designed as per the availability of ROW anywhere betweenSH-10 and this Take of point or at Take of	Tentative location of 33kV take off point is not marked on Drawing no.B22 of section-A. Owner may please revise drawing and indicate coordinates of take off point.	Drawing will be provided in Corrigendum.

						point and upto the 2x6.3MVA, 33kV/11kV Construction Power Supply Substation location (Ref. Item No.: 71, Plot Plan, DRW No.:18A03-DWG-M-002A). The 11kV transmission line route shall be designed as per the availability for ROW from 2x6.3 MVA,33kV/11kV Substation as above up to Township entrance Location No.1. (Ref.: Section-A, Chapter-VI, Drawings,Township LayoutDrawingC1).		

1811	Corrigendum 6, Page 96 of 112 PRICE SCHEDULE VOLUME: I-A SCHEDULE: F1 Table 1.2 of Section A UNIT PRICE FOR INFRA STRUCTURE WORKS-SECTION-A.	Table 1.2, Table 1.2.5 EXTERNAL ELECTRICAL WORKS	38 of 46, 43 of 46	**Table 1.2 of Section A UNIT PRICE FOR INFRA STRUCTURE WORKS-SECTION-A.** The Unit Rates of some of the items mentioned below need to be furnished by the bidder. Bidder need to quote these unit rates relevant to the Technical Specification and the lump sum prices quoted in Schedule-F1, Table 1 and price break up quoted in	-	-	Owner has asked unit rate of items for contract price adjustment on account of quantity variation, however Owner has not provided any reference baseline scheme/layout to consider by bidder while bidding. Bidder request Owner to provide baseline scheme/layout.	As entire scope of work lies with single point responsibility EPC contract, Contractor shall ascertain the scheme / layout, total requirement of towers / poles, conductor / cable etc., designed w.r.t RoW availability as per site requirements and got purchaser's approval during detailed engineering.

				Tables 1.1 of Section A- Infrastructures. **These unit rates shall be used for contract price adjustment on account of quantity variation.** Table 1.2.5 EXTERNAL ELECTRICAL WORKS: A) THERMAL POWER PLANT AREA ... ... B) INTEGRATED TALABIRA TOWNSHIP				



Coordinates and Plot Nos with Mauza of Proposed HT Line

Sl No	Pole No	Easting	Northing
1	AP-1	806899.876	2407041.039
2	AP-2	806955.498	2406751.993
3	AP-3	807083.322	2406598.173
4	AP-4	807317.673	2406287.773

Sl. No	BHEL Unit	Volume/Section/Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	Reply from CIVIL/CTO
1.	PSSR	Section A Volume IB Part I Clause No. 2.1.1 a) Page 4 of 280 Section A Volume IB Part I Clause No. 2.2.1.1 a) Page 5 of 280	The Sub-Contractor should have…….. a) Any embankment formation work / Road work / Water Supply work / Drain formation work in a single contract…….. The Sub-Contractor should have…….. a) Any embankment formation work / Road work / Water Supply work / Drain formation work in a single contract……..	Since the PQ is for Site grading, the bidder requests Customer to allow any leveling and grading work to be considered for Pre-Qualification requirement.	The given PQ doesn't explicitly mention about Leveling and Grading works. Inclusion of the same shall broaden the vendor base for qualification.	Tender condition prevails
2.	PSSR	Section A Volume IB	Construction Water	Considering the distributed location of Construction Works and the distance of Township from Bhedan		Construction water supply in Bidder's scope. Tender

Sl. No	BHEL Unit	Volume/Section/Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	Reply from CIVIL/CTO
		Chapter II Clause No. 6 Page 57 of 280		River, the bidder requests Owner to provide multiple points for drawing Construction Water from multiple sources in the nearby areas, in addition to the Bhedan River, along with the list of sources considered by the owner. Kindly inform whether there is any limit on consumption of water and in case there is a limitation, kindly inform the maximum limit of quantity of Construction Water that can be utilized.		conditions prevail.
3.	PSSR	Section A Volume IB Chapter V Clause No. 1 Page 125 of 280	Construction Power	Since Construction Power is expected to be ready by 27th month and infrastructure works is expected to start well before that, kindly allow the bidder to use the 33kV Takeoff Points near Mines	Since Construction Power is expected to be ready by 27th month and infrastructure works is expected to start well before that, kindly allow the bidder to use the 33kV Takeoff Points near Mines entrance for Construction	Tender conditions prevail. Construction Power is to be ready by 12th month and not 27th month.

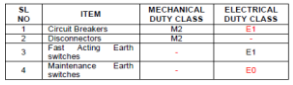
Sl. No	BHEL Unit	Volume/Section/Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	Reply from CIVIL/CTO
				entrance for Construction Power.	Power	**Ref.:** i) Section A, Infrastructure Works / Chapter V - External Electrification work, pg. No.: 130 of 280, Cl.: 4.00.00 General Scope, Sub Cl.: 4.00.01 ii) Section-B, Vol. II-F1/Section-I General Electrical Specification, Cl. 1.11.35, Pg. 10 of 83. iii) Sl. No.: 13, PBQ. No.: 358, Pg. No.: 8 & 9 of 1335 in Corrigendum No.: 5, Dt.: 08-01-2021.

Sl. No	BHEL Unit	Volume/Section/Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	Reply from CIVIL/CTO
1.	PSSR	Section A Volume IB Part I Clause No. 2.1.1 a) Page 4 of 280 Section A Volume IB Part I Clause No. 2.2.1.1 a) Page 5 of 280	The Sub-Contractor should have…….. a) Any embankment formation work / Road work / Water Supply work / Drain formation work in a single contract…….. The Sub-Contractor should have…….. a) Any embankment formation work / Road work / Water Supply work / Drain formation work in a single contract……..	Since the PQ is for Site grading, the bidder requests Customer to allow any leveling and grading work to be considered for Pre-Qualification requirement.	The given PQ doesn't explicitly mention about Leveling and Grading works. Inclusion of the same shall broaden the vendor base for qualification.	Tender condition prevails
2.	PSSR	Section A Volume IB	Construction Water	Considering the distributed location of Construction Works and the distance of Township from Bhedan		Construction water supply in Bidder's scope. Tender

Sl. No	BHEL Unit	Volume/Section/Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	Reply from CIVIL/CTO
		Chapter II Clause No. 6 Page 57 of 280		River, the bidder requests Owner to provide multiple points for drawing Construction Water from multiple sources in the nearby areas, in addition to the Bhedan River, along with the list of sources considered by the owner. Kindly inform whether there is any limit on consumption of water and in case there is a limitation, kindly inform the maximum limit of quantity of Construction Water that can be utilized.		conditions prevail.
3.	PSSR	Section A Volume IB Chapter V Clause No. 1 Page 125 of 280	Construction Power	Since Construction Power is expected to be ready by 27th month and infrastructure works is expected to start well before that, kindly allow the bidder to use the 33kV Takeoff Points near Mines	Since Construction Power is expected to be ready by 27th month and infrastructure works is expected to start well before that, kindly allow the bidder to use the 33kV Takeoff Points near Mines entrance for Construction	Tender conditions prevail. Construction Power is to be ready by 12th month and not 27th month.

Sl. No	BHEL Unit	Volume/Section/Clause No./ Sheet No.	Specification Requirement	Pre-Bid Queries/ Clarifications	Reason for Clarification	Reply from CIVIL/CTO
				entrance for Construction Power.	Power	**Ref.:** i) Section A, Infrastructure Works / Chapter V - External Electrification work, pg. No.: 130 of 280, Cl.: 4.00.00 General Scope, Sub Cl.: 4.00.01 ii) Section-B, Vol. II-F1/Section-I General Electrical Specification, Cl. 1.11.35, Pg. 10 of 83. iii) Sl. No.: 13, PBQ. No.: 358, Pg. No.: 8 & 9 of 1335 in Corrigendum No.: 5, Dt.: 08-01-2021.

S N	S P C	C N	P	B S S	S	NLCIL DCPL R C N	S	P R
Layout								
1791	Corrigendum 5, point no. 897, VOLUME II-A Overall contents	-	Pdf page 30	Volume : II-L (Tender drawing) General arrangement drawing 18A03-DWG-M-002C-Area Grading with Roads and Laydown Locations 18A03-DWG-M-004A/B/C/D-Power House Building 18A03-DWG-M-004E-Power House Cross Section	Listed drawing are not received along with BID documents Owner to provide PDF and DGN/DWG copy of these drawings.	Refer corrigendum.	Power House buidling and cross section (18A03-DWG-M-004A/B/C/D) & 18A03-DWG-M-04E) not received in corrigendum. purchaser to provide the same.	Refer 1.3, Technical:EPC, Table:A (Mechanical & Electrical) Drawing, Sl no: 85 of Corrigendum:3, Power House buidling and cross section (18A03-DWG-M-004A/B/C/D) & 18A03-DWG-M-04E) drawings are deleted.
1792	Corrigendum 5, point no. 905, VOLUME: II-A, SECTION-V, ANNEXURE-II	4.2 (A)	34 of 46	SL. No.-1) Pitch (Estimated) 152.0 Meters.	Bidder understand that Pitch given is indicative only, Pitch shall be decided based on Bidder's developed layout. Purchaser is requested to confirm bidders understanding.	Refer corrigendum.	Estimated pitch of 151 M is provided in corrigendum. Bidder understand that Pitch shall be slightly readjusted based on Bidder's developed layout with tender specified TG building length & considering footprint of Boiler, ESP. Purchaser is requested to confirm bidders understanding.	Bidder shall maintain estimated pitch of 151 m. In case of any adjustments required, Bidder shall submit the necessary layout drawings with all dimensions and required data alongwith the bid. However, bidder shall maintain the minimum layout requirements mentioned in the specification like: (i) TG building length of 453.5 meters. (ii) Minimum width of maintenance bays. (iii) Minimum distance between bunker bay column and adjacent CCR column with a clear road width of 10 meter. (iv) Minimum road width of 10 M between the ESP's of adjacent units. (v) Turbine bay column width. (vi) Clear space around equipments and walkways etc. The proposed layout of the bidder shall be considered by the purchaser only if it fulfills the minimum technical specification requirements.
1793	Corrigendum 5, point no. 1573, Volume-II-A, Section-V,	ANNEXURE-II	41 of 46	CRITERIA FOR LAYOUT Sl. No. 27 Basement, Pits & Trenches in Main Plant building	Bidder understand that CEP pump mounting pit and CW pipe line pit etc. which is unavoidable/required as per equipment layout is acceptable to Owner. Other pits and trench's which is required in TG building will be reviewed by owner during detail engineering stage. Owner is requested to confirm bidders understanding.	Refer Annexure-II, sl no:27, section:V, Vol-IIA. Bidder to comply the specification. Bidder shall bring out such requirements while submitting the bid and get the approval of the Owner.	Major pits/sumps which are unavoidable in TG building are as follows. (i) CEP pump mounting pit (ii) CW pipe line pit (iii) BFP lube oil pit etc. Thease shall be provided with required dewatering arrangements. Bidder request purchaser to review other minor pits and trench's in TG building during detail engineering stage.	Bidder understanding is inline with technical specification. Bidder to refer Annexure-II, clause no:6.0 &10, Section:V of Vol-IIA. & Annexure-II, Section:I of Vol-IIK.
1794	Volume-II-A, Section-V, & Volume-II-G1, Section-I,	ANNEXURE-II & Section-I 4.09.00 (i)	37 and 38 of 46 & 28 of 118	CRITERIA FOR LAYOUT Sl. No.7 No. of minimum floor levels in AB bay. Elevations / Equipment locations shown are indicative. Sl. No.8 No. of minimum floor levels in B- C Bay. Elevations / Equipment locations shown are indicative. Sl. No.9 No. of minimum floor levels in C-F Bay. Elevations / Equipment locations shown are indicative. The turbine -generator bay have Four floorsground floor at EL. 0.00m level, Mezzanine floor at EL. 8.50 m & EL.12.3 m level, operating floor at EL. 17.00m level and deaerator floor at EL. 24.0 m level shall be provided.	Discrepancy is found in the clauses - Bidder understand that floor elevation provided is for bidders reference only. Bidder can adjust floor elevation based on Bidder's equipment layout and OEM requirement. (I.e. Operating floor & common control room elevation given is 18.0 M, Bidder can change to 17.0 M) owner is requested to confirm bidders understanding.	Refer Annexure-II, section:V, Vol-IIA. Bidder shall note that, the levels are indicative.	By referring various clauses of Tender and corrigendum, Bidder understands that operating floor elevation 17 M is acceptable to Owner. Also as per Clause referred vol-IIA, section: V, Annexure II, S.no. 7 (p.no. 37 of 46), as mentioned "Elevations / Equipment locations shown are indicative". Request owner to confirm Bidder's understanding.	Bidder understanding with respect to floor elevation is correct. However, Bidder shall also comply with other criteria for layout like head room , minimum height between adjacent floors etc as per vol-IIA, Section:V.
General								
1795	Corrigendum 5, point no. 959 Section – B/ Vol. I-B/Section-2 Scope of Supply & Services	Cl.2.6.0; point (b) Construction Power	Page 23 of 310	The charges for the actual energy consumed by the Contractor shall be payable to the Purchaser based on prevalent rate of DISCOM guidelines. Contractor is restricted to use maximum demand of 3 MVA only. For additional power demand beyond 3 MVA, Contractor may at his own cost arrange suitable back-up power by means of DG sets for uninterrupted power supply.	Bidder request purchaser to provide the present prevailing DISCOM rates. Also please clarify, whether demand charges to be paid by Bidder or purchaser? The maximum demand of 3 MVA is very less on peak construction works for 3 x 800 MW project. Considering construction work involved in 3x800MW project along with township work, Bidder request to provide maximum demand of 7.5 MVA.	Maximum demand for construction power supply(CPS) is fixed based on the previous project experiance of NLCIL. If the CPS demand is more than 3MVA, bidder has to make his own arrangement as per the tender condition.	Please provide the following clarification & inputs. i) Present prevailing DISCOM rates. ii) Whether demand charges to be paid by Bidder or purchaser? Further, the maximum demand of 3 MVA is very less for peak construction works of 3 x 800 MW project. Bidder requires a peak demand of 7.5 MVA for 3 units. We request purchaser to review and confirm since it is impossible to manage such high demand through DG sets.	(i) The applicable DISCOM charges will be informed to the bidder during execution stage. Details of present DISCOM charges for the project location shall be collected by the bidder. (ii) Consumption charges will be levid as per DISCOM rates as applicable during execution period. Demand charges will not be levid from the bidder. However it is bidder's responsibility to keep the maximum demand within the allotted MVA.

1804	Corrigendum 5, point no. 346, Page 901 of 1335 Query reference: Vol. II-A/Section-V, General Technical Requirements, Annexure-II _____ Corrigendum 5, ANNEXURE – C2H, Point no. 2, Page 1237 of 1335	2.0 (iv) _____ Point no.2	31 of 46 _____ 1237 of 1335	Batteries shall be at Mezzanine floor level. _____ --	Bidder proposes to locate battery either at ground floor/mezzanine floor _____ and main power house/annex building based on layout requirements. Owner may please confirm. _____ --	Noted. _____ **D T** Battery shall be either located at _____ of main power house/annex building.	As per reply against point.no.346, page 901 of 1335, Corrigendum 5, Owner has confirmed for the location of batteries on ground floor/ mezzanine floor/ of main power house/annex building based according to layout requirements. However, as per point no.2, page 1237 of 1335, Annexure-C2H, Corrigendum 5, operating floor is not indicated. Bidder request Owner to reconfirm that batteries can be kept on of power house/annex building as per the clarification.	Batteries can be located in Operating floor of Annex building and not in the operating floor of TG building.
1805	Corrigendum 5, point no. 353, Page 901 of 1335 Query reference: Vol. II-A/Section-V, General Technical Requirements, Annexure-II _____ Corrigendum 5, point no. 24, Page 546 of 1335 Query reference: Vol. II-F1/Section-I, General Electrical Specification --------- Vol. II-F2/Section-IX, CABLING, GROUNDING AND LIGHTNING PROTECTION SYSTEM	4.4 _____ 5.04.02.7 ----- 7.02.18	41 of 46 _____ 67 of 83 ----- 18 of 41	The cable vault space below the HT/LT switchgear room and Control room shall have 800mm wide and 2.1m high movement passage all aroud the cable trays in the cable vault/cable spreader room for easy laying/maintenance of cables. _____ In cable vaults clear height in walkway or cross over below the cable trays shall be 1.5m. ------ In Cable vault / Cable spreader room below the Switchgear room and Control Room, shall have clear space of 800 mm wide and 2.1 m clear height for passage / movement of personnel.	Cable vault height below the HT/LT switchgear room at main plant is fixed due to TG OEM requirement and as indicated in Vol. II-A/Section-V, Annexure-II, 4.2.B.7/8/9. Hence, movement passage of 800mm wide and 2.1m height will be provided to the extent feasible in main plant cable vault. Owner may please accept. _____ As specified in Vol. II-F1/Section-I, clear height in walkway or cross over below the cable trays shall be 1.5m. Please confirm	Tender condition prevails. _____ Noted. Bidder understanding is correct.	We observed discrepancies in the responses. Bidder understands that clear height of walkway or cross over below the cable trays shall be 1.5m in every cable vault/cable spreader room as per Owner's reply for point no. 24, Page 546 of 1335, corrigendum-5. Owner may please confirm the same.	There is no discrepancy. 1.5 Mtr height is the minimum clear height required at Trays cross over. Whereas 2.1Mtr clear height is required around the cable tray for personnel movement.
1806	Corrigendum 5, point no. 378, Page 904 of 1335 Query reference: Vol-II-F1/Section-I, General Electrical Specification _____ Corrigendum 5, point no. 56, Page 706 of 1335 Query reference: Vol. II-F2/Section-XII,765KV, 400KV & 33KV GAS INSULATED SWITCHGEAR (GIS) ---------- Corrigendum 5, point no. 57, Page 707 of 1335 Query reference: Vol-II-F1/Section-I, General Electrical Specification	1.11.05 ------- 22.01.01, D. _____ 2.02.01 C, D ---------- 1.11.05	03 of 83 ------- 80 of 83 _____ 3 of 116 --------- 3 of 83	…..section. Bus bar configuration shall be one and half breaker scheme for 765kV & 400kV and double bus system for 33kV. The…. ---------- D. …….. The 33kV GIS shall employ single bus configuration. _____ 2.02.01 D. The ……, whereas 33kV GIS shall employ single bus configuration (Two incomer with bus coupler scheme). 2.02.01 C. The 33KV GIS shall have following panels i) Incomer …. iv) 1 no. bus coupler ---------- Bus bar configuration shallbe one and half breaker scheme for 765kV & 400kV and double bus systemfor 33kV.	There is discrepancy between referred clauses of specification. Bidder requests Owner to clarify the bus requirement for 33kV GIS. _____ We understand that 33kV GIS shall employ single bus configuration (Two incomer with bus sectionalizer scheme) and 2.02.01 C. iv) 1 no. bus coupler is actually bus sectionalizer with circuit breaker – please confirm. ---------- We understand that 33kV GIS shall be single bus only as per 33kV GIS Key SLD – please confirm.	There is no discrepancy. 33kV GIS shall have double bus with bus coupler , Refer 33kV GIS SLD _____ Bidder understanding is in order. ---------- Bidder understanding is in order.	We observed discrepancies in the responses. Bidder understands that 33kV GIS shall have single bus configuration (Two incomer with bus sectionalizer scheme) as per Owner's reply for point no. 56, Page 706 of 1335, corrigendum-5. Owner may please confirm the Bidder's understanding.	It is already clarified that bidder to refer the 33kV GIS SLD.
1807	Corrigendum 5, point no. 1114, Page 1004 of 1335 Query reference: Corrigendum 1Cabling Notes & Details Dwg. No. 18A03-DWG-E-0400	-	18 of 28	Cable tray support system	Bidder propose to provide conventional cable tray support system (like ISMC, angle etc.). Owner may please accept.	Bidder shall refer to Cabling Notes and Details drawing 18A03-DWG-E-0400-**S**	Owner's reply indicates to refer Sh 1 , which implies that there are 37 pages. However, the drawings received with corrigendum-1 has total sheet-28 only. Bidder request to provide latest Cabling notes and details along with all 37 pages.	The Subject drawing contains 28 sheets only. Bidder to refer Sheet-1 to 28 as attached in Corrigendum-1.
1808	Corrigendum 5, point no. 959, Page 974 of 1335 Query reference: Section – B/ Vol. I-B/Section-2 Scope of Supply & Services	Cl.2.6.0; point (b) Construction Power	Page 23 of 310	The charges for the actual energy consumed by the Contractor shall be payable to the Purchaser based on prevalent rate of DISCOM guidelines. Contractor is restricted to use maximum demand of 3 MVA only. For additional power demand beyond 3 MVA, Contractor may at his own cost arrange suitable back-up power by means of DG sets for uninterrupted power supply.	Bidder request purchaser to provide the present prevailing DISCOM rates. Also please clarify, whether demand charges to be paid by Bidder or purchaser? The maximum demand of 3 MVA is very less on peak construction works for 3 x 800 MW project. Considering construction work involved in 3x800MW project along with township work, Bidder request to provide maximum demand of **A**	Maximum demand for construction power supply (CPS) is fixed based on the previous project experiance of NLCIL. If the CPS demand is more than **A**, bidder has to make his own arrangement as per the tender condition.	Bidder would like to clarify that the maximum demand of 3 MVA fixed by Owner is very less with reference to the quantum of work involved in construction of 3x800MW project. Moreover, substantial power is also required for township work. Bidder request to accept maximum demand of **A** for construction power and request Owner to make necessary arrangement.	Bidder to note that 3 MVA is the construction Power supply requirement to Section-B only (Power plant Portion).
1809	Corrigendum 5, point no. 1597, Page 1068 of 1335 Query reference: Vol. II-F2/Section-XII 765kV,400kV & 33 kV GIS Key Single Line diagram for station conneciton Dwg No: 18A03-DWG-E-002	ANNEXURE-A For 765/800kV & 400/420kV	110 of 116 1 of 2 and 2 of 2	10.0 - Rated Normal Current busbar - 3150A Bus bar continuous current is indicated as 5000A.	Both referred clauses for 765/800kV & 400/420kV are contradicting with each other. Further, Bidder would like to clarify that the available type tested GIS Busbar rating with Indian GIS manufacturers is upto 3150A for 765kV & 400kV GIS. Owner may please accept and issue amendment.	Bidder to refer Corrigendum.	Bidder has not received amendment in corrigendum-5. Owner may please issue change in specification as follows: **B A** **B A**	The required details are already provided as part of Corriegndum-2. (S.No. 62; Page-26 of 40, Table-A-Mechanical & Electrical). Bidder to follow the same.
1810	Corrigendum 5, point no. 1598, Page 1068 of 1335 Query reference: Vol. II-F1/Section-I General Electrical Specification	4.22.00	33 of 83	Zigzag winding transformer shall be provided for tertiary winding Earthing	Owner is requested to provide details including rating and design criteria for Zig-Zag transformer.	Size and technical requirement shall be decided during detailed engineering stage as per system requirement.	**O** Rating of equipment is very vital information and should be provided by Owner without which there will be substantial cost implication at later stage.	Size and technical requirement shall be decided during detailed engineering stage as per system requirement.
1812	Corrigendum 5, point no. 11, Page 727 of 1335 Query reference: Volume-II-F/2,Section-XII _____ Corrigendum 5, ANNEXURE – C2H, Point no. 55, Page 1251 of 1335	Cl. 5.01.16,Service life _____ Point no.55	Page 37 of 116 _____ 1251 of 1335	Electrical and mechanical class; CB - M2 & E2 Disconnector - M2 & E2 Fast acting ES - E1 Maintenance ES - E1 _____ --	Please note that GIS OEM confirm following CB - M2 & E1 Disconnector - M2 Fast acting ES - E1 Maintenance ES - E0 Acceptance confirmation from M/s. NLC/DCPL required in this regard. _____ --	Tender condition prevails. _____  **SL NO** / **ITEM** / **MECHANICAL DUTY CLASS** / **ELECTRICAL DUTY CLASS** 1 Circuit Breakers M2 E1 2 Disconnectors M2 - 3 Fast Acting Earth switches - E1 4 Maintenance Earth switches - E0	We have observed discrepancy in the responses.. Bidder understands that bidder to follow as per point.no.55, page 1251 of 1335, Annexure-C2H, Corrigendum 5 for revised duty class. Owner may please confirm bidder's understanding.	Bidder shall refer the relevant change in Specification (ANNEXURE – C2H, Point no. 55, Page 1251 of 1335) of Corrigendum and this supersedes the previous requirement. .

1821	Corrigendum 5 Query Serial No. 1307 Geotechnical Investigation Vol. II-G1/ Section V	1.02.00	1026 of 1335	The design, type, size, depth of the foundation/pile, Net safe bearing capacity/pile capacity values shall be based on the approved soil investigation report of the successful Bidder/Owner's soil recommendations (Available in the Tender document) whichever is conservative.	The design, type, size, depth of the foundation/pile, Net safe bearing capacity/pile capacity values shall be based on the approved soil investigation report of the successful Bidder/Owner's soil recommendations, kindly confirm.	Available Geotechnical investigation report is already uploaded. However conservative value of the nearest borehole as per the discretion of Owner / Consultant shall be binding upon the successful bidder.	Owner to note that the Ground level mentioned in the bore hole report do not match with the contour levels shared with the tender document. Comparison of the same is attached as Annexure-1 for your reference. As not a single bore hole is available for facilities like FGD, Switchyard, ETP, DM etc., hence it will not be possible to interpret soil parameters from tender stage geotechnical investigation report. Owner to kindly review and accept Bidder's submission that approved soil investigation report will be considered during detail engineering.	Soil report enclosed shall be followed as such with figures indicated against RL shall be replaced with NGL. The NGL (RL) of the Bore level shall be taken from the Talabira contour levels. Tender condition prevails. For clarity, Conservative value of the nearest borehole as per the discretion of Owner / Consultant shall be binding upon the successful bidder.
1822	Section-II/Vol. II-G1	4.00.00 (d)	17 of 38	The design of R.C.C - Structures shall be carried out by limit state or working stress method as per the provisions of IS-456 (Latest Revision).	As per standard practice RCC shall be designed as per limit state method as per IS 456 : 2000. Please confirm.	Tender condition prevails	The clarification given by customer is not clear to us. IS 456 : 2000 refers to RCC structure design as per limit state method only. In case customer requires for working stress method using the above mentioned code, the specific structures requiring such designs may please be clarified.	Tender condition prevails. For clarity, Working stress method using IS 456 : 2000 shall be followed wherever mentioned in the specification. Otherwise limit state method shall be followed for all other structures.
1823	Section-IV/Vol. II-G1	3.19.00 (g)	43 of 127	Suitable arrangement of floor drain with trap shall be provided in floor where spillage of water / floor washing will occur.	As a matter of practice followed in every plant, drains are not considered on the elevated RCC floors of the steel buildings. This wash water is drained towards the down comer pipes located at suitable corners of the buildings through floor slope of 1 in 200. However for roof this slope is envisaged to be 1 in 100.	Tender condition prevails	As a matter of practice followed in every plant, drains are not considered on the elevated RCC floors of the steel buildings. This wash water is drained towards the down comer pipes located at suitable corners of the buildings through floor slope of 1 in 200. However for roof this slope is envisaged to be 1 in 100. Owner is once again requested to review the specific requirement in the clause and revert back.	For elevated floors, drains are not necessary. Floor drainage arragement shall be provided with necessary slope and trap in floor where spillage of water / floor washing will occur.
1824	Vol. II-G1/Section-I Corrigendum 3 Corrigendum 6	4.23.10 Point 30 Point 43	34 of 40 32 of 112	Ash dyke shall be constructed by optimized cutting/filling required to build up storage capacity as indicated in Mechanical Volume. With top of the bund shall not exceed 204.0m including free board of 1.5 m and bottom level shall be kept above the ground water table.			Request Owner to provide the site specific Ground Water Table level to verify the ash storage volume with respect to the allotted area and bund height RL as 204.0M. Also Owner to advise measures in case the storage volume within the specified boundary conditions does not meet the specified capacity requirement. (As per geotechnical report provided in tender, for Borehole 29, Standing Water Level was observed as 198.225)	Soil investigation for Ash dyke is Under bidders scope. For capacity refer Mechanical volume
1825	Vol II-G1 Corrigendum 3	4.25.02 Point 38	34 of 40	The reservoir shall be formed with optimum cutting and filling of the earth (without compromising the safety of power plant) with top of the bund shall not exceed 204.0m including free board of 1.5 m and bottom level shall be kept above the ground water table.			Request Owner to provide the site specific Ground Water Table level to verify the raw water storage volume with respect to the allotted area and bund height RL as 204.0M. Also Owner to advise measures in case the storage volume within the specified boundary conditions does not meet the specified capacity requirement. (As per geotechnical report provided in tender, for Borehole 21, Standing Water Level was observed as 196.601)	For RWR holding capacity calculations only - Ground water table shall be considered at RL 194.00 m , this reply shall read in conjunction with reply 1821. Necessary dewatering if any shall be considered during constrction based on actual site condition as water table fluctuates throughout the year. For capacity refer Mechanical volume
1826	Vol II-G1/Section-1 Corrigendum 5 sr. no. 477)	4.21.04	38 of 118	Run-off coefficient for open ground area (unpaved) shall be minimum 0.90 and for paved area and other covered surface including roads the same shall be considered as 1.0.			Please note, as per IRC:SP:42-2014, Table 6.5, the run-off coefficient for 'Steep, bare rock and watertight pavement surface (concrete or bitumen)' shall be 0.9 and for unpaved areas shall be 0.5 to 0.6. Bidder requests Owner to consider the values indicated above to get realistic drain design/ cross sections	Run-off coefficient for open ground area (unpaved) shall be minimum 0.75 and for paved area and other covered surface including roads the same shall be considered as 0.9.
1827	Drawing B1, Corrigendum 6 Rain water harvesting pond: All the rain water from road rains/ buildings shall be conveyed and let into Rain harvesting pond						1. Please furnish the storm water outfall points for a) Plant storm water drains b) Peripheral single lane road (at NGL), main plant approach road, peripheral double lane road (Marked in green colour in area grading drawing B1-R1) c) Approach roads from township 2. The rain water harvesting pond (40,000 Cum) is not capable of holding the entire plant catchment water. Please confirm size of pond.	1. a.Will be conncted to rainwater harvestinng pond for Inside Plant boundary only. 2.For capacity of Rain water harvesting pond tender condition prevails .For clarity, water from the RWHP shall be pumped into the Raw water resevoir and to ensure that there is no overflow from RWHP.
1830	Vol II-G1	4.23.10 4.25.02	34 of 40				Ash Dyke and Raw water Reservoir embankments of height less than 3.0M do not require sand chimney and rock toe as per Table 1, IS 12169. Please confirm it is not required for both the facilities.	Tender condition prevails

1839	Corrigendum 5, Prebid Query No. 547		924 of 1335		With regards to obtaining statutory clearance which is kept in Bidder scope; a) Since Bidder is doing legwork on behalf of Customer, Bidder shall not be responsible for any delay in obtaining the permit(s). Delay in project, if happens due to delay in obtaining the permit, Bidder shall be compensated accordingly. B) In case of any fees charged by state and central government bodies/organisations for approving design, drawings or inspection etc. with respect to works outside plant boundary including intake system, transmission line, approach road, bridges, construction water and township shall be payable by Owner. Please confirm.	a) Bidder shall be totally responsible for any delay in obtaining the permit(s), statutory approvals as needed for the completion of the project. No compensation whatsoever will be entertained. b) Payment of necessary licence fee only to the State/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approvals is in the scope of successful bidder. b) Payment of necessary licence fee only to the State/Central Govt. authority for obtaining statutory approval will be borne by the owner. However facilitation for obtaining statutory approvals is in the scope of successful bidder.	Owner is requested to refer to the drawing below wherein the red line shows mines boundary and green line indicates the proposed route for various corridor along existing CTR road. In view of the above, Bidder requests Owner to consider the below mentioned corridors along CTR road and then route it from Talabira Mine area, which is already in possession of Owner. a) Raw water intake pipe line b) Ash Pipe lines c) Water line for township d) Transmission lines Accordingly Owner to kindly confirm acceptance and incorporate the aforesaid route as Corrigendum. This proposed route will not call for additional land acquisition, however bridge location will be changed accordingly. 	Tender condition prevails
1840	Drawing B1, Corrigendum 6 Dwg. No. 18A03-DWG-C-007 Rev 00						a) As per corrigendum 6 , Drawing B1 area grading around the Raw water reservoir is not envisaged. However, Dwg. No. 18A03-DWG-C-007 Rev 00 of Raw water reservoir shows FGL as RL 201.5 near periphery road of reservoir. Bidder understands that no grading is required as per Corrigendum 6 and road shall be constructed on NGL. Please confirm. b) Owner is requested to share autocad file of Plot Plan Drg No. 18A03-DWG-M-002A, Rev 1, furnished with Corrigendum 6.	a) Bidders understanding not in order. Outside Peripheral 2 lane road around the reservoir shall be maintained at RL 201.0 . It is preferable to avoid cutting. In areas of higher ground level along two lane road maintaining longitudinal slope as per IRC norms. Dwg. No. 18A03-DWG-C-007 (RWR) will be revised accordingly . b) Drawing already furnished

N						NLCIL/DCPL's Reply
		Sl.no: 16 Pg.no. 729 of 1335	condition (micro volt) For 765kV GIS 2500 at 508kVrms For 400kV GIS 1000 at 320kVrms Bidder Clarification - Please note that GIS offered by OEM is type tested as per the IEC standards. GIS OEM shall confirm the mentioned parameter as per the same. Kindly accept the same. NLC Reply - Tender Condition Prevails.	the GIS type tested as per IEC without insisting on the specific parameters.		
5.	TBG	Corrigendum-5_Pre-bid_08.01.2021-841-1336 Sl.no: 359 Pg.no. 902 of 1335	NLC Reply: 2. From 33kV GIS Switchgear 2 nos. of 33kV power supply shall be extended (33kV cable) up to 33kV cable intake gantry structure of 33kV transmission line	We understand the following :- i) Construction of 33kV D/C Transmission line between 33kV Take Off Point and Mines sub-station (in Mine developer scope) is not in scope of subject project (Sec-A or	Clarification from customer	i) Bidder's understanding is correct. ii) Bidder's understanding is correct. iii) Cable to OH line

N						NLCIL/DCPL's Reply
			(Ref. Cl. 5.01.00, pg. No.: 132 of 280 in Bidder's scope under Section-A Package) located near Construction Power Supply Substation inside Thermal Power Project site in turn will feed power to the Mines.	Sec-B) – please confirm. ii) "33kV cable intake gantry structure of 33kV transmission line" – we understand same is to be constructed by bidder (Sec-A) for termination of 33kV cable feeders from 33kV GIS and further connected to the 33kV D/C transmission line (across Bhedan river / constructed by then) which was previously connecting 33kV VCB switchgear of construction power S/S and 33kV Take Off point – please confirm. iii) Please also explain mode of inter-connection between "33kV cable intake gantry structure of 33kV transmission line" and the by-then constructed 33kV D/C transmission line (across Bhedan river). iv) We understand that once 33kV Cables from GIS start supplying power to Mines at the end stage of subject project, "33kV 240 sq. mm.		termination . iv) Bidder's understanding is correct. v) Bidder's understanding is correct. vi) The route of 33kV Transmission line shall be designed as per the availability of ROW between take-off point and 2x6.3 MVA, 33kV/11kV Substation location near Gate Complex inside the plant. vii) As per Project schedule, after 765/400/33kV GIS Commissioned.
		Corrigendum-5_Pre-bid_08.01.2021-1-400 Sl.no: 3 Pg.no. 2 of 1335	The Purchaser's 33kV DC feeder from Lapanga Grid Substation is proposed to be erected along the Coal Transport Road (As per Talabira/Electrical). The tentative location of 33kV Take off point will be approximately 2.4 Km from SH-10 (Ref.Section- A, Annexure Drawing C1). The route of 33kV transmission line shall			

N						NLCIL/DCPL's Reply
			be designed as per the availability for Right Of Way anywhere between SH-10 and this Take of point or at Take of point and upto the 2x6.3 MVA,33kV/11kV Substation location near Gate Complex inside the plant. (Ref. Item No.: 71, Plot Plan, DRW No.:18A03-DWG-M-002A).	XLPE Al. Cable" indicated in "External Electrification Works SLD" is to be dismantled – please confirm. v) We understand that 33kV Cables from GIS for supplying power to Township , at the end stage of subject project , are to be terminated into 33kV VCB switchgear bays occupied by existing "33kV 240 sq. mm. XLPE Al. Cable" after dismantling these "33kV 240 sq. mm. XLPE Al. Cable" – please confirm. vi) "The route of 33kV transmission line shall be designed as per the availability for Right Of Way anywhere between SH-10 and this Take of point or at Take of point and upto the 2x6.3 MVA,33kV/11kV Substation location near Gate Complex inside the plant" – Please clarify "anywhere between SH-10 and this Take of point" as same not clear.		
		Corrigendum-5_Pre-bid_08.01.2021-1-400 Pg.no. 126 of 1335	External Electrification Works SLD			

N						NLCIL/DCPL's Reply
				vii) Please confirm around which month of construction schedule 33kV cable feeders from 33kV GIS to Mines and Township are to be laid and commissioned since same not clear from TS/Corrigenda/Amendments.		
6.	TBG	18A03-DWG-E-0002, 765kV GIS SLD, Page- 1of 2	SLD	765kV CT inside GIS is indicated in SLD for 2 nos. 765kV ICT Bays , however outdoor AIS CT visible in GIS switchyard layout in Plot Plan – we understand 765kV CT required to be provided inside 765kV GIS bays only and not outdoor AIS type – please confirm.	Clarification from customer	Bidder to refer SLD 18A03-DWG-E-0002& 18A03-DWG-E-0104-Sh 3-R-0 for requirement on current transformer, Plot plan is indicative only.
	TBG	"Corrigendum -6" Plot Plan Dwg No. – 18A03-DWG-M-002A, R-1 Pg.no. 106 of 106	Plot Plan			
7.	TBG	VOLUME: II-F/2 SECTION-XII 765KV, 400KV & 33KV GIS ANNEXURE-A SYSTEM PARAMETERS Page 110 of 116	18. Minimum clearances in air a) Phase to Phase, mm : 4200	We understand that Minimum clearances in air Phase to Phase shall be 4000mm instead of 4200mm – please confirm.	Clarification from customer	Tender condition prevails. For Rod-conductor Configuration ph-ph clearance shall be 4200mm. For Conductor-conductor configuration ph-ph clearance shall be

effected after the approval by the purchaser on the Insurance policies submitted by the Contractor.

3.3.4 Final Payment (Retention): 10%
Upon completion of Defect Liability period for civil works and Warranty/ Guarantee for electrical works.

Site grading in main plant area (except green belt area)	8 months	12 months	20 months
Construction of compound wall , thermal project office building, gate complex, security and time office, CISF-Barracks	18 months	12 months	30 months
Completion of other Civil Infrastructure works (except site grading of green belt area & formation of embankment along Bhedan river)	27 months	12months	39 months*
Site grading of Green belt area and Formation of Embankment along Bhedan river	45 months	12 months	57 months

* However, main approach road to power plant, 2 lane road shall be maintained by the bidder till commissioning of Unit 3.

CIVIL WORKS IN INTEGRATED TALABIRA TOWNSHIP	**Completion**	**DLP**	**Release of**

							final payment
				Completion of 50% of the quarters as per requirement of Purchaser including all services required for occupation	27 months	12months	39 months
				Completion of entire scope of work in integrated Talabira township	45 months	12 months	57 months
				COMPLETION OF ENTIRE SCOPE OF WORK IN EXTERNAL ELECTRICAL WORKS.	**Completion**	**DLP**	**Release of final payment**
				POWER PLANT AREA			
				33k.V transmission line up to 2X6.3 MBA substation, 2X6.3 MBA substation	12 Months	12 months	24months
				Remaining scope	27 Months	12 months	39months
				INTEGRATED TALABIRA TOWNSHIP			

3 X 800 MW NLC TALABIRA THERMAL POWER PROJECT

VOLUME – II B

SPECIFICATION NO PE-TS-N80-Township-C001

TECHNICAL SPECIFICATION FOR INTEGRATED TALABIRA TOWNSHIP AND ASSOCIATED WORKS

Bharat Heavy Electricals Limited
Project Engineering Management
PPEI Building, Power Sector,
Plot No. 25, Sector 16A,
Noida (U.P.)-201301

PREAMBLE

This volume is sub-divided into following sections:

Section A : This section outlines the Scope of work, Exclusions and Terminal points

Section B : This section outlines the Project information

Section C : This section outlines the specific technical requirements

3 X 800 MW NLC TALABIRA THERMAL POWER PROJECT

VOLUME – II B

SPECIFICATION NO PE-TS-N80-682-Township-C001

SECTION – A

SCOPE OF WORK, EXCLUSIONS & TERMINAL POINTS

Bharat Heavy Electricals Limited
Project Engineering Management
PPEI Building, Power Sector,
Plot No. 25, Sector 16A,
Noida (U.P.)-201301

SECTION – A

SCOPE OF WORK, TERMINAL POINTS & EXCLUSION

1.0 Scope of Work:

The scope of work includes Civil, Structural & Architectural works for Integrated Talabira Township and associated works on Engineering, Procurement and Construction (EPC) basis for 3 X 800 MW NLC TALABIRA THERMAL POWER PROJECT. The scope of work described herein are in general and shall include those specified in Section-C of this specification as well.

The scope of civil work comprises of the following within Township area:

a) Integrated Talabira township including site clearance, site levelling & grading, topographical survey, geotechnical investigation, establishing construction water supply, establishing construction power supply, internal electrification, fire safety, water supply, drainage & sewerage arrangements etc.

b) Executive hostel, Shopping complex, Guest house, Recreation club, Sports office, badminton court, swimming pool and Library, Auditorium, Community hall, Hospital, School, Township administration (TA) office, Estate store, Two wheeler parking shed, Four wheeler parking shed, Security building, Servant's quarters for Project head and VIP Guest House

c) Compound wall around township area

d) Entrance arch to township and indicative arch at SH-10 entrance

e) Main Approach road from Integrated township to SH-10

f) Main road & internal road within township

g) Dedicated approach road from Power plant to township

h) Main Drinking Water pipeline network from Power plant WTP to township

i) Water supply distribution network including Overhead water tank and sump within township

j) Storm water drainage network within township

k) Sewage network with STP within township including recycling of treated water

l) Rain water harvesting scheme

m) Street lighting and external electrification

n) Park and playground

o) Gardening & walkway inside Type I, II, III & IV Blocks area

p) Statue/logo/beautification near main entrance of township

q) Connection of all the external services like Water Supply, Sewerage, Drainage, Electric Supply, LAN/WAN, etc. to the main lines of the authorities/service providers

r) Obtaining all municipal & mandatory approvals required for occupation and completion of the project

Any other work not specified herein but specified in Section-C and those required for successful completion of Township area.

1.1 Construction facilities

The following facilities shall be taken care by the bidder at their own end.

1. All civil and structural works associated with drinking and service water facilities for bidder's labour and other personnel at the work site/staff colony.

2. Development of temporary staff colony and labour colony as required along with fencing etc.

3. Making all arrangements for distribution of construction power at various locations as per requirements.

4. Making all arrangements for the supply of construction water.

5. Construction of bidder's site office, stores (open/covered as applicable), workshops, material/field testing laboratory and any other temporary facilities as required.

6. Providing all necessary firefighting devices/equipment/fire tender etc. as required during construction stage.
7. Providing all materials, tools and plants (T & P) required for completion of the work.
8. Providing skilled/semiskilled/unskilled labours and supervisory staff for quality control and execution.
9. Meeting occupational health and safety requirements.
10. Temporary illumination and lighting as required for execution of work.
11. Development of temporary approach roads, temporary drains as required for the execution.

Any other civil, mechanical, electrical works as required by the bidder enabling smooth execution of work.

1.2 Additional requirements

1. All works including materials shall be as per technical specification and approved drawings. The approval shall be obtained from BHEL & NLC/customer's consultant.
2. Bidder has to obtain approval of BHEL & NLC/customer's consultant for all works including design, drawing, construction methodology, construction materials, schedule etc.
3. All necessary statutory clearances shall be obtained by the bidder.
4. All the quality standards, tolerances, bolting and welding standards and other technical requirements shall be strictly adhered to.
5. Works shall be carried out as per approved design/drawings, specifications and field quality plans (FQP). The FQP shall be prepared by bidder and approved by BHEL & NLC/ customer's consultant.

6. The bidder should visit the site and fully apprise himself of the prevailing conditions at the site.
7. It is also to be noted that in case any other works are in progress or under execution nearby the Ash dyke area, the work shall be planned and executed in such a way that the same shall not affect others work. No claim will be entertained by BHEL & NLC/ customer's consultant on ground of lack of knowledge on this account.
8. Necessary precaution and arrangements including sprinkling of water as required during work as acceptable to BHEL & NLC/ customer's consultant for safety, security and dust suppression etc. have to be made by the bidder.
9. Any other measures as required for safety of the adjacent existing structures/buildings/facilities during execution shall also be taken care by the bidder.
10. Bidder shall note that the analysis, design and drawings will be reviewed by BHEL; after incorporating BHEL comments/observations the same shall be further submitted to NLC/ customer's consultant for their review and approval. It is the responsibility of the bidder to get things approved by BHEL & NLC/ customer's consultant.

11. Bidder shall submit "as built drawings" after completion of construction of respective structure/building/facility in soft as well as in hard copies.

12. Foundation system and Geotechnical investigation:

a) There is no geotechnical data available for proposed township area. However, preliminary geotechnical data for proposed plant area is attached in Section-C of this document is solely for the purpose of guidance to the bidder. BHEL/Owner does not take any responsibility about the accuracy and applicability of the geo-technical data furnished herewith. The onus of correct assessment/interpretation and understanding of the existing sub-strata conditions is on the bidder. Any variation in the data between the one furnished and to that found during execution of the work at site shall not constitute a valid reason in affecting the

terms & conditions of this bid and the bidder shall note that nothing extra will be payable on this account. The bidder shall

fully satisfy himself about the nature of sub-strata expected to be encountered including the type of foundation, ground water table and construction methodology to be adopted etc. prior to the submission of the bid.

b) Preliminary Geotechnical data of plant area attached is for reference only. However, bidder has to carry out detailed Geotechnical Investigation for Township area. Bidder is advised to verify the content of Preliminary Geotechnical data and if necessary make his own tests at site as per requirement before submission of bid. Alternatively, Bidder may make his own assessment for the type of foundations envisaged based on this preliminary report at his own risk. In any case, Bidder has to carry out detailed Geotechnical Investigation after the award of contract, through some approved / reputed agency and submit Geotechnical Investigation report with recommendation for BHEL's review & approval. The recommendation given in approved final report becomes binding on the Bidder. The Bidder shall not be eligible for increase his price or demand any extension of time because the final report is in variance from preliminary data furnished for plant area.

2.0 Exclusions

Nil

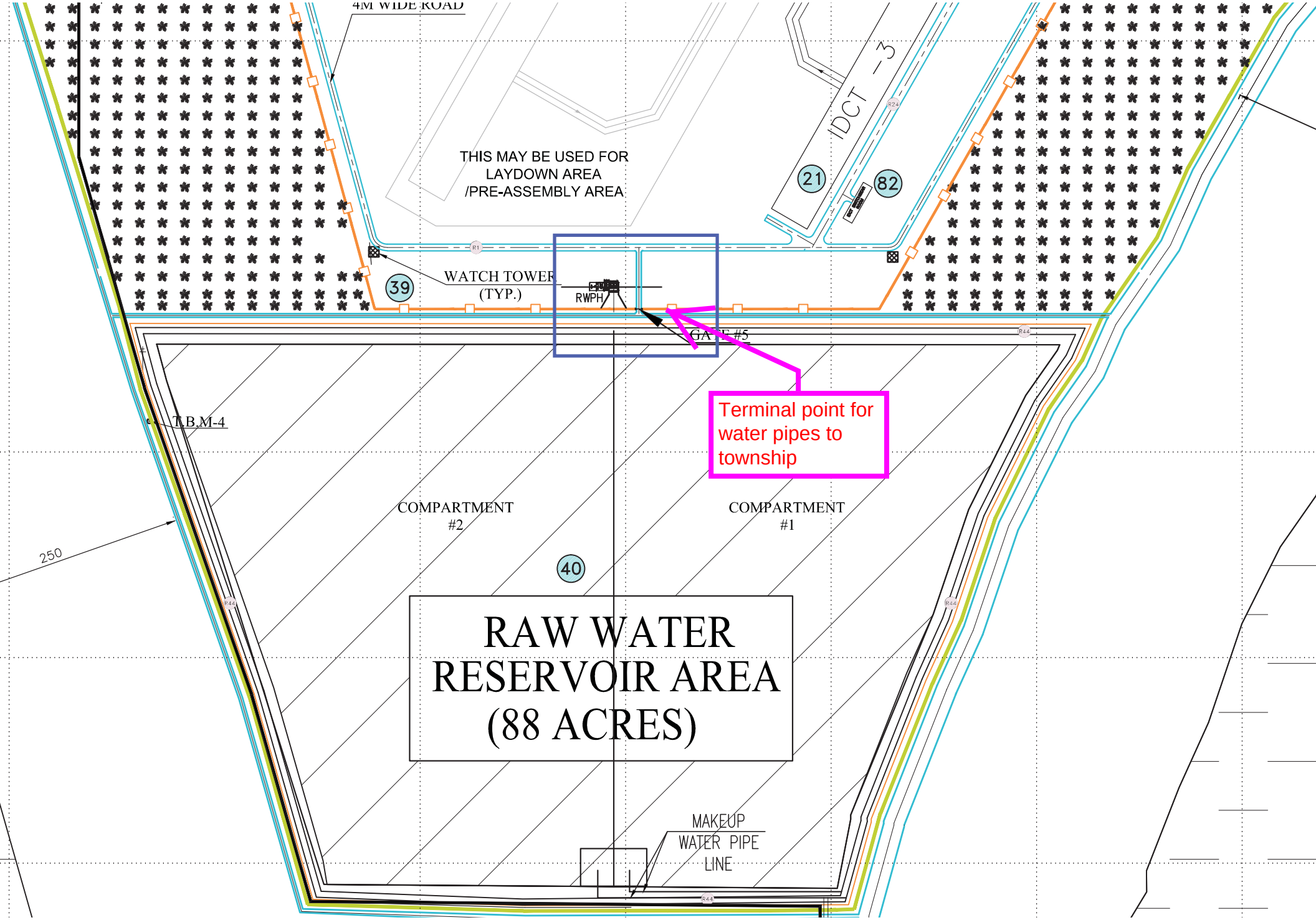
3.0 Terminal points

For Electrical works

11kv incoming supply at 4 Pole Gantry of Township.

For Drinking water pipe line

At plant boundary near raw water reservoir (as shown in the attached drg)


4M WIDE ROAD
IDCT - 3
THIS MAY BE USED FOR
LAYDOWN AREA
/PRE-ASSEMBLY AREA
21
82
39
WATCH TOWER
(TYP.)
RWPH
GATE #5
Terminal point for water pipes to township
T.B.M-4
COMPARTMENT
#2
COMPARTMENT
#1
250
40
RAW WATER
RESERVOIR AREA
(88 ACRES)
MAKEUP
WATER PIPE
LINE

3 X 800 MW NLC TALABIRA THERMAL POWER PROJECT

VOLUME – II B

SPECIFICATION NO PE-TS-N80-Township--C001

SECTION – B

PROJECT INFORMATION

Bharat Heavy Electricals Limited
Project Engineering Management
PPEI Building, Power Sector,
Plot No. 25, Sector 16A,
Noida (U.P.)-201301

1.0 Introduction

NLC India Ltd. (NLCIL) formerly Neyveli Lignite Corporation Limited is a 'Navratna', Government of India Enterprise engaged in mining of lignite and generation of power through lignite based thermal power plants. NLCIL was established by Government of India in 1956, following the discovery of lignite deposits in Neyveli, Tamil Nadu. NLCIL currently operates four open cast lignite mines in Neyveli (Tamil Nadu) and Barsingsar (Rajasthan) of total capacity of 30.6 Million Tonnes per Annum (MTPA). The company operates five pithead thermal power stations at the above locations with a total installed capacity of 3640 MW. NLCIL, through its subsidiary NTPL, has also recently commissioned a 1000 MW coal based power plant at Tuticorin (Tamil Nadu), 1001.56 MW solar plants and 51 MW wind power plant at Kazhuneerkulam (Tamil Nadu), thus bringing the total installed capacity of the company to 5581.56 MW.

In addition, another 3X660 MW coal based thermal power project at Ghatampur, U.P. in joint venture with U.P. is under execution.

NLCIL have now taken up implementation of Coal based pit head type NLC Talabira Thermal Power Project, consisting of three (3) supercritical units of 800 MW capacity each, near Kumbhari & Tareikela villages in Jharsuguda District, Odisha. Development Consultants Private Limited (DCPL) has been appointed as the Consultant for the project.

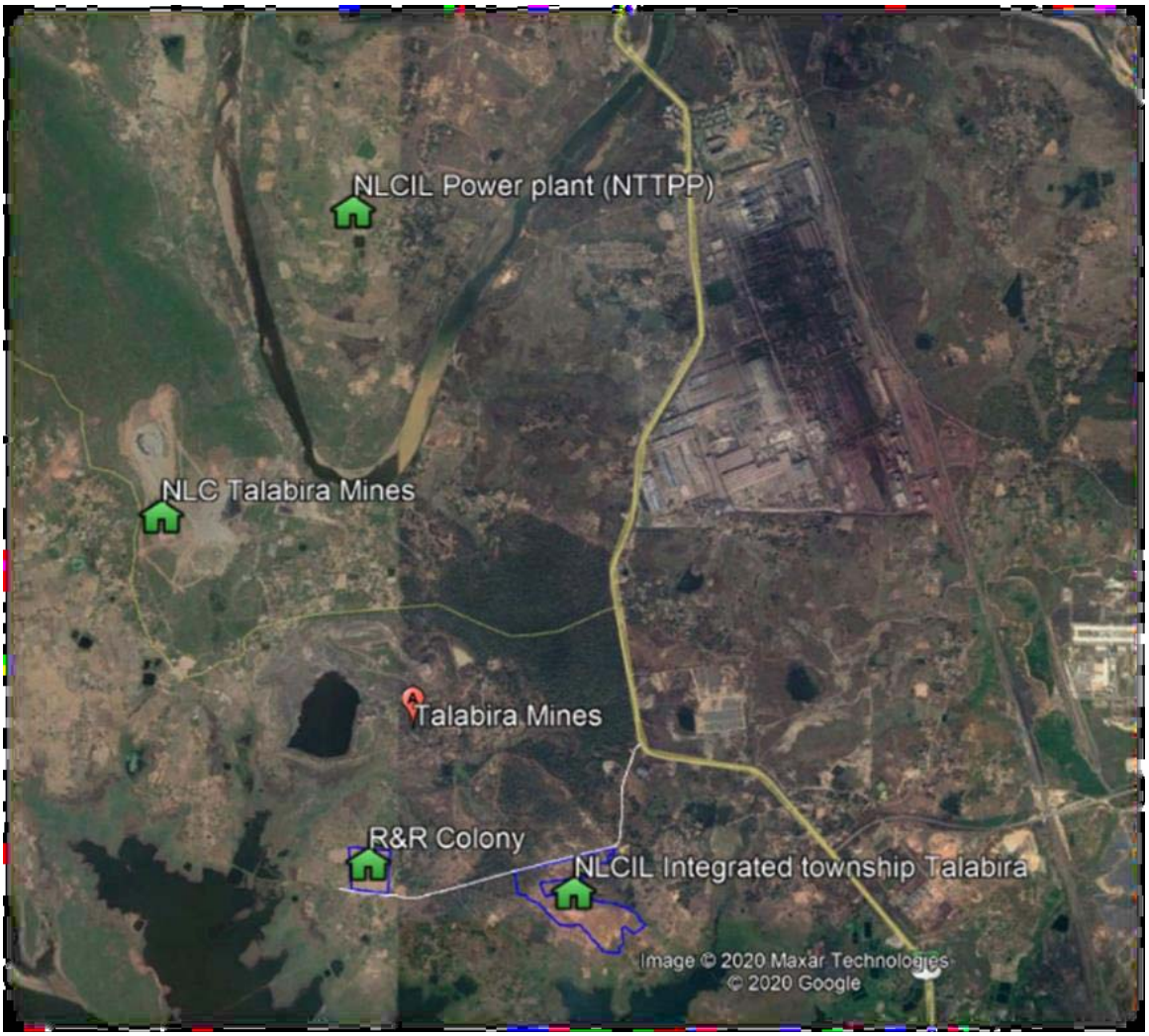
2.0 Location

The plant and township of the project proposed to be located near Kumbhari and Tareikela villages on south west of Brijraj Nagar town on Sambalpur Rourkela highway in Jharsuguda district and ash disposal area is located near Thelkolai village in Sambalpur district. The main plant area is defined by the following coordinates:

Description	Latitude	Longitude
North Extreme	21° 46’ 56.11’’ N	83° 59’ 30.59’’ E
East Extreme	21° 46’ 52.95’’ N	84° 00’ 20.72’’ E
South Extreme	21° 45’ 16.80’’ N	83° 59’ 9.36’’ E
West Extreme	21° 46’ 34.18’’ N	83° 58’ 50.54’’ E

Township location:

Integrated township is located at a distance of 1.50 kms from SH-10 running between Jharsuguda and Sambhalpur. Google earth location of Integrated Township is added below:



3.0 Access

The project site is approachable from Sambalpur – Jharsuguda highway after crossing Bedhan River via state PWD road. Two separate 4 lane roads from Sambalpur – Jharsuguda highway have been envisaged for main approach to the project site. The nearest airports are at Bhubaneswar at a distance of 350 km and Raipur airport is at a distance of approx. 290 km. Nearest railway station at Jharsuguda on Howrah-Nagpur main (trunk) section is at a distance of 11 kms.

4.0 Meteorological Data

The meteorological station nearest from the site is Jharsuguda. Salient meteorological data of site is given below:

a) Mean Ambient temperature : 33.1 ºC maximum
20.7 ºC minimum
27.5 ºC average

b) Extreme Ambient temperature : 48.0 ºC maximum
6.0 ºC minimum

c) Mean wet bulb temp : 26.3 ºC

d) Mean relative humidity :
(i) At 8.30 hrs. 66%
(ii) At 17.30 hrs. 50%

e) Annual Rainfall : 1445 mm

f) Wind load : In accordance with IS-875 for a basic wind speed of 50 m/sec, up to a height of 10 meters above mean ground level.

g) Seismic Zone : Zone III as per IS:1893 latest edition.

h) Altitude : 203 M above MSL

3 X 800 MW NLC TALABIRA THERMAL POWER PROJECT

VOLUME – II B

SPECIFICATION NO PE-TS-N80-682-Township-C001

SECTION-C

SPECIAL TECHNICAL REQUIREMENT

Bharat Heavy Electricals Limited
Project Engineering Management
PPEI Building, Power Sector,
Plot No. 25, Sector 16A,
Noida (U.P.)-201301

SECTION – C

SPECIFIC TECHNICAL REQUIREMENTS

NLC INDIA LIMITED (NLCIL)

REGD. OFFICE: 'NEYVELI HOUSE', 135, PERIYAR

EVR HIGH ROAD, CHENNAI – 600 010

TENDER SPECIFICATION

FOR

INFRASTRUCTURE WORKS (SECTION-B)

&

SINGLE PACKAGE ENGINEERING, PROCUREMENT & CONSTRUCTION (EPC)

VOLUME - IB

NLC INDIA LIMITED

NLC TALABIRA THERMAL POWER PROJECT 3x800 MW,

JHARSUGUDA, ODISHA

NLC INDIA LIMITED (NLCIL)

REGD. OFFICE: 'NEYVELI HOUSE', 135, PERIYAR

EVR HIGH ROAD, CHENNAI – 600 010

TENDER SPECIFICATION

FOR

INFRASTRUCTURE WORKS (SECTION-A)

OF

NLC INDIA LIMITED

NLC TALABIRA THERMAL POWER PROJECT

3x800 MW, PHASE - I

JHARSUGUDA, ODISHA

COMMERCIAL & TECHNICAL SPECIFICATIONS

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PART-I
COMMERCIAL

1.0 BRIEF SCOPE OF WORK: (Detailed scope of work is contained in TECHNICAL PART-II).

1.1 INTRODUCTION

The scope EPC contract shall covers complete design of Civil, Structural and architectural Works, detailed engineering, providing necessary labour, materials construction equipment, tools and plants, appliances, temporary works, supply and delivery to site, storage at site, construction works etc for the proper completion of ' **INFRA STRUCTURE WORKS** ' including, obtaining all statutory approvals from Local Authorities / Body including services for completion of the work in all respect for the Coal based Thermal Power Plant to be constructed as Phase-I (3 x 800 MW) near Kumbhari & Tareikela villages, Jharsuguda District, Odisha. All the execution drawings with detailed design engineering calculations, shall be got approved from NLCIL (through CCMS) prior to commencement of construction works.

2.0 <u>PRE QUALIFICATION FOR SUB CONTRACTOR.</u>

2.1 The main contractor may engage a sub-contractor to execute entire section-A (Infrastructure works) as a whole provided the sub-contractor shall possesses the following pre qualifications to the extent possible .

2.1.1 The sub-contractor should have completed the following during the last (7) seven years reckoned with the original scheduled date of tender opening.

a) Any embankment formation work/Road work / Water supply work/Drain formation work in a single contract involving earth work for a volume of minimum 15 Lakhs cubic meter using Machineries.

b) Any building work in a single contract agreement/work order of completed value not less than 80% of the value quoted by the main contractor for building works.

c) Any road work in a single contract agreement/work order of completed value not less than 80% of the value quoted by the main contractor for the road works.

d) The sub contractor should possess a valid Electrical Contractor's License issued by Electrical Licensing Board of the State.

e) The sub contractor should have executed erection of 33kV/11kV substation for a capacity of 6.3 MVA and above in a single contract agreement / work order.

f) The sub-contractor should have completed any work involving civil and electrical works executed in a single contract agreement/work order of completed value not less than 80% of the value quoted by the main contractor for section-A works.

2.2 The main contractor may also engage a sub-contractor to execute any part of section-A (Infrastructure works) provided the sub-contractor shall possesses the following prequalification to the extent possible in the respective part of work.

2.2.1 **SITE GRADING :** The sub contractor shall possess the following pre qualifications :

2.2.1.1 The sub-contractor should have completed the following during the last (7) seven **years** reckoned with the original scheduled date of tender opening.

a) Any embankment formation work/Road work / Water supply work/Drain formation work in a single contract involving earth work for a volume of minimum 15 Lakhs cubic meter using Machineries.

b) Any civil work in a single contract agreement/work order of completed value not less than 80% of the value quoted by the main contractor for site grading.

2.2.2 **BUILDING WORKS :** The sub contractor shall possess the following pre qualifications:

2.2.2.1 The sub contractor should have completed any building work in a single contract agreement/work order of completed value not less than 80% of the value quoted by the main contractor for the respective work, during the last (7) seven years reckoned with the original scheduled date of tender opening.

2.2.3 **ROAD WORKS :** The sub contractor shall possess the following pre qualifications :

2.2.3.1 The sub contractor should have completed any road work in a single contract agreement/work order of completed value not less than 80% of the value quoted by the main contractor for the respective work , during the last (7) seven years reckoned with the original scheduled date of tender opening.

2.2.4 **OTHER CIVIL WORKS:** The sub-contractor shall possess the following pre qualifications :

2.2.4.1 The sub contractor should have completed any civil work in a single contract agreement/work order of completed value not less than 80% of the value quoted

by the main contractor for the respective work , during the last (7) seven years reckoned with the original scheduled date of tender opening.

2.2.5 **ELECTRICAL WORKS:**

2.2.5.1 The sub contractor should possess a valid Electrical Contractor's License issued by Electrical Licensing Board of the State.

2.2.5.2 The sub contractor should have executed erection of 33kV/11kV substation for a capacity of 6.3 MVA and above in a single contract agreement / work order.

2.3 The main contractor may engage one or more subcontractors as in para 2.1 or 2.2 above by submission of the credentials of the sub contractor/ contractors and approval of the Purchaser . The prequalification of the sub contractors will be scrutinised and approval shall be given by the purchaser . In case if the prequalification of the sub contractor is almost nearer to the stipulated prequalification, the Purchaser have right to access the capability of the sub contractor and approval shall be given by the Purchaser .

3.0 COMMERCIAL TERMS AND CONDITIONS

3.1.0	**Commercial terms and conditions for civil and electrical works of INFRASTRUCTURE WORKS (SECTION-A) is same as the terms and conditions stipulated for civil and electrical works in SECTION-B respectively except the following clauses which are defined below:**
3.2.0	**TIME SCHEDULE:**
3.2.1	The basic consideration and essence of the Contract shall be strict adherence to Time Schedule for performing the Scope of Work.
3.2.2	The CONTRACTOR shall then prepare a detailed Pert-Net work and/ or other Control measure charts and finalise the same with the Purchaser .
3.2.3	The overall completion period of the scope of work in Section-A is 30 Months from the date of LOA. However the following time schedule shall be adhered by the contractor

	DESCRIPTION	Time Schedule in Months from the date of LOA .
	THERMAL POWER PLANT AREA	
	SITE GRADING IN MAIN PLANT AREA (except green belt)	Before commencement of civil foundation works under Section-B
	CONSTRUCTION OF COMPOUND WALL	15 Months
	THERMAL PROJECT OFFICE BUILDING	16 Months
	GATE COMPLEX , SECURITY AND TIME OFFICE	15 Months
	CISF- BARRACKS	18 Months
	COMPLETION OF OTHER CIVIL INFRASTRUCTURE WORKS	27 months
	INTEGRATED TALABIRA TOWNSHIP	
	Completion of 50% of the quarters as per requirement of Purchaser including all services required for occupation	20 months
	Completion of entire scope of work in integrated Talabira township	30 Months
	COMPLETION OF ENTIRE SCOPE OF WORK IN EXTERNAL ELECTRICAL WORKS	30 Months

3.3.0 TERMS OF PAYMENT:

3.3.1 **Initial advance Ist Stage: 5 %**

On establishment of Site office and on fulfilling the conditions:

a) Acceptance of LOA

b) Submission of Advance payment Bank Guarantee for an amount equal to 110% of the advance payment and acceptance thereof.

c) Submission of Contract Performance Guarantee for an amount equal to 10% of the contract price and acceptance thereof.

3.3.2 **IInd Stage advance : 5%**

After the contractor moves the required construction plant and machinery and commences the site activities and submission of advance bank guarantee for 110% of the advance amount and acceptance by the Purchaser.

3.3.3 **Stage progressive : 80%**

Payment shall be made as per billing break up submitted by the contractor for 80% of the work quoted by the contractor and approved by the Purchaser.

This payment can be effected after the approval by the purchaser on the Insurance policies submitted by the Contractor.

3.3.4 **Final Payment (Retention): 10%**

Upon completion of Defect Liability period for civil works and Warranty/ Guarantee for electrical works .

3.3.5 **OTHER CONDITIONS :**

i) All payments except advance will be released only after contract signing.

ii) The advance payment made to the contractor shall be adjusted on pro-rata basis while making progressive payment.

iii) The Contractor Employers shall be required to undertake the responsibility of remitting the Contribution/ subscription etc., of the contract workmen engaged by them towards EPF, ESI etc. (as applicable) and NLCIL as the principal employer, will ensure compliance under the relevant applicable statutes by verifying the remittance made by the contractor Employers before releasing part/final bills.

3.4.0 ADVANCE PAYMENT GUARANTEE:

3.6.1 If the contractor wishes to claim advance for mobilization of work, interest free advance up to 10% of the contract value(section-A) against receipt of Bank guarantee(s) for 110% of the advance amount as per the stipulations and on acceptance of the said Bank guarantee will be arranged. This bank guarantee shall be valid till the completion of scope of work (section-A) with a grace period of 2 (two) months.

(Other clauses including for delays in scope within the agreed time schedule are same as in section-B)

3.5.0 **PRICE REDUCTION CLAUSE:**

3.5.1 Time is the essence of the CONTRACT. In case the CONTRACTOR fails to complete the Works within the stipulated period, then, unless such failure is due to Force Majeure or due to PURCHASER'S defaults, the total Contract price (section-A) shall be reduced by ½% (Half percent) of the Total Contract Price (section-A) per week of delay or part thereof subject to a maximum of 5% of the Total Contract Price (section-A), by way of reduction in price for delay and not as penalty.

(Other clauses are same as in section-B)

PART II
TECHNICAL

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CHAPTER I
GENERAL

1. INTRODUCTION

The scope EPC contract shall covers complete design of Civil, Structural and architectural Works, detailed engineering, providing necessary labour, materials construction equipment, tools and plants, appliances, temporary works, supply and delivery to site, storage at site, construction works etc for the proper completion of work for the following **INFRA STRUCTURE** facilities including, obtaining all statutory approvals from Local Authorities / Body including services for completion of the work in all respect for the Coal based Thermal Power Plant to be constructed as Phase-I (3 x 800 MW) near Kumbhari & Tareikela villages, Jharsuguda District, Odisha.. All the execution drawings with detailed design engineering calculations, shall be got approved from NLCIL (through CCMS) prior to commencement of construction works.

2. SCOPE OF WORK

THERMAL POWER PLANT AREA:

List of Works:

1. Site grading of power plant & green belt area
2. Laying of Main Approach road to power plant
3. Construction of Compound wall around plant area
4. Laying of Peripheral fencing and peripheral inspection road (outside fencing) along acquired land boundary
5. Formation of Embankment along Bhedan river along with slope protection and toe drains as per recommendation of area-drainage study
6. Providing Construction water supply
7. Design & Construction of Thermal Project office building (G+1)
8. Design & Construction of Miscellaneous Non plant buildings
    1. Gate complex along with security and time office
    2. Parking lot
    3. Watch tower
    4. CISF – Barracks (G+2), Armoury and quarter guard, Canteen, security check post and toilet block
9. Providing construction power supply

INTEGRATED TALABIRA TOWNSHIP

1. **Preliminary works such as :**
   a) Topographical survey of Township area
   b) Site levelling & grading of township area
   c) Geotechnical investigation of Township area
   d) Establishing construction water supply
   e) Establishing construction power supply

2. **Design, engineering and construction of following buildings including internal electrification, fire safety, water supply, drainage & sewage arrangements within Township area:**
   a) Project head (PH) quarters – 3 Nos.
   b) Type IV Quarter –
      - ✓ RCC Multi-storeyed building (Stilt+4) provided with 2 staircases and 1 lift.
      - ✓ 4 buildings are located in one block provided with common garden and walkway in between
      - ✓ Number of blocks = 2 Nos.
      - ✓ 64 houses each of 1717 sqft area there in one block in four floors.
      - ✓ Number of houses = 64x2 = 128 Nos.
      - ✓ Car parking facility for all houses provided in stilt floor.
   c) Type III Quarter –
      - ✓ RCC Multi-storeyed building (Stilt+4) provided with 2 staircases and 1 lift.
      - ✓ 4 buildings are located in one block provided with common garden and walkway in between.
      - ✓ Number of blocks = 3 Nos.
      - ✓ 64 houses each of 1210 sqft area there in one block in four floors.
      - ✓ Number of houses = 64x3 = 192 Nos.
      - ✓ Car parking facility for all houses provided in stilt floor.
   d) Type II Quarter –
      - ✓ RCC Multi-storeyed building (Stilt+4) provided with 2 staircases and 1 lift.
      - ✓ 4 buildings are located in one block provided with common garden and walkway in between.
      - ✓ Number of blocks = 2 Nos.
      - ✓ 64 houses each of 1012 sqft area there in one block in four floors.
      - ✓ Number of houses = 64x2 = 128 Nos.
      - ✓ Car parking facility for all houses provided in stilt floor.

e) Type I Quarter –
   - ✓ RCC Multi-storeyed building (Stilt+3) provided with 2 staircases and 1 lift.
   - ✓ 4 buildings are located in one block provided with common garden and walkway in between.
   - ✓ Number of blocks = 2 Nos.(NLCIL) + 1 (CISF)
   - ✓ 48 houses each of Minimum 680 sqft area there in one block in three floors.
   - ✓ Number of houses in NLCIL area = 48x2 = 96 Nos.
   - ✓ Number of houses in CISF area = 48x1 = 48 Nos.
   - ✓ Two wheeler parking facility for all houses provided in stilt floor.

f) Executive hostel – 4 blocks of G+1 - 96 staff
g) Shopping complex– G+1 structure
h) Guest house – G+1 – 12 rooms
i) Recreation club , Sports office, badminton court, swimming pool and Library
j) Auditorium
k) Community hall
l) Hospital (30 bed) – G+1
m) School – G+1 – 14 classrooms, 4 labs, hall & library
n) Township administration (TA) office – G+1
o) Estate store
p) Two wheeler parking shed
q) Four wheeler parking shed
r) Security building
s) Servant's quarters for PH – 3 Nos.
t) VIP Guest House – G+1 with lift

3. Design, engineering and construction/development/laying of :

a) Compound wall around township area
b) Entrance arch to township and indicative arch at SH-10 entrance
c) Main Approach road from Integrated township to SH-10 (4 lane)
d) Internal main road within township (4 lane)
e) Internal road within township (Single lane)
f) Dedicated approach road from Power plant to township (2 lane)
g) Main Drinking Water pipeline network from Power plant WTP to township
h) Water supply distribution network including Overhead water tank and sump within township
i) Storm water drainage network within township
j) Sewage network with STP within township including recycling of treated water
k) Rain water harvesting scheme
l) Street lighting and external electrification

m) Park and playground
n) Gardening & walkway inside Type I, II, III & IV Blocks area
o) Statue/logo/beautification near main entrance of township

The contractor shall visit the Thermal project site and Township site before quoting rates to ascertain the actual site condition. The contractor's quoted rates are deemed to include everything from the award of work up to & including handing over of completed project and defect liability period. The EPC Contractor is required to connect all the external services like Water Supply, Sewerage, Drainage, Electric Supply, LAN/WAN, etc. to the main lines of the authorities/service providers which shall be integral part of his scope of work and deemed to be included in his quoted price. All municipal & mandatory approvals required for occupation and completion of the project shall be obtained by the Contractor.

In case of any contradiction between any parts of the Bid Document with the other, requirement of most stringent one shall be applicable and in the event of conflict between requirement of any two clauses of this specification, or different codes / standards, the more stringent requirement as per the interpretation of Owner is to be followed by bidder.

3. CODES AND STANDARDS

Following is a general listing of Codes and Standards to be used. Specific applicable codes and standards shall be identified in Technical Specifications as appropriate. Unless otherwise stated, the latest editions/ revision of following codes and standards as on the original scheduled date of tender opening along with addendums/ amendments, if any, shall be followed:

3.1. General

a) Internationally accepted design Codes and Standards where Indian Codes are not available and which are equivalent to Indian Standards (Latest version).
b) National Building Code of India.
c) "Accepted Standards" and "Good Practice" listed in the appendix to National Building Code of India.
d) IS-1256: Code of Practice for Building Byelaws.

3.2. Earthwork

a) IS-1498 : Classification and identification of soils for General Engineering purposes.

b) IS-3764 : Safety Code for excavation work.

c) IS-7293 : Safety Code for working with construction machinery.

d) IS-4081 : Safety Code for blasting and related drilling operation

e) Indian Explosives Rule 2008

.

f) IS-9759 : Guidelines for Dewatering during construction.

3.3. Concrete

a) IS-269 : Specification for 33grade Ordinary portland cement.

b) IS-383 : Coarse and fine aggregate for concrete.

c) IS-432 : Mild Steel and medium tensile steel bars and hard drawn steel wire for concrete reinforcement.

d) IS-455 : Portland Slag Cement.

e) IS-456 : Code of Practice for Plain and reinforced concrete.

f) IS-460 : Test Sieves (all parts).

g) IS-516 : Methods of test for strength of concrete.

h) IS-1199 : Methods of sampling and analysis of concrete.

i) IS-1566 : Hard drawn steel wire fabric for concrete Reinforcement.

j)	IS-1786	:	High strength deformed steel bars and wires for concrete reinforcement.
k)	IS 1489	:	Part 1: Specification for Portland pozzolana cement Part 1 Fly ash based
l)	IS-1834	:	Hot applied sealing compounds for joints in concrete.
m)	IS-2386	:	Methods of test for aggregates for concrete (all parts).
n)	IS-2502	:	Code of practice for bending and fixing of bars for concrete reinforcement.
o)	IS-3370	:	Code of practice for concrete structures for storage of liquids (all parts).
p)	IS-3414	:	Code of practice for design and installation of joints in buildings.
q)	IS-4948	:	Welded steel wire fabrics for general use.
r)	IS-7320	:	Concrete slump test apparatus.
s)	IS-7861	:	Code of practice for extreme weather concreting (all parts).
t)	IS-8041	:	Rapid Hardening Portland cement.
u)	IS-8112	:	Specification for 43 Grade ordinary Portland Cement.
v)	IS-12269	:	Specification for 53 Grade ordinary Portland Cement.
w)	IS-10262	:	Recommended guidelines for concrete mix design.

x) IS-13920 : Ductile Design and Detailing of RC Structures Subjected to Seismic Forces.

3.4. Foundations

a) IS-1904 : Code of practice for design and construction of foundations in soils: General requirements.

b) IS-2950 : Code of practice for design and construction of raft foundations.

c) IS-2974 : Code of practice for design and construction of Machine foundations (all parts).

d) IS 2911 : Code of practice for Design and Construction of Pile Foundations (All Parts).

3.5. Loading

a) IS-875 : Code of practice for design loads (other than earthquake) for buildings and structures.

b) IRC : Indian Roads Congress Codes (With latest amendments)

3.6. Masonry

a) IS-712 : Building limes.

b) IS-1077 : Common Burnt Clay Building Bricks.

c) IS-1127 : Recommendations for dimensions and workmanship of natural building stones for masonry work.

d) IS-1528 : Methods of sampling and physical tests for refractory materials.

e) IS-1597 : Code of practice for construction of stone masonry (all parts).

f)	IS-2212	:	Code of practice for brickwork.
g)	IS-2116	:	Sand for masonry mortars
h)	IS-2185	:	Concrete masonry units. (all parts - Hollow and Solid concrete blocks).
i)	IS-2250	:	Code of practice for preparation and use of masonry mortars.
j)	IS-2572	:	Code of practice for construction of hollow and solid concrete block masonry.
k)	IS-2691	:	Burnt clay facing bricks.
l)	IS-3414	:	Code of practice for design and installation of joints in buildings.
m)	IS-3495	:	Methods of tests of burnt clay building bricks.
n)	IS-4441	:	Code of practice for use of Silicate type chemical resistant mortars.
o)	IS-4860	:	Acid Resistant Bricks.
p)	IS 12894	:	Specification for Pulverized Fuel Ash-Lime Bricks

3.7. Doors, Windows & Ventilators

a)	IS-399	:	Classification of commercial timbers and their zonal distribution.
b)	IS-883	:	Code of practice for design of structural timber in building.
c)	IS-1003	:	Timber paneled and glazed shutters (all parts).
d)	IS-1038	:	Steel doors, windows and ventilators.

e)	IS-1081	:	Code of practice for fixing and glazing of metal (steel and aluminium) doors, windows and ventilators.
f)	IS-1361	:	Steel windows for industrial buildings.
g)	IS-2835	:	Flat Transparent sheet glass
h)	IS-1948	:	Aluminium doors windows and ventilators.
i)	IS-1949	:	Aluminium windows for industrial building.
j)	IS-2191	:	Wooden flush door shutters (Cellular and hollow core type).
k)	IS-2202	:	Wooden flush door shutters (solid core type).
l)	IS-3103	:	Code of practice for Industrial ventilation.
m)	IS-3548	:	Code of practice for glazing in buildings.
n)	IS-3614	:	Specification for metallic and non-metallic Fire check doors (all parts).
o)	IS-4021	:	Timber door, windows and ventilator frames.
p)	IS-4351	:	Steel door frames.
q)	IS-6248	:	Metal rolling shutters and rolling grills.

3.8. Roof & Flooring

a)	IS-2204	:	Code of practice for construction of reinforced concrete shell roof.
b)	IS-3201	:	Criteria for the design and construction of precast concrete trusses and purlins.

c)	IS-2210	:	Criteria for Design of R.C. shell structures and folded plates.
d)	IS-809	:	Rubber flooring materials for general purposes.
e)	IS-1195	:	Bitumen mastic for flooring.
f)	IS-1196	:	Code of practice for laying bitumen mastic flooring.
g)	IS-1198	:	Code of practice for laying, fixing and maintenance of linoleum floors.
h)	IS-1237	:	Cement concrete flooring tiles.
i)	IS-1443	:	Code of practice for laying and finishing of cement concrete flooring tiles.
j)	IS-2114	:	Code of practice for laying in situ terrazzo floor finish.
k)	IS-2571	:	Code of practice for laying in situ cement concrete flooring.
l)	IS-5491	:	Code of practice for laying in situ granolithic concrete floor topping.
m)	IS-5766	:	Code of practice for laying burnt clay brick flooring.
n)	IS-1197	:	Code of practice for laying of rubber floors.
o)	IS-2441	:	Code of practice for fixing ceiling coverings.

3.9. Waterproofing

a)	IS-1322	:	Bitumen felts for waterproofing and damp proofing.
b)	IS-1346	:	Code of practice for waterproofing of roofs with bitumen felts.

c) IS-1609 : Code of practice for laying damp proofing treatment using bituminous felts.

d) IS-3036 : Code of practice for laying lime concrete for a waterproofed roof finish.

e) IS-3037 : Bitumen mastic for use in waterproofing of roofs.

f) IS-3067 : Code of practice for general design, details and preparatory work for damp proofing and water proofing of buildings.

g) IS-3384 : Bitumen primer for use in water proofing and damp proofing.

h) IS-4365 : Code of practice for application of bitumen mastic for waterproofing of roofs.

3.10. Membrane Waterproofing

a) ASTMD-1076 : Solid Content

b) ASTMD-1475 : Specific Gravity

c) ASTMD-412 : Elongation

d) ASTMD-2240 : Hardness

e) ASTMD-822 : Water vapour transmission resistance

3.11. Soil Engineering

a) IS-1498 : Classification and identification of soils for general Engineering purposes.

b) IS-1892 : Code of practice for sub-surface investigation for foundations.

c) IS-2131 : Method for standard penetration test for soils.

d)	IS-2720	:	Methods of test for soils (all parts).
e)	IS-10379	:	Code of Practice for Field Control of Moisture and compaction of soils for embankment and subgrade.

3.12. Water Supply, Drainage & Sewerage

a)	IS-404	:	Lead pipes
b)	IS-458	:	Pre-cast Concrete pipes (with and without reinforcements)-specification
c)	IS-651	:	Salt glazed stoneware pipes and fittings.
d)	IS-771	:	Glazed fire-clay sanitary appliances (all parts).
e)	IS-774	:	Flushing cisterns for water closets and urinals (other than plastic cisterns)-Specification.
f)	IS-783	:	Code of practice for laying of concrete pipes.
g)	IS-1172	:	Code of basic requirements for water supply, drainage and sanitation.
h)	IS-1626	:	Asbestos cement building pipes and pipe fittings, gutters and gutter fittings and roofing fittings (all parts).
i)	IS-1742	:	Code of practice for building drainage.
j)	IS-2064	:	Code of practice for selection, installation and maintenance of sanitary appliances.
k)	IS-2065	:	Code of practice for water supply in buildings.
l)	IS-2470	:	Code of practice for installation of septic tanks (all parts).

m)	IS-3114	:	Code of practice for laying of Cast Iron pipes.
n)	IS-4127	:	Code of practice for laying of glazed stoneware pipes.
o)	IS-12251	:	Code of practice for Drainage of Building Basement.
p)	IS-1536	:	Centrifugally cast (spun) iron pressure pipes for water, gas and sewage.
q)	IS-1537	:	Vertically cast iron pressure pipe for water, gas and sewage.
r)	IS-3486	:	Cast iron spigot and socket drain pipes .
s)	IS-5329	:	Code of practice for sanitary pipe work above ground for buildings.
t)	IS-3076	:	Low density polyethylene pipes for potable water supplies.
u)	IS-1538	:	Cast iron fittings for pressure pipes for water, gas and sewage.
v)	IS- 1729	:	Cast Iron/Ductile Iron Drainage Pipes and Pipe Fittings for Over Ground Non-Pressure pipeline Socket and Spigot series.
w)	IS-784	:	Prestressed concrete pipes (Including Fittings)-Specification.
x)	IS-1726	:	Cast iron manhole covers and frames.
y)	IS-5961	:	Cast iron grating for drainage purposes.
z)	IS-5219	:	Specification for cast copper alloys traps: Part1 "P" and "S" traps.

aa) IS-772 : General requirements for enamelled cast iron sanitary appliances.

bb) IS-775 : Cast iron brackets and supports for wash basins and sinks.

cc) IS-777 : Glazed earthenware wall tiles.

dd) IS-2548 : Plastic water closet seats and covers (all parts).

ee) IS-2527 : Code of practice for fixing rainwater gutters and down pipes for roof drainage.

3.13. Paving & Road Works

a) IS-73 : Paving bitumen

b) IS-702 : Industrial Bitumen

c) IS-1201 : Method of testing tar and bituminous materials. thru' 1220

d) Practice followed by Indian Road Congress (all parts).

3.14. Earthquake Resistant Design

a) IS-1893 (all parts) : Criteria for earthquake resistant design of structures.

b) IS-4326 : Code of practice for earthquake resistant design and construction of buildings.

3.15. Structural Steelwork

a) IS-800 : Code of practice for general construction in steel.

b) IS-802 : Code of practice for use of structural steel in Overhead Transmission Line towers (all parts).

c)	IS-806	:	Code of practice for use of steel tubes in general building construction.
d)	IS-808	:	Dimensions for Hot Rolled steel beams, Columns, channels and angle sections.
e)	IS-813	:	Scheme of symbols for welding.
f)	IS-814	:	Covered electrodes for manual metal arc welding of carbon and carbon manganese steel.
g)	IS-816	:	Code of practice for use of metal arc welding for general construction in mild steel.
h)	IS-817	:	Code of practice for training and testing of metal arc welders.
i)	IS-818	:	Code of practice for safety and health requirements in electric and gas welding and cutting operation.
j)	IS-819	:	Code of practice for Resistance spot welding for light assemblies in Mild Steel.
k)	IS-919	:	Recommendations for limits and fits for Engineering.
l)	IS-1024	:	Code of practice for use of welding in Bridges and Structures subjected to Dynamic loading.
m)	IS-1161	:	Steel tubes for structural purposes.
n)	IS-1182	:	Recommended practice for Radiographic Examination of Fusion Welded Butt joints in steel plates.
o)	IS-1239	:	Mild steel tubes, tubulars and other wrought steel fittings (all parts).

p)	IS-1363	:	Black hexagonal bolts, nuts and locknuts (dia. 6 to 39 mm) and black hexagon screws (dia.6 to 24 mm). [all parts]
q)	IS-1364	:	Precision and semi-precision hexagon bolts, screws, nuts and locknuts (dia. range 6 to 39 mm). [all parts]
r)	IS-1365	:	Slotted countersunk flat head screws (Common Head Style) - Product Grade A
s)	IS-1367	:	Technical supply conditions for threaded steel fasteners.
t)	IS-1443	:	Code of practice for laying and finishing of cement concrete flooring tiles.
u)	IS-1608	:	Method for tensile testing of steel products.
v)	IS-1730	:	Dimensions for steel plates, sheets, strips and Flats for structural and general Engineering purpose.
w)	IS-1731	:	Dimensions for steel flats for structural and general Engineering purposes.
x)	IS-1852	:	Rolling and cutting tolerances for hot rolled steel products.
y)	IS-2016	:	Plain Washers
z)	IS-2062	:	Hot rolled medium and high tensile structural Steel
aa)	IS-2074	:	Ready mixed paint, air drying, red oxide zinc-chrome, priming.
bb)	IS-2633	:	Methods of testing uniformity of coating of zinc coated articles.

cc)	IS-3613	:	Acceptance tests for wire-flux combinations for submerged-arc welding of structural steels.
dd)	IS-3664	:	Code of practice for Ultrasonic Pulse echo testing by contact and immersions methods.
ee)	IS-3757	:	High strength structural bolts.
ff)	IS-4000	:	High strength bolts in steel structures.
gg)	IS-4759	:	Hot dip zinc coatings on structural steel and other allied products.
hh)	IS-5334	:	Code of practice for Magnetic Particle Flaw detection of welds.
ii)	IS-7215	:	Tolerances for fabrication of steel structures.
jj)	IS-7280	:	Bare-wire electrodes for sub-merged arc welding of structural steels.
kk)	IS-7318 [Part-I]	:	Approval test for welders when welding procedure approval is not required.
ll)	IS-8500	:	Structural steel – micro-alloyed (medium and high strength qualities).
mm)	IS-9595	:	Recommendation for metal arc welding of carbon and carbon manganese steels.
nn)	AWS D.1.1	:	Structural Welding Code.

3.16. Painting

a)	IS-348	:	Specification for French Polish.
b)	IS-427	:	Specification for Distemper, dry colour as required.

c)	IS-428	:	Specification for Distemper, oil emulsion, colour as required.
d)	IS-1477 [I & II]	:	Code of practice for painting of ferrous metal in buildings.
e)	IS-2338 [I & II]	:	Code of practice for finishing of wood and wood based materials.
f)	IS-2339	:	Specification for Aluminum Paints for general purposes in dual containers.
g)	IS-2395	:	Code of practice for painting concrete, masonry and plaster surface.
h)	IS-2932	:	Specification for enamel, synthetic, exterior - a) undercoating, b) finishing.
i)	IS-2933	:	Specification for enamel, exterior - a) undercoating, b) finishing.
j)	IS-5410	:	Specification for cement paint.

3.17. a) Indian Road Congress (IRC) Bridge Codes
b) Indian Railway Standard Bridge Rules

3.18. Environmental Protection

Charter on Corporate Responsibility for Environmental Protection (CREP) published in Gazette of India dated 27.08.2003.

4. DESIGN BASIS

General civil material specification for all RCC / Foundation works shall be as mentioned below:

Cement	Cement of the following Grades shall be used for all works. It shall conform to the following standards. All RCC works shall be with OPC Cement. For PCC, Plastering and other works, Portland - Pozzolana Cement IS 1489 (Parts 1 & 2) can be used.
Aggregate	Coarse aggregate - Shall confirm to latest IS 383. Fine aggregate - River sand / M-Sand can be used subject to confirmation of latest IS 383. However, quarry dust shall not be used for construction activities. Approval shall be obtained from NLCIL site in-charge for source of M-Sand.
Water	Potable water confirming to IS 456
Reinforcement	All reinforcement steel used shall confirm IS 1786 and shall minimum Grade Fe500. Binding wire for reinforcement shall be annealed steel wire 20 BWG conforming to IS: 280 “Specification for Mild Steel Wire”. The number of strands shall be as per BIS specification.
Bricks	Bricks shall conform to the requirements laid down in IS: 1077. Class 5 bricks shall be used for the work. Brickwork shall be as per IS: 2212.
Fly Ash Bricks	Fly ash lime bricks shall confirm to latest IS 12894

Minimum Grade of RCC work shall be M25 as per IS standards for all buildings/structures. For all water retaining structure, Minimum grade of RCC work shall be M30 as per IS standards.

The Contractor shall get mix design approved from Govt. Engineering College / NABL accredited laboratories. Advance action should be taken by the contractor for Mix design approval using the locally available coarse & fine aggregates, before commencement of the concreting works.

The buildings/structure shall be designed for loads and load combination as per Indian Standards (latest revisions)

i. **Dead load**: Dead loads shall be self-weight of all structural and nonstructural members as per latest IS 875, Part I

ii. **Live load** : Live loads shall be as per latest IS 875, Part II

iii. **Wind Load**: The wind load parameters shall be considered as per latest IS 875, Part-3.

iv. **Earthquake Load**: All structures shall be designed for Seismic forces for Zone III. Seismic parameters & Importance Factor shall be based on latest BIS: 1893(Part-1).

v. **Vertical Deflection & Horizontal Sway Limits**: The limiting permissible vertical and horizontal deflection for structural members shall be as per latest IS.

All the works shall be carried out as per the relevant I.S. Codes. The contractor has to carry out the work as per the approved drawings and as per the Engineer's instructions. All the material required for the work shall be as per IS specifications and approved by the Engineer.

RCC structures shall be designed based on limit state method of design as given in latest IS: 456 & ductility provision in detailing of RCC structures shall be considered based on latest IS: 13920 for Lateral force resisting elements or the structure.

All buildings shall be designed aesthetically considering the overall appearance and elevation.

The structural design along with STAAD file and detailed drawings of all buildings/structures shall be submitted to NLCIL for approval, before commencement of work.

5. DOCUMENT SUBMISSION

5.1. DRAWING SUBMISSION FOR APPROVAL

The Contractor shall submit the Master Drawing List (MDL) within 15 days from the date of issue of LOA by NLCIL. Categorization of the Drawings according to the priority for approval in line with the Project Time Schedule shall be done by assigning Target Date of first Submission. On approval of MDL, the Soft copy of individual Drawings / Design Calculations / Vendor Documents etc. prepared to meet the requirements of Specifications, safety and statutory regulations of the relevant authority, shall be uploaded, giving priority to the critical Drawings to the Central Contracts Management System (CCMS) Portal, for which access will be given by NLCIL. Further, one Hard Copy of the Drawing for each revision shall

be handed over to the NLCIL Engineering Department for review / return with comments / approval, till the Document is Approved. This review and / or approval of the drawings by NLCIL will not relieve the Contractor from any of his responsibilities under this contract. After approval of each Drawing, 6 Hard Copies shall be submitted for Stamping by NLCIL. Stamped hard copies shall be distributed as below.

- ✓ 2 copies to the Contractor
- ✓ 3 copies to NLCIL Site Engineers
- ✓ 1 copy for NLCIL Records.

5.2. AS-BUILT DRAWINGS AND DOCUMENTS

On completion of the project, '**As built Drawings'** shall be prepared after incorporating all the changes carried out during the execution. As built drawings shall be duly authenticated by contractor and NLCIL Site in-charge and shall be uploaded in CCMS. 1 set of stamped 'As built Drawings' in Hard Copy along with 3 sets of Soft Copies, each set stored in External Hard Drives of minimum 1 TB, shall be submitted.

5.3. CONSTRUCTION DOCUMENT

Based on approved design, detailed drawings for construction shall be prepared by the successful bidder.

- ✓ For reinforced concrete structures and foundations detailed bar bending schedules with approximate quantity involved (both reinforcement and concrete in grade wise) in approved format shall accompany each detailed drawing.
- ✓ For structural steel work the detailed drawing shall have schedule of structural members with approximate quantity of steel involved.

The successful bidder shall prepare detailed fabrication drawing along with bill of materials.

All detailed drawings/ fabrication drawings as decided by Engineer for all structures along with bar-bending schedule/bill of materials need be furnished to Owner at construction site for their review and approval before commencement of work.

5.4. EXECUTION:

The contractor has to carry out the work as per the approved drawings and as per the Engineer's instructions. All the material required for the work shall be as per IS specifications and approved by the Engineer.

5.5. LAYOUT

Before starting the work, the successful bidder shall carry out the setting out of foundation and structures and provide levels, with reference to general existing grid and benchmark. If the successful bidder uses the grid, benchmark and reference pillar made by other agencies, he shall coordinate with that Agency and shall satisfy himself of the accuracy of the reference marks. If he is required to set out the foundation afresh, he shall do so independently with reference to the one existing grid and benchmark, which has been followed by other agency at the instruction of the Engineer. In case any discrepancy is found, it shall be immediately brought to the notice of the Engineer for any rectification / modification necessary. No complaint shall be entertained at a later stage. The successful bidder shall accurately set out the position for holding down bolts and inserts.

If required, in the option of the Engineer, he shall construct and maintain pillars for grid, references and benchmarks and maintain them till the completion of the construction. He shall also help the Engineer with instruments, materials and labour for checking the detailed layouts and levels. The successful bidder shall be solely responsible for the correctness of the layout and levels, and Engineer's approval shall not be deemed to imply any warranty in carrying out the works correctly. The bidders shall take into account the cost of these in quoting their price.

5.6. WORKSMANSHIP

Workmanship shall be of the best possible quality and all work shall be carried out by skilled workmen except for those, which normally require unskilled persons. In case of manufactured materials, the successful bidder shall have, with no additional cost to the Owner, the services of the supervisors of the manufacturers to ensure that the work is being done according to the manufacturer’s specifications.

5.7. TEMPORARY WORK

All scaffoldings, staging, temporary bracing and other necessary temporary work required for proper execution of the Contract shall be provided by the successful bidder at his own cost and inclusive of all materials, labour, supervision and other facilities.

All temporary work shall be so constructed as not to interfere with any permanent work or with the work by other agencies. If it is necessary to remove any of the temporary work at any time to facilitate execution of the work or with the work of other agencies,

such removal and re-erection, if required, shall be carried out by the successful bidder at the direction of the Engineer without any delay and any extra cost on this account shall be borne by the successful bidder.

5.8. INTERFACE WITH STRUCTURES UNDER OTHER'S SCOPE

Modification in layout of foundation/structure during detail engineering stage may be necessary to avoid fouling with other structures. Necessary changes on this account shall be made by the bidder without any extra cost to Owner.

5.9. SEQUENCE OF WORK AND PROGRESS REPORT

The sequence in which the works are to be carried out shall be as approved by the Engineer in accordance with the construction method accepted by the Engineer and to be followed by the successful bidder. A programme of work is to be submitted for the Engineer's review and approval and this has to be periodically updated and modified as per actual progress to enable timely completion.

The successful bidder shall regularly submit to the Engineer progress reports for periods of working as specified by the Engineer showing up to date progress on all-important items of work.

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CHAPTER III
INTEGRATED TALABIRA TOWNSHIP

Scope of Work

For scope of work, **Refer Section A-Chapter 1 (General) – Cl 2.0**

Note:-

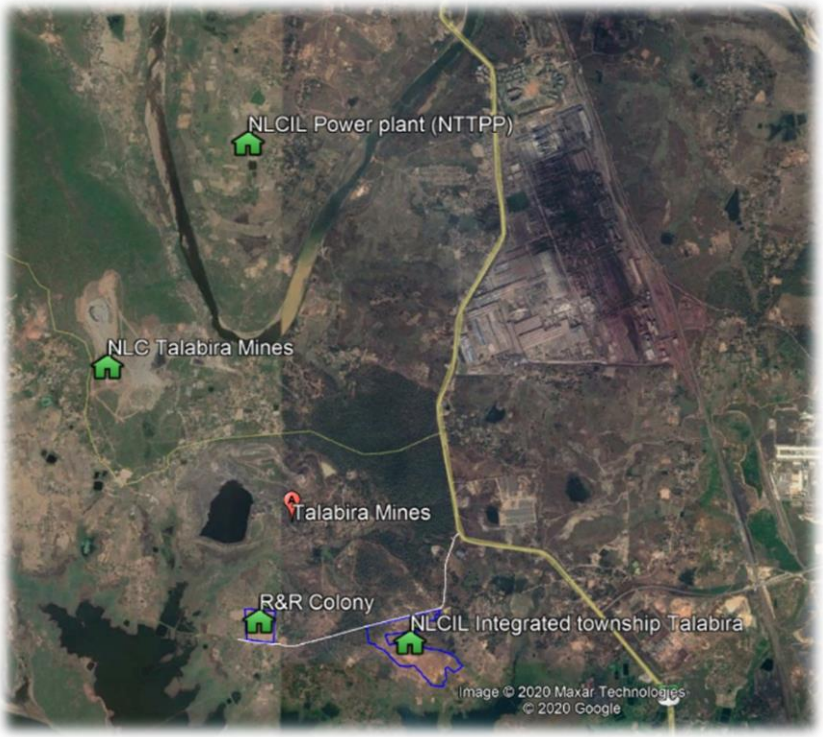
i. Unless otherwise specified here, all the works shall be referred & executed as per the relevant clauses mentioned in the **SECTION B-Volume II G Part A & B** of the document enclosed.
ii. Indicative preliminary drawings are mentioned wherever necessary in and same shall be taken for guidance.
iii. The contractor shall submit all the detailed engineering drawings along with design calculations for approval of OWNER, before commencement of construction.
iv. All the electrical works shall be done as per the electrical specifications.

Contractor shall carry out all works right from concept to commissioning of Integrated Talabira township including Architectural Planning, Survey, Soil investigation, Site grading, Architectural and structural design of all Structures and MEP services including allied works, obtaining all statutory approvals from Local Authorities / Body including services, preparing design document & execution drawings, getting approval from NLCIL, Construction and Commissioning of all infrastructure works.

The contractor's quoted rates are deemed to include everything from the award of work up to & including handing over of completed project including defect liability period. The EPC Contractor is required to connect all the external services like Water Supply, Sewerage including STP, Storm water drainage network, rain water harvesting, Internal & External Electric Supply including LAN/WAN and firefighting arrangements to the main lines of the authorities/service providers which shall be integral part of scope of work and deemed to be included in his quoted price. All municipal & mandatory approvals such as safety clearance for high rise buildings, etc required for occupation and completion of the project shall be obtained by the Contractor.

Township location:

Integrated township is located at a distance of 1.50 kms from SH-10 running between Jharsuguda and Sambhalpur. Google earth location of Integrated Township is added below:



1. PRELIMINARY WORKS

1.1. TOPOGRAPHICAL SURVEY

It is the responsibility of the CONTRACTOR to verify the various site conditions and features on his own before submission of bid and carry out necessary Survey work as required for the execution of work.

Preliminary township boundary & contour drawing is enclosed in **Annexure drg No. C26** for reference.

Topographical survey for the entire integrated township area shall be carried out:

- ✓ Grid interval – 5 m x 5 m (Plain area), 3 m x 3 m (Undulated area)
- ✓ Contour interval – 0.5 m
- ✓ Northing & Easting co-ordinates shall be based on UTM (Universal Transverse Mercator of respective Zone).
- ✓ Reference benchmarks in power plant area shall be transferred to township

After completion of topographical survey, the contractor shall submit draft survey report consisting of following documents:

- ✓ Write-up consisting of details of survey agency, equipments used for surveying.
- ✓ Contour layout for entire project area (AutoCAD file) with recommendation for site grading required for township area indicating FGL for each zone.
- ✓ Topographical survey drawing with spot levels for the entire project area (AutoCAD file).
- ✓ All the permanent features viz., buildings, structures, railway lines, temples, rivers, nallahs, etc. shall be marked in the plot plan of the site area.
- ✓ Excel file consisting of XYZ data for entire project area

After attending NLCIL's comments if any in this regard, Five (5) sets of hard copy and one (1) set of soft copy (in editable AutoCAD format) of the Final Survey report with all relevant drawings shall be submitted to NLCIL for review.

1.2. SITE GRADING AND LEVELLING

Contractor shall carry out site grading for integrated township area suitably after conducting topographical survey and finalizing finished ground level for different zones to optimize cutting and filling quantity.

- ✓ Before carrying out site grading work, Concrete boundary pillars shall be erected at site at suitable spacing covering the entire NLCIL acquired area of integrated township area.
- ✓ The quantity of earthwork cutting and filling involved for the grading shall be assessed before commencement of work. Site grading layout shall be submitted to NLCIL for review.
- ✓ Finished ground level for each zone shall be finalised considering Highest Flood level (HFL) of the area.
- ✓ Site grading methodology, suitability of available earth for filling and equipment's to be used for compaction shall be ascertained by the contractor.
- ✓ For site grading technical specification, refer Chapter II - Cl 1.2 to 1.6 and 1.8 to1.12

1.3. GEOTECHNICAL INVESTIGATION

Based on the plot plan developed, the CONTRACTOR shall identify proposed borehole locations and obtain the approval of OWNER/Consultant prior to commencing the investigation. Boreholes shall be spread judiciously to cover all major buildings & structures.

Following field tests shall be conducted:

- ✓ Bore Holes
- ✓ Static Plate load tests
- ✓ Field Permeability tests
- ✓ Field Density tests
- ✓ Electrical Resistivity Test
- ✓ All bore hole shall be drilled up to a depth of 25 m or N value reaches 100 whichever is earlier.
- ✓ Standard Penetration Tests (SPT) and collection of undisturbed soil samples (UDS) shall be carried out alternatively at 1 m intervals and at significant change of strata. The interval shall be increased to 1.5 m below 5m depth of boring. UDS shall be replaced by SPT in cohesion less strata. Even in highly weathered/disintegrated rock, where core recovery is poor, SPT shall be conducted. The first SPT in any borehole shall be conducted at 1.5 m depth

In rock strata, core recovery and Rock Quality Designation (RQD) shall be noted carefully for each run, immediately after cores are taken out of barrel

During boring, the level at which ground water is struck shall be carefully noted. Ground water samples shall be collected for chemical analysis. Boring shall be carried out without the use of water or drilling mud up to the depth of ground water table.

Following laboratory tests shall be conducted on the soil samples collected:

- ✓ Grain size analysis, Hydrometer analysis & Sieve analysis
- ✓ Moisture Content
- ✓ Specific Gravity
- ✓ Chemical Analysis of soil and Ground water including Sulphates, Chlorides, pH value, etc.
- ✓ Consistency Index: Liquid Limit, Plastic Limit, Plasticity Index, Shrinkage Limit and Shrinkage ratio.
- ✓ Consolidation test giving all relevant information.
- ✓ Swelling pressure and free swell index for expansive soils.
- ✓ Unconfined Compressive Strength on undisturbed soil samples
- ✓ Direct Shear Test
- ✓ Triaxial Compressive Strength Tests:
  - ○ Unconsolidated Undrained Test
  - ○ Consolidated Undrained Test
  - ○ Consolidated Drained Test
- ✓ California Bearing Ratio (CBR)
- ✓ Moisture-density relations for Standard Proctor and Modified Proctor tests.
- ✓ Any other tests those are essential.

The geotechnical investigation report shall necessarily include but not be limited to the following information:

- ✓ Recommended types of foundation
- ✓ Allowable safe bearing capacities and settlement values in different strata for shallow foundations indicating relevant design criteria adopted, method of analysis adopted etc.
- ✓ If Pile Foundation is necessary, type of pile recommended with reasons for the same, length, diameter, allowable capacity (lateral, pull-out and vertical) of individual and groups of piles, negative skin friction if any and magnitude of estimated negative skin friction.
- ✓ Recommendations for values for modulus of subgrade reaction for foundation design by elastic method.
- ✓ Recommendations for type of cement to be used for concrete with reference to the chemical nature of subsoil and ground water.
- ✓ Recommendations regarding excavations (shallow and deep), embankment, covering safe side slopes for excavation and embankment, dewatering, site drainage, roads etc.
- ✓ Recommended soil properties such as density, specific gravity, cohesion, angle of internal friction etc. for design.
- ✓ Precautions to be taken for design of lightly loaded structures when expansive soil is encountered with respect to swelling pressure and free swell index values obtained.

1.4. ESTABLISHING CONSTRUCTION WATER SUPPLY

The contractor has to make his own arrangements for water in construction activities.

1.5. ESTABLISHING CONSTRUCTION POWER SUPPLY

The contractor has to make his own arrangements for power in construction activities.

2. DOCUMENTS TO BE SUBMITTED BY CONTRACTOR DURING CONTRACT PERIOD:

The following documents are to be submitted for the approval of the OWNER/Consultant, prior to commencement of construction. All drawings shall be of standard sizes (Metric system). The list is not exhaustive but indicative only.

- ✓ **Reports :**
  - ➢ Topographical survey report
  - ➢ Site grading layout
  - ➢ Geotechnical investigation report based on additional/detailed geotechnical investigation carried out by CONTRACTOR along with

foundation recommendation for various buildings / structures / facilities

- ✓ **Layouts, design and drawings :**
  - Township layout with state of the art facilities and incorporating green building concept/features. For Indicative township layout- Refer **Annexure Drg no. C1**
  - Coordinate Layout drawing of all buildings, structures, roads, drains, water supply, sewage network, storm water drainage network, electrical networks etc.,
  - Architectural drawing including floor plans, elevations, cross sections with good aesthetic appearance and perspective view in colour for all buildings along with 3D Revit models for all residential buildings, Auditorium, library, Guest house, VIP Guest house & community hall.
  - Design documents for all buildings, facilities, services and structures along with STAAD files (.std) wherever applicable along with design calculations for foundations/substructure and superstructure of all buildings including pump houses and other structures.
  - Foundation and structural drawings for all buildings and structures.
  - Drawing showing underground facilities with co-ordinates of these facilities like buried pipes, buried cables, trenches, ducts, sewer, drains, sumps, pits, culverts, foundations etc.
  - Safety provisions and services including firefighting arrangements for all buildings as applicable (As per NBC 2016 with latest amendments). Necessary approval for lift operation shall be obtained from statutory authorities.
  - Scheme for supply of potable and service water to all buildings/utilities
  - Storm water drainage study furnishing levels of various terraces arrangements and details of drains, culverts etc., for storm water drainage system including rain water harvesting scheme.
  - Design calculations and drawings for all facilities and services like roads, culverts, bridges, paving, road crossings, drainage pump house (if required), drains, sewers, water supply, water tank, sumps, trenches, ducts etc.
  - Drawings of all architectural works including finish schedule, colour scheme (both internal and external), doors and windows, flooring and false ceiling, etc.
  - Design calculations and drawings for plumbing and building drainage.

- All other designs, details / drawings or any other submissions as indicated elsewhere in this specification and as required by the OWNER/Consultant.

All drawings / prints shall bear a stamp at a prominent place indicating whether the drawings are submitted for approval or for information. Drawings supplied by the CONTRACTOR shall bear the date and signature of authorized person of the CONTRACTOR.

✓ **Construction documents :**

- Quality Assurance and Quality Control plan.
- Total quantity of concrete (grade wise), reinforcement steel (diameter wise) and structural steel (section wise) in all construction drawings including Bar bending schedule.
- Write up on various statutory requirements and their compliance for various buildings and facilities.
- All statutory / municipal approvals before / during / post construction stages are to be obtained by the contractor and submitted to NLCIL. The statutory fee for such clearances shall be borne by the Contractor.
- All relevant civil/structural materials shall be brought to site along with necessary test certificates and should be submitted to the OWNER for approval. CONTRACTOR shall submit a list of preferred makes as given in the format (Refer Section B - Volume IIA, Section XIV) for the materials.
- List of all sub-contractors that the CONTRACTOR proposed to employ, indicating their addresses with telephone number, experience on similar jobs, name, qualification and experience of persons who shall be employed in the job etc., shall be submitted to the OWNER. CONTRACTOR to note that subletting of work back to back basis shall not be permitted.
- A write up on dewatering system proposed at the time of construction where deep construction are to be executed where water table is encountered.

3. GENERAL TECHNICAL REQUIREMENTS FOR TOWNSHIP CIVIL INFRASTRUCTURE WORKS:

✓ **Design basis :**

- All Structures shall be designed as RCC framed structure.
- Minimum height of each floor in residential buildings shall be 3000 mm (floor to floor).

- Minimum height of each floor in non-residential buildings shall be 3600 mm (floor to floor).
- Dead Load and Live Load as per latest IS 875 Part I & II respectively.
- Wind load as per latest IS 875 (Part III).
- Earthquake load shall be considered for all buildings as per latest IS 1893. Zone-3 shall be taken for seismic design of building.
- Ductile detailing shall be provided as per latest IS 13920.
- All water retaining structures shall be designed based on latest IS 3370.

✓ **Construction basis:**

- RCC Grade M25 for Buildings/structures.
- RCC Grade M30 for water retaining structures such as Water tank/sump/STP/Swimming pool etc.
- Minimum Reinforcement Steel grade Fe 500.
- Chamber burnt bricks shall be used for 230 mm thick walls up to basement in CM 1:5.
- All 230 mm thick brick wall above basement shall be using Fly ash bricks in CM1:5 and shall confirm to IS 12894:2002
- Chamber burnt brick work 115 mm thick above and below basement in CM 1:4.
- All parapet walls at service areas, balcony and corridors shall be provided 230 mm thick brick wall with 900mm height with 300 mm height Stainless Steel handrails over it.
- All roof parapet walls shall be provided with 115mm thick brick wall of 750 mm height with 230 mm thick brick wall as stiffener.
- Staircases shall be provided with Stainless steel handrails.
- In all non-residential buildings, necessary SS handrails with ramp arrangement at entrance and dedicated toilet arrangements shall be provided for PWD (Persons with Disability).

✓ **Plastering :**

- Inside & outside plastering shall be with CM 1:5 of 15 mm thick.
- Ceiling plastering shall be with CM 1:3 of 10 mm thick.

✓ **Flooring :**

- All rooms shall be provided with Vitrified ceramic tiles (Min.600X600)
- All toilets, balcony and corridor shall be provided with Anti-skid ceramic Flooring
- All staircases shall be provided with Antiskid Step Tiles

- Stilt floor, parking area and portico shall be provided with Antiskid Euro con Tiles Flooring.
- Badminton court shall be provided with Wooden flooring.
- Parquest flooring shall be provided in stage areas in Community hall and Auditorium.
- CC Flooring with carpet shall be provided in Auditorium seating area.

✓ **False ceiling :**

- All office rooms and conference/meeting halls shall be provided with gypsum cement fibre board false ceiling of approved design /size with aluminium framed supports and all necessary fittings.
- The false ceiling shall be designed aesthetically and shall be from reputed supplier.

✓ **Doors and windows :**

- For indicative joinery schedule for all residential buildings and non-residential buildings, refer corresponding annexure tender drawings. However contractor can propose better quality joinery items to add aesthetic value to all buildings. The same shall be finalised during detailed engineering on approval of NLCIL.
- All kitchen and bedroom cabinet shelves shall be provided with Kadappa / RCC precast / slabs.
- All kitchen and bedroom lofts/cupboards shall be provided with closed cabinet arrangement of approved quality with magnetic catcher and slow close hinges.
- Windows to be provided with steel Square bars of powder coated safety grills.
- Partition wall (partly panelled & partly glazed with pre-painted steel frame)-UPVC.
- Doors, windows and ventilators shall be provided with best quality fixtures/fittings of SS make as approved by Engineer-in-charge.
- Rolling shutter shall be of 18 gauge and shall confirm to IS 6248.

✓ **Dadooing and skirting :**

- All rooms shall be provided with skirting of 100 mm using Vitrified Ceramic tiles
- All Toilet and water closet/washrooms shall be provided with ceramic bathroom wall tiles for 2100 mm height.

- In urinal area dadooing shall be provided with ceramic wall tiles up to 1500 mm height.
- All kitchen working tables shall be provided with granite finish and ceramic wall tiles up to 600 mm ht above kitchen working table.
- All corridors in residential buildings shall be provided with 900 mm ht skirting using ceramic wall tiles.

✓ **Painting :**

- All interior walls shall be provided with interior emulsion of two coats over a putty coat.
- All exterior walls shall be provided with two coats of exterior emulsion of anti-fungal & weatherproof quality. The emulsion paint for all external walls shall be of reputed brand suitable for masonry surfaces for high rainfall zone.
- All room ceiling shall be provided with interior emulsion (White colour)
- All painting on masonry or concrete surface shall preferably be applied by roller. If applied by brush then same shall be finished off with roller. All paints shall be of approved make and quality.
- For steel members, Minimum 2 finishing coats of synthetic enamel paint shall be applied over a coat of Zinc based primer. For painting on steel work and ferrous metals, relevant BIS shall be followed.
- For painting on concrete, masonry and plastered surface IS: 2395 shall be followed.
- For windows safety grills, factory made with powder coated painting shall be provided.

✓ **Roofing :**

- In case of flat RCC roof - Ceramic weather proof roof tiles
- In case of sloped RCC roof - Terracotta red clay roof tiles/Mangalore pattern tiles

✓ **Water supply from power plant to township :**

- Contractor shall ascertain the total water requirement for integrated township considering 4 members per quarters/house and necessary provision for Non-residential buildings. Per capita water requirement shall be based on latest CPHEEO manual.
- Based on the detailed engineering, main pipeline of suitable diameter, thrust blocks, pipeline support structures, necessary pressure relief valves, Air valves, scour valves, fixtures, inspection chambers and

distribution pipeline network etc., shall be provided considering minor and major head losses.

- Cement Mortar lined Ductile Iron (CMDI) main water pipeline of suitable diameter shall be laid below ground level (Crust of pipe Minimum 1.20 m below ground level) from WTP in power plant to township including crossing Bhedan river via service duct in bridge, with suitable crossings across NH/SH/Other roads with required supporting structures (if any along the alignment) for a length of approximately 7 kms.
- Necessary route survey, required soil investigation shall be conducted along alignment of main water pipeline.
- Water pipeline shall be routed alongside dedicated approach road connecting power plant and township.
- Pipe testing to withstand the design pressure shall be carried out as per IS standards.
- Pumping systems with pump rooms at intermediate levels with standby pumps as per site requirement shall be provided.

✓ **Water supply within township :**

- Based on the detailed engineering, distribution pipelines of suitable diameter, thrust blocks, pipeline support structures, necessary, Air valves, scour valves, fixtures, valve chambers and distribution pipeline network etc., shall be provided considering minor and major head losses. Design calculations shall be made and executed for feeding the entire buildings in Township at a time.
- Main water pipeline after reaching township shall be pumped to RCC overhead tank (OHT) with minimum capacity of 3 lakh litres and minimum staging height of 24 m (based on design requirement) using booster pump of adequate capacity with standby arrangements
- OHT to be provided with pump room, lightning arrestor, GI ladder with proper approach with handrails from ground level for maintenance.
- For preliminary architectural drawing of Overhead tank, **Refer Annexure Drg no. C25**
- Also, provision to be given for adequate number of underground sump to meet the contingency situation. Minimum capacity of underground sump shall be 1 lakh litres.
- For preliminary architectural drawing of sump, Refer **Annexure Drg no. C24**

- Water distribution for all water supply and plumbing works shall be provided as follows :
  - Incoming and outgoing lines for OHT – GI medium class pipes confirming to latest IS 1239.
  - From outgoing line from OHT to vicinity of buildings (Main distribution line below GL)- UPVC pipes (Minimum 6ksc pipes) of reputed manufacturer and high quality conforming to IS: 4985
  - Incoming lines for all buildings to Sintex/RCC rooftop tanks – GI medium class pipes confirming to latest IS 1239. The minimum size of pipe dia shall be 40mm.
  - From Sintex/RCC Rooftop tanks to toilet/kitchen water lines - CPVC pipelines conforming to IS 15778 CTS SDR-11
  - Size of distribution lines shall be based on design calculations.
- CPVC pipelines conforming to IS 15778 CTS SDR-11 shall be used for down take pipe from Tank to house utilities including for connecting to geyser hot water line.
- Minimum Size of down take/outlet pipe from water tank at roof to the facility of the building shall be minimum 32mm and distribution lines shall be minimum 20mm pipe.
- Each house shall be provided with individual tank and individual outlet lines.
- For Road crossing and crossing of parking area, Distribution pipes shall be laid through MS encasing pipe of diameter 150mm higher than the crossing Distribution pipes. The encasing pipe shall be laid upto drains outer edge on both sides of the road / crossing of parking area
- SINTEX make HDPE storage water tank(White colour) conforming to IS: 12701 shall be provided over the roof for a capacity of minimum 1000 litres/quarters for all residential buildings with required pipeline & fittings.
- Similarly, SINTEX make HDPE storage water tank (White colour) conforming to IS: 12701 of adequate capacity shall be provided for all non-residential buildings.
- For hospital, school and executive hostel buildings, RCC water tank of adequate capacity shall be provided based on design requirement.
- All Water tanks shall be placed on elevated RCC platforms on roof.
- Hot water metal taps shall be provided in all bathrooms.
- Valves on branches, main line and pumps shall have ball valve/gate valve/butterfly valve of good approved quality, as per requirement.

- ✓ **Sanitary fittings :**
  - All Sanitary ware shall be using low flow Chrome Plated (CP) fittings and ffixtures.
  - *Each* toilet *shall have the following minimum fittings:*
    - Wall hung/floor mounted WC (Western type) of approved quality with seat cover/IC (Indian type) with flushing cistern.
    - Toilet paper holder and ablution tap/Health faucet for E.W.C, while only ablution tap for I.W.C. will be provided.
    - Circular table top and flat back wash basins with mirror, hot & cold water mixers as per requirement.
    - Stainless steel towel rail with brackets
    - Stainless steel soap holder and liquid soap dispenser.
  - Kitchen shall be provided with stainless steel sink with drain board.
  - Flat back semi-stall urinals of size 618x420x395mm shall be provided in toilets of non-residential buildings.
  - Sensor type automatic flushing cistern shall be provided in all non-residential buildings.

- ✓ **Rain water pipes and drainage network :**
  - Storm water drainage network within township shall be designed as per the township road layout and requirements and constructed based on approved drawings.
  - All buildings shall be provided with rainwater down take PVC pipe of minimum diameter 110 mm.
  - All terraces shall be drained by providing down-takes rainwater pipes and shall be connected to catch basins.
  - A separate piped drainage system for slopping roof with leaders shall be provided.
  - Rainwater pipes are separate and independent connected to the external storm water drainage system.
  - Garland drains need to be provided in all the buildings and shall be connected to the nearby main drain.
  - Rainwater in enclosed courtyards shall be collected in catch-basins and connected to storm water drains.
  - The Rain water from hard courts and landscaped area shall be collected by catch basins through a RCC pipe network / or open drains with gratings and connected to the rain water harvesting pits in the township complex and finally over flow from rain water harvesting will be led out to main drainage outlet.

- Drainage system with gradient min 1:500 with concrete lining. The water shall be collected in an earthen pond with infiltration system
- Design calculations for drain sizes based on catchment area shall be submitted for NLCIL review.
- Drainage & Rain Water Harvesting System: Systems of Rainwater Harvesting as per NBC-2016 - Out of the various techniques adopted in India, and approved of by the Central Ground Water Authority, it is proposed to use the Systems that utilize the rainwater run-off from various surfaces including Terrace and Roads and green areas etc. for re-charging of the underground water, through various measures.

✓ **Sewage network :**

- The Soil & Waste pipe system above ground shall be planned as a "two pipe system" as defined in IS: 5329, having separate pipes for waste from kitchen sinks, bathrooms, washbasins and another one for waste water from toilets.
- Vertical soil pipe shall be connected directly to the Inspection Chamber and then connected to nearest Man Holes & waste stacks pipes shall be connected to Inspection Chamber through Gully traps and then connected to nearest Man Holes using a common/individual horizontal drain pipe with necessary gradient..
- Vent pipes/chambers shall be provided at all sewer lines at appropriate locations for proper ventilations.
- Soil, waste, vent and anti-siphon age pipes, fittings and accessories below ground level shall be PVC (U) pipes confirming to IS 15328 (SDR 34). Minimum dia of pipe shall be 160mm OD
- Above GL Drainage pipes shall be PVC-U Type-B pipes as per IS: 13592-2013 (Reaffirmed 2018). Minimum dia of pipe shall be 110mm OD
- All pipes shall be straight and smooth and their inside free from irregular bore, blow holes, cracks and other manufacturing defects.
- Suitable manholes (Brickwork/RCC) shall be provided at every 30 m c/c and at all turning/interconnection points & change in levels.
- Cast Iron Manhole cover with frame conforming to latest IS 1726 shall be provided.
- As per MOEF requirement it is mandatory to provide STP now a days and same shall be provided for this project. The STP capacity shall be designed as total sewerage flow+ 20% additional as per MOEF guideline.
- It is proposed that the sewage generated from the all blocks shall be treated in a sewage treatment plant, so that the treated effluent can be

recycled for horticulture, flushing Road Washing requirements of the Project. So that site will be ZERO discharge site.

- Water to the garden hydrants shall be supplied through a separate garden pump, wherein treated water shall be supplied from treated sewage tank near STP.
- Sewer lines shall be laid at proper gradient to ensure gravity flow till Sewage treatment Plant (STP).
- Minimum gradients of soil and drainage pipe line shall be as follows (As per IS 1742):
  - 150 mm nominal dia. : 1 in 100
  - 200 mm nominal dia. : 1 in 145
  - 250 mm nominal dia. : 1 in 195
  - 300 mm nominal dia. : 1 in 250
- Sewage Treatment Plant of minimum capacity 1.00 MLD shall be provided at lowest level within township area. STP shall be designed for the required capacity based on the general principles covered in Section B, VOLUME: II IB/4, SECTION II.
- A schematic STP network with STP details shall be designed and constructed inclusive of all civil, mechanical, electrical and instrumentation.
- The treated effluent shall be acceptable for gardening / Irrigation as per State Pollution Control Board Norms.
- After commissioning the plant, the contractor should get clearance from State Pollution Control Board for the treated effluent and any modifications required to meet the effluent criteria shall be borne by contractor at his own cost.

✓ **Additional requirements :**

- Necessary service ducts shall be provided for routing water/drainage pipelines. Service ducts shall be easily accessible from maintenance point of view preferably using ACP Cladding.
- Solid Waste Management system
- The firefighting system along with Fire Extinguishers shall be provided as per latest National Building Code of India 2016 and other relevant I.S codes.
- Elevator/lift shall be provided for following buildings to accommodate minimum of 12 users :
  - Type I Quarters
  - Type II Quarters

- Type III Quarters
- Type IV Quarters

- Elevator/lifts shall be provided for hospital to accommodate a minimum of 16 users. (1 passenger lift and 1 service lift).
- Elevator/lifts shall be provided for VIP Guest house to accommodate a minimum of 8users.
- Anti-termite treatment shall be provided for all buildings.
- For all the internal electrification works, please refer "Technical Specification for Internal Electrification Works in Non-Plant Buildings of Main Plant and Township Infrastructure Works".
- Garden and walkway between all Type I, II, III and IV quarters shall be beautified by providing Korean grass, paver block along walkway, kerbs and sprinkler system.
- All Non-residential buildings shall be provided with plinth protection of 750 mm width and shall be provided with side drain arrangements.

4. RESIDENTIAL BUILDINGS

4.1. Project head (PH) quarters

Project head (PH) quarters is the house for the UNIT HEAD of the NTTPP, Talabira Mines and Overall Project Head. Each house is a G+1 building which includes a Servant Quarter, security outpost, and car parking facility and compound wall all around the house with landscaping and garden arrangement.
3 Nos of PH quarters shall be provided in township. Out of three quarters, one quarter shall be provided with a guest room of minimum 30 sqm area in first floor, in addition to the facilities shown in drawing.

For preliminary architectural drawing of PH Quarters, **Refer Annexure Drg no. C2**
For preliminary architectural drawing of Servant's quarters, **Refer Annexure Drg no. C28**

4.2. Type IV Quarter

- ✓ RCC Multi-storeyed building (Stilt+4) provided with 2 staircases and 1 lift.
- ✓ 4 buildings are located in one block provided with common garden and walkway in between.
- ✓ Number of blocks = 2 Nos.
- ✓ 64 houses each of 1717 sqft are there in one block in four floors.
- ✓ Number of houses = 64x2 = 128 Nos.

- ✓ Car parking facility for all houses provided in stilt floor.

For preliminary architectural drawing, **Refer Annexure Drg no. C3**

4.3. Type III Quarter

- ✓ RCC Multi-storeyed building (Stilt+4) provided with 2 staircases and 1 lift.
- ✓ 4 buildings are located in one block provided with common garden and walkway in between.
- ✓ Number of blocks = 3 Nos
- ✓ 64 houses each of 1210 sqft are there in one block in four floors.
- ✓ Number of houses = 64x3 = 192 Nos
- ✓ Car parking facility for all houses provided in stilt floor.

For preliminary architectural drawing, **Refer Annexure Drg no. C4**

4.4. Type II Quarter

- ✓ RCC Multi-storeyed building (Stilt+4) provided with 2 staircases and 1 lift.
- ✓ 4 buildings are located in one block provided with common garden and walkway in between.
- ✓ Number of blocks = 02 Nos
- ✓ 64 houses each of 1012 sqft are there in one block in four floors.
- ✓ Number of houses = 64x2 = 128 Nos
- ✓ Car parking facility for all houses provided in stilt floor.

For preliminary architectural drawing, **Refer Annexure Drg no. C5**

4.5. Type I Quarter

- ✓ RCC Multi-storeyed building (Stilt+3) provided with 2 staircases and 1 lift.
- ✓ 4 buildings are located in one block provided with common garden and walkway in between.
- ✓ Number of blocks = 2 Nos.(NLCIL) + 1 (CISF)
- ✓ 48 houses each of Minimum 680 sqft area (2 BHK) there in one block in three floors.
- ✓ Number of houses in NLCIL area = 48x2 = 96 Nos.
- ✓ Number of houses in CISF area = 48x1 = 48 Nos.
- ✓ Two wheeler parking facility for all houses provided in stilt floor.

4.6. Executive hostel

The Executive hostel building consists of G+1 RCC framed structure. 4 blocks with 12 rooms per floor. Total number of rooms is 96Nos. The executive hostel should have a reception office at the entrance with portico, mess with dining facility, service room, electrical panel room etc.

- ✓ Executive hostel shall consist of individual accommodation for executives.
- ✓ Each Unit shall consist of a bed room, and toilet.
- ✓ Parking shed with sufficient space for parking 20 Cars and 75 two wheelers shall be provided.

For preliminary architectural drawing, **Refer Annexure Drg no. C6**

5. NON-RESIDENTIAL BUILDINGS

5.1. Shopping complex– G+1 structure with car parking facility:

Shopping complex shall be provided with shops for supermarket, vegetable shop, saloon, medical shop, food court etc., Each floor shall be of minimum height 3600 mm.

- ✓ Central area between shops shall be provided with atrium and polycarbonate roofing.
- ✓ Parking shed with sufficient space for parking 12 Cars and 90 two wheelers shall be provided.

For preliminary architectural drawing, **Refer Annexure Drg no. C7**

5.2. Guest house – G+1 RCC framed structure:

Guest house shall be provided with 12 rooms with attached toilet facilities. Mess and dining facilities and recreation room shall be provided in Guest house.

- ✓ The guest house building shall be a G+1 RCC framed structure with lawn facility.
- ✓ Parking shed with sufficient space for parking 12 Cars shall be provided.

For preliminary architectural drawing, **Refer Annexure Drg no. C8**

5.3. VIP Guest House – G+1 RCC framed structure:

VIP Guest house is meant to be premium guest house building for VIP Guests. All facilities, flooring, finishing and sanitary shall be of superior quality and approval shall be obtained from NLCIL. Building shall be designed aesthetically like a resort building and 3D Revit model shall be submitted along with architectural drawing. Contractor can propose better quality facilities. Building shall be provided with landscaping and garden facility at entrance.

VIP Guest house shall be provided in township with following facilities:

Ground floor:

- ✓ Portico (Min 45 sq.m)
- ✓ Reception (Min 30 sq.m)
- ✓ Foyer (Min 50 sq.m)
- ✓ Board room with false ceiling, wall paneling and air conditioning (Min 75 sq.m)
- ✓ Waiting lounge near board room (Min 25 sq.m)
- ✓ Kitchen and service area (Min 30 sq.m)
- ✓ Dining hall with wash area (Min 75 sq.m)
- ✓ Power room of suitable size
- ✓ Store room (Min 12 sq.m)

First floor

- ✓ Total 10 Nos. of Air conditioned VIP Suite rooms (Min 30 sq.m) with living room, dressing lounge, attached toilet and balcony (Min 7.5 sqm). Total area for each VIP Suite including balcony shall not be less than 70 sqm.
  - Granite floor finishing of superior quality and approved color.
  - MDF board wardrobe with dressing lounge with white inside lamination
  - Wooden wall panelling in living room upto false ceiling height.
  - Washroom/Toilet :
    - Semi polished granite
    - Wall mounted Western closet with sensor type flushing cistern
    - Circular table top with granite top and flat back wash basins with mirror, hot & cold water mixers as per requirement.
    - Stainless steel towel rail with brackets
    - Stainless steel soap holder and liquid soap dispenser
    - Geyser/centralized hot water supply

- Balcony with Stainless steel glass handrail with toughened glass.
- False ceiling of superior quality of approved make for rooms and passage area.

✓ Corridors of minimum 3 m width provided ambient lighting and stainless steel glass handrail with toughened glass.

✓ Lift capacity shall be 8 users and shall be provided and shall be provided with machine room as per requirement.

✓ 2 Nos. of staircase (Min width 1.80 m) shall be provide on either side of atrium with headroom. Stainless steel glass handrail with toughened glass shall be provided for corridors, staircase and balcony. Granite floor finishing shall be provided in staircase.

- Compound wall of 1.80 m height, ornamental gate and security cabin.
- Atrium with polycarbonate roofing and greenery/lawn in Open area in between.
- Conference hall with false ceiling, acoustic panels and air conditioning.
- Car parking facilities for parking 10 cars shall be provided in the VIP guest house complex.

5.4. Recreation club:

Recreation club shall be provided with halls for health club/gym and indoor games like caroms, billiards etc., Minimum height of recreation club shall be 3600 mm.

✓ Parking shed with sufficient space for parking 90 two wheelers and 12 cars shall be provided for complex covering recreation club, sports office, swimming pool, badminton court and library.

For preliminary architectural drawing, **Refer Annexure Drg no. C9**

5.5. Sports office, badminton court and swimming pool:

✓ **Sports Office:** The Sports office shall be provided with office rooms for sports officer, stores and halls for coaches and discussion and shall be provided with foyer and portico.
For preliminary architectural drawing, **Refer Annexure Drg no. C10**

✓ **Badminton court:** The badminton court shall be a RCC framed structure of sloped roof ht 12.80M from FGL with galvalume roofing with tubular truss and turbo ventilator. The badminton court shall consist of minimum 02 courts with wooden flooring.
For preliminary architectural drawing, **Refer Annexure Drg no. C11**

- ✓ **Swimming Pool:** The size of the swimming pool shall be 25mx15m. Depth of swimming pool shall be 1.20 m at one end and 1.50 m at other. The pool shall include balancing tank, service building with treatment plant and all swimming pool accessories like starting blocks, lane ropes etc. Service building shall contain toilets, bathing facilities, locker arrangements, office room etc. Treatment systems such as alum dosing, chlorination and ozone treatment, filtration unit etc., shall be provided.
  For preliminary architectural drawing, **Refer Annexure Drg no. C12**

5.6. Auditorium:

- ✓ Auditorium shall consist of seating area, stage, foyer, green rooms, store rooms, common toilets, office rooms etc.,
- ✓ Auditorium shall be provided with false ceiling and acoustic wall panels in seating area.
- ✓ Air conditioning (AC) for auditorium
  For preliminary architectural drawing, **Refer Annexure Drg no. C13**

5.7. Community Hall:

- ✓ Community hall shall consist of seating area, stage, foyer, dining hall, kitchen, common toilets etc.,

  For preliminary architectural drawing, **Refer Annexure Drg no. C14**

5.8. Hospital :

- ✓ 30 Bed hospital shall have minimum facilities listed below :
  - Doctor's room and Nurse's room
  - Causality
  - Lab and X-ray rooms
  - Pharmacy
  - Minor surgery room
  - OP Rooms and waiting area for various departments
  - Male ward, female ward, pediatric ward and Post-natal ward
  - Operation Theatre (OT)
  - Meeting room
  - Store and maintenance rooms
  - Common toilets
- ✓ Hospital shall be provided with ramp facility to access first floor.
- ✓ The hospital shall be G+1 RCC framed structure with compound wall of height 1.8m with separate entrance for public access.

- ✓ A passenger and service lift (2 lifts) to accommodate 16 persons shall be provided at suitable location.
- ✓ Parking shed with sufficient space for parking 12 Cars and 90 two wheelers shall be provided.

For preliminary architectural drawing, **Refer Annexure Drg no. C15**

5.9. School:

- ✓ School shall have minimum facilities listed below :
  - 14 Class rooms
  - 4 Laboratory
  - 1 Examination hall
  - 1 Library
  - 1 Activity room
  - Principal, teachers and office staff room
  - Common toilets
  - Foyer, portico and OTS with lawn
- ✓ The school shall be G+1 RCC framed structure with compound wall of height 1.8m with separate entrance for public access.
- ✓ Lawn shall be beautified by providing Korean grass and sprinkler system.
- ✓ Parking shed with sufficient space for parking 180 cycles shall be provided.

For preliminary architectural drawing, **Refer Annexure Drg no. C16**

5.10. Township Administrative office (TA Office) and Estate store room

- ✓ Township administration office (RCC framed structure – G+1) shall have minimum facilities listed below :
  - Administration room
  - Accounts room
  - Security and time office
  - Civil, mechanical and electrical office rooms
  - Water supply and health rooms
  - Records room
  - Common toilets
  - Portico

  For preliminary architectural drawing of TA building, **Refer Annexure Drg no. C17**

- ✓ Estate Store rooms shall have facilities for :
  - Civil store room

- Electrical store room
- Water supply store room
- health store room

✓ Parking shed with sufficient space for parking 8 Cars and 45 two wheelers shall be provided.

For preliminary architectural drawing of Estate store rooms, **Refer Annexure Drg no. C27**

5.11. Library

✓ Library shall have minimum facilities listed below :

- Administrative office room
- Librarian room
- Library staff room
- Reading room
- Book shelf space
- Book issue counter
- Security room
- Common toilets
- Portico

✓ The library building shall be RCC framed structure with sloped roof with Mangalore pattern tiles

For preliminary architectural drawing, **Refer Annexure Drg no. C20**

6. MISCELLANEOUS BUILDINGS/STRUCTURES :

6.1. Compound wall around township area:

✓ Township compound wall of 2.4 m height covering a length of 6.5 km (approx.) shall be constructed around the township area over Finished Ground Level (FGL).

✓ Separate enclosures with gate provisions shall be provided for NLCIL Township as well as CISF Quarters area.

✓ Compound wall shall be with fly ash bricks above GL and chamber burnt bricks below GL with suitable wall foundation based on design requirement.

✓ Pre-moulded Expansion joint filler for 25 mm thickness shall be provided at 30 m c/c

✓ Broken glass piece shall be provided on top of compound wall in CM 1:3 for 20 mm thickness.

✓ Construction drawing shall be submitted to NLCIL for approval and work shall be carried out as per detailed technical specification.

For preliminary architectural drawing, **Refer Annexure Drg no. C21**

6.2. Entrance arch and security:

- ✓ Entrance arch with 1 main gate and 1 wicket gate shall be provided at main entrance to integrated township. Entrance arch shall be provided aesthetically with ACP cladding, granite etc., with a minimum width of 16 m and minimum height 6m. Entrance arch shall be designed and constructed subject to the approval of NLCIL. 3D Revit model shall be submitted to NLCIL along with architectural drawing.
- ✓ Indicative arch showing the location of NLCIL integrated township shall be provided at the junction of SH-10 and Township main approach road.
- ✓ Security office shall be a single storey with RCC roofing. Security room can clubbed with entrance and can be provided as a single structure also.

For preliminary architectural drawing for security building, **Refer Annexure Drg no. C22**

6.3. Main Approach road from Integrated township to SH-10 and Internal main road within township :

- ✓ Main approach shall be laid from SH-10 to integrated township. Its approximate length is about 1.60KM.
- ✓ Internal main road shall be laid as per integrated township layout for a length of approximately 2.00 KM. However, this shall be as finalised during detailed engineering.
- ✓ Approach road AND Internal main road shall be **4 lane road** with median, shoulder and side drains. Total width of road including drain shall be 20 m.
- ✓ Topographical survey shall be carried out along the approach road alignment for a width of 20 m for a grid size of 5 m x 5 m in flat terrain and 3 m x 3 m in undulated terrain.
- ✓ For formation of approach road, embankment/cutting shall be carried out suitably.
- ✓ Necessary road culverts (Box culvert) shall be constructed for drain/nallah crossings as per site requirement.
- ✓ Construction drawing shall be submitted to NLCIL for approval and work shall be carried out as per detailed technical specification.

Road work particulars:

- ✓ Construction of road shall consist of :
  - Earthwork excavation for base preparation
  - Providing Granular Sub Base(GSB)
  - Providing Wet Mix Macadam (WMM)
  - Providing Dense Bitumen Macadam(DBM) and
  - Providing Semi DBM and
  - Seal coat as per IRC &MoRTH
- ✓ Road edge protection and shoulder minimum 600 mm on either side.
- ✓ Drains on either side with longitudinal slope of min 1:500 with concrete lining
- ✓ Provide SIGN/SAFETY SLOGAN BOARDS

- ✓ Provide check posts with security cabin as per requirement, if any
- ✓ Provide cat eye, thermoplastic painting, and road side berm painting with yellow and black colour.
- ✓ Interlocking paver block for road side walkways
- ✓ Provide kerb/guard stone arrangements and centre median for four lane road.
- ✓ Speed breakers for a required length using readymade rubber speed breakers wherever required

Culverts:

- ✓ Box Culverts of various sizes shall be provided as per site requirement.
- ✓ RCC grade M25 & steel reinforcement grade minimum of Fe500.

Construction drawing shall be submitted to NLCIL for approval along with design document and work shall be carried out as per detailed technical specification.

Refer Annexure Drg no. C23 sheet 1 for preliminary drawing for typical road cross section.

6.4. Dedicated Approach road from Integrated township to Power plant (NTTPP) :

- ✓ Dedicated approach road shall be laid from power plant to integrated township. Its approximate length is about 6.00 KM.
- ✓ Approach road shall be **2 lane road** with shoulder and side drains. Total width of road including drain shall be 12 m.
- ✓ Topographical survey shall be carried out along the approach road alignment for a width of 20 m for a grid size of 5 m x 5 m in flat terrain and 3 m x 3 m in undulated terrain.
- ✓ For formation of road, embankment/cutting shall be carried out suitably.
- ✓ Necessary road culverts (Box culvert/Pipe culverts) shall be constructed for drain/nallah crossings as per site requirement.
- ✓ Necessary over bridges/underpasses shall be provided for road crossings. (If required)
- ✓ Construction drawing shall be submitted to NLCIL for approval and work shall be carried out as per detailed technical specification.

Road work particulars:

- ✓ Construction of road shall consist of :
  - Earthwork excavation for base preparation
  - Providing Granular Sub Base(GSB)
  - Providing Wet Mix Macadam (WMM)
  - Providing Dense Bitumen Macadam(DBM) and
  - Providing Semi DBM and
  - Seal coat as per IRC &MoRTH
- ✓ Road edge protection and shoulder minimum 600 mm on either side.

- ✓ Drains on either side with longitudinal slope of min 1:500 with concrete lining
- ✓ Provide SIGN/SAFETY SLOGAN BOARDS
- ✓ Provide check posts with security cabin as per requirement, if any
- ✓ Provide cat eye, thermoplastic painting, and road side berm painting with yellow and black colour.
- ✓ Interlocking paver block for road side walkways
- ✓ Speed breakers for a required length using readymade rubber speed breakers wherever required

Culverts:

- ✓ Box Culvert/Pipe culvert of various sizes shall be provided as per site requirement.
- ✓ RCC grade M25 & steel reinforcement minimum of grade Fe500.
- ✓ Minimum diameter for RCC pipe culvert shall be 1000 mm.

Construction drawing shall be submitted to NLCIL for approval along with design document and work shall be carried out as per detailed technical specification.

Refer Annexure Drg no. C23 sheet 2 for preliminary drawing for typical road cross section.

6.5. Internal roads within township

- ✓ Internal roads shall be provided within township area to connect all buildings from internal main road. Internal roads shall be provided all around all quarters including CISF quarters.
- ✓ Internal road shall be **single lane road** with shoulder and side drains. Total width of road including drain shall be 7.5 m. Drains shall be provided in township based on overall drainage arrangement considering catchment area.
- ✓ Necessary road culverts (Box culvert/Pipe culvert/Slab culvert) shall be constructed for drain/nallah crossings as per site requirement.
- ✓ Construction drawing shall be submitted to NLCIL for approval and work shall be carried out as per detailed technical specification.

Road work particulars:

- ✓ Construction of road shall consist of :
  - Earthwork excavation for base preparation
  - Providing Granular Sub Base(GSB),
  - Providing Wet Mix Macadam (WMM)
  - Providing Dense Bitumen Macadam(DBM) and
  - Providing Semi DBM and
  - Seal coat as per IRC &MoRTH
- ✓ Road edge protection and shoulder minimum 750 mm on either side.
- ✓ Provide SIGN/SAFETY SLOGAN BOARDS as applicable

- ✓ Provide thermoplastic painting, and road side berm painting with yellow and black colour.
- ✓ Speed breakers for a required length using readymade rubber speed breakers wherever required

Culverts:

- ✓ Box Culvert/Pipe culvert of various sizes shall be provided as per site requirement.
- ✓ RCC grade M25 & steel reinforcement minimum grade Fe500.
- ✓ Minimum diameter for RCC pipe culvert shall be 600 mm.

Construction drawing shall be submitted to NLCIL for approval along with design document and work shall be carried out as per detailed technical specification.

Refer Annexure Drg no. C23 sheet 1 for preliminary drawing for typical road cross section.

6.6. Park, playground and statue

- ✓ **PARK:** A park shall be designed aesthetically and constructed subject to the approval of NLCIL. The size of park shall be fixed based on area availability. The Park shall contain fountain arrangements(min 03nos) of various sizes, footpath of 2.4 m width minimum for walking, ornamental lighting arrangements including high mast, children play area with playing elements such as see saw, slide etc., The park shall be covered with lawn, sand, ornamental flowering plants, trees, etc.,
- ✓ **PLAYGROUND WITH AUDIENCE GALLERY**: A multi sporting Playground with arrangements for playing football, hockey and cricket with green turf (natural or artificial subject to the approval of NLCIL) and constructed as per approved drawing. It shall contain all elements including 400m track with eight lanes as per the Indian standards with goal posts for football. Mobile goal posts for hockey shall also be provided. Playground shall contain audience gallery for seating minimum 250 peoples and service building with suitable amenities for the sportsmen.
- ✓ **STATUE**: Statue/ NLCIL logo shall be provided near main entrance to add aesthetic value with approval of NLCIL.

6.7. PARKING LOT:

Car parking sheds of 16Nos for accommodating 64 cars and two wheeler sheds of 16 nos accommodating 480 Nos two wheelers/cycles with required internal lighting facilities shall be designed and constructed with approval of NLCIL. The flooring for sheds and parking lot complex shall have granolithic flooring. The sheds shall be made up of structural steel with galvalume roofing.

Car Parking Shed **(Refer Annexure drg No. C19)**	16 Sheds	16 sheds [each shed shall accommodate	4x16=64 cars minimum

		minimum 4 cars]	
Two-Wheeler Shed **(Refer Annexure drg No. C18)**	16 Sheds	5 sheds [each shed to accommodate minimum 30 two-wheeler or 60 cycles]	16x30=480 two wheelers minimum

6.8. Street lighting and external electrification

✓ Refer the document "Technical specification for internal electrification works for NTTPP Non- Plant buildings of Main plant and infrastructure works in township".

LIST OF CIVIL FIELD QUALITY ASSURANCE LABORATORY APPARATUS FOR TOWNSHIP QUALITY CONTROL LAB (MINIMUM REQMNNT)

SL NO.	DESCRIPTION	QTY
1	Cube moulds - 150 mm (ISI marked)	40
2	Cube moulds - 70.6 mm	6
3	Cube moulds - 50 mm	6
4	Cylindrical moulds – 300mm long 150mm dia	6
5	Beam mould – 700mmX150mmX150mm	6
6	Cube testing machine with two dial gauge and brick plate attachment	1
7	Digital thermometer - 200°C	3
8	Electrical oven	1
9	IS sieve set – 75 µ, 150 µ, 300 µ, 600 µ, 1.18 mm, 2.36 mm, 4.75 mm, 6.3 mm, 10 mm, 12.5 mm, 16 mm, 20 mm, 22.4 mm, 25 mm, 31.5 mm, 40 mm, 50 mm, 53 mm, 63 mm, 80 mm, 90 mm, 120 mm, 125 mm, pan (24 nos. per set)	1 Set
10	Measuring cylinder (glass) 50 ml, 200 ml, 500 ml	2 each
11	Physical balance Digital 10 kg capacity L.C. – 1 gm	1
12	Platform balance – Digital: 200 kg capacity	1
13	Pycnometer	2
14	Slump cone with tamping rod	6
15	Specific gravity bottle – 50 ml	2
16	Air entrainment meter capacity – 0.005 cum	2
17	Casagrande apparatus	1
18	Core cutter with collar and rammer	12
19	English type trowel	6

SL NO.	DESCRIPTION	QTY
20	Hygrometer with thermometer	1
21	Impact testing machine	1
22	Le-Chatelier apparatus with water bath	1
23	Measuring cylinder (plastic) 50 ml, 100 ml, 200 ml, 500 ml	1
24	Modified Proctor test apparatus	1
25	Length gauge	1
26	Penetrometer for mortar test	1
27	Moisture meter	1
28	pH meter	1
29	Sand replacement method apparatus	2
30	Screw gauge	2
31	Spatula	8
32	Standard Proctor test apparatus	1
33	Standard sand grade 1, 2, 3	500 kg each
34	Stop watch – Digital	1
35	Thermometer ordinary 50°C	10
36	Thickness gauge apparatus	1
37	Vernier calipers – Digital	1
38	Vicat apparatus	1
39	Weigh Boxes	2
40	Cylindrical measures: - capacity 0.01 cum, Dia (I) – 250 mm, Height – 280 mm, (I) with tamping rod as per IS 1199.	1

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CHAPTER IV
INTERNAL ELECTRIFICATION WORKS

PART 1
Technical Specification

1.0 Scope

This specification pertains to internal electrification of residential and Non-residential buildings on 3 phase, 415 volts or single phase, 230 Volts, 50 Hz Ac supply system, including provision of conduits with accessories, metal boxes and Boards, wiring, metering, protection, switchgear, UPS, stablizers, energy savers, provision of fans & luminaries, pre-commissioning/ commissioning tests and handing over. Separate conduits shall be laid for:

i) Emergency and non emergency circuits
ii) Power and lighting circuits

1.1 Regulations and standards

The system shall be governed by IS:732, I.E. Rules 1956, National Electric Code (NEC), ECBC, National Building code, relevant BIS Standards and Codes applicable to internal electrification and distribution works.

1.2 The definitions of terms shall be in accordance with IS:732-1989 (Indian Standard Code of Practice for Electrical Wiring), except for the definitions of point wiring, circuit, sub-main and main wiring.

The conventional signs & symbols for technical work shall be indicated in the working and as erected drawings.

1.3 GENERALCONDITIONS:

a. Before starting wiring work approval of site drawings shall be obtained regarding layout, no.of points to be wired and location of switch boards etc.
b. All switchboards shall be of GI box type/ PVC box compatible with modular switches/plug points. No wooden switchboards shall be used.
c. The wiring shall be done from a distribution system through main and/or branch distribution boards The system design and location of boards will be properly worked ou and approved by site supervisor.
d. Each main distribution board and branch distribution board shall be controlled by an incoming circuit breaker. Each out going circuit shall be controlled by a circuit breaker/switch with fuse.All Main/sub distribution boards shall be double door recess type.

e. For non-Rresidential buildings, as far as possible, Dbs shall be separate for light and power.Only MCCB/MCB type DBs shall be used. Kitkat fuse, glass fuse, Re-wirable type fuses shall not be used.
f. ThreephaseDBsshallnotbeusedforfinalcircuitdistributionasfaraspossible.
g. 'Power' wiring shall be kept separate and distinct from light wiring, from the level of circuits (Sub-main),i.e., beyond the branch distribution boards. Conduits for light/ power wiring shall be separate.
h. Essential/non-essential/UPS distribution each will have a completely independent and separate distribution system starting from the main, switch board up-to final wiring for each system.
i. Generally, no switchboard will have more than one source of incoming supply.
j. Each MDB/DB/Switch Board will have spare outgoing ways for future expansion.
k. All M.S clamps/structures/hardware should be hot dip galvanized. If not possible special structures cold galvanization paint shall be applied.

1.4 Wiring

1.4.1 (a)Main wiring: Main wiring shall mean the wiring from one main/distribution switch board to another.

(b) Sub-main wiring: Sub main wiring shall mean the wiring from the distribution board to the 1st tapping point inside the switch box, from where point wiring starts.
(c) PVC insulated, multi stranded, Heat resistant fire retardant (HRFR), low smoke, flexible copper conductor cables of 1.1kVgrade, conforming to IS:694/1990, ISI marked shall be used.
(d) Minimum size of wiring cable/s for light and power points shall be as below:

- Light/Fan/6Amp Plug point wiring -2Run of 2.5 Sqmm& 1Run of 1Sqmm.
- Circuit Wiring -2Run of 2.5 Sqmm& 1Run of 1Sqmm
- Group control light point wiring -2Run of 4 Sqmm& 1Run of 1.5 Sqmm
- 16Amp Power plug wiring -2Run of 4 Sqmm& 1Run of 1.5 Sqmm
- AC point wiring -2Run of 6 Sqmm& 1Run of 2.5 Sqmm
- Main Wiring -4Run of 16 Sqmm& 2Run of 4 Sqmm
  (From LT panel to 3Phase DB)
- Sub main wiring -2Run of 10 Sqmm& 1Run of 4 Sqmm
  (From 3phase DB to Single phase DB)

(e) Flexible cable – Copper conductor, 3 core flexible cables shall be used for connecting single phase appliances etc.

1.4.2 Point wiring:

I. **Definition:** A point (other than plug point)s hall include all work necessary in complete wiring to the following outlets from the controlling switch or MCB:

a. Ceiling rose or connector (in the case of points for ceiling/exhaust fan points, prewired light fittings, and call bells).
b. Ceiling rose (in case of pendants except stiff pendants). Standard specification for Electrical (General)Works
c. Back plate (in the case of stiff pendants).
d. Lamp holder (in the case of goose neck type wall brackets, batten holders and fittings which are not prewired).
e. Main and sub-main wiring as described above.
f. Distribution boards of reputed make as required, modular switchboard, RCCBs in Main distribution board of adequate capacity of ABB/Siemens/Legrand/L&Tmake.

II. Scope:

Point Wiring shall include:

a. Conduit/channel as the case may be, accessories for the same and wiring cables between the switch box and the point outlet, loop protective earthing of each fan/light fixture.
b. All fixing aaccessories such as clips, screws, Philplug, rawl plug etc. as required.
c. Metal or PVC switch boxes for control switches, regulators, sockets etc., recessed or surface type, and phenolic laminated sheet covers over the same.
d. Outlet boxes, junction boxes, pull-through boxes etc. but excluding metal boxes if any, provided with switchboards for loose wires/conduit terminations.
e. Control switch or MCB, as specified.
f. 3 pin or 6 pin socket, ceiling rose or connector as required.
g. Connections to ceiling rose, connector, socket outlet, lamp holder, switch etc.
h. Bushed conduitor porcelain tubing where wiring cables pass through wall etc.
i. Main and sub main wiring of appropriate size.
j. Prewired MDB and DBs of ABB/Legrand/L&T make as required including

MCBs, RCCBs for MDBs will not be paid separately.

k. Earth wire run as per requirements.

III. **Point wiring for plug points**:

a. 16A plug points shall be mounted on separate modular board. 6 A plug point can be mounted on light/fan point switchboard or separately. Not more than 1(one) 6A plug point will be allowed on commons witch board.

b. The 6A plug point wiring shall include, controlling switch, socket and necessary wiring from sub main including earthing of third pin.

c. The 16A plug point wiring shall include separate board as approved consisting of controlling switch, socket, MCB, earthing.

IV. The following points required for residential building

- Sufficient number of LED fittings shall be provided like bed room ,hall ,kitchen &bath room etc.
- Calling bell shall be provided in hall .
- 16/6 Amp plug shall be provided for refrigerator ,washing machine in hall, dining etc.
- Foot lamp shall be provided in bed room.
- MCB plug with 20A SPMCB & 16A SPT shall be provided for geyser in bath room
- MCB plug with 20A SPMCB shall be provided for heater in kitchen & 16/6 Amp plug,6Amp plug for Mixie, Wet grinder.
- MCB plug with 25A SPMCB & 16A SPT shall be provided for AC in Bed room.

1.4.3 System of wiring:

a. Wiring shall be done only by the looping system. Phase/live conductors shall be looped at the switch box. For point wiring, neutral wire/earth wire looping for the 1st point shall be done in the switch box;a nd neutral/earth looping of subsequent points will be made from point outlets.

b. In wiring, no joints in wiring will be permitted anywhere, except in switch box or point outlets, where jointing of wires will be allowed with use of suitable connector.

c. The wiring throughout the installation shall be such that there is no break in the neutral wire except in the form of linked switch gear.

d. Colour coding:- Following colour coding shall be followed in wiring:-

Phase	Red/Yellow/Blue.(Threephasewiring)
Live	Red (Single phasewiring)
Neutral	Black
Earth	Green/Yellow-green.

e. Termination of Sub main circuit into switchboard:-Sub-main (Circuit) will consist of phase/neutral/earth wire. Sub-main (Circuit) will terminate in a switch board (first tapping point, where from point wiring starts)&the switch

board will have phase, neutral and earth terminal to receive phase/ neutral/earth wire.

1.4.4 Run of wiring:

a. The type of wiring shall be as specified in the tender documents/detailed at site namely, surface conduit/concealed conduit, MS/PVC, channel(Casing/Capping).
b. Surface wiring shall run as far as possible along the walls and ceiling, so as to be easily accessible for inspection.
c. Above false ceiling, in no case, open wiring shall be allowed. Wiring will be done in recessed conduit or surface steel conduit.
d. In concealed conduit system ,routes of conduit will be planned, so that various inspection boxes provided don't present a shabby look. Such boxes can be provided 5 mm above plaster level, and they can be covered with plaster of Paris with marking of junction boxes.
e. Generally conduits for wiring will not be taken in floor slabs.

1.4.5 Passing through walls or floors:

When wiring cables are to pass through a wall, these shall be taken through a protection (steel/PVC) pipe of suitable size such that they pass through in a straight line without twist or cross in them on either end of such holes. The ends of metallic pipe shall be neatly bushed with PVC or other approved material.

All floor openings for carrying any wiring shall be suitably sealed after installation.

1.4.6 Joints in wiring:

a. No bare conductor in phase and/or neutral or twisted joints in phase, neutral, and/or protective conductors in wiring shall be permitted.
b. There shall be no joints in the through-runs of cables. If the length of final main or sub- main is more than the length of a standard coil, thus necessitating a through joint, such joints shall be made by means of approved mechanical connectors in suitable junction boxes.
c. Termination of multi stranded conductors shall be done using suitable crimping type thimbles.

1.4.7 Capacity of Circuits (Sub-main):

a. Lighting circuit from each sub main shall feed light/fan/call bell/6A outlet points. Each circuit shall not have more than 800Watt onnected load or more than 8points.
b. Power sub main circuit will have only one 16A outlet per circuit. Not more than

4Nos.6A outlets outlet shall be allowed from one sub-main.

c. All Loads more than 1 KW each shall be controlled by suitably rated MCB and cable size shall be decided as per calculations.

1.4.8 Measurements

Measurement of point wiring for light points, fan points, exhaust fan points, group points, light plug points, power plug points & call bell points shall be done on unit basis by counting only.

Measurement of twin control point wiring shall be done on unit basis by counting.

1.4.9 Circuit Wiring

Circuit Wiring shall mean the wiring from the distribution board to the first tapping point inside the switch Board, from where point wiring starts. Looping of switch boards in the same circuit shall also be measured along the length of conduit for circuit wiring.

1.4.10 Sub main Wiring

a. Sub main wiring shall mean the wiring from the meter board or main board/ sub main board to Distribution board/ Sub distribution board as the case may be. Looping of distribution boards/ sub distribution boards shall also be provided along the length of conduit for Sub Main wiring. Main Distribution Boards, Sub Distribution Boards shall be double door recess type. MCB and LCCBs of requisite rating should be provided in the distribution board.

b. Circuit Wiring/ Sub main wiring cable/s along with earth wire cable/s shall be of the capacity specified in Bid document/NLCIL standard. Wiring of each circuit wiring/ sub/ main wiring cable/ s along with earth wire cable/s shall be drawn into an independent conduit. Drawn boxes of suitable size shall be provided at convenient locations to facilitate easy drawing of the circuit wiring/ sub main wiring cable/s. Cost of junction Board/ draw Boxes are deemed to be included in the rates of circuit wiring/ sub main wiring cables along with earth wire cable/s. **Single phase circuits shall have single earthwire whereas three-phase circuits shall be provided with two earth wires.**

c. Where sub- main, circuit wiring and point wiring cables are connected to the switch/ switchgear etc, sufficient extra length of cable/s (not less than 150 mm) shall be provided to facilitate easy connection and maintenance.

1.5 Joints in the Wiring

All joints in the wiring shall be made at main switch boxes and distribution boards only. No joint shall be made in conduits and junction Boxes or in the length of wiring cable. Wiring cable shall be continuous from outlet to inlet. All joints shall be made by use of connectors and lugs. All wire ends to be provided with lug and

connected with requisite fasteners. Lugs should be crimped properly with crimping tools.

1.6 Conduit System

1.6.1 Type and Size of Conduit

1.6.1.1 The Conduit wiring shall be carried out as under:

All the non-metallic conduit pipes and accessories shall be of suitable materials complying with IS-2509:1973 and IS-3419:1989 for rigid conduits and IS-9573(Part5):2000 for flexible conduits. Internal wiring in the buildings shall be done with ISI marked PVC rigid conduit of size not less than 25mm diameter and thickness 2.0mm (Nominal size).PVC conduit shall be used with all its associated accessories such as bends, couplers, saddles, metal deep boxes (100 mm deep for ceilings), PVC bends etc.

1.6.1.2 Concealed wiring shall be provided in all the buildings.

1.6.1.3 Limitations

The maximum number of PVC insulated 650/1100 V grade copper conductor cables that can be drawn in conduit pipes shall be limited to 45 % of the capacity of the conduit. Table indicating the capacity is as under:-

S. No.	Size of Conduit	100 % capacity in Sq mm	45% capacity in Sq mm
1.	25 mm	490	220
2.	32 mm	804	362

1.6.1.4 Conduit joints:

Conduits shall be joined by means of screwed or plain couplers depending on whether the conduits are screwed or plain. For conduit fittings and accessories reference may be made to the good practice (IS : 2667, IS:3419, IS:9537 Pert-I IIIII).

1.6.1.5 Fixing of conduits:

Conduit pipes shall be fixed by heavy gauge saddles, secured to suitable PVC plugs with screws in an approved manner at an interval of not more than 600mm, but on either side of couplers or ends or similar fittings, saddles shall be fixed at a distance of 00mm from the center of such fittings except that the spacing between saddles or supports is recommended to be 600 mm for rigid non-metallic conduits.

1.6.1.6 Bends in conduits:

Wherever necessary, bends or diversions may be achieved by bending the conduits or by employing normal bends, inspection bends, inspection boxes, elbows or similar fittings.
Conduit fittings shall be avoided, as far as possible, on outdoor systems.

1.6.1.7 Outlets:

In order to minimize condensation or sweating inside the conduit, all outlets of conduit system shall be properly drained and ventilated, but in such a manner as to prevent the entry of insects.

1.6.1.8 Heat may be used to soften the conduit for bending and forming joints in case of plain conduits. As the material softens when heated, sitting of conduit in close proximity to hot surfaces should be avoided.

1.6.1.9 Fixing of conduit in chase (concealing in plaster of wall):

The conduit pipe shall be fixed by means of staples or by means of non-metallic saddles placed at not more than 80 cm apart or by any other approved means of fixing. Fixing of standard bends or elbows shall be avoided as far as practicable and all curves shall be maintained by sending the conduit pipe itself with a long radius which will permit easy drawinginofconductors.Ateithersideofbends,saddles/staplesshallbefixedatadistance of 15 cm from the center of bends.

1.6.1.10 Inspection boxes (for concealed wiring):

Suitable inspection boxes to the nearest minimum requirements shall be provided to permit periodical inspection and to facilitate replacement of wires, if necessary. The inspection/junction boxes shall be mounted flush with the wall or ceiling concrete. Where necessary deeper boxes of suitable dimensions shall be used. Suitable ventilating holes shall be provided in the inspection box covers, where required.

1.6.2 Surface Conduits

a. Surface or open conduit pipes shall be fixed by heavy gauge saddles, secured to suitable approved plugs embedded in walls/ firmly secured with tresses etc. with screws in an approved manner at an interval of not more than 60 cm on either side of the coupler or bends or similar fittings. he saddles shall be fixed at a distance of 30cm from the center of such fittings. Open conduit wiring shall be laid parallel/ perpendicular to the walls and suitable lamps shall be fixed properly. For 25mm diameter conduit, width of clamp shall be 19 mm and of 20

SWG wall thickness. For conduits of 32 mm and above, width of clamp shall be 25 mm and of 18 SWG wall thickness.

b. Where conduit pipes are to be laid along trusses, steel joints etc., the same shall be secured by means of special clamps made of mild steel. Where it is not possible to drill holes in the truss members, suitable clamps with bolts and nuts shall be used.

c. Where conduit pipes are to be laid above false ceiling, conduit pipes shall not be clamped to false ceiling frame work and shall be suspended with suitable supports from the suffix of slab. For conduit pipes to run along with wall , the conduit pipe shall be clamped to wall above false ceiling in uniform pattern with special clamps approved by the Engineer at site.

1.6.3 Installation of Conduit system:

1.6.4 Common aspects for both concealed and surface conduit works:

a. The erection of conduits of each circuit shall be completed before the cables are drawn in.

b. All joints shall be sealed/ cemented with approved cement. Damaged conduit pipes/fittings shall not be used in the work. Cut ends of conduit pipes shall have neither sharp edges nor any burrs left to avoid damage to the insulation of conductors while pulling them through such pipes.

c. Bends in conduit : All bends in the system may be formed either by bending the pipes by an approved method of heating, or by inserting suitable accessories such as bends, elbows or similar fittings, or by fixing non-metallic inspection boxes, whichever is most suitable. Where necessary', solid type fittings shall be used.

d. Radius of bends in conduit pipes shall not be less than 7.5cm. No length of conduit shall have more than the equivalent of four quarter bends from outlet to outlet.

e. Care shall be taken while bending the pipes to ensure that the conduit pipe is not damaged, and that the internal diameter is not effectively reduced.

f. Outlets: All switches, plugs, fan regulators etc. shall be fitted in flush pattern. The fan regulators can be mounted on the switch box covers, if so stipulated in the tender specifications, or if so directed by the Engineer.

g. Painting: After installation, all accessible surfaces of metallic accessories shall be painted.

1.7 Casing and Capping:

PVC casing and capping shall conform to BIS Specification No.14927 Part 2 and for wiring application with the required accessories viz. bends and tees etc. ,as per site conditions. They should be properly fitted along with the required

accessories viz. couplers, junction box, bends, tees, PVC round blocks, sockets, clamps, bolts, nuts, screws etc., as per the site conditions. They shall be used in suitable size to accommodate the wiring and shall be laid straight horizontally/vertically on the wall/roof etc.

1.8 Accessories

1.8.1 Control Switches for lights/ fans etc.

a) All 5/6 and 15/16 Amp switches/ sockets (5 pin/6 pin) including bell push shall be modular type suitable for use on 230 Volts A.C. supply system. Switch plate shall be matching with modular switches/sockets. All switches, sockets, etc., shall normally be of white finish or as approved considering matching with the colour of walls/surface.

b) All the switches controlling the lights/fans etc. shall be connected to the phase wire of the circuit. Switches for lights and 5/6 Amp & 15/16 amp outlets shall be located at 1250 mm above finished floor level and the sub distribution boards (SDB), distribution boards (DB) shall be at 1500mm above finished floor level, unless otherwise instructed by the Engineer.

1.8.2 Ceiling Rose

The ceiling rose shall be of Bakelite, 5 amps, 250 volts, conforming to latest version of IS:371/1999(ISI marked). The colour shall normally be of white finish or as approved considering matching with the colour of wall.

1.8.3 Lamp Holder

The lamp holder shall be Polycarbonate of model as approved (ISI Marked). The colour shall normally be of white finish or as approved.

1.8.4 Call Bell

Call bell shall be fixed on metal box of approved size with 3mm Phenolic laminated sheet on top (conforming to IS: 2036:1995) fixed with brass screws and brass cup washers and shall be suitable to work on 230 V AC, single phase 50 cycle. Piano type bell push shall be fixed at the entrance door.

1.8.5 Attachment of fittings and accessories:

a. Conduit wiring system: All accessories like switches, socket outlets, call bell pushes and regulators shall be fixed in modular sheets in boxes. Accessories like ceiling roses, brackets, batten holders etc. shall be fixed on outlet boxes.

b. Steel/iron screws shall be used to fix the accessories to their bases.

c. Fixing to walls and ceiling: Wooden plugs for fixing to wall/ceiling will not be allowed. Fixing will be done with the help of PVC sleeves/Rowel plugs/ dash fasteners as required.

d. Drilling of holes shall be done by drilling machines only. No manual drilling of hole will be allowed.

e. PVC spacers shall be provided during fixing of fittings and other items onwall.

1.9 For termination of cables, crimping type cable socket/lugs shall be provided and soldered if necessary/instructed.

1.10 Load Balancing:

Balancing of circuits in three–phase installation shall be planned before the commencement of wiring and shall be strictly adhered to.

1.11 Colour code for Wiring:

Colour code for wiring installation shall be maintained as Red, Yellow and Blue for three phases, Black for neutral and green only for earth in case of insulated earth wire.

1.12 Earthing of Non- current Carrying Part

All the non-current carrying metal parts of electrical installations shall be earthed properly. All metal enclosures, cable armour, switchgear, distribution boards, light fittings and all other parts made of metal shall be bonded together and connected by means of specified earthing conductors to an efficient earthing system.

1.13 Earth Conductor

Every earthing conductor shall be of copper single core pvc wire / G.I of suitable size.

1.14 Testing of Wiring:

Wiring system shall be tested as per IS:732 for:

i) Continuity of all circuits,

ii) Earthing after the wiring is completed and before energizing,

iii) Polarity test of switche setc.

1.15 Testing

After completion of work, the entire installation shall be subjected to the following tests:

- Insulation Resistance Test.
- Earth Continuity Test.
- Earth Resistance Test.

Besides the above, any other tests specified in BIS Standards or as required by the local Authority/ Engineer shall also be carried out.

1.15.1 Insulation Resistance Test

a. The insulation resistance shall be measured by applying between earth and the whole system of conductor or any section thereof with all fuses/MCB in place and all switches closed and except in earthed concentric wiring, all lamps in position of both poles of the installation otherwise electrically connected together, a direct D. C. Voltage not less than twice the working voltage, provided that it does not exceed 500 Volts for medium voltage circuits. Where the supply is derived from 3 wires (AC or DC) or poly phase system, the neutral pole of which is connected to earth, either direct or through added resistance the working voltage shall be deemed to be that which is maintained between the outer or phase conductor and the neutral.

b. The insulation resistance in mega ohm of an installation measured as in 'a' above, shall not be less than 50 divided by the number of points on the circuit, provided that the whole installation need not be required to have a insulation resistance greaterr than one mega ohm.

c. The entire installation shall be tested and shall comply with the requirements of specifications, IS code and IE norms.

1.15.2 Testing of Earth Continuity Path:

The earth continuity test of metallic envelopes shall be done for electrical continuity. Electrical resistance of the same, along with the earthing lead, excluding any added resistance of earth leakage circuit breaker, measured from the connection with the earth electrode to any point in the earth conductor in the completed installation, shall not exceed one Ohm.

1.15.3 Polarity Test of switch

In a two-wire installation, at test shall be made to verify that all switches in every circuit have been fitted in the same conductor through out, and such conductor shall be labeled or marked for connections to the phase conductor or to the non-earthed conductor of the supply.

In a three or four wire installation, a test shall be made to verify that every non-linked single pole switch is fitted in a conductor which is labeled or marked for connection to one of the phase conductors of the supply.

1.15.4 Earth Resistance Test

Earth Resistance Test shall be carried out in accordance with Indian Standard Code of Practice for earthing IS3043–1966. All tests shall be carried out in the presence of the Engineer

PART 2
LED TYPELUMINARIES& EQUIPMENTS FOR INDOOR & OUTDOOR ELECTRIFICATION WORKS

2.0 **General:**

This specification covers for the LED fitted luminaries used for outdoor and indoor applications for working at 220+/-10%, 50Hz+/-3%, Single phase input system. The luminaries are used at Residential &Non residential buildings and AO offices etc. It consist of:

a) Fixture
b) LED
c) Driver and Electronics

2.1 Indoor Applications:

The product should be latest state of art and compliant to relevant IEC 60598-1,2,3, IEC 62031 and IEC62612 or their latest edition depending on the tyye of luminaries. In addition to the above luminaries shall adhere to relevant BIS standards IS 15885, 16101, 16102, 16103, 16104,16105,16106,16107 (Part I & II) as per the application. The product shall be of proven design should possess type test certificate /performance certificate from the accredited laboratory. The product and its major components shall be state of art and of proven design.

It should be capable to work at Maximum ambient air temperature of 65^{o}C (For outdoor product) and 45^{o}C (for indoor product) in atmosphere like coastal, humid, salt laden and corrosive.

Housing, if not used as a heat sink shall be made of 0.5 mm thick CRCA sheet/Extruded Aluminium (2mm) or pressure die cast(PDC-2 mm) confirming to relevant standards, polyester powder coated of at least 40 microns) and high U.V. and corrosion resistance.

Luminaries should be covered with suitable Glass or diffuser with High Transitivity. Outdoor luminaries shall be with clear toughened glass or clear poly carbonate cover.

Lighting fixtures and accessories shall be designed for continuous trouble free operation under diverse atmospheric conditions without deterioration of materials. Degree of protection of enclosure shall be at least IP-65 for outdoor fixtures. However, down lighter and other internal fixture shall be provided with at least IP-55protection.

To be provided with suitable control optics as per need of application and render glare free to user.

Test papers for various parameters i.e. flux, power, efficacy, chromaticity, temperature, protection etc. Issued by certified agency shall be furnished. Estimation on product's life and performance shall also be furnished.

(a) Fixture:

The fixture should conform to applicable IS 10322/IEC 60598(All parts & amendments) and should have the associated LM-79 report(for Electrical and photometric test methodology for LED lighting) from accredited lab. Test report shall be submitted along with relevant catalogues. The fixture should have a surge protection of 2 KV.

2.2 LED (Light Emitting Diode)

LED approved makes are Phillips, Wipro, Crompton Approved Equivalent on specific approval of project authority on basis of test reports and specification in comparison of these standard makes. Manufacturer should have IEC (Illuminating Engineering Society) -LM-80 test report and with projected life as per IEC-LM21. Test report shall be submitted along with relevant catalogues. All LED to be solid state embedded as light sources, arrays and modules.

High lumen efficacy LEDs suitable for the application along with following features shall be used:

(i) LED Efficacy at the chip level shall >120 lumen/watt (For High power LED)

(ii) The efficiency of the LED at 85 Degree C junction temperature shall be more than85%.

(iii) The system luminous efficacy of LED luminaire' shall be asunder:

- **a)** Efficacy > 60 lumen/watt for low wattage luminaries (<45W):and
- **b)** Efficacy > 80 lumen/watt for a high wattage luminaries(>45W).

(iv) Adequate heat sink with proper thermal management shall be provided.

(v) Minimum view angle of the LED shall not be less than120*.

(vi) Power factor of complete fitting shall be more than0.9

(vii) LED shall be surface mounted type duly soldered to PCB by Reflow system of COB Type. The Solder used shall be ROHS compatible for environment friendliness.

(viii) Colour rendering index CRI >=70 as specified in the item description.

(ix) Correlated colour Temperature shall be in the range of 3000 K-6500 K as specified in item description.

2.3 LED driver.

LED driver shall be capable to withstand and work with Input voltage Range from 160V (RMS) to 270 V(RMS) with built in 2KV surge protection. Output voltage of the driver shall be designed to meet the Power requirement of the system. Output voltage ripple should be within 3%. Output over voltage protection should be up to 125 V DC. Full Load Efficiency shall be more than85%.

Total Harmonic Distortion

- For 0-50 W shall be less than25%
- Above 50 W rating shall be less than15%

Current waveform should meet EN 61000-3-2. LED Driver shall be able to withstand voltage of 350V for 2 hours and restore normal working when normal voltage is applied. The driver should comply to CISPR 15 for limits and methods of measurement of Radio Disturbance characteristics and it should comply to IEC 61547 for EMC immunity requirement. The control gear should be compliant to IEC61347-2-13, IEC62031 and IEC62384.

2.4 General

The lumen maintenance of the LED lightings shall not be less than 70% after 50,000 hours i.e. L70 (B50). The supplier shall provide evidence that the LED chipset manufacturer has the patent right to produce the supplied LED chipset to avoid infringement of white LED patent. Free warranty shall commence after delivery and end at 60 months after delivery. The warranty of replaced item shall re-start from date of attending defect/replaced.

2.5 Ceiling Fan

2.5.1 Ceiling fans shall be provided with suspension hook arrangement in the concrete slab/roof members at appropriate stage be forecasting of roof at locations indicated on the working drawings prepared by the contractor. Co-ordination has to be maintained with civil engineering contractor authorities for the dates of casting of roof in order to provide fan box with MS hook as approved.

2.5.2 Ceiling fans shall be continuous duty type with double ball bearings, copper wound motor, complete with canopies, down rod, 3 blades, capacitor etc conforming to IS374/1979, suitable for operation on 230Volt +/-10%, 50Hz, A.C. supply and star rated. Fans shall be generally off-white.

2.6 Normally 1400 mm ceiling fans shall be provided in AO building and 1200mm sweep ceiling fans in residential buildings.

2.7 Stepped type electronic regulator shall be provided for control of speed of fan at locations other than passenger shelters/sheds as per Engineer's decision.

2.8 Exhaust fans

Exhaust fans shall be heavy-duty type, suitable sweep, 900 rpm , noise free with fibre/steel body, star rated (if available in India), double ball bearing and conforming to IS 2312-1967. Exhaust fan shall be complete with copper wound motor, capacitor and louver/shutter, frame and mounting bracket and shall be suitable for operation on 230 volt +/- 10 %, 50 Hz, single phase AC supply system. The color of the exhaust fan shall be preferably matching with the wall.

2.9A suitable hole shall be provided in the wall to suit the size of the frame, which shall be fixed by means of rag bolts embedded in the wall. The size of the rack bolt and spacing shall match with the holes on the frame of exhaust fans. The hole shall be neatly finished to the original shape of the wall.

2.10 SMART Energy Meter (All residential & Non-residential buildings)

2.10.1 Description – Residential & Commercial Energy Meters. All energy meters will be three phase meters.

2.10.2 Requirement –

1. 10-60A Three Phase Meters with RS Communication Port capable of measuring single phase to three phase measuring
2. Data Concentrator Unit
3. GPRS communication SIM
4. MCB for Energy Meters
5. Enclosure to House Energy meter & MCB etc
6. Web enabled SCADA Software to view data on real time basis.

NOTE:

SMART Energy Meter shall be of approved make/quality from the reputed manufacturers and sample shall be submitted for NLCIL approval.

PART:-3

DISTRIBUTION BOARD

3.0GENERAL

a) Distribution boards for power and light circuit distribution shall be pre-wired, factory built, duty powder coated and complete with copper bus bars, MCB/SPMCB/RCCB etc. and shall be suitable for 415 V, 3 – phase or 230 V, single-phase spply. The distribution boards shall conform to IS:8623 and IS:13032 as applicable

b) However, if none of the types readily available from the approved makes meets the requirements, alternative makes may be offered with technical literature and test certificates, for approval of the Engineer.

c) Separate distribution board shall be provided for light and power circuits in Residential & Non residential building and & in AO buildings, as approved by the Engineer.

3.1 Type

The Distribution Board shall be double door type suitable for flush installation. The boards shall be of cabinet design, totally enclosed and shall have a degree of protection not less than IP42 (indoor type) and IP54 (outdoor type) as per IS:13947/Part1/1993.

3.2 Miniature Circuit Breakers (MCB)

Miniature Circuit Breakers for lighting circuits shall be of "B" series and for inductive loads shall be of "C" series. . MCBs shall generally conform to IS: 8828. They shall be suitable for snap fixing on a standard DIN rail.

3.3 Three phase MCBs shall have common trip bar so that all the poles make and break simultaneously. Miniature circuit breakers shall be quick make & quick break type with trip free mechanism. They shall have thermal & magnetic short circuit protection.

3.4 Residual Current Circuit Breakers (RCCB), Residual Current Circuit Breaker with Overload, short circuit & earth leakage Protection (RCBO)

3.5 RCCB/RCBO shall be used in distribution boards. The RCCB/ RCBO shall be rated for 30/100/300mA fault circuit tripping. **RCCB and RCBO** shall conform to relevant IS.

Note: 1.Single phase DB with 4 way, 8way&12 way

2.3phase MCB DB 4 way ,8way

3.3 phase Vertical type DB 4 way ,8 way

The above DB's having DP MCB ,TP MCB & SP MCB with RCCB shall be used wherever necessary in residential &Non Residential building.

PART -4.0
LT PANEL

4.0. GENERAL

This section covers the detail requirements for Design, Manufacturing, and Testing at works. Main L.T. Panel shall be made out of CRCA sheet steel indoor type, floor mounted, free standing, totally enclosed, extensible type, air insulated type for use on 415 Volts, 3 phase with neutral, 50 cycles/sec system.

The panel board consists of the following switch gear mounted on it.

1.415 Volt 4 Pole MCCB (400A,250A,125A,63A etc.)

2.Totally Enclosed Metering compartment of suitable size with following metering devices mounted on it.

- Analog Ammeter
- 4 position Ammeter selector switch
- Analog voltmeter
- 4 position Voltmeter selector switch.
- Current transformer
- Phase indication lamps
- Digital 3 phase energy meter
- 5 amp HRC fuse link

Totally Enclosed bus bar chamber made up of 16SWG MS sheet with 4 Nos of suitable size copper bus.40x10mm ,25x10mmetc.the copper bus of suitable length mounted on a bus bar support insulator /hylem supports. Earth bus made up of copper flat of suitable size .

The total enclosed cable compartment of suitable size on either side of the panel covering entire height. All the above enclosures shall be made up of 16SWG CRCA sheet steel & shall be mounted on a base frame made up of MS channel of suitable size so as to form a neat indoor totally enclosed floor mounting type cubical panel board with different compartments .The all the switch gear with suitable size copper conductor wire /flat earthing all the switch gear ,painting the panel with Grey or light green colour synthetic enamel based power coated paint over one coat of red oxide primer so as to have a neat &smooth finish interconnection of incoming /outgoing cables with suitable size brass cable gland, earthing of panel with suitable size GI flat of suitable length connected to earthing electrode, marking of all the switchgear& devices.

4.1. Load bank Panel system

Company manufacture load bank panel system shall be used for AO building with LT main panel.Load bank panel shall be used at First floor of AO building.

4.2. Timer panel

Automatic street light control switch gear system having following switchgear.

a) surface mounting type analog time switch
b) power contactor with suitable current rating.
c) Terminal block
d) HRC fuse unit with suitable current rating.
e) Porcelain base re wirable type fuse unit for bypass circuit.
f) Company manufacture outdoor mounting type ,weather proof 16SWG sheet steel enclosure with hinged door& panel locking arrangements for enclosing the above switchgear. The sheet steel enclosure shall be of size not less than 450mmx300mmx300mm & painted with powder coated paint. All control circuit wiring shall be done with 1.5 Sqmm copper conductor wire & power wiring shall be done using 16Sqmm copper conductor wire.

CHAPTER 5
CABLE LAYING

5.0. General

LT UG cable with XLPE insulated PVC inner sheathed Armoured copper conductor confirming to IS 7098 (Part 1) 1988 shall be used.

5.1. The route of the cable shall be decided before the work of cable laying is undertaken.

5.2. Cables of different voltage grading shall be generally laid in different trenches. In case it is not possible to lay them in separate trenches, due to site constraint, the same trench may be used, but adequate separation within the trench shall be ensured. Specific approval shall be obtained from the engineer.

5.3. There shall be adequate distance between HT & LT cables. In case it is unavoidable to separate HT&LT cables, the high tension HT cable shall be laid below LT cable.

5.4. Wherever the power and telecom cables are to cross each other the same shall be laid at right angles to avoid interference. Wherever it is unavoidable to lay them in proximity, horizontal and vertical clearance between the two shall not normally be less than 600mm

5.5. Laying of Cable

The cable shall be laid in ground, in pipes, under road/railway track, recess in wall/on surface/clamping with erected pole etc. depending upon the requirement and site conditions.

5.6. Laying in Ground

The cable shall be laid in ground, wherever it is passing through open country/along road/lanes etc.

5.7. Laying of Cables under road/ Railway track/Bridge etc.

a) Wherever the cable is to cross road/railway track/ Bridge, Nalla etc. the cable shall be laid through suitable size of pipes as per instructions of the Engineer.

b) GI/CI/RCC/HDPE pipe etc shall be used for the purpose. Pipes shall be continuous with couplers etc. and clear of any debris. Before drawing of cables, sharp edges at ends shall be smoothened to prevent injury to cable insulation and/or sheathing.

c) All the road crossings to be done by UG cables with spare cable provision. One spare duct with same size dia HDPE/GI/CI/RCC pipe also to be made along with crossing for future use.

5.8. Laying of Cables under Passage/Wall etc.

Passage/wall used for the laying of cables, shall be cut as required and repaired to match with the original finish. In case cable is being laid on the wall, cable should be well supported by J clamp/hooks.

5.9. Erection along Erected Pole

For erection of cable along the pole, the cable shall be held vertically with protective G. I. pipe. The diameter of the pipe shall be adequate for the cable size and length of pipe shall be 3 meters. Cable & G. I. pipe shall be clamped with the erected pole with 40 x 6 mm Ms flat clamps, not more than 2m apart. End of the pipe should be sealed with suitable putty to avoid entry of moisture and rodents.

5.10. Width of Trench

(a) The width of cable trench shall be approx.350mm. Wherever one additional cable is laid in the same trench in horizontal formation, the width shall be increased such that inter axial distance between the cables shall be at least 200 mm. There shall be clearance of 150mm between the end cables and sides of the trench.

(b) In addition to the protective cover over the cables laid in the underground trench, a brick on edge shall be laid in between the two juxtaposed cables along the direction of lay of the cables for providing separation.

(c) Minimum width of cable trench for laying of LT cable at various locations shall be as indicated hereunder:

Width of Trench for LT Cables

Location	**Width of cable trench**	**Width of cable trench for one additional cable**	
		Width	**Remarks**
Under-ground	350mm approx.	550 mm approx.	Additional bricks on edge shall be laid in between the two juxtaposed cables.
On platform	350 mm approx.	550 mm approx.	
Under Railway Track/road	350 mm approx.	--	Through pipe
In wall/floor	To be recessed as per the instructions		

	of the Engineer		
Other than above	As per the instructions of the Engineer	As per the instructions of the Engineer	As per the instructions of the Engineer

5.11 Depth of Trench

Normally cables shall be laid in single tier formation and the minimum depth of top of laid cable/pipe at various locations from the ground surface/bottom of sleeper shall not be less than as indicated here under:

5.12 Depth of Trench for LT Cable

Location	**Minimum Depth of top of laid cable/pipe from the ground surface/bottom of sleeper**	**Remarks**
Under road	1000 mm from ground surface	Cables to be laid in single tier formation
Under-ground	1000 mm from ground surface	--do--
On platform	750 mm from platform level	--do--
Under Railway Track	Not less than 1200mm from bottom of laid sleeper at locations **where ground & track formation are in same level** (with manual digging)	New Lines
	Not less than 3000 mm **from ground level at locations where track formation level is above ground surface.** (with trenchless method)	
	Not less than 1200 mm (with manual digging) and 3000 mm (with trenchless method) **from bottom of laid sleeper at locations where ground & track formation are in same level.**	Locations other than New Lines (as approved by Engineer)
	Not less than 1200 mm (with manual digging) and 3000mm (with trench less method from **ground level** at locations **where track formation level is above ground surface.**	
In wall/floor	To be recessed	---do--
Other than above	As per instructions of the Engineer	---do--

5.13 Excavation of Trench

To the extent possible, the trenches shall be excavated in straight lines. Wherever a change in line is required, due to site conditions, suitable curvature shall be provided. As far as possible, mechanical means shall be employed for undertaking excavation. Manual excavation method shall be used if adequate working area is not available .The soil shall be stacked on the side of the trench in such a manner that it does not fall back into the trench.

a. Due care shall be taken to avoid damage to any existing cables, pipes or other such installations in the proposed route during execution. While excavating, if route markers, bricks, tiles, bare or protective covers are encountered, further excavation shall not be carried out without the approval of Engineer.

b. In case existing property gets exposed during trenching, the same shall be temporarily supported or propped adequately as directed by the Engineer. The trenching in such case shall be limited to short lengths. Protective pipes shall be laid for passing the existing cables therein, and the trench shall be refilled, in case there is a danger of collapse, or the trench is endangering existing structure the same shall be sufficiently supported before proceeding with the excavation work. The bottom of the trench shall be level, free from brick bats and gravel.

5.14. Laying ofCable

Before and after the cable is laid, the individual cores shall be tested for continuity and insulation resistance and ends of cables shall be sealed suitably to avoid ingress of moisture. Surplus length of approx. 3.0 meters shall be left in the shape of a loop at each termination/joint etc. unless otherwise approved by Engineer.

5.15. Protection and Sand Cushioning

a. The cable shall be protected by providing warning to future excavation of sand also for avoiding any accidental mechanical damage by pickaxe, blows etc.

b. The cable shall be protected with well-burnt bricks. The bricks on face shall be so provided that the width of the brick is in the direction of lay of cable. The bricks shall be provided throughout the length of the cable to the satisfaction of Engineer. Wherever more than one cable is laid I n the

same trench, the protection cover for cable shall protect at least 50 mm on the side of end cables.

c. Protective covering, sand cushioning of LT Cable & making good surface at various locations shall be as indicated hereunder:

5.16. Protection and Sand Cushioning for LT Cable

Location	Protective Covering	Sand cushioning	Surface
Underground	2nd class Bricks 225 x 100x60 mm (nominal size) width wise on top	Base cushion 80 mm under cable & 100 mm above laid cable	Making good damages and finishing as per original
On platform	-do--	-do--	--do--
Under Road	Through laid pipe	---do--	--do--
Under Rly Track	--do--	--do--	--do--
In wall/floor	Plastering	--do--	--do--
Other than above	As per instructions of the Engineer	As per instructions of the Engineer	As per instructions of the Engineer

5.17. Back Filling of Trench

5.17.1. After excavation and laying of cables, the trench shall be back filled with he excavated earth, free from stone or other sharp-edge debris and shall be watered if necessary. A 100 mm crown of earth shall be left in the center, tapering towards the sides of the trench to allow for subsidence. The trench shall be inspected at regular intervals particularly during wet weather and any settlement of soil shall be made good by the contractor by further filling, if required.

5.17.2. Due to cable laying work, if any disturbance to existing equipments in the area, like roads, pavements and garden takes place, the same shall be made good to original standard /finish after the cable laying work isover.

5.18. Cable Route Marker and Joint Indication Marker

Route markers shall be provided along straight runs of the cables at locations approved by the Engineer and generally at intervals not exceeding 50 meters. Wherever the cable route is changing or it is entering a fixed installation,

route marker must be provided. Route markers shall be properly grouted in concrete or laid along with the cable securely to avoid theft as per directions of the engineer. Joint indication marker shall also be provided at joints of cable. The word cables, the level of voltage, size of cable, depth shall be inscribed on the route marker and joints. Normally no joints are permitted. Under the circumstances, if joints can not be avoided, specific approval shall be obtained from the Engineer.

5.19. Cable Testing

All cable shall be tested jointly at site by the contractor with the engineer, before laying, to ensure that the insulation values of the cable are within limits. The insulation test on the cable shall be conducted with 500 V Megger up to and including 1.1 kV grade and with 5000 V Megger for cables of higher voltage. The cable cores shall be tested for continuity, insulation resistance etc. All cables shall be again tested after laying and before covering

PART -6
AUDIO SYSTEM

6.0. General

Audio system shall be used for TA Community hall , AO building & Auditorium

6.1. Wiring

The wiring shall be used with 2 core ,0.75 mm speaker cable

6.2. Speaker

Ceiling mounting audio speaker with suitable rating in Watts shall be used.

PART -7
CCTV system

7.0. CCTV IP Based low wattage CCTVs and Access Control systems using open and non-proprietary standards powered by the network switch (PoE), Hybrid energy efficient Road Blockers and boom barriers for outdoor access control, Metal Detection Systems, Perimeter Intrusion Detection Systems, Events based Remote Site Monitoring and storage.

7.1. **TELECOMMUNICATION SYSTEM & TV CABLE /LAN CABLE**

The EPC Contractor should design a suitable capacity telecommunication /EPBAX/TV /LAN system shall be provided.

PART -8
FIRE EXTINGUISHER

8.0. Portable dry powder 4Kg fire extinguisher (IS 15126 Recommended) ABC type shall be used in all residential quarters.

PART -9
LIFT

9.0 Scope:

The scope includes design, manufacturing, supply at site, erection, testing, commissioning and handing over in satisfactory working condition of Machine room less & Gear less machine with permanent magnet motor operated Electric traction passenger lift to the requirements as given by the EPC contractor with approval of NLCIL engineer.

PART- 10
HVAC system& fire detection system (For AO building)

10.0. The HVAC (Heat Ventilation Air conditioning) & fire detection system shall be designed by EPC contractor with approval of NLCIL engineer.(for AO building)

PART -11
LIGHTNING ARRESTOR

11.0. Lightning mast arrangement consists of the following

a) Copper lightning mast of 900 mm long 16 mm stem and 4 spike -1 no
b) 38mm dia 'B' class GI pipe- 3 Meter.
c) GI clamps out of GI flat of size 40x6 mm thick with bolts and nuts ,Washer etc.-4 No.
d) GI bolt ,nuts & washers M 15x249/250mm long -4 no.

e) TW round block of size 150x60x50 mm-4 no and erection of 1 No copper lightning mast (Containing ball ,4 No lightning spike ,900 mm long and 16 mm dia GI stem etc.) on a GI pipe in the place as directed .The lightning mast and the GI pipe should be rigidly fixed with clamps made out of GI flat as required .The GI pipe should be fixed to the wall at two places using GI bolt ,Nuts ,washers or anchor fasteners suitable grouted as directed with two no of TW blocks .The GI flat should be bent to shape at one end and provided with suitable fixing holes as directed this has to be fixed by providing suitable bolts & nuts to the lightning mast bottom.

f) The size of GI flat 25x3mm thick with suitable length required.

PART -12
EARTHING

12.0. General :

Pipe Earthing : The earthing arrangements using 40 MM dia GI pipe (medium class) of length 2500mm (10mm dia holes shall be provided at 0.5meter interval) surrounded by alternate layers of coke ,charcoal or lecofile, and common salt as per NLCIL standard, including interconnection between each earth electrode to main fuse board and between earth electrodes using sufficient length of 25x6mm GI flat /No.8 SWG GI wire connected to earth electrode with suitable size of clamps made up of GI flat 25x6mm using GI bolt ,nuts and washers ,excavation earth pit refilling ,construction of suitable size masonry trough with slab cover.(A typical pipe earthing drawing is enclosed.)

PART-13
UNDER WATER LIGHTING SYSTEM (For Swimming Pool)

13.0. Scope: Make: ASTRA Pool

a) 300 Watts ,12Volt Niche type under water lighting luminaire with ABS face plate but without niche and flexible conduit including 1No 300W 12V halogen lamp and supplied with 2.2 Meter length (Approx) of HO7RN-F cable of size 2x6 Sqmm 1 No.

b) Deck box made of ABS with Necessary threaded outlets to be embedded in the Deck.

c) 300VA ,220V to 12V transformer with protective transformer housing suitable for under water lighting operations and supplied with 2x6 Sqmm HO7RN-F cable of sufficient length enclosed in PVC rigid conduit pipe of wall thickness not less than 2 mm for interconnection between transformer and deck box .

LIST OF MATERIALS RECOMMENDED FOR USE IN ELECTRICAL WORKS		
Sl.No	**Name of Materials**	**Recommendation of Makes**
01	PVC insulated unsheathed single core aluminum conductor cable size and voltage as per specification in the schedule	Confirming to IS 694 as amended upto date. Make: RADIANT/PARAGON
02	PVC insulated PVC sheathed single core aluminum conductor cable size and voltage as per specification in the schedule	Confirming to IS 694 as amended upto date. Make: RADIANT/PARAGON
03	PVC insulated PVC sheathed twin flat weatherproof aluminum conductor wire size and voltage as per specification in the schedule	Make: KUNDAN/PARAGON
04	PVC insulated heavy-duty armoured multicore aluminum/Copper conductor cable and voltage as per specification in the schedule	Confirming to IS 7098/part-I as amended upto date. Make: CCI/POLYCAB/ FINOLEX/HAVELLS/KEI
05	PVC insulated unsheathed single core copper conductor cable	Make: FINOLEX/HAVELLS/V-GUARD
06	PVC insulated and PVC sheathed single core copper conductor cable	Make: FINOLEX/HAVELLS/V-GUARD
07	Telephone cables as per specification	Make: RPG/DELTON/SHYAM/RELIANCE
08	Miniature circuit breakers & MCCB's capacity and	Confirming to IS 8825 Make: LEGRAND/HAVELLS/SIEMENS/L&T

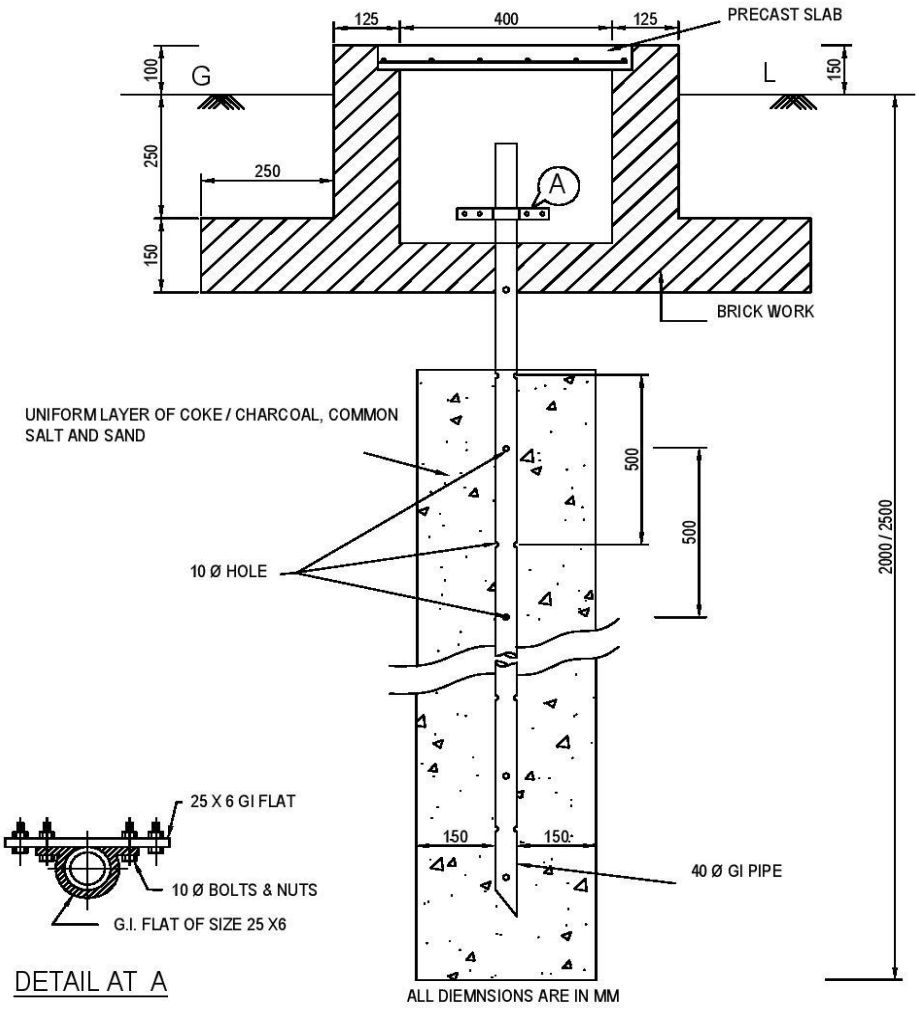
	ratings as per specification	
09	Residual current circuit breakers capacity and ratings as per specification	Make: LEGRAND/HAVELLS/SIEMENS/L&T
10	Distribution board for miniature circuit breakers capacity and ways as per specification	Make: LEGRAND/HAVELLS/SIEMENS/L&T
11	Distribution board with plug and socket suitable to hold MCB/RCCB and rating as per specification	Make: LEGRAND/HAVELLS/SIEMENS/L&T
12	250V,5A &15A SPT switch flush type	Make:ANCHOR/RECORD/ LEADER/KUNDAN
13	250V,5A,15A socket outlet with combination switch(flush type)	Make:ANCHOR/RECORD/ LEADER/KUNDAN
14	Modular switches, fan regulator, plugs and accessories	Make:MK-INDIA/CRAB TREE/LEGRAND/PHILIPS
15	250V,5A ceiling rose 2 plate & 3 plate (PVC white)	Make:ANCHOR/LEADER/KUNDAN
16	Pendant holder B.C.	Bakelite brass skinted
17	PVC Angle batten /Straight batten holder	Make:ANCHOR/LEADER
18	Staircase switch (flush mounting)	Make:ANCHOR/RECORD/ LEADER/KUNDAN
19	Bell push flush type switch	Make:ANCHOR/RECORD/ LEADER/KUNDAN
20	Bell	Make:ANCHOR/EDISON/LEADER
21	Buzzer	Make:ANCHOR/EDISON/LEADER
22	Bulk head fittings	PHILIPS/CROMPTON GREAVES /WIPRO Di-cast aluminum body prismatic glass, with rubber gasket/without wire guard suitable to hold CFL lamps.
23	Lighting Fixtures	Make:PHILIPS/CROMPTON GREAVES/WIPRO

24	Voltmeter, Ammeter	Make: MECO/AUTOMATIC ELECTRICAL/IMP/ M/s.TOSHINIWAL
25	Digital Energy Meter	Make:ABB/SECURE/L&T/HAVELLS
26	1200mm/1400mm sweep ceiling fan	Make:/CROMPTON GREAVES/GEC/ORIENT/HAVELLS
27	Exhaust Fan	Make:KHAITAN/GEC/ALMONARD
28	Electronic fan regulator	Make:ANCHOR/ALMONARD
29	PVC Pipe & accessories	Make: FINOLEX/AVAN PLAST/ SUN/V-GUARD/KUNDAN

For items not indicated, contractor shall have to obtain specific approval from the NLCIL authorities.

ELECTRICAL SAFETY PROCEDURE

- Only trained and certified workers shall be allowed to work
- Wear Electrical Safety Shoes ,Hand gloves(Categories like:IS 15298 & IS 4770 up to 600 Volt) , goggles and helmet.
- While doing work in height area use safety belt.
- Ensure & Use Proper tools like Insulated plier ,tester ,test lamp , wire stripper, Digital Multimeter, Earth Tester and Megger etc.
- Before carrying work Ensure Line Clearance(LC) from the user department..
- Ensure & Use Colour coding of wires (Phase :R-Red ,Y-Yellow ,B-Blue, Neutral: Black & Earth: Green)
- Before laying UG cable Check IR value
- Ensure cable & wires have tightened connection.
- Ensure marking in switch gear & DB's.
- Ensure the switch boards & MCB controlled enclosures is fixed at height not less than 1.5 m from floor level.
- Ensure Minimum distance of earth electrode of main earthing system is 5 ft from building.
- "Danger 415 Volt" sign symbol should be pasted .& while working Caution symbol for "Men at work" should be provided.
- Check Earth pit electrode earth resistance value
- In single phase system single earth & Three phase system Double earthing ,So Ensure Proper earthing in all works.
- Before charging the supply ,Ensure that no tools left inside the panel.



	SIGNATURE	DATE
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CM/D		
DGM/C		
GM/C		

NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

TYPICAL ARRANGEMENTS OF PIPE EARTHING

A2	SCALE:		DRG No:

06.09.2016 S:\CTO-DRG-DATA\EARTHING.dwg

CHAPTER V
EXTERNAL ELECTRIFICATION WORKS

1.00.00	**SCOPE OF WORK:**
	The scope of the Bidder shall include but not be limited to complete Design, Engineering, Manufacture, Inspection, Testing at Manufacturer's Work, Packing, Assembling, and Forwarding to Site, Transportation, Unloading, Storage at Site, Erection, Painting, Civil and Structural Works, Insurance, Supervision, Testing, Obtaining Statutory Approvals and Commissioning of the following Electrical Infrastructures to provide **Power Supply To Integrated Talabira Township & Miscellaneous Non Plant Buildings and Construction Power for the 3x800 MW NLCIL Talabira Thermal Power Project.**
	The source supply is from Lapanga (400 / 220 / 132 / 33 kV) Grid Substation which is the nearest SS approximately 8 Kms from Thermal Power Project.
	The Purchaser's scope is to extend Two number 33kV lines from Lapanga Substation with a maximum capacity of 15 MVA each, through dedicated Double Circuit feeders upto the location, near Mines entrance which is approximately 4 Kms from Thermal Power Project Main Gate.
	The Purchaser will provide Two Number 33kV Takeoff points at single location, near Mines entrance as mentioned above with a **Total Maximum Capacity of 15 MVA** to meet the Township, Miscellaneous Non Plant buildings and Construction Power requirements.

1.01.00	**33kV Double Circuit Feeders:**
	The Bidder scope is to provide **33kV Double Circuit Transmission** line across the **Bhedan River**, through lattice type steel structure with all accessories, supplies & services, from 33kV Takeoff point at Mines entrance to inside thermal Power Project site up to the 2x6.3 MVA, 33kV/11kV substation.
1.02.00	**33/11kV, 6.3 MVA Substation:**
	The Bidder scope is to construct the **2x6.3 MVA, 33kV/11kV Substation** complete with all associated supplies & services still commissioning of the substation for the **Township, Miscellaneous Non Plant Buildings and Construction power supply** at suitable location inside Thermal Power Project site.
	The 33kV Double Circuit feeding arrangement shall be designed to handle a M**aximum Capacity of 15 MVA** each. The Double Circuit feeding arrangements and the Substation shall be permanent infrastructure and will be used for maintaining power supply to Mines & Township from Thermal Power Plant Switchyard in future.
	Suitable Protection & metering arrangement along with associated Relays, Instrument transformers and Metering Cubicles shall be provided by the Bidder.
	33kV Construction Power Feeders Metering has to be provided at substation end for the measurement of actual energy consumed by the bidder.
1.03.00	**Miscellaneous Non Plant Building (MNPB) Switchgear:**

	The Bidder scope is to extend the Power supply from **2x6.3MVA, 33/11kV Substation** by providing Two number 630kVA, 11/0.415kV oil type outdoor transformer and downstream 415V switchgear upto the PDB's of the following Miscellaneous Non Plant buildings.
	➢ Thermal Project Office (Administrative building).
	➢ Gate complex along with security and time office.
	➢ Parking lot (250 vehicles).
	➢ Watch tower.
	➢ CISF Barracks (3 Nos.), CISF Armoury and quarter guard, CISF security check post and toilet block.
1.04.00	**11kV Double Circuit Feeders:**
	Bidder shall provide **11kV Double Circuit Transmission** line across the **Bhedan River**, from 11kV switchgear of **2x6.3MVA, 33/11kV Substation** to construct 11kV Ring Main Distribution Network within Township and other associated provisions.
1.05.00	**11kV Ring Main System:**
	Bidder shall provide **11kV Ring Main Distribution System** from Substation / DC gantry to scatter the power supply needs of the Integrated Township, associated buildings, amenities etc., including illumination system within the Township, Peripheral & Approach Roads etc.,
	The Ring Main System shall be equipped with sufficient number (minimum

	Nine) of Ring Main Unit's (3 / 4 unit **RMU**s & Bus-Coupler unit) with 11kV/415V, 500 kVA Transformer (minimum eight) connected with each **RMU** for providing 415V, 3phase, 4 wire power supply at suitable locations within Township to maintain uniform distribution at LT level as well as at 33kV/11kV substation end.
	The 11kV Ring Main Distribution Network shall be interconnected only through underground Cables inside Township premises and boundary.
1.06.00	**Illumination System:**
	Illumination system for the plant inspection road, Main Approach Road From NH/SH To Power Plant, dedicated approach road from Township to Project, Township internal main & approach roads are in the bidder's scope.
1.06.00	Five number 250kVA Diesel Generator sets along with acoustic enclosure of stationary type suitable for outdoor installation to be provided including Mandatory spare parts and maintenance equipments as required.

2.00.00 **CIVIL SCOPE:**

2.00.01 Complete Civil, Structural and Architectural works, including providing construction offices, field laboratory and construction equipments, construction water supply, construction power, construction / permanent roads, drainage arrangements, fencing / boundary wall etc.,

2.00.02 Area levelling, site preparation & marking, Route survey and finalization of transmission line Right of way.

2.00.03 Supply and construction of Control Room with all facilities, Four / Two wheeler shed, Yard flooring, Compound wall, Fencing, Gate, etc.

2.00.04 Supply and providing Rain Water Drainage with Cover Slabs, Sump Pump House, Oil Soak Pit with Oil Ducts / Pipes & Pumps.

2.00.05 Supply and providing foundations for Equipments & Lighting Mast, Jack point & Anchoring Blocks for Power Transformers, Baffle wall between transformers as per the statutory norms.

2.00.06 Supply and providing Plinths for equipments, , Masonry Troughs for Earth Pits with CI Lid, Cable Ducts with Cover Slabs

2.00.07 Supply and providing. Roads, Hauling Rails, Cable culverts at Road crossings, Cable Joint / Route Marker, Blue metal spreading around equipments.

2.00.08 Allied civil works for the completeness of the system, functional requirements, statutory and other direct & indirect works involved though not specifically mentioned herein.

3.00.00 **ELECTRICAL SCOPE:**

3.00.01 Tapping of incoming 33kV power supply to the proposed sub-station from the Purchaser's source point.

3.00.02 Supply, erection, testing and commissioning of 2x6.3MVA, 33/11kV sub-station.

3.00.03 Supply and providing EMS system for the substation consists of 2x6.3MVA Power transformers and its connected feeders.

3.00.04 Supply, erection, testing and commissioning of one number of 250kVA DG set at

sub-station.

3.00.05 Supply, erection, testing and commissioning of two numbers of 630kVA 11/0.415 Transformer and LT distribution for Miscellaneous Non Plant Buildings.

3.00.06 Supply, erection, testing and commissioning of 11kV Ring Main network for Integrated Talabira Township at various locations.

3.00.07 Supply and providing required number of 500kVA 11/0.415 Transformer and LT distribution forsubstation, Township and associated amenities at various locations.

3.00.08 Supply, erection, testing and commissioning of four number 250kVA DG set for Hospital, Guest House, Community Hall & Shopping Complex Township.

3.00.09 Obtaining approval from Statutory Authorities for commencement, carryout and energisation of the entire system.

3.00.10 Operation and Maintenance including providing of necessary maintenance / defective spares of the 33kV & 11kV DC Transmission lines, 2x6.3 MVA, 33kV/11kV Substation, 11kV Ring Main System & connected LT Distribution Network, , Miscellaneous Non-Plant Buildings' HT/LT Distribution Network, including lighting fixtures such as luminaires, LED drivers, etc., of illumination system is under the scope of the Bidder for a period of Twelve months from the date of Handing over of the entire system.

4.00.00 **GENERAL SCOPE:**

4.00.01 The scope of the Bidder shall include organizing / providing necessary power supply arrangements on his own by means of DG sets of sufficient quantity &

capacity for the preliminary activities that shall have to be carried out before commissioning the above substation.

4.00.02 The complete scope of the proposal for the Design, Engineering, Manufacture, Supply, Construction, Erection, Testing & Commissioning works for the EPC Package shall be on the basis of single point responsibility, completely covering the following activities and services in respect of all the equipment & works specified and covered under the specifications:

4.00.03 Basic Engineering of the complete system including preparation of Manuals.

4.00.04 Detailed design of all the equipment and equipment system(s) including civil, structure steel works included in bidder's scope.

4.00.05 Providing engineering drawings, equipment sizing & performance data, instruction manuals, as built drawings and other information.

4.00.06 Compliance with statutory requirements and obtaining clearances from statutory authorities, wherever required for commencement, carryout and energisation of the entire system.

4.00.07 Complete manufacturing including shop testing/type testing etc.,

4.00.08 Packing and transportation from the manufacturer’s works to the site including logistic studies, insurance and clearances if any.

4.00.09 Receipt, storage, preservation, handling and conservation of equipment at the site.

4.00.10 Fabrication, pre-assembly, if any, erection, testing, commissioning and completion of facilities including putting into satisfactory operation all the

equipments including successful completion of initial operation.

4.00.11 Performance and guarantee tests after successful completion of initial operation;

4.00.12 Furnishing of spares on FOR site basis.

5.00.00 DESCRIPTION OF WORKS (ELECTRICAL)

5.01.00 <u>Incoming Power Supply (33kV Double Circuit Feeders)</u>

1.0 Supply, Transport & Erection of lattice type towers, hoisting of insulators, stringing of ACSR power conductor and earthwire with necessary hardware materials termination, testing and commissioning of Double Circuit feeders from the 33kV Four Pole structures for tapping of 33kV supply upto the Substation.

2.0 Supply and erection of required number of Gantry and other Supporting structures including necessary fixtures for cable tapping arrangement.

3.0 Supply, erection, laying, termination, testing and commissioning of 19/33kV, 3C×240sq.mm, XLPE insulated, steel armoured, Aluminium conductor cable for two feeders from the 33kV Gantry structures and shall be connected with incomer VCBs of 33kV Panel Board in the control room.

4.0 Supply and providing heat shrinkable type straight through joints (if any) outdoor / indoor end terminations suitable for the above cable at both ends for extending the supply upto Control Room 33kV panel Board.

5.02.00 <u>33/11kV, 2x6.3MVA Substation</u>

Supply and construction of control room with all facilities, Four/two wheeler shed, rain water drainage, sump pump house, oil soak pit, roads, hauling rails, cable ducts, yard flooring, compound wall, fencing, gate, etc. and allied civil

works for the completeness of the system, functional requirements, statutory and other direct & indirect works involved although not specifically mentioned herein

5.03.00 <u>33kV VCB Panel Board:</u>

1.0 Supply, erection, testing and commissioning of indoor type, floor mounted, metal clad, 33kV VCB panel board consist of five numbers of VCBs (2nos. for incomers, 2nos. for Power transformers and 1no. for Bus-coupler) with lines & bus PTs in the control room, as per the technical specification.

2.0 Supply, laying and termination of power and control cables for interlocks, control, metering and indications.

5.04.00 <u>33/11kV, 6.3 MVA Power Transformers:</u>

1.0 Supply, erection, testing and commissioning of two numbers of 2x6.3 MVA, 33kV/11kV Power transformers as per the technical specification.

2.0 Necessary rail foundation shall be designed to erect two number Power Transformers taking into consideration of static and dynamic loads.

3.0 Supply, laying, termination, testing and commissioning of 19/33kV, 3C×240sq.mm, XLPE insulated, steel armoured, Aluminium conductor cable from respective VCBs of 33kV VCB Panel Board at Control Room and shall be connected with power transformers' primaries.

4.0 Supply and providing heat shrinkable type indoor end terminations suitable for the above cable at both ends.

5.0 Supply and commissioning of Portable programming station to acquire data and to programme the Numerical / MF relays with necessary connectors, converters and licensed software.

6.0 Supply, laying and termination of power and control cables for control, protection and indications of transformer to the 33kV and 11kV VCB panel boards.

5.05.00 <u>11KV Neutral Grounding Resistor:</u>

1.0 Supply, erection, testing and commissioning of NGR and the transformer

neutral shall be earthed through the NGR.

2.0 Necessary plinth with suitable foundation shall be constructed to erect 2 nos. of NGR.

3.0 Supply, laying and termination of power and control cables from NGR to the 33kV and 11kV VCB panel boards.

5.06.00 <u>11/0.415kV, 500KVA Station Transformers:</u>

1.0 Supply, erection, testing and commissioning of two numbers 11/0.415kV, 500KVA station transformer as per the technical specification.

2.0 Necessary plinth shall be constructed to erect the station transformers.

3.0 Supply, laying, termination, testing and commissioning of 11/11kV, 3C×50sq.mm, XLPE insulated, steel armoured, Aluminium conductor cable from respective VCBs of 11kV VCB panel board and shall be connected with station transformers' primaries.

4.0 Supply and providing heat shrinkable type indoor end terminations suitable for the above cable at both ends.

5.0 Supply, transport, erection, testing and commissioning of two numbers indoor LT Panels as per the technical specification, for the station transformers, in the control room.

6.0 Supply, laying and termination of 3 runs of 1100V grade, 3.5Cx150 sq.mm, PVC/XLPE insulated, steel armoured, aluminium conductor cable (or equivalent) between the station transformers' secondaries and the LT Panel incomers, located at the control room. Necessary cable end termination / brass cable gland for the above cable shall be provided.

7.0 Necessary supporting structures for HT and LT cables shall be supplied and erected.

5.07.00 <u>11kV VCB Panel Board:</u>

1.0 Supply, erection, testing and commissioning of indoor type, floor mounted, metal clad, 11kV VCB panel board consist of thirteen numbers of VCBs (2nos. for incomers, 2nos. for future use, 2nos. for station transformers, 2nos. for Capacitor Banks, 2nos. for CPS, 2nos for Township and 1no. for Bus-coupler, bus PTs) in the control room. (as per the technical specification).

2.0 The power transformers' secondaries shall be connected to respective incomer VCBs of 11kV VCB Panel Board using 2 runs of 11/11kV, 3C×120sq.mm, XLPE insulated, steel armoured, Aluminium conductor cable or suitable size as per sizing calculation.

3.0 Supply and providing heat shrinkable type indoor end terminations suitable for the above cable at both ends.

4.0 Supply, laying and termination of power and control cables for control, interlocks, metering and indications.

5.08.00 <u>11kV Capacitor Bank:</u>

1.0 Supply, erection, testing and commissioning of two numbers of outdoor type, plinth / structure mounted, metal clad, 11kV Capacitor Bank for automatic power factor correction, as per the technical specification.

2.0 Necessary plinth with suitable foundation shall be constructed to erect 2 nos. of Capacitor Banks.

3.0 The capacitor banks shall be connected to respective buses of 11kV VCB Panel boards using adequate size of cables.

5.09.00 <u>AC Distribution panel:</u>

1.0 Supply, erection, testing and commissioning of AC distribution panel as per specification, inside the control room.

2.0 Supply and laying of cables from LT panel to AC distribution panel and to the respective equipment locations.

3.0 Each circuit shall be taken independently and they shall not be looped together.

5.10.00 Battery and battery charger:

1.0 Supply, Erection, testing and commissioning of Battery charger as per specification, in the control room.

2.0 Supply and erection of acid proof, steel/wooden racks for mounting of batteries.

3.0 Supply, Erection, testing and commissioning of Batteries as per specification, in the Battery room.

4.0 Supply, laying and termination of cables from LT panel to Charger and charger to battery bank.

5.11.00 DC Distribution panel:

1.0 Supply, erection, testing and commissioning of DC distribution panel as per specification, inside the control room.

2.0 Supply, laying and termination of cables from Charger/battery to DC distribution panel and to the respective equipment locations.

3.0 Each circuit shall be taken independently and they shall not be looped together.

5.12.00 Internal Electrification:

1.0 The wiring shall be in concealed nature.

2.0 Light fittings, fans, switches and other fixtures shall be provided as per specification.

3.0 Plug points as specified shall be provided for taking power supply for portable instruments / equipments.

4.0 Designing of individual circuits, connecting of light and fan points in a circuit, etc, shall be designed as per IER norms.

5.0 Power circuits shall be independent of light circuits.

6.0 DC lighting shall be provided in the control room for emergency as per specification. Wiring for DC lighting shall be separate from the AC wiring and shall not be run in the same conduit.

7.0 The wiring cable shall be of FR PVC insulated, stranded, copper conductor of size not less than 1.5sq.mm for lighting circuit, fan, etc. and 2.5sq.mm for power circuits.

5.13.00 External Illumination:

5.13.01 Lighting mast:

1.0 Supply, erection, testing and commissioning of required numbers of lighting masts, in different locations as given below.

Sl.no	Locations	Minimum No
1	Each Sub station	1
2	Entrance Arch	1
3	School	1
4	Hospital	2
5	Play Ground	2
6	Residential Complex	10
7	STP area	1
8	Park	1
9	Recreation Club	1
10	Swimming Pool	1
11	Road junctions	5

2.0 The lighting arrangement shall be for 360 degree.

3.0 Necessary materials, structures, and other hardware required are to be supplied, erected and commissioned.

4.0 Necessary foundations are to be designed and constructed to erect the lighting masts.

5.0 Supply, laying and termination of adequate rated cable from LT panel to the masts (Lighting control panel) as per the technical specification..

5.13.02 Road Lighting:

1.0 Supply, erection and providing lighting for the entire yard and along the roads inside the sub-station area as ring main as per the technical specification.

2.0 Supply, erection and providing lighting for plant inspection road, Main Approach Road From NH/SH To Power Plant, dedicated approach road from Township to Project, Township internal main & approach roads as per the technical specification.

Lighting fixtures complete with lamps & accessories, LED lighting fixture complete with driver circuit & accessories Lighting Panels, Receptacles, Switch boxes, lighting poles, Lighting masts, Earth wires and rods, Junction boxes etc., shall be erected with the approval of NTTPP.

Required number of Lighting masts shall be erected inside substation at suitable locations identified by NTTPP authorities. Within Township boundary single / double arm street lights, and Lighting masts shall be erected with the approval of NTTPP

3.0 Supply, laying and terminating of adequate rated cable from LT panel / lighting Mast control panel and to the luminaries, as per the technical specification.

4.0 Post top lanterns shall be provided in the gate pillars at the entrance of the sub-station. Necessary cabling shall be done for the post top lantern.

5.0 The yard lights shall be switched-on / switched-off through Mast lighting control panel. Other road lights shall be grouped through required number of Timer Panel at suitable locations.

5.14.00 Energy Management System:

1.0 Supply, erection, testing and commissioning of Energy Management System (EMS) for acquiring, monitoring and preparing reports of electrical parameters of 2x6.3MVA sub-station for documentation and analysis.

2.0 All the energy meters pertaining to the 33kV and 11kV VCB panel boards and energy meters of LT panels shall be connected to the EMS.

3.0 Supply and erection of necessary cables, interface units, transducers, converters, etc.

4.0 All the energy meters shall be linked and connected to the EMS such that the system becomes fully functional.

5.0 Supply, erection and commissioning of Workstation (of high-end configuration) with complete hardware, software, printer, UPS, furniture, etc., as per the technical specification.

6.0 After commissioning the system, it shall be demonstrated.

5.15.00 Cables and cable laying:

1.0 All the power, control and communication cables as required shall be supplied.

2.0 For connecting CT secondary, separate cables shall be provided.

3.0 For DC controls, separate cables shall be provided.

4.0 For PT secondary circuits, separate cables shall be provided.

5.0 For AC power supply, separate cables shall be provided.

6.0 For DC power supply, separate cables shall be provided.

7.0 No cable shall be used as common for the above said items.

8.0 Sufficient number of spare cores shall be provided for all important CT, PT, control and indication cables.

9.0 Cable shall be laid on cable trays in cable duct, inside the control room and switch yard.

10.0 HT cable shall be laid in separate duct / trays. HT cables other than substation area shall be laid in cable trench as per standard norms.

11.0 Control and communication cables can be laid in same duct through different layers of cable trays.

12.0 Cable erection includes supply and providing indoor and outdoor end termination as per requirement. No straight through joints shall be used in the power / control / communication cables.

13.0 Necessary cable glands and lugs shall be provided for LT and control Cables.

14.0 Suitable GI pipe protection shall be provided for cable raise wherever necessary.

15.0 Termination shall be made using bimetal strips wherever required (aluminium to copper or vice versa).

5.16.00 <u>Earthing:</u>

1.0 Supply, erection and commissioning of Earth grid as per specification.

2.0 Sufficient number of earth pits shall be provided for the earth grid to bring down the value to minimum and uniform throughout as per the standard.

3.0 Earth grid shall cover entire transformer yard and control room area as per specification. Soil resistivity of the entire substation area shall be measured and the earth grid shall be designed such that the touch & step potential shall be within the statutory limits. Earth calculation shall be submitted for approval before taking up the work.

4.0 All the electrical equipments, panels, structures etc. shall be connected to the earth grid in duplicate with suitable size earth conductor as specified.

5.0 All the earth pits shall be of treated earth pits as per the specification.

6.0 Two numbers of earth electrodes shall be provided for neutral earthing of each power and station transformer.

7.0 Neutral earth electrodes of the respective transformers shall be interconnected and connected to the grid using GI flat as per specification.

8.0 GI earth wire shall run all along the wire fencing and shall be connected to the grid at 20m interval.

9.0 Gates shall be connected to the earth grid as per specification.

10.0 15.10 Single run of earth flat as per specification shall run around the control room to form separate earth grid interconnecting sufficient number of earth electrodes all around the control room to bring down the earth value below statutory requirement.

11.0 15.11 Two runs of GI flat as per specification shall be run in the cable duct / tray inside the control room to form earth bus and shall be connected to the external control room earth grid in duplicate.

12.0 15.12 All the control room equipments shall be connected to the earth bus in the cable duct in duplicate.

5.18.00 <u>11kV Ring Main network:</u>

1.0 Supply, erection, testing and commissioning of required numbers of outdoor type 11kV, 3 / 4 unit Isolator cum VCB Kiosks (2 nos. Isolators + 1 / 2 nos. VCBs) at various locations for Township (Quantity as per detailed design & as per the site requirements).

2.0 Supply, erection, testing and commissioning of one number of outdoor type 11kV, single unit Bus-coupler VCB Kiosk at suitable location as per the technical specification.

3.0 Necessary plinth shall be constructed to erect the above kiosks.

4.0 Supply, laying, termination, testing and commissioning of 11/11kV, 3C × 95 sq.mm XLPE insulated, steel armoured, aluminium conductor cable (or as per detailed design) from the outgoing feeder VCBs of 11kV VCB Panel Board ,

located at 2x6.3 MVA sub-station control room. All the 3 / 4 unit and the bus-coupler kiosks shall be connected to form a ring-main system.

5.0 Supply and providing heat shrinkable type indoor end terminations suitable for the above cables at all ends.

6.0 Supply, erection, testing and commissioning of required numbers 11/0.415kV, 500kVA Distribution Transformer to the RMUs. (Quantity as per detailed design & as per the site requirements).

7.0 Necessary plinth shall be constructed to erect the Distribution Transformers. Supply, laying, termination, testing and commissioning of 11/11kV, 3C×50sq.mm, XLPE insulated, steel armoured, Aluminium conductor cable from the 11kV, 3 / 4 unit kiosk and shall be connected with distribution transformers' primaries.

8.0 Supply and providing heat shrinkable type indoor end terminations suitable for the above cable at both ends.

9.0 Supply, transport, erection, testing and commissioning of require number of outdoor LT Panels, for each of the Distribution Transformers (Quantity as per detailed design & as per the site requirements).

10.0 Supply, laying and termination of 1100V grade, 3.5Cx120 sq.mm, PVC insulated, steel armoured, aluminium conductor cable (or as per detailed design & as per the site requirements) between the Distribution Transformers' secondaries and the LT Panel incomers. Necessary cable end termination / brass cable gland for the above cable shall be provided.

11.0 Necessary supporting structures for HT and LT cables shall be supplied and erected.

5.19.00 <u>250kVA Diesel Generator Set:</u>

1.0 Supply, Transport, erection, testing and commissioning of five numbers of out-

door type, CPCB-II compliant, 250kVA Diesel Generator Set with control panel, acoustic enclosure, other accessories and AMF panel, as per the technical specification.

2.0 Necessary plinth with suitable foundation as per the manufacturer's design shall be provided.

3.0 The Control and AMF panels shall be indoor type and the same shall be erected in the control room.

5.20.00 <u>Statutory Requirements:</u>

1.0 Danger boards for 33kV, 11kV and 415V system, as per the BIS, shall be provided wherever required.

2.0 Supply and laying of insulating mats of 3mm thickness and 1 meter width, in front of all the panels inside control room.

3.0 All the incoming and outgoing cables' source / destination shall be written in the cable chamber.

4.0 All the equipments shall be identified with numbering and letter painting.

5.0 Name plate details of the transformers shall be written on the plinth for Distribution Transformers and separate board shall be displayed for Power Transformers.

6.0 Aluminium identification tags shall be provided on all the cables on uniform interval.

7.0 Necessary clearance shall be obtained from statutory authorities.

8.0 All statutory requirements for the entire works, as applicable shall be complied with, not limited to the above.

6.00.00 TECHNICAL SPECIFICATIONS (ELECTRICAL)

1.0 **19/33kV, 3Cx240sq.mm, XLPE, Aluminium UG Cable.**

1.1 **Material Description:**

19/33kV, 3Cx240sq.mm., XLPE insulated, aluminum conductor, UG cable.

1.2 **Scope:**

Manufacture and supply of 19/33kV, 3Cx 240 sq.mm. XLPE insulated, Aluminum conductor cable (or as per detailed design) conforming to IS: 7098 (Part-2)-1985 as per the detailed specification furnished below.

1.3 **System Particulars:**

a) Normal System Voltage: 33kV.

b) Highest system Voltage: 36kV.

c) Number of Phases: 3.

d) Frequency: 50 Hz ± 5 %.

e) System earthing: Solidly / Resistance Earthed.

1.4 **Location Details:**

To extend 33kV power supply to NTTPP sub-station.

1.5 **Cable construction:**

1.5.1 Conductor: The conductor made up of multi-stranded aluminium.

1.5.2 Conductor screening**:** Conductor screening shall be provided over the conductor by extrusion of non-metallic semi-conducting compound.

1.5.3 Insulation: The conductor with protective screen shall be provided with cross-linked polyethylene insulation applied by extrusion conforming to the requirements of IS 7098(Part2)-1985.

1.5.4 Insulation screening: The insulation screening shall consist of two parts, metallic and non-metallic. Non-metallic part shall be applied directly over the insulation of each core and shall consist of extruded semi-conducting compound. The metallic part shall be non-magnetic tape applied over the non-metallic part.

1.5.5 Core identification: Core identification for three core cables shall be of coloured strips of red, yellow & blue colours and shall be applied over the non-metallic insulation screening of core.

1.5.6 Fillers: The interstices shall be filled with non-hygroscopic material.

1.5.7 Binder tape: binder tapes shall be applied over the laid up cores.

1.5.8 Inner-sheath: The laid up cores shall be provided with inner sheath applied by extrusion PVC compound conforming to the requirements of Type ST2 of IS: 5831-1984.

1.5.9 Armouring: Galvanized round steel wire armouring (conform to IS: 3975-1999) shall be applied over the inner-sheath.

1.5.10 Binder tape: A binder tape may be applied on the armour.

1.5.11 Outer sheath: The outer sheath shall be applied over the armouring by extrusion PVC compound conforming to the requirements of Type ST2 of IS: 5831-1984. Colour of the outer sheath shall be black.

1.6. **Tests:**

1.6.1 a) Type Tests: Type test certificate already conducted on 33 kV cable shall be submitted.

1.6.2 b) Routine Tests: Routine tests shall be conducted on all the cable drums in the presence of NTTPP representative.

1.6.3 c) Acceptance Tests: Acceptance test shall be conducted as per BIS.

1.7. **Identification:**

The manufacturer shall be identified throughout the length of cable by manufacturer's name or trade-mark, the voltage grade and year of manufacture indented, printed or embossed or by means of a tape bearing this information. The indentation, printing or embossing shall be done only on the outer sheath.

1.8 **Relevant standards:**

a) Conductor: IS- 8130-1984 with latest amendments.

b) Insulation: IS-7098 (Part-2)-1985 with latest amendments.

c) Armouring: IS: 3975-1979 with latest amendments.

d) Outer sheath: IS: 5831-1984 with latest amendments.

e) Tests: IS-7098 (Part-2)-1985 with latest amendments.

1.9 **Inspection:**

The NTTPP representative shall have access to the contractor's works at any time during working hours for the purpose of inspection of manufacture or test on the cable and may select samples of the materials. The representative shall be provided with necessary facilities for such inspection or test. At least 15 days advance notice regarding the readiness of the cable shall be given to enable to depute our representative for inspection of the cable and / or witnessing the tests.

2 **33kV VCB Panel Board:**

2.1 **Construction:**

2.1.1 33kV VCB panel board shall consist of two number incomer VCB cubicles with line PT chamber, one number bus coupler VCB cubicle, two number outgoing Feeder VCB cubicles, and two number of Bus PT cubicles.

2.1.2 The panel board shall be of indoor type, floor mounted, free standing type, metal clad with fully draw out type breaker. It shall be totally enclosed dust, damp and vermin proof.

2.1.3 Separate compartments shall be provided for CBs, bus bars, relay & instruments, CT&PT and cable boxes, fully and effectively segregating these from one another so that fault in any one compartment do not cause damage

to equipments in other compartments.

2.1.4 Design and construction shall be such as to allow extension at either end or connection to future multiunit panel as per standard mounting arrangements, suitable to site condition.

2.1.5 Installation materials, communication cable for EMS, external control cables, cable glands, termination kit and lugs shall be as per the system requirement.

2.1.6 The switchgear enclosure shall conform to the degree of protection not less than IP40.

2.1.7 The minimum thickness of sheet steel used shall be 2.5mm for load bearing members, front / rear doors & end cover and for others, not less than 2mm (except explosion cover).

2.1.8 For exterior surfaces CRCA sheet shall be used. The base plate shall be of adequate thickness to carry the load of VCB truck and cubicle.

2.1.9 The switchgear assembly shall comprise of a continuous, dead front line-up of freestanding, vertical cubicles.

2.1.10 The panels shall be bolted together to form a continuous flush front switch gear suitable for front operation of board.

2.1.11 The cubicles shall be of folded steel construction on all sides.

2.1.12 Each cubicle shall have a front-hinged door with sturdy hinges and suitable locking arrangement and a hinged and bolted type removable back door.

2.1.13 All the doors as well as side walls shall be provided with stiffeners or reinforcement to prevent any warping or bend.

2.1.14 All covers, doors and the seating portion of top panels where main buses are running shall be provided with suitable gaskets.

2.1.15 Rubber beading, gasket etc. of best quality shall be provided wherever necessary to avoid entry of insects.

2.1.16 Suitable lifting eye/arrangements shall be provided for the cubicle.

2.1.17 The cubicles shall be of bolted construction to ensure compact and rigid structure, presenting a neat and pleasing appearance.

2.1.18 The panels to be supplied shall be interchangeable.

2.1.19 Pressure relief flaps shall be provided with suitable size in each cubicle and the position shall be at a slightly raised level.

2.1.20 Power and control cable entry into the switchgear panel shall be totally segregated.

2.1.21 All relays, meters, switches and lamps shall be flush mounted on the respective cubicle door of the control cabinet built on the front of the cubicle.

2.1.22 For connection between dissimilar metals, bimetallic connectors shall be provided.

2.1.23 A glass window shall be provided in all the panels for viewing the operation of the breaker.

2.1.24 Illumination lamp with door switch shall be provided for better viewing.

2.1.25 Two independent earthing lugs/cleats shall be brought out from the panels for the connection with station earth.

2.2. **Bus bar & Bus bar Tappings:**

2.2.1 The main buses and connections including earth bus shall be of high conductivity electrolytic copper sized for specified current ratings.

2.2.2 Clearance on the equipment shall be adequate as per Standard to withstand the basic insulation level of the system.

2.2.3 Bus insulators shall be of 33kV Insulators and shall be flame-retardant, track resistant type with high creepage surface.

2.2.4 All buses and connection shall be supported to withstand stresses due to maximum short circuit and also to take care of any thermal expansion.

2.2.5 The bus bars shall be colour sleeved for easy identification.

2.2.6 Bus bar running from one cubicle to the other cubicle shall be through wall bushings or suitably insulated.

2.3 **Circuit Breaker:**

2.3.1 The circuit breaker shall be of Vacuum circuit breaker.

2.3.2 Draw out VCBs shall have SERVICE, TEST and DISCONNECTED position with positive indication for each position.

2.3.3 Circuit breakers of identical ratings shall be physically and electrically interchangeable.

2.3.4 Circuit breakers shall have motor wound, spring charged, trip free mechanism with anti-pumping feature and shunt trip. In addition, facility for manual charging of spring shall be provided.

2.3.5 Spring charging shall take place automatically after each breaker closing operation.

2.3.6 One open-close-open operation of the circuit breaker shall be possible after failure of power supply to the motor.

2.3.7 The circuit breakers offered shall have short breaking and making time to suit the changeover requirements.

2.3.8 The open contacts of the VCB shall be capable of withstanding the system voltage with loss of vacuum.

2.3.9 The following mechanical safety inter-lock shall be provided:

1 The withdrawal part cannot be moved from disconnected position to the service position unless the low voltage plug connector has been fitted in first.

2 The breaker cannot be operated unless the withdrawal part is either in TEST or SERVICE Position.

3 The withdrawal part cannot be moved from TEST to SERVICE position and vice

versa unless the circuit breaker is open.

4 The door cannot be opened if the withdrawal part is in SERVICE or in an intermediate position. The door cannot be closed unless the LV plug has been fitted.

5 Automatic earthed metallic or Fibre Reinforced plastic (FRP) safety shutters shall be provided to fully cover the female primary disconnections when the breaker is withdrawn.

2.3.10 Wire mesh of suitable size shall be provided at VCB and CT chambers for the escape of hot gases.

2.3.11 Each circuit breaker shall be provided with the following auxiliary / limit switches.

2.3.12 Auxiliary switch with required number of NO / NC contacts shall be mounted on the draw out portion for normal operation and indication.

2.3.13 Breaker position switch with 3 NO + 1 NC contacts each for TEST and SERVICE position.

2.3.14 A set of minimum 6 NO + 6 NC auxiliary contacts shall be provided in the circuit breaker for system control and process interlocking. Position limit switchgears (test/service) shall have 2NO + 2NC auxiliary contacts.

2.4 **Control and Indication:**

2.4.1 Breaker fault trip indication shall be provided through clustered LED type indicating lamp.

2.4.2 The ON and OFF switch for Closing and Tripping of the breaker shall be rotary type fly back switch with pistol grip.

2.4.3 Indicating lamps shall be provided on front of the panel.

2.4.4 Necessary auxiliary relays, timers, wirings etc. required for the above purpose shall be included.

2.5 **Current Transformer:**

2.5.1 Current transformers shall be of epoxy resin cast and bar primary type and of class E or better insulation.

2.5.2 All secondary connections shall be brought out to terminal blocks in the control and relay compartment.

2.5.3 Current transformer shall be mounted on stationary portion of the switchgear and shall be easily accessible for maintenance and testing.

2.5.4 CT and cable chamber can be accessed through removable bolted rear covers having viewing window of polycarbonate material for operator's safety.

2.5.5 Accuracy class, VA burden, short time rating of the CT shall be as per data sheet.

2.5.6 The polarity of the CTs shall be clearly shown in the drawings.

2.6 **Voltage transformer:**

2.6.1 The PTs shall be cast-resin, draw-out type and rating shall be as per data sheet.

2.6.2 HRC fuses shall be provided to protect high voltage windings of PT.

2.6.3 Low voltage HRC fuses to protect from over-load shall be installed for secondary leads.

2.6.4 Fuses shall be suitably located to permit easy replacement while the switchgear is energized.

2.6.5 Secondary fuse shall be provided in the respective panel in which PT is located.

2.6.6 Line PT shall be provided for each incomer VCB cubicles.

2.6.7 Bus PTs shall be provided in two separate cubicles.

2.7 **Relays:**

2.7.1 All protective relays shall be of flush mounting, draw out type design. Small auxiliary relays may be in non-draw out execution and mounted within the cubicle.

2.7.2 Relays shall be rated for operation of secondary current of 5A and 110V secondary voltage. Auxiliary Voltage available is 110 V DC. Number and rating of relay contacts shall suit the job requirements.

2.7.3 Necessary terminal blocks of disconnecting type shall be provided for all the CT secondary terminals connection and relay testing.

2.7.4 All the protections shall pass through a Master trip relay.

2.8. **Meters:**

2.8.1. Indicating instruments shall be of flush mounting and digital type.

2.8.2 Watt-hour meter shall be of flush mounted type and compatible for EMS.

2.8.3 Test terminal block shall be provided to facilitate testing of meters without disturbing CT or PT secondary connection.

2.9. **Push Buttons:**

2.9.1 All push buttons shall be heavy duty, spring return type with finger touch proof terminal suitable for flush mounting on sheet steel cubicle doors.

2.9.2 The push button shall be of flush type and spec. as given in the data sheet.

2.10 **Selector switches:**

2.10.1 The selector switch shall be of heavy duty, rotary, stay put type.

2.10.2 Contacts shall be silver plated, air break, wiping type.

2.10.3 The continuous current and breaking capacity of the contacts shall be adequate for the duty involved with a minimum of 10A continuous current rating at 240V AC or 110V DC.

2.10.4 Ammeter selector switches shall be provided with make before break contacts.

2.10.5 Ammeter and Voltmeter selector switches shall be provided with wing knob handle.

2.11 **Secondary Wiring:**

2.11.1 The switchgear shall be fully wired at the factory to ensure proper functioning

of control, protection schemes etc.

2.11.2 Fuse and links shall be provided to permit individual circuit isolation from bus wires without disturbing other circuits.

2.11.3 All spare contacts of relays, switches and other devices shall be wired up to terminal block.

2.11.4 Wiring shall be done with flexible, 650V grade, heat resistant PVC insulated wire with stranded copper conductors of 2.5 sq.mm for CT circuits and 1.5 sq.mm for control circuits.

2.11.5 Each wire shall be identified, at both ends, with permanent marking bearing wire numbers as per approved wiring diagrams.

2.11.6 Wire termination shall be made with crimping type connectors with insulating sleeves.

2.11.7 Wires shall not be spliced between terminals.

2.11.8 The wires shall be properly grouped into small bundle of wires and it shall be covered with flexible hose for hinged area to protect against mechanical damages.

2.11.9 PVC channels shall be used for control wiring purpose and shall be wired neatly. Rigid clamping arrangement shall be provided for CT wiring.

2.11.10 Removable type gland plate shall be provided for control cables.

2.12 **Terminal Blocks:**

2.12.1 Terminal blocks of 650V grade, (stud type) with marking strips shall be provided for terminating the internal wiring and outgoing cables.

2.12.2 Terminals for CT secondary leads shall have provision for shorting.

2.12.3 10% spare terminals shall be provided.

2.12.4 The size of the terminals shall be such that 2 nos. of 4 sq.mm wires can be connected in a single terminal.

2.12.5 Terminal blocks shall be located to allow easy access.

2.12.6 Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals.

2.13 **Cable Chamber:**

2.13.1 The cable entry shall be from the bottom. Sufficient space shall be provided for easy termination and connection of designed 3c × 240 sq.mm XLPE insulated aluminium conductor cable (or for cable as per detailed design).

2.13.2 Necessary copper bus dropper for connecting cable for taking incoming / outgoing feeder along with insulated support shall be provided.

2.13.3 CBCT (suitable for the cable diameter) shall be provided in all transformer feeders.

2.13.4 Necessary provision shall be made for earthing the incoming and outgoing feeder cable at the panel. The accessories required for the same shall be also supplied.

2.13.5 Suitable cable clamping arrangement shall be provided in the cable chamber. The cable termination shall be suitable for the cable. The accessories required for the same shall be also supplied.

2.13.6 Sufficient space shall be provided between the power cable end termination and gland plate such that the CBCT shall be accommodated within this space.

2.13.7 The cables are to be terminated on the copper bus directly after the CT chamber. Minimum clearance of 500 mm. shall be made available from bottom plate to the 33 kV copper bus. Suitable epoxy cast resin supports shall be provided for the copper bus for termination. Suitable wire mesh barrier shall be provided for prevention of accidental contacts with live bus when the rear door is opened.

2.13.8 Hinged and bolted type rear door shall be provided for the incomer, bus

coupler and feeder panels at cable box chamber. The door shall be provided with stiffeners and handles.

2.13.9 Suitable size pressure relief vent shall be provided for the cable termination chamber so that any pressure due to fault or explosion inside the cable termination chamber will be released through the pressure relief flap on the roof.

2.13.10 Lever type limit switch shall be provided to trip the breaker at the time of opening the rear door inadvertently. This is required as per the statutory provisions.

2.14 **Earth Bus:**

2.14.1 A continuous running of 50 × 6 sq.mm earth bus shall be provided through the rear side of the panels. One more earth bus below the panels shall be provided in the cable box for connecting the earth core of the outgoing feeder cable and both the earth bus shall be interconnected.

2.14.2 The ground bus shall be provided with two suitable holes drilled and supplied with bolts and nuts at each end to receive the earth bus.

2.14.3 CT and PT secondary neutrals shall be earthed through removable links so that earth of one circuit may be removed without disturbing other. The doors shall also be earthed through braided copper leads.

2.15 **Name Plate:**

2.15.1 Name plates shall be as per the standards.

2.15.2 Nameplates of approved design shall be furnished at each cubicle and at each instrument and device mounted on or inside the cubicle.

2.15.3 The material shall be anodized aluminium or approved metal of 3mm.thick with white letter on black background.

2.15.4 Self-tapping screws shall hold the name plate.

2.15.5 Individual panel number and caution notice on suitable metal plate shall be affixed at the back and front of each vertical panel.

2.15.6 Danger caution board in English and Hindi with symbol shall be painted as per IS on switchboards front and back.

2.15.7 Name plates made on Anodized Aluminium sheet shall be fixed on top of each panel indicating the names like incomer, bus coupler, feeder nos. for easy identification.

2.16 **Space Heater & Plug and Socket:**

2.16.1 Each cubicle shall be provided with thermostat controlled space heaters of suitable rating taking into account the low temperature condition.

2.16.2 Cubicle heater, plug/socket circuits shall have individual MCBs and switches.

2.17 **AC/DC Power Supply:**

2.17.1 Terminals shall be provided for the AC and DC external supplies in each panel with separation and identification.

2.17.2 Supply Voltages:

A.C. supply:-230V ± 10%, 50 Hz.

D.C. supply:-110V ± 10%

2.17.3 Separate 2 pole MCB shall be provided at each switchgear panel for the incoming AC and DC supply.

2.17.4 Bus wires of adequate size shall be provided to distribute the incoming supplies to different cubicles.

2.18 **Tropical Protection:**

2.18.1 All equipment accessories and wiring shall have fungus protection involving special treatment of insulation and metal against fungus, insects and corrosion.

2.18.2 Screens of corrosion resistant material shall be furnished on all ventilating louvers to prevent the entrance of insects.

2.19 **Painting:**

Fabricated bolted construction shall have coating with colour shade of Light grey No.631 of IS: 5 for both interior and exterior.

2.20 **Special Maintenance Tools:**

2.20.1 A set of special maintenance tools which are necessary or convenient for erection, commissioning, maintenance and overhauling of the equipment shall be supplied free of cost.

2.20.2 The tools shall be dispatched in separate containers clearly marked with the name of the equipment for which they are intended.

3 **33/11kV, 6.3 MVA Power Transformers:**

3.1 **General:** 33/11kV, 6.3 MVA, 3 phase, 50Hz, core type, copper wound, oil immersed, AN, Dyn11 outdoor type Power Transformer with cable box arrangement on both HV & LV side including first fill of oil and necessary accessories. Transformer shall be suitable for operation in humid atmosphere and in tropical sun with ambient temperature of 50ºC.

3.2 **Rating & Dimension:** The transformers shall have a maximum continuous rating for the capacity specified in Data Sheet 'A' when operating at normal frequency and at all ratios. The temperature rise shall not exceed the limits specified.

3.3 **Frequency:** The transformers shall be designed to work at the standard normal frequency of 50 Hz and shall also be capable of operating satisfactorily with a frequency variation of ± 3% from normal.

3.4 **Temperature Rise:** The temperature rise shall not exceed 55ºC as measured by resistance for winding and 50ºC as measured by thermometer in oil after a continuous run at full load on ambient temperature of 50ºC.

3.5 **Losses:** The No-load voltage ratio & transformer losses shall be as per IS

tolerance.

3.6 **Connections:** The group symbol of the transformers shall be Dyn11. The winding of the transformers shall be connected in Delta on the high voltage and star on the low voltage side. Neutral of the transformer shall be brought out for Resistance earthing.

3.7 **Terminal Arrangement:** The terminal arrangement on the HV and LV sides of the transformers shall be of cable of box type. Neutral shall be brought out separately.

3.8 **Tapping Arrangement:**

3.8.1 The tap switch shall be provided on the primary side in order to make up for voltage variation of ±2.5 to ±7.5% in steps of 2.5% on the high voltage side.

3.8.2 The transformer shall be provided with triple pole hand operated tap changing switch suitable for external operation on "OFF" circuit without removing tank covers or lowering oil level.

3.8.3 The tapping switches shall be of the gang operated type enabling tapping on all the three phases to be changed simultaneously.

3.8.4 An engraved cast indicating plate shall be provided for the tap switch with a movable pointer to clearly show the voltage for which tapping on each phase is connected.

3.8.5 Provision shall be made so that the switch can be locked at any one of the tap positions but not in any intermediate position. The whole arrangement shall be absolutely rigid and adequately insulated throughout.

3.8.6 The tap change switch with suitable cover to prevent entry of water shall preferably be on the shorter side of the transformer tank.

3.8.7 Operating rod extension attachment shall be tubular or rod, and main tap switch fixing rod shall be of Texalite / Fiber Glass material.

3.9 **Transformer Core:**

3.9.1 The transformer cores shall be constructed from high-grade cold rolled non-ageing grain oriented silicon steel laminations.

3.9.2 The core shall be firmly secured to the supporting frame to prevent undue vibration or noise.

3.9.3 Suitable eyes or lugs shall be provided for lifting the core and windings out of the tank.

3.9.4 The core shall be effectively earthed to the tank.

3.10 **Winding & Insulation:**

3.10.1 Winding materials for both LT and HT shall be of copper.

3.10.2 The arrangement of the windings must be such that there is electrical and magnetic balance under all conditions of operation.

3.10.3 The arrangement shall permit free circulation of oil to ensure the absence of hot spots.

3.10.4 The windings etc, shall be secured in such a way, no jumping of coils etc, shall occur under any conditions.

3.10.5 The general design and construction of transformers and bracing of the windings shall be such that no mechanical movement of the coils will be possible with dead short on either side of the transformer.

3.10.6 Suitable clamping arrangement for both HV & LV coil limbs shall be provided.

3.10.7 The insulation shall be suitable for working continuously at a voltage of 10% above normal.

3.11 **Oil:**

3.11.1 The Insulating oil used in the transformer shall comply with the requirements specified in the IS 335 of the latest issue.

3.11.2 The transformer shall be supplied with necessary oil.

3.11.3 The oil shall be free from PCB.

3.12 **Tank:**

3.12.1 The transformer tank shall be built of good quality commercial grade sheet steel.

3.12.2 All joints of the transformer tank and fittings shall be hot oil tight and no bulging shall occur during service.

3.12.3 The tank design shall be such that the core and windings can be lifted free of the container with minimum dismantling.

3.12.4 The tank plates shall be of adequate strength such that the complete transformer when filled with oil can be lifted by means of lifting lugs, fixed on the tank.

3.12.5 The tank shall be fitted with a suitable cover with necessary provision for taking the external fittings specified below.

3.12.6 The tank may be either plain with necessary stiffeners or fitted with cooling tubes or fins as per manufacturer's standard practice.

3.12.7 The transformer tank and fittings shall withstand vacuum as per CBIP specification.

3.12.8 The cover plate of the tank shall be slightly sloping on one side to drain off rainwater.

3.12.9 At all places of flange joint viz., tank cover, cable boxes, conservator end plates etc., protection lips shall be provided to prevent ingress of moisture or rain water.

3.12.10 Copper 'U' clamp shall be provided for earth continuity wherever necessary.

3.13 **Extra Fittings:**

3.13.1 Drain cum filter valve with provision for oil sampling with plug.

3.13.2 Top filter valve with plug.

3.13.3 Air release plug.

3.13.4 Top oil sampling valve with cover plate.

3.13.5 Thermometer pocket with plug.

3.13.6 An oil conservator tank of sufficient capacity with oil filling hole (with cap), drain pipe with valve.

3.13.7 Dehydrating (Silica gel) breather of transparent type.

3.13.8 Plain oil level gauge (Prismatic) with maximum and minimum levels marked.

3.13.9 Pressure relief Valve shall be provided.

3.13.10 Winding Temperature Indicator, Oil Temperature Indicator with alarm and trip contacts shall be provided.

3.13.11 Buchholz Relay shall be provided.

3.13.12 Lifting lugs or shackles.

3.13.13 Rating and diagram plate (Indelibly engraved) with full details as required in IS 2026 of latest issue.

3.13.14 Inspections cover with handle for lifting.

3.13.15 Base channels and bi-directional rollers.

3.13.16 Off-circuit tap changing switch.

4 **11kV Neutral Grounding Resistor:**

4.1 Neutral Grounding Resistor shall be of outdoor type, weather and vermin proof, plinth mounted type with control cable terminal box.

4.2 The top of the enclosure shall have suitable sloped canopy such that the rain water shall not accumulate on the top and also it shall not drip inside the NGR.

4.3 Suitable lifting arrangement shall be provided to lift the NGR.

4.4 Necessary ventilation with mesh shall be provided.

4.5 The NGR shall be painted with shade of 631 of IS5.

4.6 Porcelain bushing shall be provided for High end connection with suitable box for terminating neutral cable.

4.7 Porcelain wall through bushing shall be provided for Low end connection.

4.8 The low end terminal shall be suitable for connecting GI flat.

4.9 The resistor elements shall be of punched stainless steel and supported by porcelain insulators.

4.10 Two earthing studs with necessary nuts and washers shall be provided.

4.11 Space heater with thermostat controlled by one MCB, industrial type 10A plug & socket controlled by one MCB and CFL lamp with enclosure controlled by one MCB shall be provided.

5 **11/11kV, 3Cx120/95/50 sq.mm, XLPE, Aluminium UG Cable:**

5.1 **Material Description:**

11/11kV, 3Cx120/95/70/50sq.mm., XLPE insulated, aluminium conductor, UG cable.

5.2 **Scope:**

Manufacture and supply of 11/11kV, 3Cx 120/95/70/50 sq.mm. XLPE insulated, Aluminium conductor cable (or as per detailed design) conforming to IS: 7098 (Part-2)-1985 as per the detailed specification furnished below.

5.3 **System Particulars:**

a) Normal System Voltage: 11kV.

b) Highest system Voltage: 12kV.

c) Number of Phases: 3.

d) Frequency: 50 Hz ± 5 %.

e) System earthing: Solidly/Resistance Earthed.

5.4 **Location Details:**

To extend 11kV power supply from Station to Miscellaneous Non Plant Buildings (MNPB), Township RMU locations and Distribution transformers.

5.5 **Cable construction:**

Conductor: The conductor made up of multi-stranded aluminium.

Conductor screening**:** Conductor screening shall be provided over the conductor by extrusion of non-metallic semi-conducting compound.

Insulation: The conductor with protective screen shall be provided with cross-linked polyethylene insulation applied by extrusion conforming to the requirements of IS 7098(Part2)-1985.

Insulation screening: The insulation screening shall consist of two parts, metallic and non-metallic. Non-metallic part shall be applied directly over the insulation of each core and shall consist of extruded semi-conducting compound. The metallic part shall be non-magnetic tape applied over the non-metallic part.

Core identification: Core identification for three core cables shall be of coloured strips of red, yellow & blue colours and shall be applied over the non-metallic insulation screening of core.

Fillers: The interstices shall be filled with non-hygroscopic material.

Binder tape: binder tapes shall be applied over the laid up cores.

Inner-sheath: The laid up cores shall be provided with inner sheath applied by extrusion.

Armouring: Galvanized round steel armouring (conform to IS: 3975-1999) shall be applied over the inner-sheath.

Outer sheath: The outer sheath shall be applied over the armouring by extrusion PVC compound conforming to the requirements of Type ST2 of IS: 5831-1984. Colour of the outer sheath shall be black.

5.6 **Tests:**

a) Type Tests: Type test certificate already conducted on 11 KV cable shall be submitted.

b) Routine Tests: Routine tests shall be conducted on all the cable drums in the presence of NTTPP representative.

c) Acceptance Tests: Acceptance test shall be conducted as per BIS.

5.7 **Identification:**

The manufacturer shall be identified throughout the length of cable by manufacturer's name or trade-mark, the voltage grade and year of manufacture indented, printed or embossed or by means of a tape bearing this information. The indentation, printing or embossing shall be done only on the outer sheath.

5.8 **Relevant standards:**

(a) Conductor: IS- 8130-1984 with latest amendments.

(b) Insulation: IS-7098 (Part-2)-1985 with latest amendments.

(c) Armouring: IS: 3975-1979 with latest amendments.

(d) Outer sheath: IS: 5831-1984 with latest amendments.

(e) Tests: IS-7098 (Part-2)-1985 with latest amendments.

5.9 **Inspection:**

The NTTPP representative of the purchaser shall have access to the contractor's works at any time during working hours for the purpose of inspection of manufacture or test on the cable and may select samples of the materials. The representative shall be provided with necessary facilities for such inspection or test. At least 15 days advance notice regarding the readiness of the cable shall be given to enable to depute our representative for inspection of the cable and / or witnessing the tests.

6 **11kV VCB Panel Board:**

6.1 **8.1. Construction:**

6.1.1 11kV VCB panel board shall consist of two number incomer VCB cubicles with line

PT chamber, one number bus coupler VCB cubicle, eight number outgoing Feeder VCB cubicles, two number of Bus PT cubicles and two number spare cubicles.

6.1.2 The panel board shall be of indoor type, floor mounted, free standing type, metal clad with fully draw out type breaker. It shall be totally enclosed dust, damp and vermin proof.

6.1.3 Separate compartments shall be provided for CBs, bus bars, relay & instruments, CT&PT and cable boxes, fully and effectively segregating these from one another so that fault in any one compartment do not cause damage to equipments in other compartments.

6.1.4 Design and construction shall be such as to allow extension at either end or connection to future multiunit panel as per standard mounting arrangements, suitable to site condition.

6.1.5 Installation materials, communication cable for EMS, external control cables, cable glands, termination kit, lugs etc., shall be as per the system requirement.

6.1.6 The switchgear enclosure shall conform to the degree of protection not less than IP40.

6.1.7 The minimum thickness of sheet steel used shall be 2.5mm for load bearing members, front and rear doors and end cover and for others, not less than 2mm (except explosion cover).

6.1.8 The base plate shall be of adequate thickness to carry the load of VCB truck and cubicle.

6.1.9 The switchgear assembly shall comprise of a continuous, dead front line-up of freestanding, vertical cubicles.

6.1.10 The panels shall be bolted together to form a continuous flush front switch gear suitable for front operation of board.

6.1.11 The cubicles shall be of folded steel construction on all sides.

6.1.12 Each cubicle shall have a front-hinged door with sturdy hinges and industrial locking arrangement and a hinged and bolted type removable back door.

6.1.13 All the doors as well as side walls shall be provided with stiffeners or reinforcement to prevent any warping or bend.

6.1.14 All covers and doors where main buses are running shall be provided with suitable gaskets.

6.1.15 Rubber beading, gasket etc. of best quality shall be provided wherever necessary to avoid entry of insects.

6.1.16 Suitable lifting eye/arrangements shall be provided for the cubicle.

6.1.17 The cubicles shall be of bolted construction to ensure compact and rigid structure, presenting a neat and pleasing appearance.

6.1.18 The panels are to be supplied shall be interchangeable.

6.1.19 Circuit breakers, instrument transformers, bus bars, instruments and cable compartment shall be housed in separate compartments within the cubicle.

6.1.20 The design shall be such that failure of one of the equipment shall not affect the adjacent units.

6.1.21 Pressure relief flaps shall be provided with suitable size in each cubicle and the position shall be at a slightly raised level.

6.1.22 Power and control cable entry into the switchgear panel shall be totally segregated.

6.1.23 All relays, meters, switches and lamps shall be flush mounted on the respective cubicle door of the control cabinet built on the front of the cubicle.

6.1.24 For connection between dissimilar metals, bimetallic connectors shall be provided.

6.1.25 A glass window shall be provided in all the panels for viewing the operation of the breaker.

6.1.26 Illumination lamp with door switch shall be provided for better viewing.

6.1.27 Two independent earthing lugs/cleats shall be brought out from the panels for the connection with station earth.

6.2 **Bus bar & Bus bar Tapings:**

6.2.1 The main buses and connections including earth bus shall be of high conductivity electrolytic copper sized for specified current ratings.

6.2.2 Clearance on the equipment shall be adequate as per Standard to withstand the basic insulation level of the system. All live parts in the switchboards in service conditions shall be sleeved/ insulated.

6.2.3 Bus supporting insulators shall be flame-retardant, track resistant type with high Creepage surface.

6.2.4 All buses and connection shall be supported to withstand stresses due to maximum short circuit and also to take care of any thermal expansion.

6.2.5 Bus bar running from one cubicle to the other cubicle shall be wall through bushings or suitably.

6.3 **Circuit Breaker:**

6.3.1 The circuit breaker shall be of Vacuum circuit breaker.

6.3.2 Draw out VCBs shall have SERVICE, TEST and ISOLATED position with positive indication for each position.

6.3.3 Circuit breakers of identical ratings shall be physically and electrically interchangeable.

6.3.4 Circuit breakers shall have motor wound, spring charged, trip free mechanism with anti-pumping feature and shunt trip. In addition, facility for manual charging of spring shall be provided.

6.3.5 Spring charging shall take place automatically after each breaker closing operation.

6.3.6 One open-close-open operation of the circuit breaker shall be possible after failure of power supply to the motor.

6.3.7 The circuit breakers offered shall have short breaking and making time to suit the changeover requirements.

6.3.8 The open contacts of the VCB shall be capable of withstanding the system voltage with loss of vacuum.

6.3.9 The following mechanical safety inter-lock shall be provided:

6.3.10 The withdrawal part cannot be moved from isolated position to the service position unless the low voltage plug connector has been fitted in first.

6.3.11 The breaker cannot be operated unless the withdrawal part is either in TEST or SERVICE POSITION.

6.3.12 The withdrawal part cannot be moved from TEST to SERVICE position and vice versa unless the circuit breaker is open.

6.3.13 Automatic earthed metallic or Fibre Reinforced plastic (FRP) safety shutters shall be provided to fully cover the female primary disconnections when the breaker is withdrawn.

6.3.14 Wire mesh of suitable size shall be provided at VCB and CT chambers for the escape of hot gases.

6.3.15 Each circuit breaker shall be provided with the following auxiliary/ limit switches.

6.3.16 Auxiliary switch with required number of NO/ NC contacts shall be mounted on the draw out portion for normal operation and indication.

6.3.17 Breaker position switch with 3 NO + 1 NC contacts each for TEST and SERVICE position.

6.3.18 A set of minimum 6 NO + 6 NC auxiliary contacts shall be provided in the circuit breaker for system control and process interlocking. Position limit switchgears (test/service) shall have 2NO + 2NC auxiliary contacts.

6.4 **Control and Indication:**

6.4.1 Breaker fault trip indication shall be provided through clustered LED type indicating

lamp.

6.4.2 The ON and OFF switch for Closing and Tripping of the breaker shall be rotary type fly back switch with pistol grip.

6.4.3 Indicating lamps shall be provided on the front of the panel.

6.4.4 Necessary auxiliary relays, timers, wirings etc. required for the above purpose shall be included.

6.5 **Current Transformer:**

6.5.1 Current transformers shall be of epoxy resin cast and bar primary type and of class E or better insulation.

6.5.2 All secondary connections shall be brought out to terminal blocks in the control and relay compartment.

6.5.3 Current transformer shall be mounted on stationary portion of the switchgear and shall be easily accessible for maintenance and testing.

6.5.4 CT and cable chamber can be accessed through removable bolted rear covers (three pairs) having viewing window (450mm×175mm) of polycarbonate material for operator's safety.

6.5.5 Accuracy class, VA burden, short time rating of the CT shall be as per DATA sheet.

6.5.6 The polarity of the CTs shall be clearly shown in the drawings.

6.6 **Voltage Transformer:**

6.6.1 The PTs shall be cast-resin, draw-out type and rating shall be as per data sheet.

6.6.2 HRC fuses shall be provided to protect high voltage windings of PT.

6.6.3 Low voltage HRC fuses to protect from over-load, shall be provided secondary leads.

6.6.4 Fuses shall be suitably located to permit easy replacement while the switchgear is energized.

6.6.5 Secondary fuse shall be provided in the respective panel in which PT is located.

6.6.6 Line PT shall be provided in each incomer VCB cubicles.

6.6.7 Bus PTs shall be provided in two separate cubicles.

6.7 **Relays:**

6.7.1 All protective relays shall be of flush mounting, draw out type design. Small auxiliary relays may be in non-draw out execution and mounted within the cubicle.

6.7.2 Relays shall be rated for operation of secondary current of 5A. Auxiliary Voltage available is 230V AC and 110 V DC. Number and rating of relay contacts shall suit the job requirements.

6.7.3 Necessary terminal blocks of disconnecting type shall be provided for all the CT secondary terminals connection and relay testing.

6.7.4 All the protections shall pass through a Master trip relay.

6.8 **Meters:**

6.8.1 Indicating instruments shall be of flush mounting and digital type.

6.8.2 Watt-hour meter shall be of flush mounted type and compatible for EMS.

6.8.3 Test terminal block shall be provided to facilitate testing of meters without disturbing CT or PT secondary connection.

6.9 **Push Buttons:**

6.9.1 All push buttons shall be heavy duty, spring return type with finger touch proof terminal suitable for flush mounting on sheet steel cubicle doors.

6.9.2 The push button shall be of flush type and spec. as given in the data sheet.

6.10 **Selector Switches:**

6.10.1 The selector switch shall be of heavy duty, rotary, stay put type.

6.10.2 Contacts shall be silver plated, air break, wiping type.

6.10.3 The continuous current and breaking capacity of the contacts shall be adequate for the duty involved with a minimum of 10A continuous current rating at 240V AC or 110V DC.

6.10.4 Ammeter selector switches shall be provided with make before break contacts.

6.10.5 Ammeter and Voltmeter selector switches shall be provided with wing knob handle.

6.11 **Secondary Wiring:**

6.11.1 The switchgear shall be fully wired at the factory to ensure proper functioning of control, protection schemes etc.

6.11.2 Fuse and links shall be provided to permit individual circuit isolation from bus wires without disturbing other circuits.

6.11.3 All spare contacts of relays, switches and other devices shall be wired up to terminal block.

6.11.4 Wiring shall be done with flexible, 650V grade, heat resistant PVC insulated wire with stranded copper conductors of 2.5sq.mm for CT circuits and 1.5sq.mm for control circuits.

6.11.5 Each wire shall be identified, at both ends, with permanent marking bearing wire numbers as per approved wiring diagrams.

6.11.6 Wire termination shall be made with crimping type connectors with insulating sleeves.

6.11.7 Wires shall not be spliced between terminals.

6.11.8 The wires shall be properly grouped into small bundle of wires and it shall be covered with flexible hose for hinged area to protect against mechanical damages.

6.11.9 PVC channels shall be used for control wiring purpose and shall be wired neatly. Rigid clamping arrangement shall be provided for CT wiring.

6.11.1 Removable type gland plate shall be provided for control cables.

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6.12 **Terminal Blocks:**

6.12.1 Terminal blocks of 650V grade, (stud type) with marking strips shall be provided for

terminating the internal wiring and outgoing cables.

6.12.2 Terminals for CT secondary leads shall have provision for shorting.

6.12.3 Not more than two wires (one in and one out) shall be connected to any terminal.

6.12.4 10% Spare terminals shall be provided.

6.12.5 The size of the terminals shall be such that 2 nos. of 4 mm^2 wires can be connected in a single terminal.

6.12.6 Terminal blocks shall be located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals.

6.13 **11kV Cable Termination:**

6.13.1 The termination shall be done as per the standard practice and system requirement.

6.13.2 The cable entry shall be from the bottom. Sufficient space shall be provided for easy termination and connection of 2 runs of 11kV, 3x120 sq.mm XLPE cable for the incoming feeders and 11kV, 3x120/95/50 sq.mm XLPE cable for outgoing feeders (or for cable as per detailed design).

6.13.3 Heavy duty lugs of adequate size and quantity required for crimping on cable ends together with bolts and nuts, cable support, removable bottom gland plate for cable entry and bimetal strips wherever two different materials are to be connected together shall be supplied.

6.13.4 Necessary copper bus dropper with insulated support for connecting the cable shall be provided.

6.13.5 CBCT with inner dia. suitable for 11kV cables shall be provided in all outgoing feeders.

6.13.6 Necessary provision shall be made for earthing the incoming and outgoing, feeder cables. The accessories required for the same shall be also supplied.

6.13.7 Sufficient space shall be provided between the power cable end termination and gland plate such that the CBCT shall be accommodated within this space.

6.13.8 Minimum clearance of 500 mm. shall be made available from bottom plate to the 11kV copper bus.

6.13.9 Suitable weld mesh barrier shall be provided for prevention of accidental contacts with live bus when the rear door is opened.

6.13.10 Hinged and bolted type rear door shall be provided for the incomer, bus coupler and feeder panels and cable chamber. The door shall be provided with stiffeners and handles.

6.13.11 Suitable size pressure relief vent shall be provided for the cable termination chamber so that any pressure due to fault or explosion inside the cable termination chamber will be released through the pressure relief flap on the roof.

6.13.12 Lever type limit switch shall be provided to trip the breaker at the time of opening the rear door inadvertently.

6.14 **Earth Bus:**

6.14.1 A continuous running of 50 × 6 sq.mm copper earth bus shall be provided through the rear side of the panels.

6.14.2 The frame of each circuit breaker shall be grounded through heavy multiple contacts at all times till the power contacts are separated by a safe distance.

6.14.3 CT and VT secondary neutrals shall be earthed through removable links so that earth of one circuit may be removed without disturbing other.

6.14.4 The doors shall also be earthed through braided copper leads.

6.15 **Name Plates:**

6.15.1 Name plates shall be as per the standards.

6.15.2 Name plates of approved design shall be furnished at each cubicle and at each instrument and device mounted on or inside the cubicle.

6.15.3 The material shall be anodized aluminium or approved metal of 3mm.thick with white letter on black background.

6.15.4 Self-tapping screws shall hold the nameplate. Name plate sizes shall be such that the details are legible.

6.15.5 Name/number of the individual panel shall be affixed at the back and front of each panel.

6.15.6 Danger/caution board, as per IS, shall be affixed on front and back of the panel boards.

6.15.7 Name plates made on Anodized Aluminium sheet shall be fixed on top of each panel indicating the names like incomer, bus coupler, feeder nos. for easy identification.

6.16 **Space heaters and plug sockets:**

6.16.1 Each cubicle shall be provided with thermostat controlled space heaters of suitable rating taking into account the low temperature condition.

6.16.2 Cubicle space heater, plug/socket shall have individual MCBs.

6.17 **AC/DC Power supply:**

a) Terminals shall be provided for the AC and DC external supplies in each panel with separation and identification.

i.) A.C. supply 230V ± 10%, 50 Hz.

ii.) D.C. supply 110V ± 10%

b) 2 poles MCB shall be provided at each switchgear panel for the incoming AC and DC separately.

c) Bus wires of adequate size shall be provided to distribute the incoming supplies to different cubicles.

6.18 **Tropical Protection:**

6.18.1 All equipment accessories and wiring shall have fungus protection involving special

treatment of insulation and metal against fungus, insects and corrosion.

6.18.2 Screens of corrosion resistant material shall be furnished on all ventilating louvers to prevent the entrance of insects.

6.19 **Painting:**

Fabricated bolted construction shall have coated with colour shade of Light grey No.631 of IS: 5.

6.20. **Special Maintenance Tools:**

6.20.1 A set of special maintenance tools which are necessary or convenient for erection, commissioning, maintenance and overhauling of the equipment shall be supplied free of cast.

6.20.2 The tools shall be dispatched in separate containers clearly marked with the name of the equipment for which they are intended.

7.0. **11kV Capacitor Bank:**

7.1 **Scope:**

This specification covers 11kV, 50Hz pole-mounted automatically switched capacitor installations comprising of

a) 11 kV automatic capacitor switches.

b) Capacitor banks suitable for 6.3MVA, 33/11kV Power Transformer.

7.2 **Operating Conditions:**

a) Nominal system voltage: 11 kV.

b) Highest system voltage: 12kV.

c) Normal frequency: 50 Hz.

7.3 **Applicable Standards:**

Unless otherwise stipulated in the specification, the 11kV pole mounted switched capacitors shall comply with the latest version of IS: 13925 (Shunt Capacitors for

Power Systems).

7.4 **Temperature Category:**

Unless otherwise specified, the capacitors shall be suitable for upper limit of temperature category 50° C as per IS: 13925.

7.5 **Rated Output:**

The power factor bank shall be suitable for use in 11kV system (Highest system voltage 12kV) on the secondary side of 6.3MVA, 33/11kV power transformer. The PF shall be maintained at 0.95 or better, even when the PF is as low as 0.7. The design calculation shall be furnished to NTTPP site authorities.

7.6 **Permissible Overloads:**

The maximum permissible overloads with regard to voltage, current and reactive output shall conform to IS: 13925.

7.7 **Power Loss:**

The power loss in capacitors shall not exceed 0.2 Watt/ kVAr (Subject to a tolerance of plus 10%).

7.8 **Discharge Device:**

Suitable discharge device shall be connected across the capacitor units in accordance with the provision of IS: **13925**.The discharge device shall reduce the residual voltage from the cross value of the rated voltage to 50V or less within 5 minutes after the capacitor is disconnected from the source of supply.

7.9 **Earth Connection:**

The container of each capacitor unit shall be provided with suitable earthling terminal clearly marked as ‘Earth’.

7.10. **Protective Fuses:**

The capacitors shall be provided with external fuses. It shall be possible to identify the blown-off fuse from outside. The tolerance and the degree of unbalances shall

also be indicated as per relevant IS. The manufacturer shall supply a set of external fuses together with fixing accessories and a set of three spare fuse links along with the capacitor bank.

7.11 **General Requirements:**

7.11.1 The capacitors shall be of non – PCB type, using polypropylene film as the dielectric.

7.11.2 The containers shall be made from sheet steel of thickness not less than 2mm.

7.11.3 The container shall be hermetically sealed by welding process. The metal flanges of the bushing should be welded to the container and covered with epoxy compound providing a strong hermetical seal to the container.

7.11.4 Suitable mounting brackets shall be welded to the container.

7.11.5 The outside of the container should have smooth and tidy look and should be coated with weather- proof and corrosion – resistant paint of white or light grey shade. The container / enclosure shall be painted with length grey colour, shade 631 as per IS: 5.

7.11.6 The fuses and capacitors cells shall be interchangeable.

7.11.7 The dielectric loss angle (tan delta) shall be as per IS: 13925.

7.11.8 The equipment offered by the manufacturer shall comply with the general safety regulations.

7.12 **Marking:**

The capacitor shall be provided with a rating plate and terminal markings as stipulated in IS: 13925.

7.13 **Tests:**

7.13.1 **Routine Tests:**

All the individual capacitor units shall be subjected to the following routine tests at the manufacturer's works (at the cost of manufacturer) in accordance with IS:

13925 with latest amendments.

i) Visual inspection.

ii) Sealing Test.

iii) Measurement of output and capacitance.

iv) Insulation resistance between terminals and containers.

v) Capacitor loss tangent (tan delta) measurement.

vi) Voltage test between terminals and containers.

vii) Test of discharge device.

7.13.2 **Type Tests:**

Type test certificate shall be produced for the equipments /accessories like capacitor bank, capacitor switches, etc of similar or higher voltage rating during getting approval.

7.13.3 **Acceptance Tests:**

The acceptance tests shall be carried out as specified in the IS: 13925 with latest amendments.

7.14 **Drawings & Documents:**

7.14.1 Test Certificates shall be submitted for approval.

7.14.2 Drawing and Catalogues Tender must accompany relevant catalogues and sectional drawing showing necessary details of the equipment offered.

7.14.3 One copy of the dimensional drawing and internal construction drawing shall be submitted.

7.15 **Guaranteed Technical Particulars:**

a) Name of the manufacture & type.

b) Reference standard IS: 13925.

c) Max Voltage (RMS) which the capacitor can withstand.

d) Capacitor Bank rating in kVAr.

e) Rated voltage of capacitor unit in kV.

f) kVAr of individual unit at rated voltage.

g) Type of capacitor connection.

h) Mode of fuse protection.

i) Type of discharge device and its location.

j) Dielectric loss angle of capacitor (Tan Delta).

k) Dielectric loses.

l) Type of impregnate use.

m) Type of dielectric.

n) Insulation level.

o) No. of units in each bank and no. of units / phase.

p) No. and type of bushings for capacitor units.

q) Creepage distance of bushing in mm on rated voltage.

r) Discharge Device.

s) Residual voltage & Time.

t) Terminal tests.

u) Type of fuse.

v) Quantity of oil in kg.

w) Weight of capacitor unit in kg.

x) Dimensions of capacitor unit.

8.0. **Automatic Emulsifying System For Fire Protection**

The following specification specifies the hydraulically controlled automatic emulsifying system for fire protection of 2x6.3 MVA Transformers, 33 / 11kV, outdoor type, oil immersed cable box type both on HV and LV side.

8.1 Design Requirement:

8.1.1 The fire protection system shall be designed for providing fire protection for 2Nos. of 6.3 MVA, 33/11kV power transformers in the switch yard using high velocity water sprinkler system. All the equipments and materials used in the system shall be strictly designed in accordance with the regulations of Tariff Advisory Committee (TAC) of Insurance Association of India.

8.1.2 The distance between sump and pump house will be approximately 10m and pump house to transformers will be approximately 20m

8.2 The System Shall Consist Of The Following:

8.2.1 Automatic Electric Motor Driven Centrifugal Pump Set:

1) One No. automatic electric motor driven centrifugal pump set of required capacity with necessary control panel and other accessories such as required numbers of projectors & quartzoid bulb detectors, deluge valve with alarm motor gong, strainers, air connections, suitable types of valves, pressure gauges, pressure switches etc. as main to provide water supply to the emulsifying system.

2) The motor to drive the pump shall be squirrel cage, TEFC type suitable for 415V, 50 Hz. The class of insulation shall be 'B' or 'F' and shall be suitable for 50 deg.C ambient. The degree of protection shall be IP 54 and the type of cooling 0141 of IS:6362.

3) The motor shall be provided with automatic starting switch, isolator and auxiliary switch. The automatic switch shall be of DOL starting, hydraulic pressure controlled, automatic self closing and manually resetting three phase switch of required rating. The switch shall be fitted with two independent diaphragm units, the main unit adjustable for the closing of the switch, at a preset value of falling pressure and auxiliary diaphragm unit to close the switch upon application of pressure. Hinged front cover shall be provided to indicate availability of electrical supply.

4) The isolator shall be of 3 phase, manually operated type with mechanically

interlocked. The blades of the isolator shall be fitted with suitable rated high rupturing capacity cartridges fuses and isolator fitted with sealing box, wiping gland and armor clamp for the incoming cable.

5) The auxiliary switch shall be of two way micro switch type of suitable rating and actuated by the arm of the automatic switch to give remote indication of the closure of the automatic switch or for any other purpose required in connection with switch operation. Necessary ammeter shall be provided for metering purpose. A priming tank, valves, connecting pipes etc. shall be provided for priming of the pump.

8.2.2 Automatic Diesel Engine Driven Pump Set:

a) One No. automatic diesel engine driven pump set of the same capacity as above, complete with starting control panel and other accessories to act as stand by to the above electrically driven pump.

b) The diesel engine for driving the pump shall be provided with 24V DC starting motor, tacho generator and fuel tank to give six hours of full load run. The engine shall be of cold starting, air loss injection type and fitted with a governor capable of regulating the engine speed.

c) The engine shall be provided with a fuel tank containing fuel oil for six hours of full load run.

d) Lead acid 24V heavy duty starter battery along with 230V, 50Hz, single phase battery charger shall be provided.

e) Pressure switch shall be provided to automatically start the pump set due to fall in pressure. When the engine stops, all the controls shall automatically be reset to its normal starting operation. The engine cooling water shall be obtained from the pump discharge.

f) A priming tank, valves, connecting pipes etc. shall be provided for priming of the

pump.

8.3 Priming Pump:

Priming pump, with suitable capacity motor, for priming purpose of both electrically driven pump set and diesel engine driven pump set (or) alternate arrangement for the purpose of priming shall be provided accordingly.

8.4 Annunciation Panel With Battery:

Annunciation panel with battery and battery charger, for both electric pump and diesel pump.

8.5 Electrically Driven Jockey Pump Set:

Suitable electrically driven jockey pump set with control panel and other accessories.

8.6 Piping Arrangement:

Necessary M.S piping (conforming to IS: 1239 / 3589 medium quality) of required size for water distribution system and G.S piping of required size around transformer for water line and supporting materials for suction, inlet and outlet piping.

8.7 Other Works:

Providing necessary power and control cabling, providing necessary earthing arrangements and all other works required for completeness of the system. MCC shall be supplied and erected at emulsifier pump house for providing power supply to pumps, motors and other electrical equipments of this system. Power supply to the MCC shall be tapped from the LT main panel located at SS control room.

8.8 Description Of The System:

8.8.1 Water distribution system:

a) Water available at the sump shall be distributed through suitable size M.S pipes up to the deluge valve and through G.S pipes around the transformers. The water

distribution system beyond the deluge valve shall consist of network of pipes with projectors suitably arranged around the transformers in such a way that in the event of fire the complete transformers can be drenched with water by the high pressure water spray in the form of a fog from the projectors. For the high velocity water spraying system suitable spray nozzles shall be provided as per the system requirement.

b) The piping shall be such that the pipes and supports are capable of being dismantled easily to facilitate removal of equipment for maintenance/ repair.

c) The deluge valve shall be kept closed against the water pressure in the mains by means of the water pressure in the wet pilot detector system. Isolating valves shall be provided before and after the deluge valve to facilitate testing and maintenance of the system.

d) The deluge valve shall be provided with a drain valve for testing of the system. Pressure gauges shall be provided on both upstream and downstream of the deluge valve. Hydraulically operated alarm motor and gong for individual deluge valve shall be provided.

8.8.2 Detector System:

The quartzoid type detector shall be of fusible type capable of fusing in the event of a fire. The detectors shall be located at strategic points, around the transformer on a pipe network charged with water at required pressure. The detector system shall also be suitably connected to the deluge valve network. Suitable pressure gauges shall be provided for network of each equipment. Suitable test connections for manual release of water pressure from detector line for testing the effectiveness of the annunciation system by stimulating fire conditions without actual discharge of water spray on the transformer protected.

8.8.3 Annunciations And Contacts:

Necessary contacts and / or switches for audible and visual annunciations shall be provided to indicate the conditions of the system as below:

I. For Electric motor pump:

1) Water supply pressure- LOW.

2) Low water pressure in detector network.

3) Equipment on fire (indicated by sudden drop in detector water pressure)

4) Deluge valve open (indicating fire).

5) Isolating valves on upstream and downstream of deluge valve – Not fully open.

6) Power supply "OFF" (Flow switch)

7) Water spray "ON" (Flow switch)

8) DC supply "OFF"

9) Water pump-1 Running (Electrical driven pump)

10) Water pump-2 Running (Diesel engine driven pump)

11) Jockey pump running

12) Spare windows.

II. For Diesel engine operated pump:

1) Battery –Not charged.

2) Fuel level- LOW.

3) Lubricating oil pressure- LOW.

4) Spare windows

8.8.4 Suitable contacts shall be provided in the deluge valve for automatic tripping of the protected equipment due to the opening of the deluge valve in the event of fire. Provision shall be made to by-pass this contact during testing of this system. This by-passing shall be indicated on annunciation panel by means of audible and visual alarm.

8.8.5 Annunciators of facia type having translucent window of suitable size engraved with

appropriate function in block letters for each alarm point shall be provided on the control panel. Annunciators shall be suitable for operation with both normally open and normally closed alarm contacts. Three push buttons for audible alarm reset, trouble lamp reset and lamp test with appropriate name plates and necessary relays shall be provided in the control panel.

8.8.6 On receiving an alarm impulse, even if momentary, the appropriate alarm relay shall pick up energizing the corresponding visible and audible alarm units. It shall be possible for the operator to reset the audible alarm even if the fault condition persists. However visible alarm shall not reset unless the alarm condition has disappeared and operator presses the lamp reset push button. Annunciator shall provide sealed in lamp indication and audible alarm condition immediately after the alarm is reset for a previous alarm condition. Annunciators shall operate satisfactorily between 80% and 110% of rated supply voltage (110V).

8.9 Clearance From Live Points:

A minimum electrical clearance of 432 mm for 33kV and 178 mm for 11kV on the equipment shall be provided.

8.10. Operation:

In the event of a fire, the detector shall fuse resulting in a pressure drop in the detector network. The deluge valve shall open due to this pressure drop resulting in flow of water. Simultaneously audible and visual alarm shall be indicated on the annunciator panel and the 33kV Breaker tripped.

8.11 Data Sheet For Fire Water Piping:

Materials Steel (M.S pipes up to the deluge valve and through G.S pipes around the transformers)

Specification	IS 1239
Class	Medium

Joints	Welded.
Painting	As per insurance regulation.

Isolating valves Shall be approved by TAC.

Isolating valves As per IS 1367 Gr 4 b.

Gaskets Natural Red Rubber.

8.12 Tests:

8.12.1 Acceptance tests:

Leakage test on deluge valve:

With the deluge valve completely closed and with the fire water mains upto the deluge valve maintained at 7kg/cm2, no leakage shall be noticed through the deluge valve.

All pipe joints, isolator valves etc., shall be tested for leaks with the pump working at full load.

8.12.2 Leakage test on detector network:

The complete network shall be charged to the maximum rated pressure and no leakage of water shall be noticed.

Automatic starting of pump due to the opening of deluge valve shall be carried out by closing the isolating valve downstream of deluge valve and opening the drain valve in the deluge valve.

8.12.3 Drawings:

Drawings such as general layout of emulsifying system showing piping arrangement, position of projectors & detectors and valves, location of pump house, compressor room etc., Electrical drawings for providing power supply to pumps, motors and compressors, control circuits, protection circuits and other drawings shall be submitted for approval. Drawings for bought out items shall also be submitted for approval.

9.0. **11kV 3 / 4 RMUs & 1 unit BC:**

9.1 **Scope:**

This specification provides details for supply of outdoor type, weather and vermin proof, metal-clad, plinth mounted 3 phase, 12kV, 3/4 Unit Kiosks with load break switches and draw out type VCBs and single unit Bus coupler kiosk with one draw out type VCB.

9.2 **Description:**

9.2.1 3 unit kiosks shall consist of two LBS cubicles and one VCBs cubicle.

9.2.2 4 unit kiosks shall consist of two LBS cubicles and two VCBs cubicles.

9.2.3 The LBS and VCBs shall be positioned such that the VCBs are at the centre and the LBS are either side of the VCBs.

9.2.4 The VCB cubicle consist of one number trip free, draw out type VCB, all necessary protective relays, CTs, bus PT, instruments, meters, control and indication circuits, panel illuminations and other accessories, etc.

9.2.5 The incoming and outgoing terminals shall be on the rear side of the panel and shall be suitable to accommodate 11kV, 95mm^2 cable (or as per design) for bottom entry with necessary detachable double-half gland plate arrangement.

9.3 **Construction Details:**

9.3.1 The kiosk shall be of metal clad, fully compartmentalised, self-standing outdoor cubicle type.

9.3.2 Thickness of outer shell and load bearing members shall not be less than 2.5 mm thick sheet steel. Front and rear door shall not be less than 2mm thick sheet steel.

9.3.3 The enclosure shall be of IP55 protection.

9.3.4 Roofing shall be double roof with fibre glass coating on the top.

9.3.5 Suitable ventilation louvers with weld mesh shall be provided.

9.3.6 Necessary lifting arrangements with suitable reinforcement shall be provided for lifting the kiosk.

9.3.7 The top canopy of the kiosk shall be so designed that the rain water shall not fall on the front or rear side of the kiosk.

9.3.8 The kiosk shall be provided with bottom seating channel suitable for plinth mounting.

9.3.9 Partition shall be provided between PT chamber, CT chamber, metering chamber, HT cable chamber for the kiosks and also between breaker chamber & load break switch chamber for 3 / 4 unit kiosks, such that there is no access from one chamber to the other.

9.3.10 Wherever 11kV is visible when the door is open, additional safety grill shall be provided with danger/caution board.

9.3.11 Operation of the load break switch and the breaker shall be from the front side of the kiosk.

9.3.12 Incoming and outgoing terminals of load break switch and VCB cubicles shall be suitable for 11kV, 3x95sq.mm, XLPE, armoured, aluminium cables (or as per design).

9.3.13 The incoming and outgoing HT cable chamber shall be in rear side with provision for bottom entry of the cable with separate detachable gland plate arrangement.

9.3.14 Final paint finish shall be with IS5: 631 shade.

9.4 **Circuit Breaker:**

9.4.1 Circuit breaker shall be 3 pole vacuum circuit breaker with spring charged operating mechanism. Plug in isolating contacts, auxiliary contacts all mounted on a withdrawable carriage.

9.4.2 Circuit breaker shall be of spring operated, manual close/open and series & shunt trip (using power pack) type.

9.4.3 Provision for manual charging of spring through the cubicle door shall be provided.

9.4.4 Operation counter shall be provided on the breaker for recording number of operation.

9.4.5 The circuit breaker carriage shall have three clear positions viz. The service position where the control and power terminals of the circuit breaker are engaged; the test position, where the power terminals of the circuit breaker are isolated, while the control terminals remain engaged; isolated position, where power terminals of the circuit breaker are isolated.

9.4.6 The service and test position of the circuit breaker shall be within the cubicle and it should be possible to keep the door closed, with the breaker carriage in either test or service position. However the isolated position can be with door open.

9.4.7 The carriage shall be provided with locking arrangement for locking them in either test or service position, to prevent movement due to short circuit forces.

9.4.8 Spring loaded, sliding earth terminals shall be provided on both sides of the carriage, making positive connection with the earth strip provided in the cubicle to ensure that all non-conducting metal parts are securely earthed before moving the breaker carriage to test and service positions.

9.4.9 The moving contacts shall engage with fixed contacts through opening in the bus bar chamber. Each opening shall be covered by spring loaded automatic safety shutters. Shutters shall be positively operated by the travel of the carriage, each shutter independently of the other.

9.5 **Load Break Switches:**

9.5.1 Load break switch is intended to connect / disconnect the ring main system.

9.5.2 The load break switch shall be air break type in fixed design.

9.5.3 It shall have quick make, quick break independent manual operating mechanism with mechanical ON/OFF indication.

9.5.4 It shall not be possible to open the door with load break switch ON.

9.6 **Inter-Locks:**

9.6.1 The following mechanical/electrical interlocks shall be provided.

9.6.2 Load break switch and Breaker operation (closing or opening) shall not be possible with its chamber doors open.

9.6.3 The door cannot be opened when the load break switch is in closed condition.

9.6.4 Breaker operation (closing or opening) shall not be possible with cable chamber doors open.

9.6.5 The carriage cannot be moved in or out of its cubicle with the circuit breaker closed. The carriage shall automatically get locked in service, which can be unlocked, when breaker is open racking operation initiated.

9.6.6 Attempt to open the door of the breaker chamber, when the breaker is in closed condition, shall trip the breaker automatically.

9.6.7 The carriage cannot be pushed to service position without making the connections of control isolating contacts.

9.7 **Metering:**

9.7.1 The kiosk shall be provided with 0-12kV AC voltmeter (with Red mark at 11kV) with selector switch and 0-150/300A AC ammeter with selector switch.

9.7.2 Ammeter and volt meter shall be of 96 Sq.mm, flush mounting, rectified moving coil type and 1.5 accuracy class.

9.8 **Indication:**

9.8.1 Mechanical & Electrical indication shall be provided for breaker ON, OFF and spring charge for VCB.

9.8.2 Mechanical and Electrical indication shall be provided for load break switch ON and OFF indication.

9.9 **Protection:**

9.9.1 Over current and Earth fault relays with both H/S and T/L shall be provided.

9.9.2 The relay shall be of self-powered, series trip and flush mounted type.

9.9.3 Surge arrester shall be provided for outgoing feeders.

9.10. **HRC Fuse Control:**

One set of three HRC fuses shall be provided for AC volt meter circuit.

9.11 **System Particulars:**

a) Nominal system Voltage : 11kV

b) Highest system Voltage : 12 kV

c) System earthing : Resistance earthed

d) No. Of phase : Three

e) Frequency : 50 Hz+3%

9.12 **Earthing:**

9.12.1 A continuous earth bus of copper of size 50 × 6 sq.mm shall be run from one end of the kiosk to the other end of the kiosk.

9.12.2 The main earth bus shall be extended outside the kiosk on both the ends to facilitate external earth connection.

9.12.3 All the equipment / instruments shall be provided with duplicate earthing connected to the common earth bus. Doors shall be earthed with braided copper strips.

10.0. <u>11/0.415kV, 500 / 630kVA Transformers:</u>

10.1 **General:**

10.1.1 Manufacturing / procurement, testing before dispatch, transport, supply at site, of oil immersed, natural cooled, 500 / 630kVA, 11/0.415KV outdoor type copper wound transformers suitable for cable box on both HV and LV side. The transformers shall be supplied with first fill of oil.

10.1.2 The Transformers shall comply with B.I.S. of the latest issue for the transformers.

10.1.3 The transformers shall have a maximum continuous rating for the capacity specified in Data Sheet when operating at normal frequency and at all ratios.

10.1.4 The temperature rise shall not exceed the limits specified in the specification.

10.1.5 The Overload capacity of the transformers and their emergency short time rating shall conform the IS 6600 of latest issue.

10.1.6 The No-load voltage ratio of the transformers shall be as per data sheet and within BIS tolerance.

10.1.7 The insulation shall be suitable for working continuously at a voltage of 10%above normal.

10.1.8 The group symbol of the transformers shall be Dyn11 (IS 2026 of latest issue). Neutral of the transformer shall be brought out for earthing.

10.1.9 The terminal arrangement on the HV and LV sides of the transformers shall be of cable box type.

10.2 **System Details:**

i) No of phase :3

ii) Voltage :11000V±10%

iii) Frequency :50 Hz, ± 3%

iv) System Earthing :Resistance earthed.

10.3 **Tapping on the HV side:**

10.3.1 The transformer shall be provided with triple pole gang operated tap changing switch suitable for external operation on “Off- Load” without removing tank covers or lowering oil level.

10.3.2 An engraved cast indicating plate shall be provided for the tap switch with a movable pointer to clearly show the voltage for which tapping on each phase is connected.

10.3.3 Provision shall be made so that the switch can be locked at any one of the tap

positions but not in any intermediate position. The whole arrangement shall be absolutely rigid and adequately insulated throughout.

10.3.4 The tap change switch with suitable cover to prevent entry of water shall preferably be on the shorter side of the transformer tank.

10.4 **Transformer core:**

10.4.1 The transformer cores shall be constructed from high-grade cold rolled non-ageing grain oriented silicon steel laminations.

10.4.2 The core shall be firmly secured to the supporting frame to prevent undue vibration or noise.

10.4.3 Suitable eyes or lugs shall be provided for lifting the core and windings out of the tank. The core shall be effectively earthed to the tank.

10.5 **Winding & Insulations:**

10.5.1 The windings (both HV and LV) shall be of copper.

10.5.2 The short circuit rating of the transformer shall be as per IS 2026 of latest issue. All clearance of winding and other live parts shall be adequate for maximum voltage operation of plus 10%.

10.6 **Oil:**

The Insulating oil used in the transformer shall comply with the requirements specified in the IS 335 of the latest issue. The transformer shall be supplied with necessary oil. The oil shall be free from PCB.

10.7 **Tank:**

10.7.1 The transformer tank shall be built of good quality commercial grade sheet steel.

10.7.2 All joints of the transformer tank and fittings shall be hot oil tight and no bulging shall occur during service.

10.7.3 The tank design shall be such that the core and windings can be lifted free of the container with minimum dismantling.

10.7.4 The tank plates shall be of adequate strength such that the complete transformer when filled with oil can be lifted by means of lifting lugs, fixed on the tank.

10.7.5 The tank shall be fitted with a suitable cover with necessary provision for taking the external fittings specified below.

10.7.6 The tank may be either plain with necessary stiffeners or fitted with cooling tubes or fins as per manufacturer's standard practice.

10.7.7 The transformer tank and fittings shall withstand vacuum as per CBIP specification.

10.7.8 The cover plate of the tank shall be slightly sloping on one side to drain off rainwater.

10.7.9 Copper 'U' clamp shall be provided for earth continuity wherever necessary.

10.8 **Extra Fittings:**

The following fittings shall be provided **a**s per IS 2026.

10.8.1 Drain cum filter valve with provision for oil sampling with plug.

10.8.2 Top filter valve with plug.

10.8.3 Air release plug.

10.8.4 Buchholz Relay (shall be provided as per IS).

10.8.5 Top oil sampling valve with cover plate.

10.8.6 Thermometer pocket with plug.

10.8.7 An oil conservator tank of sufficient capacity with oil filling hole (with cap).

10.8.8 Dehydrating (Silica gel) breather (Transparent type) (shall be located 300 mm above the transformer base).

10.8.9 Oil level gauge with maximum and minimum levels marked.

10.8.10 Explosion vent.

10.8.11 Thermometer.

10.8.12 Lifting lugs or shackles.

10.8.13 Rating and diagram plate (Indelibly engraved) with full details as required in IS 2026 of latest issue.

10.8.14 Inspection covers with handle for lifting.

10.8.15 Base channels.

10.9 **Painting:**

Gray shade 631of IS 5

11 LT Main Panel For Station Transformer:

11.1 The LT main panel shall be cubicle type, Single front, made out of not less than 2.5mm thick. The enclosure shall be dust, vermin and weather proof suitable for indoor installation.

11.2 Individual removable gland plates shall be provided at the bottom of the cable chamber.

11.3 Adequate size earth bus shall be provided and the same shall be extended outside of the panel to facilitate earth flat connection.

11.4 The panel shall be given one coat of red oxide primer and two coats of enamel paints. The finishing colour shall be white enamel inside and shade 632 of IS 5 outside.

11.5 Incomer ACB-1 shall be fed from station transformer and Incomer ACB -2 shall be fed from AMF panel of DG set.

11.6 In normal condition, the load shall be connected to station supply. In case of failure of station supply, the DG set shall be switched-on and the load shall be transferred to DG set supply. On restoration of station supply, again the load shall be transferred to station supply and the DG set to be switched-off. Necessary inter-lock shall be provided wherever necessary.

11.7 Bus coupler ACB shall be provided such that it can be closed only when the station supply ACB-1 is in service.

11.8 Necessary ventilation louvers and lifting hooks shall be provided.

11.9 All doors shall be earthed in duplicate with suitable size insulated copper conductor.

11.10. The LT main panel shall be suitable for 3 phase, 415V, 50Hz system and consists of the following.

Incomers	3phase, 415V, 800A, draw out type ACB with over load magnetic and thermal release, earth fault protection, shunt trip release with necessary CTs and relays - 2 nos.
Bus coupler	3phase, 415V, 800A, draw out type ACB with over load magnetic and thermal release, earth fault protection, shunt trip release with necessary CTs and relays - 1no.
Bus bar	Totally enclosed bus bar chamber consists of 3 phase, 415V, 1000A rated copper bus bars (R, Y, B & N) with epoxy bus support insulators. There shall not be any access from bus bar chamber to other chambers. The bus bar shall be colour coded. The tapping for the individual switches shall be suitable size copper bus connection through insulated barriers without any gap. No instruments or components shall be mounted on the chamber.
Outgoings	i). 3 phase, 415V, 250A combination fuse switch with HRC fuses – 6nos. ii). 3 phase, 415V, 125A combination fuse switch with HRC fuses – 4nos. iii). 3 phase, 415V, 63A combination fuse switch with HRC fuses – 4nos.
Metering chamber	Metering chamber with voltmeter with selector switch and 1 set of HRC fuses, ammeter with selector switch, phase indication cluster LED lamps with switch and HRC fuses. The door of the metering chamber shall hinged one

with volt meter, ammeter, switches, static energy meter suitable for EMS, digital frequency meter shall be provided. No bus bar shall be found in the metering chamber – 1 set.

CBCT — Incomer shall have earth fault protection using CBCT and CAG12 relay in combination to operate for the unbalanced current. The CBCT inner dia shall be suitable to accommodate 3 runs of 3.5x150 sq.mm Al cable - 2 sets (1 set for each incomer).

Cable chamber — The cable chamber shall be provided with removable doors. Provision shall be made at the bottom of the panel for glanding of the cable with knock-out for cable entry and clamping provision in the cable chamber to clamp the cable from bottom plate up to the switch.

12.0. **AC DISTRIBUTION PANEL:**

12.1 AC distribution panel shall be weather, dust and vermin proof, indoor, free standing, floor mounting type made out of 2.5mm thick MS sheet steel and structural frames with hinged type front door and industrial locking arrangements.

12.2 Removable gland plates shall be provided at the bottom.

12.3 The panel shall be given one coat of red oxide primer and two coats of enamel paints.

12.4 Two earthing studs of adequate size with necessary nuts and washers shall be provided.

12.5 Space heater with thermostat controlled by MCB shall be provided.

12.6 Necessary ventilation louvers shall be provided.

12.7 When the main door is opened the MCB shall be visible. But no bus, live points shall be visible. There shall be another partition in between main door and the

bus bar arrangements.

12.8 The bus bar shall be supported by epoxy insulators. The exposed portion of the bus bar shall be covered with hylam sheet.

12.9 The distribution panel shall be pre-wired with suitable size insulated copper wire and terminated at the terminal blocks for easy termination of incoming and outgoing cables.

12.10. Label shall be provided for all incoming and outgoing circuits.

Incoming	3 phase, 415V, 100A, MCCB-1no.
Bus bar	4 runs of copper bus rated for 100A- 1set
Outgoing	Single phase, 240V, 10A SPMCB –not less than 12 nos.
Terminal blocks	Stud type terminals suitable for 4sq.mm eye type lugs for each circuit (Phase & Neutral)- 1set

13 **Battery And Battery Charger:**

13.1 **Batteries:**

- DC system voltage : 110V DC.
- Capacity : 250 AH.
- No. of cells : 56.
- Cell voltage : 2V per cell.
- Type : Valve Regulated Lead Acid (VRLA) Batteries.
- Stand : Suitable rack shall be provided.

13.2 **Battery charger:**

General:

13.2.1 The charger panel shall be free standing cabinet, floor mounting type sheet

steel construction.

13.2.2 The charger shall be full wave, solid-state, float charger, float cum boost charger.

13.2.3 Battery should automatically take the load during power failure. When power resumes again, the charger should automatically switch-on and take over the load and battery charging currents.

13.2.4 The charger shall have provision for float charge and boost charge both in auto and manual modes.

13.2.5 Float cum boost charger shall automatically switch over to boost mode when battery requires boost charging and return to float when boost charging is completed.

13.2.6 HRC fuse shall be provided for AC input.

13.2.7 AC input control switch, MCB control for both float charge and boost charge, control for varying the charging current in both modes, auto / trickle / boost mode selector switch shall be provided.

13.2.8 Detachable gland plates shall be provided at the bottom of the panel for the incoming and the outgoing cables.

13.2.9 Float mode charger shall supply for the equipments, and the float cum boost charger shall charge the batteries. Necessary tapping in the cells shall be provided to feed the equipment normal voltage during boost charge mode.

13.2.10 4 pairs of stud type terminals (one for battery, two for DC distribution panel and one as spare) shall be provided.

13.2.11 The outer shell shall be painted with 631 shade of IS: 5.

13.3 **Protections:**

13.3.1 Unit shall be protected for RF and lightning surges from the AC input.

13.3.2 Battery under voltage trip shall be provided.

13.3.3 Over voltage Trip shall be provided.

13.3.4 Over load protection shall be such that short circuit at output terminals should be sustained indefinitely.

13.3.5 Gradual reduction of current limit if heat temperature exceeds preset limit shall be provided for over temperature control.

13.3.6 Individual circuit breakers at input for each rectifier module shall be provided.

13.3.7 Individual MCBs for equipment load and battery load shall be provided.

13.3.8 Necessary controls shall be provided to put the rectifier modules to work on load sharing mode.

13.3.9 During boost charge mode, the voltage to the loads shall not exceed tolerable limits of the equipments and relays.

13.4 **Metering:**

The following integrated digital type meters with 1.5% accuracy shall be provided.

a) AC voltmeter (0-500V) with selector switch for incoming supply.

b) AC Ammeter for charging current.

c) DC voltmeter for charger output.

d) DC Ammeter for load current.

e) DC Ammeter for quick / trickle charging current.

13.5 **Indications & Alarm:**

13.5.1 Displays for output voltage, output current, individual rectifier module current, equipment voltage and current, battery voltage and current shall be provided.

13.5.2 Indications for rectifier modules (ON, OFF, TRIP, etc.) shall be provided.

13.5.3 Indication for 3 phase input supply shall be provided.

13.5.4 LED indications and alarm for all abnormal conditions like AC failure, battery

E/F, over voltage, under voltage, etc. shall be provided.

13.5.5 Push button for accept, reset and test shall be provided.

14 **DC Distribution Panel:**

14.1 DC distribution panel shall be weather, dust and vermin proof, indoor, free standing, floor mounting type made out of 2.5mm thick MS sheet steel and structural frames with hinged type front door and industrial locking arrangements.

14.2 Removable gland plates shall be provided at the bottom.

14.3 The panel shall be given one coat of red oxide primer and two coats of enamel paints.

14.4 Two earthing studs of adequate size with necessary nuts and washers shall be provided.

14.5 The distribution panel shall be pre-wired with suitable size copper insulated wire and terminated at the terminal blocks for easy termination of incoming and outgoing cables.

14.6 Label shall be provided for all incoming and outgoing circuits.

Incoming	40A DP MCB suitable for 110V DC system- 1no.
Bus bar	40A copper bus for both positive & negative-1 set.
Outgoing	10A DP MCB for outgoing – not less than 12 set.
Terminal block	Stud type terminals (for both positive & negative) suitable for 4sq.mm eye type lugs - 1set

15.0. **<u>Outdoor LT Panel For Township:</u>**

15.1 The LT panel shall be outdoor, plinth mounting, free standing, cubicle type, single front, made out of not less than 2.5mm thick. The enclosure shall be dust, vermin and weather proof suitable for outdoor installation.

15.2 Individual removable gland plates shall be provided at the bottom of the cable chamber.

15.3 Adequate size earth bus shall be provided and the same shall be extended outside of the panel to facilitate earth flat connection.

15.4 The panel shall be given one coat of red oxide primer and two coats of enamel paints. The finishing colour shall be shade 632 of IS 5 outside.

15.5 Incomer MCCB shall be fed from Distribution Transformer.

15.6 Necessary ventilation louvers and lifting hooks shall be provided.

15.7 All doors shall be earthed in duplicate with suitable size insulated copper conductor.

15.8 Supply and providing of 440V/3phase/14 way Double door Vertical type MCCB Distribution Box with 1No. of 250A, 4 pole, MCCB, 14 Nos. of 63A, 4 pole, MCB at various location.

15.9 Laying of 1100V grade, suitable size 3.5C, PVC insulated, PVC overall sheathed, steel armoured, aluminium conductor cable confirming to IS 7098 of latest amendment, in the cable trench. This includes supply and providing termination at both ends with suitable size aluminium lugs and compression type brass cable glands. (From LT panel to each Residence block).

16. Indoor LT SWGR For MNPB:

1.0 General Specification

Switchgear shall be of double front construction. Breaker panels shall be single front. All Switchgears / MCCs shall be sectionalized unless specifically mentioned in the single line diagram.

Switchgears shall be easily extendable on either side. The bidder shall supply Switchgear in various shipping sections consisting of Incomer, Ties and Motor modules. Bidder may be

required to change module types, sizes and the components in respect of certain feeders even during erection, testing and commissioning.

Power Pack for 220V DC control supply shall be provided at each incomer before ACB.

2.0 **Auto Changeover**

2.1 Auto-changeover facility shall be provided between incomers & Bus coupler. This switchgears/MCC shall normally operate with bus-coupler open. If sustained under voltage is detected on any one of the bus section, the respective incoming breaker shall trip and bus - coupler shall close if voltage is available on the other bus section. Auto changeover shall be blocked if the Incoming Breaker has tripped due to bus fault. Manual change over from one source of supply to the other or vice versa shall be possible by momentary paralleling of the two supplies after checking synchronism with the help of a synchro check relay. On closing the Incoming breaker, the selected running Breaker should trip within a preset time. An annunciation shall be provided if the two bus sections remains paralleled for more than a preset time. If the selected running breaker fails to trip within the preset time the incoming breaker shall trip.

2.2 During auto changeover of the supply the contactors in the affected bus would have dropped off. The services which shall be restarted immediately without time lapse to keep the process running are considered essential services. Such services shall restart automatically without any action by the operator after an auto changeover. This shall be achieved through logics build up in intelligent controllers / numerical relays without any external timers.

2.3 Energy Accounting & Audit Meter shall be of 0.5S accuracy class, communicable, multifunction, electronic digital integrated type meter, (meter and metering CTs, suitable for measurement, recording and display of cumulative energy with date & time, having a built in calendar & clock and shall have high sampling rate.

Accuracy class of energy accounting and audit meters and its associated CTs shall be 0.5S for incomers of PMCC / PCC/ MLDB.

3.0 Specific Requirements

3.1 **Construction:**

a) The Switchgear shall be of Form 4B Type 7 construction as per IEC 61439.

b) Switchgear shall be indoor, air insulated, metal-clad, floor mounting type. Switchgear shall be fully draw out type having self-aligning type secondary plug in contacts.

c) The enclosure of the equipment shall be dust and weather proof, conforming to a degree of protection IP-52. The switchboard frames shall be fabricated using suitable mild steel structural section or braced and shall be cold rolled sheet steel of thickness of not less than 2mm. The frames shall be enclosed in cold rolled sheet steel of not less than 1.6mm. The doors and covers shall also be of cold rolled steel of thickness not less than 1.6mm. Adequate stiffness shall be provided wherever necessary. Gland plates shall be 3mm. The design shall be such that specified degree of protection shall be achieved even after a breaker control module has been taken out of the panel.

d) The design shall be fully compartmentalized with metal / insulating partitions between compartments. The working height shall be limited within 300 mm to 1900 mm. Switch boards shall be mounted on base frame of 75 mm height from the finished floor.

e) Each breaker / control module / MCCB unit shall be housed in a separate compartment, complete with an individual front access door having sufficient opening with concealed type hinges. Each vertical section of single front board shall have a removable back cover.

f) All doors and covers shall be provided with lifelong rubber and lifelong pasting neoprene gaskets. MCC module shall also be dust and vermin proof when the module is taken out from the chassis. Suitable arrangement to achieve this feature shall be provided.

g) All switches push buttons, lamps, indicating instruments shall be flush mounted on respective module compartment whereas relays and other auxiliary devices may be mounted on a separate cubicle. All meters indicating lamps and protective relays shall be visible on the door.

h) A full height vertical cable alley with cable supports shall be provided in each section to facilitate dressing of unit wiring. The chamber shall be liberally sized to accommodate all cables

and shall have hinged doors opening on opposite sides with respect to the module doors and removable cover at back side for access. The width of the cable chamber when viewed from front of the switchboard shall not be less than 250mm.

i) Breaker cubicle shall be so sized as to permit easy closing of the front access door when the breaker is pulled out to 'ISOLATED' position. The breaker can be operated both in SERVICE & TEST position with the door closed.

3.2 **Bus and Bus Taps for SWGR**

a) The main, tap off buses and connections shall be of high conductivity aluminum / aluminum alloy. The size for specified current ratings shall be such that maximum temperature rise at bus bar joints shall be limited to 90 Deg. C (i.e. 40 Deg.C rise over 50 Deg.C ambient).The maximum allowable temperature rise at silver plated joints shall be 105 deg.C (i.e. 55 deg.C rise over 50 deg.C ambient).

b) Vertical bus bars shall be designed as per system requirement and to meet the short circuit rating as in type test report.

c) All bus connections shall be provided with anti-oxide grease. For all bus connections adequate contact pressure shall be ensured by means of two bolt connection with plain and spring washers and locknuts. The protruding bolts of different phases / poles shall be staggered and shall not see each other directly. All the joints surfaces shall be silver plated.

d) Bus bars and connections shall be fully insulated for working voltage with adequate phases / ground clearance. Insulating sleeves for bus bars and shrouds for joints shall be provided. Shrouds for bus bar joints and tapping points shall be two part click-fit type epoxy resin cast / fiber glass moulded.

e) Minimum clearance of 25.4mm is required between phases / poles for entire run of horizontal and vertical bus bars and 19mm between phase and earth irrespective of sleeve / shroud provided for bus bars.

f) For all other components, the clearance between two live parts, a live part and earthed part, and isolating distance shall be at least 10mm throughout.

g) Wherever it is not possible to maintain the above mentioned clearances, insulation shall be provided by means of barriers. All connections from busbars up to the fuses shall be fully shrouded to minimize risk of phase to phase and phase to earth faults.

h) Insulating shrouds for bus bar joints shall be moulded type. SWGR / PCC / MCC / DB with higher clearances shall be preferred considering dust laden environmental condition in which SWGR / PMCC / MCC / DB has to operate. Bus bars shall be supported on flame-retardant, track resistant type bus insulators with high creepage distance and covered with heat-shrunk PVC sleeves which shall be shrunk fit and not capable of being removed without destruction. Separate supports shall be provided for each phase and neutral busbar.

i) Cross section of bus bar shall be uniform throughout the length of assembly. All buses and connections shall be supported and braced to withstand, the stresses due to maximum short-circuit current and also to take care of any thermal expansion.

j) Bus bars shall be color coded for easy identification and so located that the sequence R-Y-B shall be from left to right, top to bottom or front to rear, when viewed from the front of the SWGR / PMCC / MCC / DB assembly.

k) Bolted disconnect links shall be provided for DBS for all incoming and outgoing feeders for isolation of neutral, if necessary.

4.0 **Module Details**

4.1 Draw out type control module shall have self-aligning, plug in power / control disconnects. All disconnects shall be silver-plated to ensure good contacts.

4.2 The design shall be such as to permit easy withdrawal / reinsertion of the unit guide rails to ensure correct alignment & all the power contacts meet accurately every time the module is inserted. Two feeders shall not be accommodated in the same module of MCC.

4.3 Various module sizes should be multiples of one basic unit to facilitate modifications at site. Suitable provision for this purpose should also be incorporated in the vertical busbars.

4.4 Control module shall house the control components for a circuit such as MPCB / MCCB, contactors, relays, push buttons, lamps etc. as per requirement only the push button actuators, lens of indicating lamps and transparent windows for meters shall be mounted on module door such that when the module is withdrawn the cubicle door shall be provided the specified degree of protection when the module door is closed. These modules shall be designed to withstand internal arc faults i.e. in the event of fault occurring in one module the arc should not spread to neighboring module and should not affect their functioning.

4.5 The equipment layout shall provide sufficient working space in between the components and subject to Purchaser's approval.

4.6 It shall be possible to carry out routine, maintenance checks or small changes in a module without physically taking the module away from switchboard.

4.7 Automatic safety shutters shall be provided to fully cover the female primary disconnects when the module is withdrawn. Under any circumstances it shall not be possible to access the vertical dropper accidentally and also suitable means shall be provided to avoid any phase short circuit in vertical droppers.

4.8 The module shall be dust & vermin proof even when module is completely withdrawn. Suitable means shall be provided to achieve this feature.

4.9 Draw out type control modules of same size and type shall be electrically and physically interchangeable.

4.10 Draw out control modules of PCC / PMCC / MCC shall have the SERVICE, TEST & ISOLATED positions with positive indications and interlocking for each position. The doors of individual modules and the cable alley should open in opposite directions to facilitate clear view of the module when the operator is working on the cable terminals.

In service position, both power and control circuits shall be engaged. It shall not be possible to open the module door when the module is in service position.

In TEST position, the power circuits shall be disengaged but the control circuits shall be engaged. It shall be possible to close the module door when the module is in TEST position. Keeping the front access door of module in closed condition, the breaker can be placed in ISOLATED, TEST or SERVICE position from outside.

In ISOLATED position, both power and control circuits shall be disengaged.

4.11 For all breaker operated motors, numerical protection relays are envisaged. All motor feeder modules shall also be provided with local / remote selector switches on the module itself.

5.0 **Circuit Breakers**

5.1 Breakers shall have anti-pumping feature.

5.2 Circuit breakers shall have minimum interrupting capacity equal to the listed fault level.

5.3 Circuit breaker shall be three poles air break type with stored energy, trip free mechanism and shunt trip. To ensure maximum interchangeability, operation flexibility, reduction in inventory, the ratings of breakers shall be restricted to 3 to 4 ratings only.

5.4 Circuit breakers shall be draw out type, having SERVICE, TEST & ISOLATED positions with positive indication for each position.

5.5 Circuit breakers of identical rating shall be physically and electrically interchangeable.

5.6 All circuit breakers shall be of motor wound spring charged mechanism and also shall have hand operated spring charged mechanism facility.

5.7 For motor wound mechanism, spring charging shall take place automatically after each breaker closing operation. One open-close / open operation of the circuit breaker shall be possible after failure of power supply to the motor.

5.8 Mechanical safety interlock shall be provided to prevent the circuit breaker from being racked in or out of the service position when the breaker is closed.

5.9 Automatic safety shutters shall be provided to fully cover the female primary disconnects when the breaker is withdrawn.

5.10 Each breaker shall be provided with closing and emergency manual trip, mechanical ON-OFF indicator, an operation counter and mechanism charge / discharge indicator.

5.11 Each breaker shall be provided with one (1) number trip coil. In addition to the auxiliary contacts required for normal breaker operation and indication, each breaker shall be provided with following for interlocking purpose:-

a) Position / cell switch with 4 NO + 4 NC contacts.

b) Auxiliary switch, with 6 NO + 6 NC contacts, mounted on the moving portion of the switchgear / PMCC / MCC and operated mechanically by a sliding lever from the breaker.

Alternatively Electrically reset latching relay may be used for the purpose. The exact requirement of contacts of position / cells switch, limit switch, auxiliary switch and latching relay shall be decided by the Bidder, subject to Owner's review and approval, taking into account the scheme requirement and also spare contacts requirement.

c) Spring charge limit switch shall be provided for breakers with motor wound spring charging mechanism. These limit switches for motor duty shall be provided with minimum 2 NO + 2 NC aux. contacts.

d) Limit / auxiliary switches shall be convertible type that is suitable for changing NO contact to NC and vice-versa.

e) Provision of mechanical closing of breaker only in 'Test' and 'Withdrawn' position shall be made. Alternatively, mechanical closing facility should be normally inaccessible, accessibility rendered only after deliberate removal of shrouds. It shall be possible to close the door with breaker in test position.

f) Mechanical tripping shall be through red 'Trip' push button outside the panels for breakers and through control switches for other circuits.

6.0 **Moulded Case Circuit Breakers (MCCB) and Miniature Circuit Breakers (MCB)**

6.1 MCCBs shall be provided with spring assisted quick make / break manually operated trip free mechanism.

6.2 MCCBs shall be provided with adjustable tripping device with inverse time characteristics for overload protection and instantaneous characteristics for short circuit protection. As per requirement, MCCBs shall also be provided with ground fault protection and 1 NO contacts for tripping indication / alarm for purchaser use.

6.3 MCCBs for motor feeder shall be equipped with instantaneous magnetic adjustable tripping element only.

6.4 MCCBs operating handle 'ON' and 'OFF' positions shall be displayed and the operating handle shall be mounted on the door of compartment / module housing MCCBs.

6.5 MCCBs / MPCBs shall be provided with minimum 2 NO + 2 NC spare auxiliary contacts.

6.6 MCBs shall be used in all the AC control circuits and DC control & lighting feeders, as specified. However, control fuses may be used in the ACB feeders for DC circuit.

6.7 The MCBs shall be suitable for manual closing and opening and automatic tripping under overload and short circuit conditions. They shall be provided with trip-free mechanism.

6.8 The MCBs shall be suitable for housing in the lighting panels and for connection of standard copper / aluminium wires at both the incoming and outgoing ends by copper lugs or bus bars connection on the incoming end.

6.9 The terminals of MCB and ON and OFF positions shall be clearly and indelibly marked.

6.10 The interrupting current and continuous current rating of the MCCBs shall be as per the requirement.

7.0 **Control & Indication**

7.1 The circuit breaker shall be wired up for local and remote operation. Each breaker cubicle shall be equipped with following:-

a) One (1) “TEST / REMOTE” selector switch stay put type with black pistol grip handle.

b) Two (2) heavy duty, oil tight, push buttons for TRIP & CLOSE.

c) One (1) heavy duty, oil-tight, CLOSE-NEUTRAL-TRIP Switch.

d) Indicating light on front of compartment:

GREEN - Breaker open

RED - Breaker closed

AMBER - DC supply fail

BLUE - Breaker Spring charged

AMBER - Breaker trip

WHITE - Trip coil healthy

WHITE - Breaker in test position

YELLOW - Breaker in service position

e) Lamps shall be LED type with coloured dome. Lamps and lens shall be replaceable from the front. LED lamp shall be made in accordance with InP technology (Aluminuim Indium Gallium Phosphide technology). The body shall be made of poly carbonate unbreakable lens. LED shall be protected by inbuilt fuse with surge suppressor or leakage voltage glow protection. LED circuit shall be PCB mounted. Intensity shall be greater than 200 mcd. All push button lamps shall be as per LED indicating lamp.

f) Two (2) incomers and bus coupler shall be so interlocked that no two incomers shall operate in parallel except during momentarily paralleling.

8.0 **Current Transformer**

a) Current Transformers shall be epoxy cast-resin type rated minimum of 10VA. All secondary connections shall be brought out to terminal blocks where wye or delta connection shall be made. Insulation class shall be “E or better”.

b) Accuracy class of the current transformers shall be:-

- Class PS for differential
- Class 5P20 for other relaying

- Class 0.5, ISF < 5 for metering other than MEAA
- CTs for MEAA metering shall be as per Section-I.

c) Separate wire shall be used for metering and protection as far as possible. Secondary wire terminals shall be made available accordingly.

d) Terminals with CT secondary shorting links for metering leads and TEST terminals block for C.T. secondary relay and KWH leads shall be provided.

e) VA Burden of CT's shall be adequate (15VA minimum) for connection to remote metering system. Also additional terminal blocks etc. as may be required shall be provided in panels.

f) CT secondary shall be rated 1A for metering and protection.

9.0 **Voltage Transformer**

9.1 Three nos. single phase voltage transformer shall be provided in each incoming power supply circuit with voltmeter and selector switch. Additional three nos. voltage transformers shall be provided for each bus section voltmeter and its selector switch. These Bus and Line voltage transformers shall be mounted in separate compartments of the switchgears.

9.2 Voltage transformers shall be epoxy cast resin and shall have an accuracy class of 1.0. Voltage Transformers mounted on breaker carriage is not acceptable. Voltage rating for the Transformer shall be 1.2 continuous and 1.5 for 30 second.

9.3 Voltage transformer shall capable to withstand 200% of rated voltage continuously without change in its characteristics.

9.4 High voltage windings of voltage transformer shall be protected by current limiting fuses.

9.5 Suitably rated three phase MCBs to prevent overload shall be installed in all ungrounded secondary leads. MCBs shall be suitably located to permit easy access while the MCC is energized.

9.6 VTs for NEMA metering shall be as per Section-I.

9.7 PT signals shall be extended to all module of LT Switchgear for energy measurement / monitoring through intelligent controller.

10.0 **Control supply for ACBs of PCC and PMCC modules**

220V DC control supply to ACB shall be derived through Power Pack connected at the incomer terminal.

11.0 **Relays**

11.1 Relays shall be of modular design with built-in testing facilities. Small auxiliary relays may be in non-draw-out execution and flush mounted type.

11.2 Numerical type protective relays / intelligent controllers along with suitable rated current measuring modules shall be provided to isolate the faulty equipment and system as early and as expeditiously possible.

11.3 The Bidder shall furnish, install & co-ordinate all relays to suit the requirements of protection, interlock and bus transfer scheme.

11.4 All relays shall be mounted on the front of the panel and shall be specified as per requirement.

11.5 Protection relay shall be lockout type with hand reset feature.

11.6 Rated continuous making and breaking currents for contacts shall be suitable for service involved.

11.7 All Numerical Relays shall be suitable for 220V DC operation.

11.8 All numerical relays shall have keypad / keys to allow relay settings from relay front. In addition, relay shall have front port for downloading / uploading of relay settings from the PC / Laptop. All hand-reset relays shall have reset button on the relay front. Relay to be self or hand reset shall be software selectable.

11.9 All relays shall have LED / LCD display for settings, status, faults and events. LCD display shall be backlit and temperature compensated up to 65^0C for contrast and legibility.

11.10 As a minimum, the relay shall have LED indicating lamps for fault trip, relay healthy / unhealthy and control supply on.

11.11 The relay shall have at least 6 programmable LEDs on relay front.

11.12 Trip Circuit Supervision & Lock out function

Relay shall have built in lockout function. Lock out feature shall be self-reset or hand reset and shall be software selectable.

For trip circuit supervision separate relay shall be provided.

11.13 Input / Output Interface, Filters and Galvanic Isolation.

Relay shall have at least 4 NO contacts each shall separately be programmable for either hand reset or self-reset. The contact rating shall be minimum 5A at 250V AC / DC.

Relay shall be made immune to capacitance effect due to long length cables.

All IOs shall have galvanic isolation. Analog inputs shall be protected against switching surges, harmonics etc.

12.0 **Metering and Protection**

The feeders shall have the following protections / metering required for the switchgear panels. The minimum protections / metering required for various typical feeders including ACB operated feeders are given below. For non ACB controlled feeders having intelligent controller, the metering indicated shall be in-built.

Remote Metering shall be for the listed metering parameters done through Multi function Meters.

1) ACB controlled feeders with numerical relays.

A) Incomers

Protections: Instantaneous over current protection 50, IDMT over current protection 51, Instantaneous earth protection 50N, IDMT Earth fault protection 51N, Circuit breaker failure protection 50BF, Under voltage protection 27, Backup (Standby) earth fault protection 51NS

Local Indication: Digital Multi-function type Energy Audit meters with an accuracy of Cl.0.5S

Apart from above protection relays, each electrically operated breaker shall be provided with anti-pumping (94), lockout (86) and trip circuit supervision (95) relays. Lockout relay shall be a hand reset type and shall not be clubbed with numerical relay.

Check synchronizing 25 through relay mounted in bus coupler.

B) Bus Couplers

Protections: Instantaneous over current protection 50, IDMT over current protection 51, Instantaneous earth protection 50N, IDMT Earth fault protection 51N, Circuit breaker failure protection 50BF, Under voltage protection 27, Check synchronizing 25

Local Indication: Current in all the three phases (Through Numerical relay)

Apart from above protection relays, each electrically operated breaker shall be provided with anti-pumping (94), lockout (86) and trip circuit supervision (95) relays. Lockout relay shall be a hand reset type and shall not be clubbed with numerical relay.

2) MCCB Controlled feeders rated below 630A.

C) Outgoing Feeder (Below 630A) with MCCB (non-motorized)

Protections: Over current protection, Short circuit protection

Local Indication: Current (3 phase), **Metering (for remote)**

3) Other feeders

A) Bus PT / Line PT Modules

Protections: Under voltage protection 27, Fuse failure protection

Local Indication: Voltage – phase to phase, phase to neutral

Metering (for remote): Voltage – phase to phase, phase to neutral

13.0 **Secondary Wiring**

a) The Switchgear / MCC / DB shall be fully wired at the factory to ensure proper functioning of control, protection, transfer and interlocking schemes.

b) Fuse and links shall be provided to permit individual circuit isolation from bus wires without disturbing other circuits. All spare contacts of relays, switches and other devices shall be wired up to terminal blocks.

c) Wiring shall be done with flexible, 750 / 1100V grade, PVC insulated switchboard wires with stranded copper conductors of 2.5 sq.mm for current & PT circuits and 1.5 sq.mm for control circuits. Colour code shall be maintained for voltage and current circuits.

d) Each wire shall be identified at both ends with permanent tubular type printed markers bearing wire numbers as per Bidder's wiring diagrams. Each wire shall be ferruled by plastic tube with indelible ink print at both ends having terminal block no., terminal nos., destination no, as per approved drawing.

e) Wire terminations shall be made with crimping type connectors with insulating sleeves. Wire shall not be spliced between terminals. Fork type lugs shall be provided for all control terminals. The lugs shall be suitable for 2.5 sq.mm stranded copper conductor. However, CT wiring shall be done by using circular type lugs.

f) For power wiring inside module copper cables are to be used.

g) Terminal blocks with loose wires shall be provided in each shipping section for inter panel wiring.

h) All control terminals shall be of 10 sq.mm size and shall be sliding type for draw out module and clip on type for fixed type module.

14.0 **Terminal Blocks**

a) Terminal blocks shall be 1100V grade box-clamp type with marking strips, similar to ELMEX 10 sq.mm or equal. Terminals for CT secondary leads shall have provision for shorting or any other equivalent new technology terminal blocks after approval of Purchaser.

b) Not more than two wires shall be connected to any terminal. Spare terminals equal in number to 20% active terminals shall be furnished.

c) Terminal block shall be located to allow easy access. Wiring shall be so arranged that individual wires of an external cable can be connected to consecutive terminals.

d) Colored terminal blocks for connection of power cables (R, Y & B phases) shall be provided.

e) Twisted pair 0.5sq.mm copper cable shall be used for DDCMIS interface.

15.0 **Cable Termination**

a) SWGR shall be designed for cable entry from the bottom. Sufficient space shall be provided for ease of termination & connection.

b) All provisions & accessories shall be furnished for termination & connection of cables, including removable gland plates cable supports, crimp type tinned copper / aluminium lugs, double compression type brass glands with tapered washer (power cables only) and terminal blocks. Terminating of power cables shall be shrouded to avoid accidental touch. Suitable supporting clamps shall be provided for cables to eliminate stresses on terminals.

c) Gland plates shall be minimum 3 mm thick. The gland plate and supporting arrangement for I/C Power cables shall be such as to prevent flow of eddy current.

d) Gland plates shall be easily removable type. The gland plate shall be mounted at 40/50 mm above the bottom of base frame of switch board.

e) Cabling area above gland plate shall be free of any earth bus, neutral bus etc. so that the total gland plate area is usable for cabling and also do not obstruct removal of gland plate.

16.0 **Ground Bus**

a) A ground bus made of copper / GI rated to maximum fault current shall be extended to full length of the Switchgear / MCC / DB.

b) The ground bus shall be provided with two-bolt drilling with G.S. bolts and nuts at each end to receive 50x6 mm G.S. flat.

16.1 Each stationary unit shall be connected directly to the ground bus. The frame of each circuit breaker and VT unit shall be grounded through heavy multiple contacts at all times except when the primary disconnecting devices are separated by a safe distance.

16.2 The frames of all other drawout modules shall be grounded through heavy multiple contacts at all times except when the power disconnects are separated by a safe distance.

16.3 A definite ground at the SWGR / PCC / MCC for each circuit thus grounded shall be run independently to the ground bus and connected thereto.

16.4 CT and VT secondary neutral shall be earthed through removable links so that earth of one circuit maybe removed without disturbing others.

16.5 Door earthing shall be done by using 2.5sq.mm stranded flexible copper conductor PVC insulated (Green color).

17.0 **Name Plates**

17.1 Name Plates of approved design shall be furnished at each cubicle / control compartment, at the top of each Switchgear / MCC / DB and at each instrument and device mounted on or inside the cubicle.

17.2 The material shall be lamicoid or approved equal 3mm thick with white engraved letters on black background.

17.3 The name plate shall be held by self-tapping screws. Name plate size shall be minimum 40 X 150mm of 0.5mm thick for instrument/devices & 75 x 45mm of 1mm thick for panels. The size of lettering shall be minimum 5mm for module / feeder designation; however, component designation letter size shall be 6mm.

17.4 Caution notice on suitable metal plate shall be affixed at the back of each vertical panel for single front construction.

17.5 Board labels and panel Nos. shall be provided both on front and rear at two locations each if board is more than 10 meters in length.

18.0 **Space Heaters and Plug Sockets**

18.1 Each vertical section shall be provided with thermostat controlled space heater and 5A, 3 pin plug socket.

18.2 Cubicle heater, plug socket circuit shall have individual switch fuse units.

19.0 **Tropical Protection**

- All equipment, accessories and wiring shall have fungus protection, involving special treatment of insulation & metal against fungus, insects and corrosion.
- Screens of corrosion resistant material shall be furnished on all ventilating louvers to prevent the entrance of insects.

20.0 Painting:

20.1 All surfaces shall be subject to tank pretreatment process to produce a smooth, clean surface free of scale, grease and rust.

20.2 The SWGR / PCC / MCC / DB and all other components shall be powdered coated as mentioned in Section-I.

20.3 Sufficient quantity of touch-up paint shall be furnished for application at site.

21.0 Tests

21.1 During the fabrication switchgears shall be subject to inspection by Purchaser or its authorized representatives. Manufacturer shall furnish necessary information concerning the supply to purchaser.

21.2 All routine tests shall be carried out at manufacturer's work under his care and expense, in the presence of purchaser or his representative.

22.3 Stage inspection after the pretreatment and preparation of under surface and before final painting shall be carried out by Purchaser.

23.0 **Routine Test**

23.1 A general visual check shall be carried out. This shall cover measurement of overall dimension, location, number and type of devices, terminal boxes, location and connection of terminal etc.

23.2 Manual and electrical operation of circuit breakers / relay shall be checked under the worst condition of the auxiliary voltage.

23.3 Dry insulation test with power frequency voltage shall be conducted for the main and auxiliary circuit.

23.4 Insulation resistance of the main and auxiliary circuits shall be checked before and after high voltage withstand test.

23.5 Operation checks shall be carried out for every control function / interlocks as per the schematic diagrams by manually simulating fault condition and operation of the control switches / relay etc.

23.6 Relay shall be tested with secondary injection test equipment.

23.7 Primary injection test to check winding of current transformers, ammeter, ammeter selector switch and correction of wiring connection between them.

23.8 For equipment bought from other sub suppliers, certified test report of tests carried out at the manufacturer's works shall be submitted. Normally all the routine test specified in the relevant standards shall be conducted by the sub-supplier at his works.

23.9 Interchangeability of similar modules shall be checked on random basis. This may be done on one module of each size.

24.0 **Type Test**

24.1 Valid Type test certificates on any equipment, if so desired by the Owner / Purchaser, shall be furnished. In case of non-availability of valid test certificate, contractor shall conduct type tests as per IS / IEC without any additional commercial implication to prove the design.

24.2 In case the Bidder is not able to submit report of the type test(s) conducted or in the case of type test report(s) are not found to be meeting the specification requirements, the Bidder shall conduct all such tests in the presence of the Purchaser without cost implication and submit the reports for approval.

25.0 Drawings, Data And Manuals

25.1 Following drawings / data and Manuals to be submitted for approval:

a) Outline dimensional drawing showing general arrangement, space requirements / cable entry points.

b) Cross-section with parts list

c) Foundation plan with loading

d) Board-wise single line diagrams

e) Control schematics

f) Wiring diagrams

g) Consolidated Bill of Material

h) Relay setting calculation

i) Test Certificates and QAP

j) Bus bar sizing

k) CT/VT sizing

l) Technical leaflets

26.0 Codes And Standards

26.1 The electrical installation shall meet the requirements of Indian Electricity Rules as amended up to date and relevant IS codes of practice. In addition, other rules or regulations as applicable to the work shall be followed. In case of any discrepancy, the more restrictive rule shall be binding.

26.2 All equipment and materials shall be designed, manufactured and tested in accordance with the latest applicable Indian Standard (IS) except where modified and / or supplemented by this specification.

26.3 Equipment and materials conforming to any other standard which ensures equal or better quality may be accepted. In such cases copies of the English version of the standard adopted shall be submitted along with the bid.

17.0 Internal electrification:

17.1. General:

17.1.1 Internal electrification works for the control room and other auxiliary buildings involving;

i. MCB Distribution Board.
ii. Circuit main, Plug points and point wiring.
iii. Air condition units, light fittings, ceiling fan, siren, exhaust fan, buzzer, etc.
iv. DC lighting arrangements.
v. Emergency lights.

17.1.2 The wiring shall be in concealed system (fully/partly).

17.2. MCB Distribution Board:

17.2.1. Suitable size, branded, factory made, Flush mounting type, double door, pre-wired, 3 phase, 415V, MCB distribution board shall be provided in the wall.

17.2.2. Incoming control shall be of suitable current rated 3 phase, 415V, 4 pole, 100mA ELCB.

17.2.3. Outgoing control shall be of suitable current rated single/three phase, 230/415V, SP/DP/4P MCBs.

17.2.4. Number of outlet shall be decided such that a separate circuit shall be run for each room or each switch board or the loads of maximum 1000W, whichever is applicable.

17.2.5. Separate circuit shall be run for AC power points and independent plug points.

17.2.6. The unused MCB slots if any in the MCB DB shall be properly closed with suitable dummies.

17.2.7. Name of the circuits shall be marked/numbered (of permanent nature) on the MCB DB for identification.

17.3. Circuit main, plug points and point wiring:

17.3.1. Circuit mains/independent Plug Points shall be carried out with 2 runs of 4 sq.mm, 1100V grade, FR PVC insulated, single core, multi strand copper conductor cable with a run of 1.5 sq.mm, 1100V grade, FR PVC insulated, single core, multi strand copper conductor cable as earth continuity.

17.3.2. 15/20A plug points for A/C shall be carried out with 2 runs of 6 sq.mm, 1100V grade, FR PVC insulated, single core, multi strand copper conductor cable with a run of 2.5sq.mm, 1100V grade, FR PVC insulated, single core, multi strand copper conductor cable as earth continuity.

17.3.3. All the light/fan/buzzer point wiring shall be carried out with 2 runs of 1.5 sq.mm, 1100V grade, FR PVC insulated, single core, multi strand copper conductor cable with a run of 1.0 sq.mm, 1100V grade, FR PVC insulated, single core, multi strand copper conductor cable as earth continuity and 5A flush type control switch. 5A, 3 point ceiling rose shall be used to terminate the wiring cables and lead-in wires for each point.

17.3.4. Suitable sizes of PVC rigid conduit pipe of wall thickness not less than 2mm shall be used for concealed wiring to run the wiring cables.

17.3.5. Circuit main and point wiring shall not be run in the same conduit pipe.

17.3.6. Switch boards shall be branded, factory made, Flush mounting type boxes with modular top suitable to accommodate flush type switches, stepped electronics fan regulators, dependent plug points, etc. Each switch board shall have earthing provision.

17.3.7. Separate board shall be used for independent/power plug points.

17.4. Air condition units, light fittings, ceiling fan, siren, exhaust fan, buzzer, etc.

17.4.1. Electrical fixtures like light fittings, ceiling/exhaust fan, siren, buzzer, etc. shall be fixed on the wall/ceiling/false ceiling at suitable height using suitable fixing arrangements.

17.4.2. Sufficient number of energy efficient (LED) light fittings of suitable model and type shall be provided in all the rooms of the control room, Pump house room, four & two wheeler shed to maintain standard lux level.

17.4.3. Light fittings in the battery room shall be of energy efficient flame proof.

17.4.4. Sufficient numbers of suitable size ceiling fans and exhaust fans shall be provided with suitable fixing arrangements.

17.4.5. Suitable capacity of siren shall be provided for warning purpose.

17.4.6. The fixtures and its corresponding control switches shall be marked / numbered for easy operation.

17.4.7. Sufficient number of buzzer shall be provided wherever necessary.

17.4.8. Control switches for battery room lights, exhaust fan, etc. shall be kept outside the battery room.

17.4.9. Sufficient number of split A/C units shall be provided for the SCADA room, EMS room, Computer room, etc.

17.5. DC lighting arrangements:

17.5.1. Wiring:

i. Light point wiring shall be carried out with 2 runs of 2.5 sq.mm, 1100V grade, FR PVC insulated, single core, multi strand copper conductor cable and 5A flush type control switch. 5A ceiling rose shall be used to terminate the wiring cables and lead-in wires for each point.

ii. Wiring shall be run in separate conduit pipe of wall thickness not less than 2mm.

iii. Separate switch board shall be used for DC lighting.

17.5.2. Fittings:

i. DC light fittings of energy efficient for general illumination shall be provided in all the rooms of control room building by using automatic changeover contactor from DC source of the battery room.

17.6. Emergency lights:

Sufficient number of portable emergency lighting unit with re-charging facility shall be fixed on the wall with suitable stand arrangements in the Panel room, operator's room and Shift Engineer's room.

18.0. External Lighting:

18.1. Lighting Mast:

18.1.1 The height of the lighting mast shall be 16mtr.

18.1.2 The mast shall be of tapered section and shall be based on proven three wire rope systems with double drum and winch.

18.1.3 The mast shall be fabricated as per relevant IS. All holding bolts shall be hot dip galvanized. For environmental protection of the mast, the entire fabricated mast shall be hot dip galvanized internally and externally, with entire shaft section galvanized through single dip process, without any overlapping of zinc coating and having a minimum uniform thickness of 85 microns. No further touching up, finishing or modification shall be carried out after galvanizing, except for those specified in applicable standards.

18.1.4 It shall be possible for the lantern carriage to be lowered/ hoisted by means of suitable winch and rope arrangement so that maintenance of the luminaries can be carried out from ground level. The hoisting and lowering the carriage shall be through motorized power tools as well as manual. It shall be possible to lock the carriage at top level so that there is no strain on the wire ropes.

18.1.5 An adequate door opening should be provided at the base of mast so as to permit clear access to equipment like winch, cables, etc and also to facilitate easy removal of the winch. The

door opening shall be complete with close fittings, vandal resistant, weather proof door, with suitable industrial locking arrangement.

18.1.6 The wire ropes shall be of stainless steel designed to support the carriage with the luminaries.

18.1.7 The mast shall be designed to withstand the following dynamic loading prevailing at site with adequate factors of safety. The design life of the mast shall be minimum 25 years with design wind speed.

18.1.8 The mast shall have suitable lightning spike & aviation lights and shall be earthed properly.

18.1.9 The mast, ropes, winches, etc. shall confirm to the relevant Standards prescribed for them.

18.1.10 Each mast shall be provided with two earth electrodes. The sizes of the earth of GI strip shall be 50 × 6mm.

18.1.11 The scope of work includes design, manufacture, supply and erection of mast including foundation works and hardware.

18.1.12 Necessary design for the foundation of the mast shall be furnished before taking up the foundation works.

18.1.13 The foundation shall be so designed after taking into account the soil bearing capacity at the mast location.

18.1.14 Luminaries per mast shall be 6 nos. of 300 W LED flood light fittings.

18.1.15 All the fittings shall be installed and connected with necessary cables. Trailing cable shall be of 1100V grade, electrolytic grade copper conductor multi core flexible cable of minimum 4sq.mm size. The connections from the top junction box to individual luminaries should be made by using 1100V grade copper conductor 3c x 1.5 sq.mm flexible cables.

18.1.16 All accessories like timers, MCBs and control circuits shall be housed in a control panel.

18.1.17 The lighting control panel shall be weather, dust and vermin proof, pedestal type made out of 2.5mm thick MS sheet steel and structural frames.

18.1.18 Removable gland plates shall be provided at the bottom.

18.1.19 The panel shall be given one coats of red oxide primer and two coats of enamel paints. The finishing colour shall be 631 shade of IS 5.

18.1.20 Two earthing studs of adequate size with necessary nuts and washers shall be provided.

18.1.21 The bus bar shall be of copper and of adequate size and shall be supported by epoxy insulators.

18.1.22 The panel shall be of adequate size to provide sufficient space for incoming and outgoing cables.

18.1.23 The panel shall be pre-wired with suitable size copper conductor cable up to incoming and outgoing terminal blocks and shall be labelled.

Incomer	3 phase, 415V, 100A, 4P MCB - 1 no.
Bus bar	4 runs of 100A copper bus & earth bus - 1 set.
Outgoing	3 phase, 415V, 63A 4P MCB - 2 sets.
Contactor	63A power contactor with 230V AC coil - 2 nos.
Timer units	Electronic automatic clock switch with battery backup - 2nos.
By-pass switch	Timer by-pass switch - 2nos.
Terminal block	Stud type terminals suitable for 35sq.mm eye type lugs - 1set.

18.2. Street Lighting:

18.2.1 8m height flange mounted hot dip galvanized Octagonal pole for yard and road lighting with bottom 135mm (A/F), top 70mm (A/F,) made up of 3 mm thick sheet steel having base plate 225x225x16mm with 1500 mm long single / double arm bracket GI pipe, M20X750 long

foundation bolts, Bakelite sheet with 1no. 6A SP MCB and 20A, 8way stud type terminal block suitable for 4Cx25 sq.mm. cable loop-in-loop-out.

18.2.2 Sufficient number of energy efficient (LED) street light/flood light luminaires shall be provided to maintain standard lux level in the area..

18.2.3 Energy efficient Post top lantern of elegant design shall be fixed on the sub-station gate pillars.

18.3 Timer panel

18.3.1 Fixing of Analog automatic programmable Street light timer box with 230V, 40A, 3 pole contactor.

18.3.2 a) Surface mounting type analog time switch

18.3.3 b) Power contactor with suitable current rating.

18.3.4 c) Terminal block

18.3.5 d) HRC fuse unit with suitable current rating

18.3.6 e) Porcelain base rewirable type fuse unit for bypass circuit,

18.3.7 g) Company manufacture outdoor mounting type, weather proof 16SWG sheet steel enclosure with hinged door& panel locking arrangements for enclosing the above switchgear the sheet steel enclosure shall be of size not less than 450mmx300mmx300mm & painted with powder coated paint all control circuit wiring shall be done with 1.5 Sqmm copper conductor wire & power wiring shall be done using 16Sqmm copper conductor wire.

19.0 Energy Management System:

19.1. General:

19.1 The output of the KWh meter shall be transmitted to the central monitoring system through suitable communication system in order to take the meter reading.

19.2 The KWh meter shall be as per the specification given in the technical data for the meters provided in each HT and LT panels.

19.3 The general arrangement drawing shall be submitted for approval before manufacturing.

3 Ph. Energy meter with RS 485 Serial Port:

Description	Specification
Voltage Input	110V AC RMS (±10%) 415V AC RMS ((±10%)
System	3 - phase, 4 Wire
Current Input	1A, 5A, AC RMS (CT operated)
Working Load range	0.05 I_b to I_b max of load current
PT ratio	33 KV Feeders : 33 kV/110V 11 KV Feeders : 11 kV/110V LT Side : 415V
CT ratio	33 kV Side: Incomer : 150-300/5-5A Tr. Feeders : 75-150/5-5A 11 KV Side: Incomer : 200-400 / 5-5A Outgoing Feeders : 100-200/ 5-5A 11 KV Stn. Transformer Feeders :15-30/5-5A LT Panel 415V Side: For 500 kVA TR. Panel 800/5A,
Working PF	0.5PF Lag to 0.7 PF lead
Energy Measurement	For forward energy
Accuracy	0.5 class
Energy registering	LCD counter or Pulse Counter
Parameters shown	KWH
Resolution KWH	To be furnished
Phase Indication	LEDs shall be provided
Phase sequence indication	LED shall be provided

Reverse Indication	LED Shall be provided
Tampering Indication	To be provided
Calibration output	Shall be provided through LED.
Meter constant	To be furnished
Burden ON Voltage Input	To be furnished
Burden ON Current Input	To be furnished
PC Interface	An optically isolated RS 485 serial port with relevant protocol to suit the system requirement.
Isolation level	Should withstand 2kV for 1 minute between communication and other circuits.
Aux. Power supply	To be derived from the voltage input terminals.
Mounting	Flush mounting with tamper proof.
Enclosure	Acrylic.
Real Time Clock/Calendar:	
Time	24 Hours (in Hours, Minutes and Seconds)
Calendar	Day, Month and Year
Setting	Through Keypad
Integration	15 or 30 minutes pre settable time with indicating resolution of ± 0.1 Minute.
Peak Demand	It shall show previous peak max demand values with date and time
Energy Storage	Stored in non-volatile chip last long for 10 years. No external battery back-up is needed.
Data Stored	a) Import, KVAh, KWh, KVARh (Lead/Lag). b) Peak KVA max. demand c) Zone based registering of energy and demand.
Serial Port	RS 485 interface.
Type of Protocol	Relevant protocol to suit the system requirement.
Calibration pulse output	Provided through LED in the front panel of the meter either for KWh or KVARh. (Selectable through keypad with password facility).
Meter constant	To be furnished.
Mounting	Panel.

RS 485 to RS 232 Convertor:	
Input	RS 485 communication input.
Output	RS 232 Communication output.
Maximum connectivity	To be furnished.
Baud rate	To be furnished.
Max. distance to be communicated	1.2 km.
Aux. power supply	230V AC.
Box dimension	To be furnished.
Mounting	Table top.

19.4 Software:

19.4.1 The software shall be capable of running in a networking environment and shall work in Windows platform.

19.4.2 The software shall have provision for naming the meters connected to the network.

19.4.3 Alpha numeric characters shall be used to name the meters (titles), length of which shall be as per specifications.

19.4.4 The software shall display all the meters through a tree structure with different levels (say feeder wise).

19.4.5 The values displayed in the software shall be auto refreshing type and the value shall change whenever there is a change in meter reading without need for manual refresh.

19.4.6 The software shall ensure that, the reading displayed in the meter and the readings displayed in the software shall be matching without any errors.

19.4.7 The software shall be possible to group the meters as required. One meter may be part of two different groups.

19.5 Password Access:

19.5.1 None of the features of the EMS terminal shall be accessible without the user first being required to log on by entering a password.

19.5.2 Both name and alphanumeric passwords of up to 16 characters unique to every user shall be required to long on the system, These shall definable by individual user.

19.6 Data Logging:

Storage of logged information shall be possible either by single shot, continuous, circular or event based. These are defined as below:

a. Single shot file logging is carried out only during a pre-defined period for which the start and finish time and date shall be configurable.

b. Continuous file logging is carried out and continuously written into the terminal log data base.

c. Circular file logging is carried out in the out-stations and written into a circular log file for retrieval to the terminal database on user request.

19.7 Data Extraction and Storage:

19.7.1 Two types of tables are required for Energy Meter readings, one showing the latest value another showing the data at scheduled timing.

19.7.2 First table shall be updated for any change in any of the meter readings, whereas the second shall be updated by the data collected through the time schedule.

19.7.3 At any given time, number of records in the first table shall be equal to the number of meters monitored. In second table, number of records shall grow as per the number of times the data is collected within a period.

19.7.4 Software shall have provision for restricting the size of the database by taking automatic backup and generating warning messages. At any given time, the software shall not allow overflow of data and consequent delay in operations.

19.7.5 The database shall be accessible to other software but with read only level. Modification of data within the database shall be allowed only by a special password, which shall be separate from operator level password.

19.7.6 Any software/Interface or any other system which is not covered in our specification shall also be supplied with the system for the complete functioning of the system. Software shall be supplied in CD also.

20.0 CABLES:

Depending upon the site conditions, the size of the cable shall be selected, but not less than the sizes that mentioned below.

20.1 Control cable:

20.1.1 The cable shall be 1100V grade, PVC insulated and FRLS PVC overall sheathed, galvanised steel armoured, stranded annealed copper conductor cables of size 2.5sq.mm for control & PT and 4sq.mm for CT circuits.

20.1.2 The core of the cable shall be identified by colours / numbers as per IS 1554.

20.2 LT Power Cable:

20.2.1 1100V grade, PVC insulated and FRLS PVC overall sheathed, galvanised steel armoured, stranded annealed copper conductor cables for the following to provide AC & DC power supply. The core of the cable shall be identified by colours / numbers as per IS 1554.

20.2.2 LT panel to AC distribution panel – not less than 4×10 sq.mm.

20.2.3 AC distribution panels to 33kV VCB Panel boards, Power transformers cooler control panels, 11kV VCB Panel boards, ACC of capacitor bank, etc. - not less than 4 × 4 sq.mm.

20.2.4 LT panel to Battery charger - not less than 4 × 10 sq.mm.

20.2.5 Battery charger to battery set - not less than 4x10sq.mm.

20.2.6 Battery charger to DC distribution panel - not less than 2x10 sq.mm.

20.2.7 DC distribution panel to all equipments/panels - not less than 2x4 sq.mm.

20.2.8 Control MCB in street light pole to fittings through control gear - not less than 3 × 2.5 sq.mm.

20.2.9 LT panel to sump pump motor- not less than 4 × 10 sq.mm.

20.2.10 LT panel to lighting DBs- not less than 4 × 4sq.mm.

20.2.11 LT Panel to Field Panels, Lighting Mast & inter connection between Lighting mast, street lighting poles & Post top Lantern 3.5C × 25 sq.mm.

20.2.12 3 runs of 1100V grade, 3.5Cx150sq.mm, PVC insulated PVC overall sheathed, galvanised steel armoured, aluminium conductor cables from Transformers secondary / DG sets to LT panels.

20.3 Communication Cables:

Polyethylene insulated, PVC sheathed, armoured, overall shielded, high conductivity electrolytic grade, annealed, tinned, copper conductor, communication cable as per IS.

21.0 EARTHING:

21.1 Electrodes:

21.1.1 Earth electrode shall be with 3M long, 50mm ID, medium class GI, drilled holes in zigzag way, with 50×6 mm GI connecting flat & funnel for watering, buried in the ground surrounded by alternate layers of coal/charcoal, salt and river sand around the electrode for 150mm radius, back filling the earth pit with excavated earth and watering.

21.1.2 The galvanization of the earth electrodes shall be carried out after welding the connecting flat.

21.1.3 Number of earth electrodes and spacing between electrodes shall be designed as per sub-station norms.

21.1.4 The earth resistance value of individual and combined earth electrodes shall be within the limits prescribed by the statutory body.

21.1.5 The earth electrodes shall be connected to the earth grid in duplicate.

21.1.6 Masonry earth pit (trough) and CI cover with hinges shall be constructed around each earth electrode as per the specification prescribed by civil department.

21.2 Earth grid:

21.2.1 Earth grid shall be formed with 50x8mm MS flat for transformer yard.

21.2.2 The earth grid shall be buried 1m below the ground level of the substation.

21.2.3 The earth grid shall be formed by running the earth conductor across & along the area.

21.2.4 Number of runs and spacing of grid conductor shall be designed as per earthing calculation.

21.2.5 The inter-section of earth conductors shall be welded properly and anti-corrosive paint shall be applied.

21.2.6 Separate earth grid shall be formed with 50x8mm MS flat for control room's equipments and shall be inter-connected with the yard earth grid in duplicate.

21.2.7 The touch and step potential shall be within the standard norms.

21.2.8 At the crossing of cable duct, oil duct, etc., the earth grid shall be run below the ducts.

21.3 Earth Connections:

21.3.1 Earthing conductors embedded in the concrete floor of the building shall have approximately 50mm. concrete cover.

21.3.2 Earth conductor shall be terminated on the earthing terminals of the equipment using suitable bolts & nuts. Other joints in the earth conductor shall be welded and anti-corrosive paint shall be applied on the joints.

21.3.3 Wherever earthing conductor crosses underground service ducts, pipes, trenches, tunnels, etc. it shall be rerouted in case it fouls with equipment foundations.

21.3.4 Main equipments like Power and station/distribution transformers (body & neutral), NGR, Capacitor bank, 33 & 11kC VCB Panel boards etc. shall be earthed in duplicate with 50x6mm GI flat.

21.3.5 The neutrals of Power transformers, station/distribution transformers and NGRs shall be directly connected to the earth electrodes.

21.3.6 Separate earth electrodes and earthing shall be provided for RMU yards. The kiosks shall be earthed in duplicate with 50x6mmGI flat and the fencing and gates shall be earthed in duplicate with 6SWG GI wire.

21.3.7 33kV and 11kV cable armour shall be earthed with suitable GI earth conductor having cross section of not less than that of the armour.

21.3.8 All LT, AC, DC power & control cable glands shall be earthed with suitable earth conductor.

21.3.9 Earthing of Transformer cooler control panels, pump motor, etc. shall be earthed in duplicate with 25x4mm GI flat.

21.3.10 Cable trays shall be earthed at suitable interval with 25x4mm GI flat.

21.3.11 6 SWG GI earth conductors shall be run all along the fencing and the fencing shall be earthed at suitable interval.

21.3.12 Transformer rails shall be earthed at suitable interval with 25x4mm GI flat.

21.3.13 Lighting mast shall be earthed in duplicate with 25x4mm GI flat.

21.3.14 Street light poles shall be earthed with 8 SWG GI wire.

21.3.15 Battery chargers, LT panels, AC/DC distribution panels, etc. in the control room shall be earthed in duplicate with 25x4mm GI flat.

21.3.16 Switches, starters, DBs, etc. shall be earthed in duplicate with 6 SWG GI wire.

21.3.17 Any movable parts like panel doors, etc. are to be earthed using suitable size braided copper or flexible copper wires.

21.4 Special Earth for EMS:

21.4.1 Separate earth electrodes with copper plate shall be provided for EMS system.

21.4.2 Copper plate of size shall be buried below ground level, such that its top edge is at a depth of 1.5 meters from the ground level.

21.4.3 Plate shall be surrounded by alternate layers of charcoal/salt/river sand, 150 mm all around the plate to a height of 1.5 meter.

21.4.4 Earth conductor of 16mm^2 flexible copper from the top of the plat shall be taken through 1.8 meter long 25 mm ID, GI pipe of medium class up to EMS room and terminated with row of earth terminals.

21.4.5 Masonry earth pit (trough) and CI cover with hinges shall be constructed around each earth electrode .

21.4.6 At least two earth electrodes shall be provided. The electrodes shall be inter-connected. This shall not be connected with other earth grids**.**

22.0 250KVA DIESEL GENERATOR SET:

22.1 Scope:

22.1.1 Supply, Transport, erection, testing and commissioning of out-door type, CPCB-II compliant, 250kVA Diesel Generator Set with control panel, acoustic enclosure, other accessories and AMF panel.

22.1.2 Valid certificates for type approval and COP issued by CPCB authorized certification agencies shall be furnished.

23.0 Programming Station:

23.1 The programming station is meant for downloading and analysing of data/parameters from the relays and programming the relays.

23.2 The programming station shall be a portable one (Lap top with inbuilt modem). Screen shall be of colour, LED backlit LCD type of size not less than 17”, 16:9 format. The lap top shall be blue tooth, Ethernet and Wi-Fi compatible.

23.3 Windows 10 OS shall be pre-loaded. Latest MS office and anti-virus (Internet security) software in CD/DVD shall be supplied and installed.

23.4 Processor shall be Intel i5 or higher.

23.5 HDD not less than 1 TB, 8GB RAM and graphic card shall be provided.

23.6 Three numbers of USB ports shall be provided in addition to other ports required for normal work.

23.7 All necessary accessories shall be provided (RS 232 Cable, Mouse, additional optic mouse, carrying case etc.).

23.8 Necessary software for the transformer differential numerical relay shall be pre-loaded and a copy to be given in CD/DVD.

23.9 Necessary software for numerical relay for the O/C and E/F used in 33kV panel and 11kV panel shall be pre-loaded and a copy of each to be given in CD/DVD.

Data Sheets

33/11kV, 6.3 MVA Power Transformers:

Sl. No.	Particulars	General specification
1.	Location	Suitable for operation under tropical conditions
2.	Altitude	Not exceeding 1000M above MSL
3.	Application/ Nature of load	Lighting loads, Motors, Welding machines, etc.
4.	Installation outdoor/indoor	Outdoor
5.	Type	Oil immersed, core Type, two windings.
6.	No. of phases	3
7.	Rating	6300kVA
8.	Ratio (at normal tap)	33/11kV
9.	Full load current (HV)	To be furnished
10.	Full load current (LV)	To be furnished
11.	No load current at 100% rated voltage	To be furnished
12.	No load current at 110% rated voltage	To be furnished
13.	Winding resistance per phase (HV)	To be furnished

	at 75^0C	
14.	Winding resistance per phase (LV) at 75^0C	To be furnished
15.	Type of cooling	ONAN
16.	Makers name of transformer	To be furnished
17.0	Transformer rating	
17.1	No load voltage – HV	33kV
17.2	No load voltage – LV	11kV
17.3	% Impedance at normal tap	To be furnished
17.4	Overload & short time rating	To be furnished
17.5	Short circuit withstand for 3 sec in Amps 1) HV winding 2) LV winding	To be furnished
18.0	Winding	
18.1	Material	Copper
18.2	Winding connection 1) HV 2) LV	 Delta Star
18.3	Vector symbol	Dyn11
18.4	Application / Direction of power flow	Both HV to LV as well as LV to HV
19.0	System data	
19.1	Nominal system voltage (HV)	33kV
19.2	Highest system voltage (HV)	36kV
19.3	Frequency	50 HZ $\pm$3%
19.4	Voltage variation	$\pm$10%
19.5	Fault level (HV)	500MVA
20.0	Losses	
20.1	No load loss at 100% rated voltage on principal tapping and at rated frequency	As per central Board of Irrigation and Power norms with BIS tolerance.

20.2	Load loss at full load current at principal tapping at 75^0C	As per central Board of Irrigation and Power norms with BIS tolerance.
21.0	Winding Insulation Test Voltage	
21.1	Impulse voltage 1) HV 2) LV	As Per IS
21.2	Power frequency voltage withstand 1) HV 2) LV	As Per IS
22.0	Temperature Rise	
22.1	Ambient temp.	50^0C
22.2	Max. Daily average air max. Yearly air	As per IS
22.3	Temp. Rise of oil by thermometer	50^0C
22.4	Temp. Rise of winding by resistance	55°C
23.0	Tapings	
23.1	Tapings on windings HV/LV	HV side
23.2	Type of tap changing switch	OFF -Load
23.3	Capacity	Full
23.4	Location of tap switch	To be furnished
23.5	If the tap switch is provided on top whether protective cover provided.	To be furnished
23.6	Tap position indicator provided.	Yes/No
23.7	Tapping range	±2.5%, ±5%, ±7.5%
24.	Vacuum withstand capacity main tank with bushing fittings and accessories.	Shall withstand vacuum of 250mm of mercury
25.0	Terminal Arrangement (HV/LV)	
25.1	Type of arrangement	Cable box type
26.	Painting	Light grey shade 631of IS 5
27.	Deviation clause shall be brought out	Yes/No

28.0	Transformer Oil	
28.1	Quantity of oil, in transformer (including cooling system)	To be furnished
28.2	Total volume of conservator	To be furnished
28.3	Type of breather	Silica gel breather, transparent type
29.	Fitting clause	All fittings are requested to be provided as required
30.	Size of the fitting	To be furnished
31	Drain cum filter valve	To be Provided
32	Top filter valve with plug	To be Provided
33	Air release plug	To be Provided
34	Top oil sampling valve	To be Provided
35.0	Mounting channel base	The fixing channel at bottom of the transformer shall be provided with bi-directional flat rollers with locking and bolting device.
36.0	Type Tests	
36.1	Type test certificates for transformer enclosed	Yes/No
36.2	List of Type tests which will be carried out	To be furnished if applicable
37.0	List of routine tests to be carried out	To be furnished
38.0	Applicable standards	
38.1	Power transformer	IS 2026
38.2	Loading of oil immersed transformer	IS 6600
38.3	Oil	IS 335
38.4	Tolerance on guaranteed particulars	As per IS 2026
38.5	Painting	IS 5

Standard: The Transformers shall comply with IS 2026 of the latest issue for the power transformers.

11kV Neutral Grounding Resistor:

Description	Specification
Type	Outdoor, structure mounted
Normal System voltage	11kV
Highest system voltage	12kV
No. of phases	Three
Frequency	50Hz
Fault Current	250A/10 sec
Ambient Temperature	50 deg C
Temperature rise	300 deg C
Resistance	25 Ohm
Resistor element	Punched stainless steel
NGR CT:	
CTR	150-300/5-5A
Class	Core - 1: 300/5 – PS Core - 2: 150/5- 5P20
Burden	15VA
Vkp	> 300V
ImA@Vk/2	<= 20mA
Rct	< 6 Ohm
NGR PT:	
PTR	11kV/110V
Class	1.0
Burden	50VA

33kV VCB Panel Board (or as per design calculation):

33kV VCB Panel Boards shall consist of Minimum Incomer cubicle -2 nos., Bus-coupler cubicle-1no., Outgoing Feeder cubicle-2 nos., and adequate number of PT & adaptor cubicles.

Sl. No.	Description	Specification
1.0	General	
1.1	Type	Metal-clad Modular design.
1.2	Service	Indoor.
1.3	Enclosure	IP 40
1.4	Thickness of sheet for load bearing member	2.5 mm
1.5	System Voltage	33kV ± 10%
1.6	Maximum system voltage	36kV
1.7	Frequency	50 Hz ± 3%
1.8	Phase	3
1.9	System ground	Solidly earthed.
1.10	Earthing Bus	Copper.
1.11	Rated current – Bus bar	630A
1.12	Ambient air temperature	50ºC
1.13	Material of Bus bar	High conductivity electrolytic copper.
1.14	Bus bar interconnection	Bus bar should be extended to the other cubicle through wall through bushings.
1.15	Max. Temp. Rise of Bus bar	40ºC over Amb. Temp of 50ºC.
1.16	Clearance in air of live parts	Shall be adequate to withstand power frequency and impulse voltage.
1.17	Short time rating of bus bar	25kA for 3 sec.
1.18	Insulation level	As per BIS.
1.19	Service voltage	230 V AC and 110 V DC.
2.0	Circuit Breaker	
2.1	Make	To be furnished.
2.2	Type	VCB trip free.
2.3	Service	Indoor.
2.4	Draw out or fixed	Draw out type.
2.5	Rated voltage	33kV ±10%
2.6	Rated current	630A for Incomer, Bus coupler & for O/G feeder.
2.7	Insulation level	As per BIS.

2.8	Operating mechanism	Motor wound spring charging stored energy mechanism.
2.9	Short circuit rating	25kA for 3 sec.
2.10	Breaker Duty cycle	0 - 0.3s – CO - 3Min - CO
2.11	Control voltage and spring charge motor voltage	110V DC for control and 230V AC for motor.
2.12	Method of operation	Motor operated / Manual spring charged closing.
2.13	Minimum No. of spares Aux. contacts	6 NO + 6 NC
2.14	Duty of the operating mechanism	O - C – O
2.15	Manual closing operation	Shall be possible.
2.16	Tripping	Manual & electrical.
2.17	Voltage rating of closing coil	110V DC
2.18	Voltage rating of tripping coil	110V DC
2.19	Wattage of closing coil	Shall be furnished.
2.20	Wattage of trip coil	Shall be furnished.
3.0	Voltage Transformer	
3.1	Line PTs	Draw out type PT shall be provided for the incomer VCB cubicles for easy replacement.
3.2	Bus PTs	Draw out type PT shall be provided in two separate cubicles.
3.3	Type	Epoxy Resin Cast, 3 - phase, draw out type.
3.4	Rated voltage	
	a) Primary	33kV
	b) Secondary	110V, with neutral brought out.
3.5	Rating	200VA
3.6	Accuracy class	0.5
3.7	Method of connection	3-phase Star / Star.
3.8	Rated Voltage Factor	1.2 continuous, 1.9 for 30 seconds.
4.0	HRC Fuses For PT	
4.1	Voltage class	33kV
4.2	Rupturing capacity	Adequate.
4.3	Primary fuse	Shall have suitable rupturing capacity.

4.4	Secondary fuse HRC	Shall be provided in the panel.
5.0	Current Transformers	
5.1	Make	As per approved list.
5.2	Type	Epoxy Resin cast.
5.3	Voltage rating	33kV
5.4	Specification	
	a) Incoming feeder	150-300/5-5A -1 Set each.
	Core – 1:	5 P 20, 10 VA
	Core - 2:	Class 1.0, ISF < 5, 10 VA
	b) Bus coupler	150-300/5-5A – 1 Set.
	Core - 1:	5 P 20, 10 VA
	Core - 2 :	Class 1.0, ISF < 5, 10 VA
	c) Outgoing Feeders	75-150/5-5-5A – 1 set each.
	Core - 1:	5 P 20, 10 VA
	Core - 2:	Class 1.0, ISF < 5, 10 VA
	Core - 3:	PS class, Vk ≥100 V, Imag at Vk/2 = 125 mA. RCT at 75ºC = 0.5 Ω
5.5	Short-time rating	25 kA, 3 sec.
5.6	Insulation level	As per BIS.
5.7	Thermal overload	20% continuous
5.8	Polarity of C.T.	The polarity of the CTs shall be marked.
6	Core Balance Current Transformer for Feeders (CBCT)	CBCTs shall be of ring type. Suitable for the diameter of the cable.
6.1	Rating	To operate at a primary current of 40A at 20% setting of CAG 12 relay.

11kV VCB Panel Board:

11kV VCB Panel Boards shall consist of Minimum Incomer cubicle -2 nos., Bus-coupler cubicle-1no., Outgoing Feeder cubicle-8 nos. , and adequate number of PT & adaptor cubicles.

1.0	General	
1.1	Type	Metal-clad Modular design
1.2	Service	Indoor

1.3	Enclosure	IP 40
1.4	Thickness of sheet for load bearing member	2.5mm
1.5	System Voltage	11kV ± 10%
1.6	Maximum system voltage	12kV
1.7	Frequency	50 Hz ± 3%
1.8	Phase	3
1.9	System ground	Neutral earthed through Resistance.
1.10	Earthing Bus	Copper
1.11	Rated current – Bus bar	630A
1.12	Ambient air temperature	50°C
1.13	Material of Bus bar	High conductivity electrolytic copper
1.14	Bus bar interconnection	Bus bar should be extended to the other cubicle through wall through bushings
1.15	Max. Temp. Rise of Bus bar	40°C over Amb. Temp of 50°C
1.16	Clearance in air of live parts	Shall be adequate to withstand power frequency and impulse voltage supported by test certificate.
1.17	Short time rating	25kA for 3 sec
1.18	Insulation level	As per BIS
1.19	Service voltage	230V AC and 110V DC.
2.0	Circuit Breaker	
2.1	Make	To be furnished
2.2	Type	VCB trip free
2.3	Service	Indoor
2.4	Draw out or fixed	Draw out type
2.5	Rated voltage	11kV ±10%
2.6	Rated current	630A for incomer, Bus coupler & for feeder
2.7	Insulation level	As per BIS
2.8	Over voltage while switching unloaded transformers and cables	Less than the insulation level of transformer and cable. Surge suppressor shall be provided.
2.9	Operating mechanism	Motor wound spring charging stored energy mechanism

2.10	Short circuit rating	25kA for 3 sec
2.11	Breaker Duty cycle	0.3S - CO - 3Min - CO
2.12	Control voltage and spring charge motor voltage	110V DC for control and 230V AC for motor
2.13	Minimum No. of spares Aux. contacts	6 NO + 6 NC
2.14	Method of operation	Motor operated/Manual spring charged closing.
2.15	Duty of the operating mechanism	O - C – O
2.16	Manual closing operation	Shall be possible
2.17	Tripping	Manual & electrical
2.18	Voltage rating of closing coil	110V DC
2.19	Voltage rating of tripping coil	110V DC
2.20	Wattage of closing coil	Shall be furnished
2.21	Wattage of trip coil	Shall be furnished
3.0	Voltage Transformers (Lines & Bus PTs)	
3.1	Make	As per recommended make list
3.2	Type	Epoxy Resin Cast, 3 - phase PT of draw out type.
3.3	Rated voltage	
a)	Primary	11kV
b)	Secondary	110V with neutral brought out and earthed
3.4	Rating	200VA
3.5	Method of connection	3-phase Star / Star
3.6	Rated Voltage Factor	1.2 continuous, 1.9 for 30 seconds.
4.0	HRC Fuses for PT	
4.1	Voltage class	11kV
4.2	Rupturing capacity	Adequate
4.3	Rated current	2 Amps.
4.4	Secondary fuse HRC	Shall be provided in the panel
5.0	Current Transformer	
5.1	Make	As per approved list
5.2	Type	Epoxy Resin cast

5.3	Voltage rating	11kV
5.4.0	Spec:	
5.4.1	Incomer	400-200/5-5-5A Core - 1: 5 P 20, 10 VA Core - 2: Class 1.0, ISF < 5, 10 VA Core - 3: PS class V_k 〈 100 V, I_{mag} at $V_k/2$ = 125 mA. $R_{CT} \leq 0.5\ \Omega$
5.4.2	Bus Coupler	400-200/5-5A Core - 1: 5 P 20, 15 VA Core - 2: Class 1.0, ISF < 5, 10 VA
5.4.3	Feeders	200-100/5-5A Core - 1: 5 P 20, 15 VA Core - 2: Class 1.0 ISF < 5, 10 VA
5.4.4	Station Transformer Feeders	15-30/5-5A Core - 1: 5 P 10, 10 VA Core - 2: Class 1.0 ISF < 5, 10 VA
5.5	Short-time rating	10 kA, 3 sec.
5.6	Insulation level	As per BIS
5.7	Thermal overload	20% continuous
5.8	Polarity of C.T.	The polarity of the CTs shall be marked.
6.0	CBCT for all the outgoing Feeders	CBCTs shall be of ring type.
6.1	Rating	To operate at a primary current of 40A at 20% setting of CAG 12 relay.
6.2	Dimension	Internal dia. sufficient to accommodate a cable of 120/95 mm^2, 11/11 kV, XLPE Cable.
6.3	Location	To be located in the feeder cable outgoing side with suitable support.
7.0	Relays	
7.1	Incomer	3 O/L, 1 E/L numerical relay, Master trip relay VAJHM13, Trip supervision relay VAX 31, Other Auxiliary relays.
7.2	Bus Coupler	CDG 61 relay 3O/L, with Time and H/S elements, CDG 12, 1 E/L with Time and H/S elements,

		Master trip relay VAJHM 13, Trip supervision relay VAX 31, Other auxiliary relays.
7.3	All Feeders	CDG 61 relay 3O/L, with Time and H/S elements, CDG 12, 1 E/L with Time and H/S elements, Master trip relay VAJHM 13, Trip supervision relay VAX 31, Other Auxiliary relays.
7.4	Settings Range	Numerical Relay and CDG61 O/L – 50-200%, H/S- 200-2000%, CDG 12 E/L - 20-80% H/S- 200-800%.
8.0	Meters	
8.1.0	Ammeters	Rectified moving coil type, 96 mm Sq. Flush mounted with accuracy class of 1.5 with following range
8.1.1 8.1.2 8.1.3 8.1.4	Incomer Bus coupler Feeders Stn. Tr Feeders	0 - 400/200A 0 - 400/200A 0 - 100/200A 0 - 15/30A
8.2.0	Volt Meters in all incomers, bus coupler and feeders panels.	Rectified moving coil type or Moving iron type, 96 mm Sq. flush mounted with an accuracy class of 1.5 and PT ratio 11 kV/ 110 V.
8.3.0	Energy Meters	Digital type, Flush mounted Energy meter compatible to EMS. With following CT and PT ratios.
8.3.1	PT Ratio C.T. Ratio Incomer Feeders Stn Tr, Feeder	11kV / 110V 400 - 200/5A 100 - 200/5A 15 - 30/5A
9.0	Indication Lamps (LED)	i) Breaker open : GREEN ii) Breaker closed : RED iii) Breaker tripped : AMBER iv) TC Failure : WHITE v) DC supply failure : BLUE

10.0	Alarm	AC bell for DC supply failure. DC hooter for breaker tripping. DC hooter for trip circuit failure. (Both the hooters of different sound).
11.0	Push buttons	The push button shall have minimum 2NO + 2NC contacts. The continuous current and breaking capacity of the contacts shall be adequate for the duty involved with a minimum of 10A, continuous current rating at 240V AC or 110V DC and a minimum of 10A and 2A breaking capacity at 240V AC and 110V DC respectively.
12.0	Selector Switches	The continuous current and breaking capacity of the contacts shall be adequate for the duty involved with a minimum of 10A continuous current rating at 240V AC or 110V DC and a minimum 10A and 2A breaking capacity at 240V AC and 110V DC respectively.
13.0	Control Switches	The ON and OFF switch for Closing and Tripping of the breaker shall be rotary type fly back switch with pistol grip.
14.0	Communication module	Each Cubicle shall have RS485 compatible communication module pre-wired with the relay contacts, breaker auxiliary contacts, energy-meter port, numerical relay port etc.

11kV 3 / 4 RMUs & 1 unit BC:

Breaker Type	Trip free, Draw out type (service, test & isolated position)
Current rating	630A
Short time rating	20kA for 3 sec
Insulation level	28/75 kV
Rated operating duty cycle	O - 0.3sec – CO - 3min – CO
Method of operation	Manual spring charge for closing and manual tripping. Auto tripping using series trip coil for series

	tripping.
Indication	Mechanical indications for ON, OFF & SPRING CHARGE
Accessories:	
a) Auxiliary switch	6 NO + 6 NC
b)Spring charging handle	One handle for each VCB feeder cubicle shall be provided.
c)Trolley for Breaker rack out/in with handle	One for each VCB feeder cubicle shall be provided.
d) Mech. operation counter	Shall be provided
Load Break Switch	
Type	On-load, indoor isolator with snap action.
Rated current	400A
Short time rating	20kA, 3 sec
Dynamic withstand capacity	50kA (peak)
Operation	Manual
Locking provision	In both ON and OFF position.
Insulation level	28/75kV
LBS handle	One handle for each LBS cubicle shall be provided.
11kV Bus Bar	
Type	Air insulated
Material of bus bar	High conductivity electrolytic copper with tinned at connection point.
Support/wall through insulator	Cast epoxy
Insulation level	28/75kV
Current rating	Suitable rating
Short time current	20kA for 3 sec.
Size of all bus bars	Rated for continuous and short time current ratings
Phase indication	RYB colours shall be provided.
11kV PT	
Type	Epoxy resin cast
Phase	Three phase, star connected
Voltage ratio	11kV/√3/110V/√3

Connection	Star/star with earthed neutral
Burden	Minimum 100VA(total)
Insulation level	28/75kV
Voltage factor	1.2 continuous, 1.9 for 3 sec
Class of accuracy	1.0
Protection	HRC fuse on HV side
11kV CT	
Type	Epoxy resin cast
Voltage rating	12kV
Ratio	200-100/5A-5A
Short time current rating	20kA for 3 sec.
Burden for both the cores	10VA
Accuracy	Class 1 with ISF 5 for metering 5P 10 for protection
Insulation level	28/75kV
Thermal overload capacity	20% continuous
11kV Surge Arrestor:	
Type	Zinc oxide, gapless
Rating	12kV, 5kA
Indoor/out door	Indoor
Location	Outgoing cable

11/0.414kV, 500 / 630kVA Transformers:

Description	Specification
Application/ Nature of load	Motor loads, welding machine, lighting etc.
Type	Oil immersed, natural cooled, outdoor type copper wound transformers with cable box on both HV and LV side.
No. of phases	3 phase
Frequency	50Hz
Rating	500 / 630kVA
Ratio (at normal tap)	11kV/0.415kV

Type of cooling	ONAN
No load voltage at HV	11000V
No load voltage at LV	415V
System earthing	Resistance earthing.
Vector Group	Dyn11
Application/ Direction of power flow	HV to LV
Nominal system voltage (HV)	11kV
Highest system voltage (HV)	12kV
Frequency	50 HZ +3%
Voltage variation	+10%
Fault level (HV)	200 MVA
System earthing	Resistance earthing.
Tapping on winding	HV side
Type of tap changing switch	OFF- LOAD
Tapping range	±2.5%, ±5%

3 phase, 415V, Indoor LT SWGR for MNPB:

Sl. No.	Description	Specification Requirements
A	**General**	
1	Rated Voltage, Phases & Freq.	415V, 3 phase, 3 wire, 50 Hz
2	System Neutral Earthing	Solidly earthed
3	Ref. Ambient Air Temperature	50°C
4	Material of Bus bars	Al. or Al. Alloy
5	Maximum temp. of bus bars joints, droppers and along the run at site reference ambient of 50°C	
a)	With Plain or Tin Joints	40°C
b)	With Silver Plated Joints	55°C

c)	Bus Enclosure and Structure	30°C
6	Short-time Rating for 1.0 Sec. (kA rms)	50
7	Momentary Rating (kA peak)	105
8	Degree of Protection as per IS:2147	IP-55 for outdoor IP-52 for indoor
9	Thickness of Sheet Steel in mm	
a)	Load Bearing Members	2
b)	Non-load Bearing Members	1.6
10	Colour Finish Shade	
a)	Interior	Glossy White
b)	Exterior	As mentioned in Section-I
B	**Air Circuit Breaker**	
1	Service	Indoor
2	Type	Air Break
3	Rated Service Voltage	415V ±10%
4	Rated Current	As per requirement
5	Rated Frequency	50 Hz ±5%
6	System Earthing	Solidly Grounded
7	Rated short time withstand current for 1 sec.	50kA (r.m.s.)
8	Rated Symmetrical breaking current at rated voltage	50kA (r.m.s.)
9	Rated Making Capacity (min)	105kA
10	Duty Cycle	O-3min-CO-3min-CO
11	Operating Mechanism	Stored Energy Type
a)	Closing	Motor Wound Spring Operated
b)	Opening	Shunt Trip Coil
c)	Latching Arrangement	Mechanically & Electrically trip free
12	Auxiliary Voltage	
a)	Closing	220V D.C. (85% - 110%)
b)	Tripping	220V D.C. (70% - 110%)
c)	Spring Charging Motor	220V ±10% D.C.
d)	Space Heater & Lamp	240V ±10% AC, 50Hz

13	Anti-pumping Feature	Electrical anti-pumping feature shall be provided.
14	No. of Poles	¾
15	Aux. Switch Contact	Min (6 NO + 6 NC)
16	Mounting	Draw-out type transfer truck within switchgear cubicle
17	Limits of Temp. Rise	As per IS:2516 part I & II / Sec I
D	**Current Transformers**	
1	Service	Indoor
2	System	415V, 3-phase, 3-wire, 50Hz, Solidly Earthed Neutral
3	Insulation Class	E or Better
4	Type	Resin Cast
5	Rated Voltage	415V ±10%
6	Quantity Required	As per requirements of individual feeders and as mentioned in the specification drawings
7	Ratio and Burden	As required, CT secondary rating shall be 1A
8	Accuracy	5P20 or better for protection and Class 0.5S for Audit meters, Class-1 for Other metering.
9	Power Frequency Withstand Voltage	2.5kV (rms) for one minute
10	Rated Short Time Current	
a)	Short Time Withstand Current for 1sec	50kA (rms)
b)	Dynamic Current	105kA (peak)
11	Mounting	Inside switchgear cubicle in stationary portion
E	**Potential Transformers**	
1	Service	Indoor
2	System	415V, 3-phase, 3-wire, 50Hz, Solidly Earthed Neutral
3	Type	Resin Cast
4	Rating Voltage Ratio	415/√3 / 110/√3

5	Rated Burden	As Specified
6	Accuracy Class	As per requirement, to be furnish during detail engineering
7	Power Frequency Withstand Voltage	
	Primary	11kV for one minute
	Secondary	2kV for one minute
8	Mounting	Fixed Type
9	Quantity	As per requirement
F	**Microprocessor Based Numerical Relays With Communication Facility (The numerical relays for 0.415kV Switchgears shall comply with but not limited to the following technical requirements)**	
1	Purpose	Control & Protection, Metering and Monitoring of all switchgears and MCCs with synchro-check facility for Incomers, Bus couplers.
2	Auxiliary Supply	220V DC for ACBs
3	CT Secondary Current	1Amp.
4	PT Secondary Voltage	110V AC, 3 Phase
5	Ambient Temperature	50°C
6	Degree of Protection	IP 54
7	Communication	The relays shall be provided with dual redundant protocol IEC61850 compatible communication ports at front for communication to RMS / DDCMIS and one rear port suitable for laptop connection
8	Input & Output	Required number of analog and digital inputs / outputs as per scheme requirement with spare.
9	Control	Close / open control of breakers through laptop from the front port / through key pad (Built in) / through rear port connection from DDCMIS
10	Metering	Instantaneous and Integrated values as indicated.
11	Protection	Complete protection for Incomer, Tie, Bus

		coupler, feeders as indicated.
12	Monitoring	Self-diagnostic facility.
13	Facilities to be made available in the relay	Programming keys for complete access without computer (built in). Provision for external programming unit through suitable software and communication ports. Display unit. Read / Write set points. Current & Voltage actual values and any other analog measurement. Event recording with Pre-trip data with starting characteristics. Statistical data. Output relays. Tamper proof security system

3 phase, 415V, Outdoor LT panel for Township:

Sl. No.	Description	Specification
1	Type	Outdoor, plinth mounting, self-standing, cubicle type L.T panel made out of sheet steel of folded construction with minimum thickness of 2.5mm sheet steel (for outer sheet roof and doors). Necessary rubber lining shall be provided for dust and weather proof.
2	Roof	The top which is exposed to atmosphere, shall be double sloped and have sufficient sloping of minimum 500mm to drain off water quickly. FRP coating shall be provided on the roof.
3	Door	Panel door shall be provided with handle double locking arrangement with pad lock, Lock and key and Castle type industrial locking arrangements. 3 sets of keys for each door shall be supplied. Hinges and door locking rods shall be sturdy.

4	Ventilation	Sufficient Ventilation arrangement shall be provided for heat dissipation.
5	Mounting	The entire cubicle shall be mounted on suitable size MS channel.
6	Incoming / outgoing terminals (or as per detailed design)	Incoming terminals shall be suitable for 3.5Cx 120sq mm, PVC, Al. cable. Outgoing terminals shall be suitable for 3.5Cx25sq mm, PVC, Al. cable.
7	Incoming:	1 no. of 3phase, 415V, 4pole, 35kA, 630A, MCCB with adjustable thermal (60%-100%) and adjustable magnetic (5-10 times) release with necessary CTs and relays.
9	Out Going (or as per detailed design)	i). 63A TPN SFU with HRC fuse unit - 8nos. ii). 100A TPN SFU with HRC fuse unit - 2nos.
10	Bus bar	Materials of bus bar shall be of Aluminium and shall be used for both main and earth bus. Main bus i.e Phase and neutral shall be 50x6 mm and Earth bus 25x4 mm. Bus insulator shall be of 1100V grade and shall be flame retardant, crack resistant type with high creepage distance.
11	Control wiring	For control wiring 650V grade single core not less than 1.5 sq mm flexible copper cables with stranded conductor and PVC insulation shall be used. CT circuit wiring shall be not less than 2.5 sq mm Copper flexible cable. Wire termination shall be made with crimping type connectors with insulation sleeves. Each wire shall be identified at both ends with numbered ferrules as per approved wiring diagrams. 20% spare terminals shall be available for connection.
12	Earthing	A continuous earth bus of 25x4mm Aluminium bus shall be run from one end to the other end. Earthing studs with nuts and washers shall be provided for connecting earth lead on either side. All the equipment / instruments shall be provided with duplicate earthing connected to the common bus. Doors shall be earthed with braided copper wire.

13	Current Transformers	3nos of 400/5A CTs, with Core 1, 10VA, cl 1.0 for metering & core 2, 10VA, 5P10 for protection.
14	CBCT (or as per detailed design)	Suitable for Primary operating current of 40A at 0.2plug setting in CAG12 relay base current of 5A-2sets. The inner diameter of the CBCT shall be suitable for 3.5Cx70sq.mm cable.
15	Relay	CAG12 with plug setting range 0.2 to 0.8 basic current of 5A.
16	Ammeter	240 deg. scale, moving coil rectifier type, 96 Sq.mm Ammeter with 3 ways and OFF selector switch: 0-500A with RED mark at full load current. Class of accuracy:1.5
17	Voltmeter	240 deg. scale, moving iron type, 96 Sq.mm Voltmeter with 3 ways and OFF selector switch: 0-500V red marked at 415V. Class of accuracy: 1.5
18	KWH meter	3 phase, 4 wire, three element, class-1, flush mounting, digital type. Pulse counter on the incoming side.
19	MCB / HRC Fuse	For control and voltmeter circuit.
20	Indication lamps	RYB LED indication for incoming supply shall be provided.
21	Painting	A primary coat of Red Oxide and two coats of powder coated of Siemens grey shall be provided for the panel. Painting shall be given after pre-treatment and phosphate.
22	Caution board	Danger caution board in English, Hindi and local language with symbol shall be painted as per IS on panel front and back of the panel.
23	Lifting hooks	Lifting hooks shall be provided at the top of the cubicle and shall be rigid rounded eye type threaded hooks of minimum 2 numbers.
24	Protection class	IP55

33 kV 240 Sq mm Al. cable (or as per design calculation):

Sl. No.	Description	Specification

1.	Name of the manufacturer	Shall be furnished
2.0	Rated voltage	33kV
2.1	Size of cable	3C × 240 sq.mm
3	Type of insulation	XLPE
4.0	Power Conductor	
4.1	Material	Aluminium
4.2	Size per core	240 sq.mm.
4.3	Shape of conductor	Solid, stranded, compacted, circular shaped.
4.4	No. of strands in each conductor	As per BIS
4.5	Dia. of each strand	As per BIS
4.6	Max. resistance of each conductor per Km at 20 deg C (ohm/Km)	As per BIS
5.0	Power Core	
5.1	Number of cores	Three
5.2	Base material of semi-conducting Compound.	XLPE based
6.0	Insulation	
6.1	Material	XLPE
6.2	Nom. Thickness	As per BIS
7	Metallic screening	Copper
8	Colour identification of cores	Coloured R, Y & B tapes in between non-metallic and metallic screening.
9	Laying up material.	Screened cores shall be laid-up together with suitable fillers in the interstices
10	Materials of fillers	Non-hygroscopic
11	Binder tape:	Binder tapes shall be applied over the laid up cores.
12.0	Inner-Sheath	
12.1	Material of inner-sheath	Extruded PVC compound, Type-ST2
12.2	Thickness of inner-sheath	As per BIS
13.0	Armouring	
13.1	Type:	Single layer of galvanized round steel as per IS:3975
13.2	Material	Galvanized round steel wire

13.3	Size of the round wire	As per BIS
13.4	Binder tape	PVC binder tape
14.0	Outer Sheath	
14.1	Material and type	PVC compound Type ST2 as per IS:5831
14.2	Thickness of the outer-sheath	As per BIS
14.3	The outer sheathing material shall have heat resisting properties.	As per BIS
15.0	Current Carrying Capacity	
15.1	Continuous current carrying capacity of cable when laid in air at ambient Temp of 30°c, 40°, 50°c-Amps.	Shall be furnished
15.2	In ground at ground temp. of 30°C-Amps.	Shall be furnished
15.3	Recommended depth of laying the cable.	Shall be furnished
16	Capacitance of cable for 250m length-mF.	Shall be furnished
17	Max. charging current at 33 KV for 500m length (in A)	Shall be furnished
18	Short time rating of the cable for 1 sec and 3 sec duration (in KA).	Shall be furnished
19	Voltage drop per 250m at rated current: when laid in air at 40°C; When laid in ground at 30°C.	Shall be furnished
20 0	Drum length.	250 m +/- 2.5% or as per site requirement.
20 1	Shall be supplied in steel drums.	Confirmed
21	Recommended min. bending radius.	Shall be furnished
22	All tests mentioned in the specification shall be carried out.	Shall be confirmed
23	The relevant standard conforming to which the test will be conducted.	IS:7098 (Part-2) of latest issue
24	The relevant IS to which the materials and construction of cable conforms. Conductor IS 8130-1984; Material construction IS 7098(Part-2)-1985; PVC inner and outer sheath IS 5831-1984; Galvanized steel armouring IS	Shall be confirmed

	3975-1979.	
25	Drum No. shall be printed on the drums	Shall be confirmed

11/11kV, 3Cx120/95/50 sq.mm, XLPE, Al. UG Cable (or as per design calculation):

Sl. No.	Description	Specification
1.	Name of the manufacturer	Shall be furnished
2.0	Rated voltage	11kV
2.1	Size of cable	3C × 120/95/50 sq.mm
3	Type of insulation	XLPE
4.0	Power Conductor	
4.1	Material	Aluminium
4.2	Size per core	120/95/50 sq.mm.
4.3	Shape of conductor	Solid, stranded, compacted, circular shaped.
4.4	No. of strands in each conductor	As per BIS
4.5	Dia. of each strand	As per BIS
4.6	Max. resistance of each conductor per Km at 20 deg C (ohm/Km)	As per BIS
5.0	Power Core	
5.1	Number of cores	Three
5.2	Base material of semi-conducting Compound.	XLPE based
6.0	Insulation	
6.1	Material	XLPE
6.2	Nom. Thickness	As per BIS
7	Metallic screening	Copper
8	Colour identification of cores	Coloured R, Y & B tapes in between non-metallic and metallic screening.
9	Laying up material.	Screened cores shall be laid-up together with suitable fillers in the interstices
10	Materials of fillers	Non-hygroscopic
11	Binder tape:	Binder tapes shall be applied over the laid up

		cores.
12.0	Inner-Sheath	
12.1	Material of inner-sheath	Extruded PVC compound, Type-ST2
12.2	Thickness of inner-sheath	As per BIS
13.0	Armouring	
13.1	Type:	Single layer of galvanized round steel as per IS:3975
13.2	Material	Galvanized round steel
13.3	Size of the round wire	As per BIS
14.0	Outer Sheath	
14.1	Material and type	PVC compound Type ST2 as per IS:5831
14.2	Thickness of the outer-sheath	As per BIS
14.3	The outer sheathing material shall have heat resisting properties.	As per BIS
15.0	Current Carrying Capacity	
15.1	Continuous current carrying capacity of cable when laid in air at ambient Temp of 30°c, 40°, 50°c-Amps.	Shall be furnished
15.2	In ground at ground temp. of 30°C-Amps.	Shall be furnished
15.3	Recommended depth of laying the cable.	Shall be furnished
16	Capacitance of cable for 500m length-mF.	Shall be furnished
17	Max. charging current at 11KV for 500m length (in A)	Shall be furnished
18	Short time rating of the cable for 1 sec and 3 sec duration (in KA).	Shall be furnished
19	Voltage drop per 500m at rated current: when laid in air at 40°C; When laid in ground at 30°C.	Shall be furnished
20 0	Drum length.	500 m +/- 2.5% or as per site requirement.
20.1	Shall be supplied in steel/wooden drums.	Confirmed
21	Recommended min. bending radius.	Shall be furnished
22	All tests mentioned in the specification	Shall be confirmed

	shall be carried out.	
23	The relevant standard conforming to which the test will be conducted.	IS:7098 (Part-2) of latest issue
24	The relevant IS to which the materials and construction of cable conforms. Conductor IS 8130-1984; Material construction IS 7098(Part-2)-1985; PVC inner and outer sheath IS 5831-1984; Galvanized steel armouring IS 3975-1979.	Shall be confirmed
25	Drum No. shall be printed on the packing drums, not on the cable surface.	Shall be confirmed

250 kVA Diesel Generator Set:

Sl. No.	Description	Specification
1	Diesel Generator Set	
a	Prime power Rating	250kVA
b	No. of phases	3
c	Output Voltage & Frequency	415V 50 Hz
d	Power factor	0.8 (lag)
e	Type	Out-Door, Canopy type with acoustic enclosure
f	Starting System	Electrical Starting System with battery
	The following details of DG set shall be furnished at the time of supply	
g	D G set model	
h	D G set dimensions (LxBxW) in mm	
i	D G set weight in kg	
2	Diesel Engine	
a	Governor type	Electronic
b	Rated RPM	1500
c	Fuel	H.S Diesel oil
d	Aspirations	Turbo charged

	The following details of Diesel Engine shall be furnished at the time of supply	
e	Rated output BHP	
f	Governor class	
g	Output prime	
h	Fuel tank Capacity :	
i	No.of cylinders	
j	cylinder arrangement	
k	Displacement (L)	
l	Bore x stroke mm	
m	Compression ratio	
n	Fuel consumption (Litres per Hour) at 75% Load with radiator and fan	
o	Fuel consumption (Litres per Hour) at 100% Load with radiator and fan	
p	Lub oil system capacity	
q	Coolant capacity (Engine+Radiator)	
r	Diesel Engine Model	
3	Alternator	
a	Prime power kVA Rating	250
b	KW Rating	200
c	Terminal voltage	415V
d	Power factor	0.8 (lag)
e	No.of phases	3
f	No.of wires	4
g	Frequency	50 Hz $\pm$ 4%
h	Speed in RPM at rated load	1500
i	Type	Brushless
j	Type of excitation	Self-excited
k	Class of Insulation	Class H
l	Enclosure protection	IP-23
m	Voltage control:	Automatic voltage regulation
n	% Voltage regulation	plus or minus 1%
o	Display parameters	Voltage, current and frequency

p	Protection	Short circuit protection to be provided.
q	Terminals	Three phase with neutral
r	Terminal box	Suitable terminal box shall be provided.
	The following details of Alternator shall be furnished at the time of supply	
s	Bus bar material	
t	Bus bar size	
u	Overload capacity	
v	Alternator efficiency	
4	Genset control panel	Microprocessor based integrated generator set monitoring, metering, protection and control system with LED/LCD display
5	Acoustic enclosure	The Engine and the Alternator shall be housed in an acoustic enclosure to meet CPCB-II norms.
	The following details of Acoustic enclosure shall be furnished.	
a	Material of enclosure	
b	Acoustic insulation.	
6	Exhaust piping	Shall be provided to suit the site condition (Building height) as per statutory norms.
7	Silencer	Shall be provided
8	Battery charger	Suitable for the above battery to be provided.
9	Mounting arrangement	The engine, Alternator shall be mounted on a common base frame with anti-vibration mounting pads.
10	Lifting Lugs	shall be provided
	The following details of Battery shall be furnished at the time of supply	
11	Battery Voltage & capacity:	
12	AMF panel	
a	Contactor	Contactor for Mains and for Alternator of suitable capacity shall be provided
b	Relays	Three over current relay for generator protection, Instantaneous earth fault Relay through Neutral CT, Field failure relay etc shall be provided.
c	Protection	Short circuit protection on both mains and

		alternator.
d	Mode selector switch	(Auto / Manual / test / off)
e	Meters	Voltmeter with selector switch 0 – 500V A.C, Ammeter with selector switch 0 – 800A, Energy meter compatible for EMS to be provided.
F	Indication	Phase indication lamps shall be provided.
g	current transformers	Suitable capacity of current transformer for Measuring and protection shall be provided.
H	Other accessories	DC/AC aux. relays, control fuses, MCBs, push buttons for start, stop, accept, reset, test, emergency, indication lamps for healthy, trip, fault indication, fuel level low, D.C alarm with all indication for various faults. Copper wire for control circuit shall be provided. The generator shall be provided with earth terminals.
13	Battery charger	Suitable battery charger with DC voltmeter, DC ammeter, selector switches for trickle and boost charge shall be provided for charging the alternator battery (when the load is in mains).
14	Relevant standards	a) DG set : ISO 8528 b) Engine: IS:10002-1981/ BS:5514/ ISO 3046 c) Alternator: IS: 4722-2001/ BS EN 60034-1

Bill Of Quantity For Electrical Works:

The quantities mentioned here is only approximate. The contractor has to furnish the actual BOQ after detailed engineering & design particulars taking into consideration all the pros & cons for commissioning and functioning of the entire system.

Sl. No.	Description	Quantity	Unit
1	19/33kV, 3cx240 sq.mm XLPE, Al. cable	As per requirement	M.
2	33kV outdoor Termination kits for 3cx240sq.mm XLPE, al. cable	2	No.

3	33kV indoor Termination kits for 3cx240sq.mm XLPE, al. cable	6	No.
4	33kV Cable supports	Lot	MT
5	33kV VCB Panel Board consists of five VCBs (2nos-I/C, 2nos-O/G and 1no-B/C)	1	Set.
6	33/11kV, 6.3 MVA cable box type Power Transformer	2	No.
7	11kV NGR	2	No.
8	Portable programming station	1	No.
9	11/0.415kV, 500kVA cable box type Station transformer	2	No.
10	11/0.415kV, 500kVA cable box type for Township.	As per requirement	No.
11	11/0.415kV, 630kVA cable box type Station transformer	2	No.
12	11/11kV, 3cx50 sq.mm XLPE, al. cable (or as per design calculation).	As per requirement	M.
13	11 kV indoor Termination kits for 3cx50 sq.mm XLPE, al. cable (or as per design calculation).	4	No.
14	Indoor LT panel with 2nos incomer & 1no. Bus-coupler for 500kVA Stn. Transformers & DG set.	2	No.
15	Indoor LT panel with 2nos incomer & 1no. Bus-coupler for 630kVA MNPB Transformers.	2	No.
16	Outdoor LT panel for 500kVA DTs for Township.	As per requirement	No.
17	11kV VCB Panel Board consists of 13 nos. of VCBs (2nos - I/C, 8nos. - O/G, 2nos. spare and 1no - B/C)	1	Set.
18	11kV APFC capacitor bank with control cubicle.	2	No.
19	11/11kV, 3cx120 sq.mm XLPE, al. cable (or as per design calculation).	As per requirement	M.
20	11 kV indoor Termination kits for 3cx120 sq.mm XLPE, al. cable (or as per design calculation).	8	No.
21	AC Distribution panel.	1	No.
22	Battery Bank.	1	Set.
23	Battery Charger.	1	No.
24	DC Distribution Panel.	1	No.
25	Internal Electrification for all buildings.	As per requirement	LS.
26	11kV, 4unit VCB cum Isolator Kiosk (2nos. LBS + 2nos. VCB).	As per requirement	No.

27	11kV, 3unit VCB cum Isolator Kiosk (2nos. LBS + 1nos. VCB).	As per requirement	No.
28	11kV single unit Bus Coupler VCB Kiosk.	2	No.
29	11/11kV, 3cx95sq.mm XLPE, al. cable for ring main system (or as per design calculation).	As per requirement	M.
30	11 kV indoor Termination kits for 3cx95sq.mm XLPE, al. cable (or as per design calculation).	As per requirement	No.
31	11 kV st. jointing kit for 3cx95sq.mm XLPE, al. cable	As per requirement	No.
32	Outdoor LT panel with 2nos. incomer & 1no. Bus-coupler for 500kVA Distribution Transformers.	As per requirement	No.
33	250KVA Diesel Generator set with AMF panel.	5	Set.
34	Lighting Mast with fittings for SS	4	Set.
35	Street light poles with light fitting for Yard Lighting.	As per design calculation.	Set.
36	Energy Management system	1	Set.
37	Cables (Power, control & Communication cables)	As per requirements	M.
38	Cable tray	As per requirements	M.
39	Post Top Lantern for SS	4	No.
40	Earth grid	As per design calculation.	M.
41	Earth pits		No.
42	Earth conductors / flats		M.

Bill Of Quantities For Civil Works

The quantities mentioned here is only approximate. The contractor has to furnish the actual BOQ after detailed engineering & design particulars taking into consideration all the pros & cons for commissioning and functioning of the entire system.

(The quantities mentioned here is only approximate. The contractor has to execute the work as per the actual requirement and as directed by the Engineer.)

Sl. No.	CIVIL WORKS	Qty	Unit
1	Control Room with all facilities along with DG Set, Day Tank, toilet,	1	No.

	Portico etc.,		
2	Construction of rain water pump house along with rain water with cover slabs	1	No.
3	Four wheeler/two wheeler shed with ramps on either side	1	No.
	Plinths of size 1.20M x 1.00M x 0.50M for 11kV NGR	2	Nos.
	Column foundations for capacitor bank (1set=6 columns)	2	Sets.
	Plinth of suitable size for 11 kV Bus Coupler Kiosk	1	No.
	Plinths of suitable size for 250 KVA DG Set (As per manufacturers specifications)	5	Nos.
	Construction of Transformer oil soak pit of required size with cover slabs including oil duct/hume pipe.	1	No.
	Transformer jack point	8	Nos.
	Transformer anchoring blocks	8	Nos.
	Fire protection wall for Power Transformers	1	No.
	As per detailed design & site requirement		
	Providing structural steel gates with ornamental grills.		
	Main Gate of suitable size.		No.
	Wicket gate of suitable size.		No.
	Providing chain link fencings for the entire Sub-station area, Transformer Yard, DT s & 11 kV RMU Yards		RM.
	Plinths of size 1.50M x 1.50M x 1.50M for 11/0.415kV Station / Distribution Transformers		Nos.
	Plinths of suitable size for 11 kV 3 / 4 RMU Kiosks.		Nos.
	Plinths of suitable size for LT Panels		No.
	Gates of suitable size for the Transformer Yard and RMU yards		Nos.
	Hard blue Granite metal 40 mm size for Transformer Yards 300mm height 40 mm size including capacitor bank and station/distribution transformer.		M^3
	Laying Concrete pavement (PCC 1:4:8) of 0.15M depth over sand filling of depth 0.20M		M^2
	BT road formation		M^2
	Cable culverts		
	RCC cable ducts with cover slabs		
	1200mm width, 1000mm depth for 33/11kV HT cables		M
	600mm width, 600mm depth for control and LT power cables		M.

	450mm width, 450mm depth for control and LT power cables		M
	Masonry trough for earth electrodes		Nos.
	Foundation for seating and hauling twin rails for power transformers		M.
	Drains by the side of roads and drain leading to rain water sump		M.
	Any other Miscellaneous items required for successful completion of the work		LS.

List Safety Equipments, Furniture, Tools & Instruments And Spares

List Of Safety Equipments:

Sl. No.	Description	Qty	Unit
1	6 feet FRP discharge rod with suitable stand	2	No.
2	Safety belt	6	No.
3	Fire extinguishers CO_2 – 4.5 Kg	6	No.
4	Fire bucket with stand for 4 buckets	2	Set
5	Sub-station layout in a board	1	No.
6	Laminated Safety rules and regulations chart	1	No.
7	33kV rated Safety gloves	5	Pairs
8	First Aid box	1	No.
9	Laminated “Instruction on First aid” charts.	2	Set.
10	Danger boards in the form of ‘men on line’, ‘On LC’ etc of size 12 inch x 8 inch	6	No.
11	PVC high voltage insulation mats of 3mm thickness as per IS 15652 for all VCB panel boards, LT panels, etc.(both front & back) – width 1 meter.	For all panels in CR	LS.

Furniture

Sl. No.	Description	Qty.	unit
1	Table (Godrej make) Executive (5 feet x 3 feet)	4	no.

2	S armed chair (Godrej make)	12	no.
3	Steel Almirah with transparent glass.(Godrej make – 6 feet height)	2	no.
4	Steel locker type Almirah (Godrej make – 6 feet height)	1	no.
5	Key board with glass double door with locking arrangement – Approx size 2 feet x 2 ½ feet	1	no.
6	Notice board size 5 feet x 3 feet with sliding glass door with built-in locking arrangement with built in lighting.	1	no.
7	Stool (steel)	10	no.
8	Filing cabinet with 4 racks	2	no.
9	Fixograph of size 5 feet x 3 feet with magnetic letters	1	no.
10	Door mat Size: 3 x 2 feet	4	no.

Tools & Instruments:

Sl. No.	Testing Equipments	Qty	Unit
1	10kV Mains cum Battery operated insulation tester (Megger BM21/Metrel/Tinsely)	1	no.
2	Automatic transformer ratio meter (Megger/Tinsley/ELTEL)	1	no.
3	Transformer winding resistance meter (Megger/Tinsley/ELTEL)	1	no.
4	Digital Micro ohm meter (Megger10 Amps)	1	no.
5	Digital 4.5 digits. True RMS Multimeter (Fluke / Megger / Yokogowa / KEW)	2	no.
6	Digital LCR meter (Fluke / Megger / Yokogowa / KEW	1	no.
7	500V insulation tester	2	no.
8	Variac (AE, Thoshiniwal)	1	no.
9	Phase sequence meter	1	No.
10	Digital Earth resistance tester (Fluke / Megger / Yokogowa / KEW)	1	no.
11	Digital clamp meter (Fluke / Megger / Yokogowa / KEW)	2	no.
12	Infra red non-contact digital thermo meter (Fluke / Megger / Yokogowa / KEW)	2	no.
II	**Tools**		
1	Pedestal type drilling machine with drill pits of various sizes.	1	no.
2	Pedestal grinding machine with grinding wheel of various types.	1	No.

3	Portable drilling machine with drill pits of various sizes.	1	no.
4	Hand grinding / cutting machine with grinding / cutting wheel of various sizes.	1	no.
5	All sizes of spanners (DE, Ring, Tubular and Box type) (each)	1	Set
6	Tool kit (Megaster)	1	No.
7	Tool box with lock & key	2	no
8	A- type Aluminium ladder	1	no.
9	Aluminium single ladder (12 feet)	1	No.
10	Battery operated crimping tool (for cable size up to 240 sq.mm al / copper)	1	no.
12	Manual crimping tool (for cable size up to 240sq.mm Al / Copper)	1	no
13	Measuring tape (5m, 30m and 50m) (each)	1	no.
14	Rodo Meter (Measuring Wheel) with 12" wheel, counts upto 10,000 feet with Built in stand.	1	no
15	Portable hand held re-chargeable searchlights with LED.	2	no.

Spares:

Sl. No.	Description of spares	Qty.	Unit
1	**For 33/11kV, 6.3 MVA Power Transformer**		
1.1	HV bushing	1	No.
1.2	LV Bushing	1	No.
1.3	LV Neutral bushing	1	No.
1.4	Complete set of gasket	1	set
1.5	Various type and size of valves	1	set
1.6	Thermometer complete with probe and capillary tube	1	set
1.7	Magnetic oil level gauge	1	No.
1.8	Prismatic oil level gauge	1	No.
1.9	Buchholz relay	1	No.
1.10	Silica gel breather	1	No.
1.11	Transformer oil	2	Barr

			el
2	**For 33kV VCB Panel Board**		
2.1	Breaker Closing coil	2	No.
2.2	Breaker Tripping coil	2.	No.
2.3	Spring charger motor	1	No.
2.4	Spring charge/discharge limit switches	1	No.
2.5	Bus support insulators	5	Nos.
2.6	Vacuum bottle	3	No.
2.7	Auxiliary contacts	2	set
2.8	33kV Current Transformer (in each ratio)	1	No.
2.9	33kV/110V PT with HT fuse	1	No.
2.10	Numerical relay with 3 O/L & 1 E/L relay	1	No.
2.11	Transformer Differential Numerical protection relay	1	No.
2.12	Protective relays (in each type)	1	No.
2.13	Auxiliary Relays (in each type)	1	No.
2.14	Indication lamp with holder	15	Nos.
2.15	Push buttons	5	Nos.
2.16	Ammeters Selector switch	5	No.
2.17	Voltmeter selector switch	5	No.
2.18	T-N-C pistol grip control switch	2	No.
2.19	AC Ammeter (in each type)	1	No.
2.20	AC Voltmeter (in each type)	1	No.
2.21	Energy meter with EMS	1	No.
2.22	Hooter & Buzzer (in each type)	2	No.
2.23	MCB for AC & DC supply (in each type)	2	No.
2.24	HRC fuse unit with fuses for different types	5	Set
2.25	Row of terminals (in each type)	10	No.
3	**For 11kV VCB Panel Board**		
3.1	Breaker Closing coil	4	Nos.
3.2	Breaker Tripping coil	4	Nos.
3.3	Vacuum bottle	3	Nos.
3.4	Spring charge motor	2	Nos.

3.5	Spring charge/discharge limit switches	4	Nos.
3.6	Auxiliary contact assemblies	2	set
3.7	PT with HT fuse	1	No.
3.8	Push button	10	No.
3.9	11kV Current Transformer (in each ratio)	1	No.
3.10	AC Ammeter (in each range)	3	No.
3.11	AC Voltmeter (in each range)	3	Nos.
3.12	Ammeters Selector switch	3	No.
3.13	Voltmeter selector switch	3	No.
3.14	DC Voltmeter	2	No.
3.15	Protective Relays (in each Type)	1	No.
3.16	Auxiliary relays (in each Type)	1	No.
3.17	MCBs for AC & DC supply (in each rating)	1	No.
3.18	HRC fuse unit with fuses for different types	2	Set
3.19	Indication lamp with holder	20	Nos.
3.20	Bus support insulator	6	Nos.
4	**For 11kV Automatic PF Correction system**		
4.1	Manufacturer's recommended spares APFC	1	set
5	**For 11kV 1/3/4 unit RMUs**		
5.1	Closing coil	4	Nos.
5.2	Tripping coil	4	Nos.
5.3	Vacuum bottle	3	Nos.
5.4	Spring charge/discharge limit switches	4	Nos.
5.5	PT with HT fuse	1	No.
5.6	11kV Current Transformer (in each ratio)	1	Nos.
5.7	AC Ammeter (in each range)	1	No.
5.8	Energy meter	2	No.
5.9	Bus bar support insulator	3	Nos.
5.10	3phase, 12kV, LBS	2	No.
5.11	Indication lamp with holder	6	set
6	**For 11/0.415kV, 500kVA Station/Distribution Transformer**		
6.1	Transformer HT bushing (for each rating)	3	No.

6.2	Transformer LT bushing (for each rating)	3	No.
6.3	Silica gel breather	3	No.
7	**For LT main Panel**		
7.1	Switches of various current ratings with HRC fuses (in each rating)	1	No.
7.2	CT (in each type & ratio)	1	No.
7.3	CBCT (in each type & ratio)	1	No.
7.4	Ammeter	1	No.
7.5	Ammeter selector switch	1	No.
7.6	AC Voltmeter	1	No.
7.7	Volt meter selector switch	1	No.
7.8	Energy meter with EMS compatibility	1	No.
7.9	CAG 12 E/F relay	1	No.
7.10	Indication lamp with holder	3	Nos.
8	**For Battery charger**		
8.1	Manufacturer's recommended spares for Battery charger	1	set
9	**For Outdoor LT Panel**		
9.1	MCCB (in each type & rating)	1	No.
9.2	Switches of various current ratings with HRC fuses	1	No.
9.3	CT (in each type & ratio)	1	No.
9.4	CBCT	1	No.
9.5	Ammeter	1	No.
9.6	Ammeter selector switch	1	No.
9.7	Voltmeter	1	No.
9.8	Voltmeter selector switch	1	No.
9.9	Energy meter	1	No.
9.10	CAG 12 E/F relay	1	No.
9.11	Indication lamp with holder	3	No.

Note: For the detailed specification of the above spares, the corresponding main item in the technical specification may be referred.

List Of Recommended Makes:

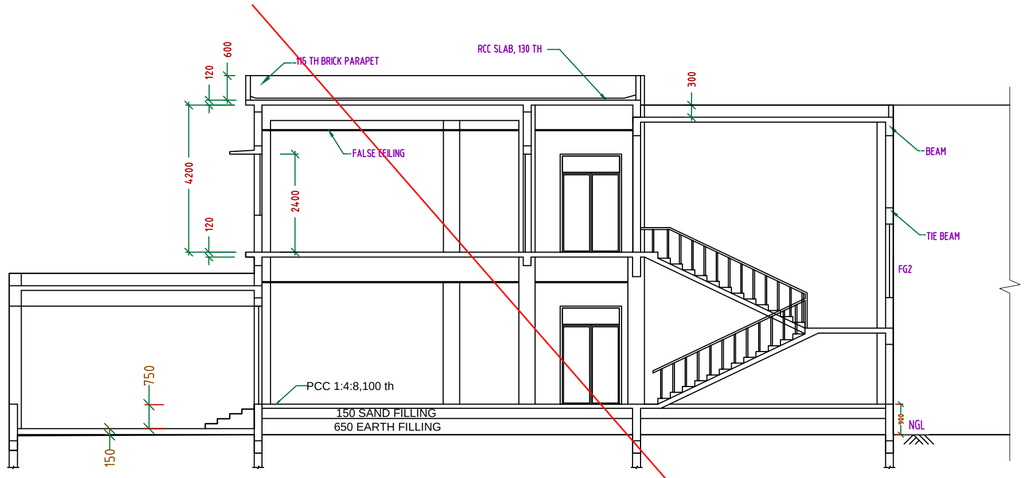
Sl. No	Equipment	Recommended Make
1	Transformers	BHEL, TELK, Bharat Bijlee, Areva, Kerala Electricals Ltd, Indo Tech, Kanohar Electricals, Kirloskar Electrical, Thana Electric supply, Andrew Yule, ABB, CGL.
2	Neutral Grounding Resistance	Any reputed make subject to approval of NTTPP
3	33kV & 11kV CTs	Kappa, Mehru, BHEL, Telk, Silkan, Pragathi, Kalpa, Areva, Current Electricals.
4	33kV & 11kV PT	Kappa, Mehru, BHEL, Telk, Silkan, Pragathi, Kalpa, Areva, Current Electricals.
5	33kV and 11kV VCBs	ABB, Areva, BHEL, CGL, Siemens, Kirloskar, Megawin, System Control.
6	11kV APFC	Any reputed make subject to approval of NTTPP.
7	11kV LBS	ABB, Areva, BHEL, CGL, Siemens, Kirloskar, Megawin, System Control.
8	33kV & 11kV Surge Arresters	Oblem, Lamco, Crompton Greaves, Areva, Elpro.
9	LT and HT Cables (UG)	Fort Gloster, NICCO, Universal, CCI, Industrial Cables, RPG, Radiant, GEM, KEI, Torrent, Poly cab, Uniflex, Havells, Sark.
10	Control cables	Fort Gloster, NICCO, Universal, CCI, Industrial Cables, RPG, Radiant, GEM, KEI, Torrent, Poly cab, Uniflex, Sark, Havells.
11	Wiring cables -	Havells, Finolex, Radiant, Atlas, NICCO, L&T, KEI, Anchor, Vguard, Kundan.
12	Battery	Amara Raja, Exide, Amco or any other reputed make subject to the approval of NTTPPL.
13	Battery charger	Mathura power, Thyristor Controls, Amara Raja, Duboss or any other reputed make subject to the approval of NTTPP.
14	Contactor	Siemens, L&T, Tele mechanic, Schneider, C&S, Havells.
15	MCB, ELCB, Plug & socket with MCB, MCBDB, etc.	Havells, MDS, Indo Asian, Standard Kopp, Siemens, S&S, Safeline, C&S, L&T.
16	SFU, MCCB, ACB	Areva, Siemens, L&T, ABB, Havells, C&S
17	Terminal Blocks	Elmex, Essen
18	All types of power connectors	Klemmen Engineering Corporation, Amp

		Control.
19	Selector switches, Rotary switches	Areva, Siemens, L&T, Kaycee.
20	Relays	Areva, Easun Rayrole, ABB, L&T, Siemens.
21	Indicating instruments	AE, IMP, Meco, Toshniwal.
22	Light fixtures	Philips, Crompton Greaves, Bajaj, Havells
23	Lighting poles	Jindal, Bombay tubes, Advance steel tube, Bajaj, Utkarsh tube.
24	Energy management system	SEMS, L&T, Industrial Controls and Drives, ABB, Yakogova, Enercon, Siemens, Kirloskar, GET Power, Areva.
25	Cable jointing kits	Denson, Raychem, M-seal, Multi shrink
26	Communication cable	Any reputed make subject to approval of NTTPP.
27	Items not covered in the list	Any reputed make subject to approval of NTTPP
28	Motor	Any reputed make subject to approval of NTTPP
29	Pumps	Any reputed make subject to approval of NTTPP
30	Diesel Engine	Ashok Leyland, Kirloskar Electric, KOEL (kirloskar oil Engine Ltd), Caterpillar, Perkins.
31	Alternator	Stamford, Kirloskar, Crompton, Leroy Somer.

CHAPTER VI
DRAWINGS

CONTENTS

DESCRIPTION	ANNEXURE DRG NOS
~~THERMAL POWER PLANT AREA~~	**~~B1 to B21~~**
INTEGRATED TALABIRA TOWNSHIP	**C1 to C28**



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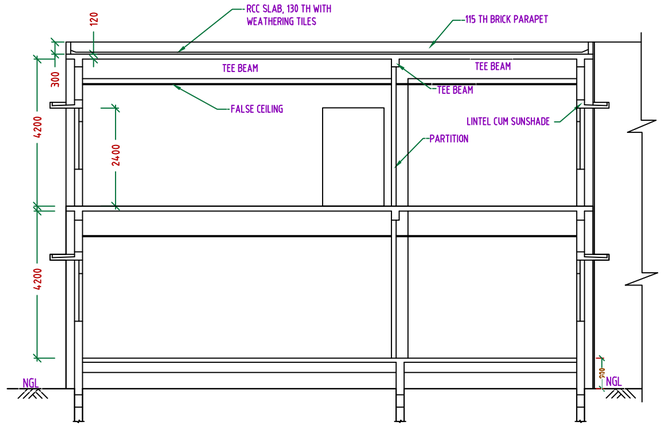

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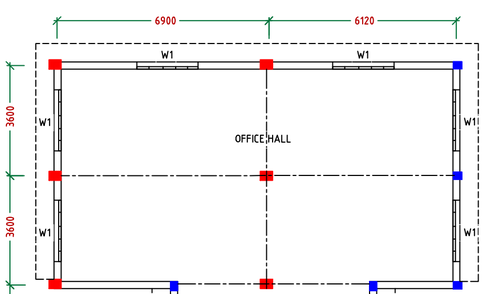

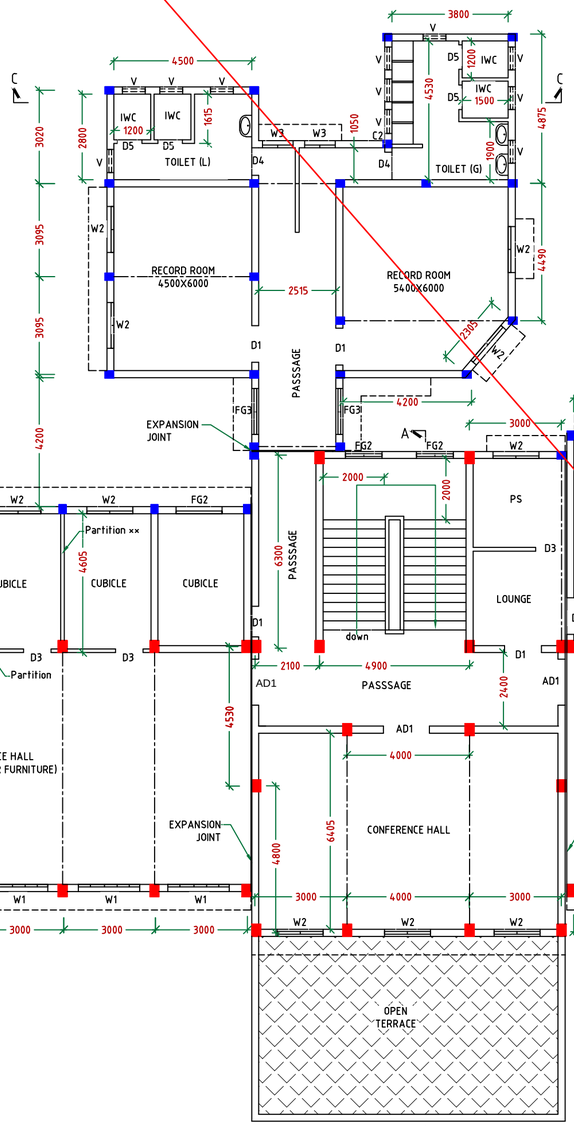
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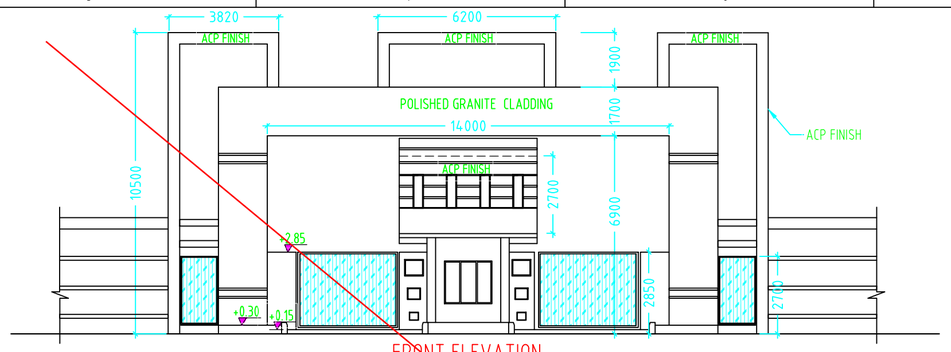

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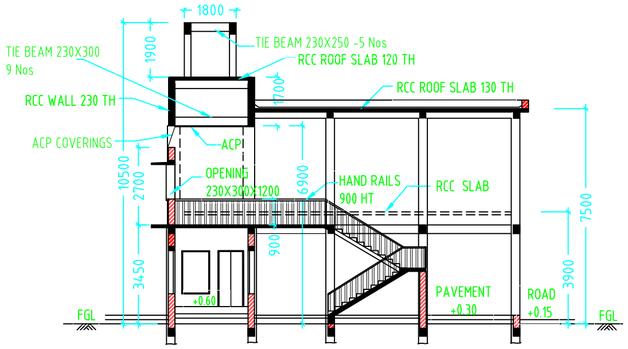

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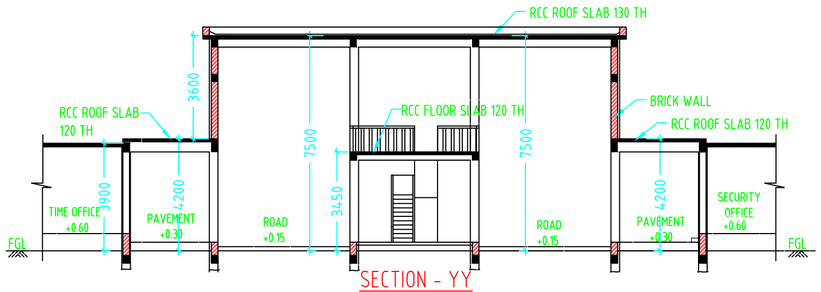

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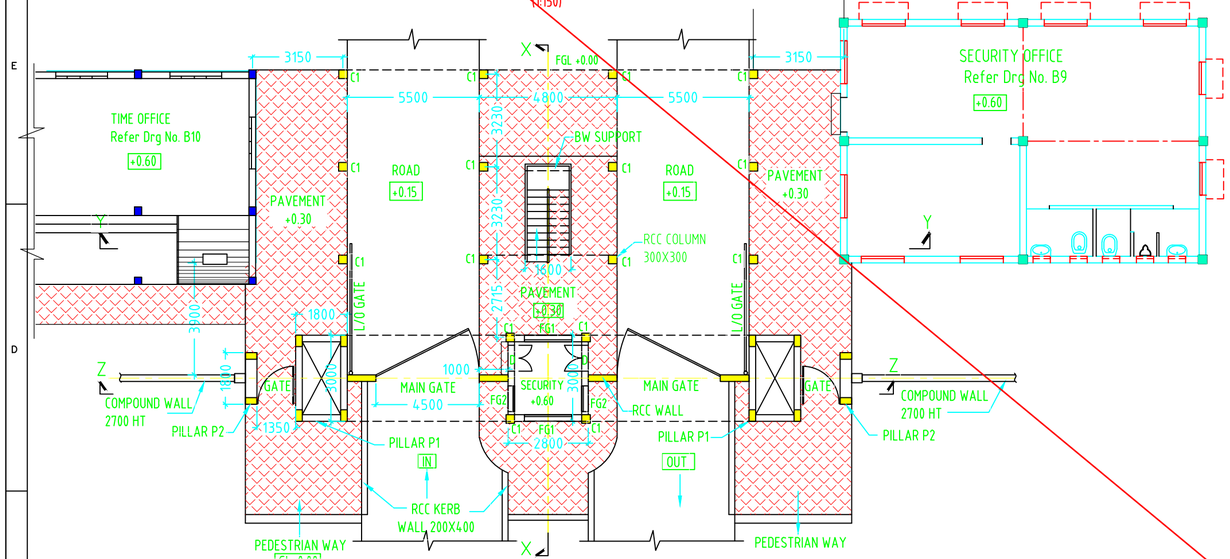

PLAN AT+1.00 m LEVEL
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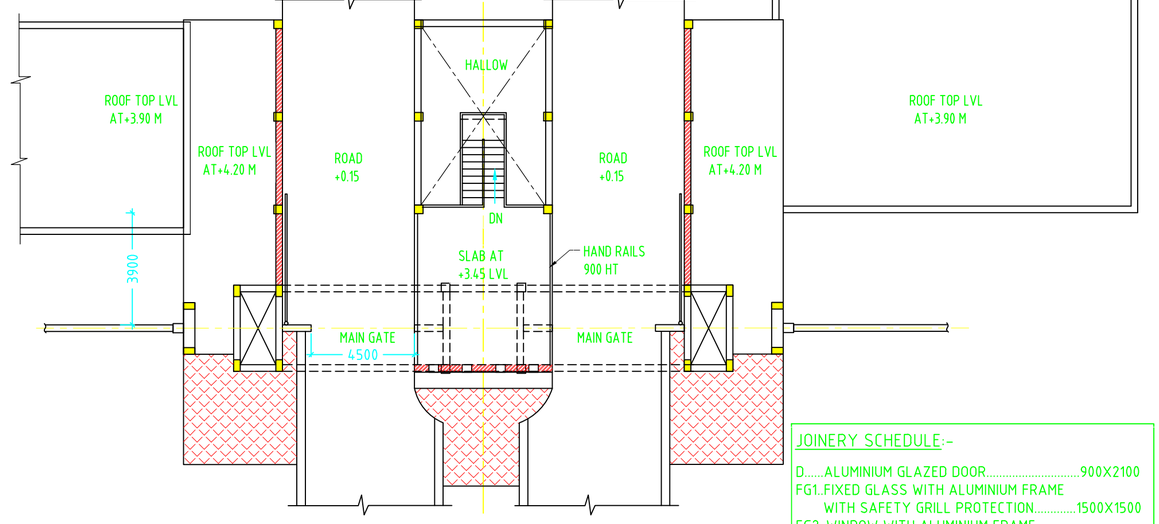

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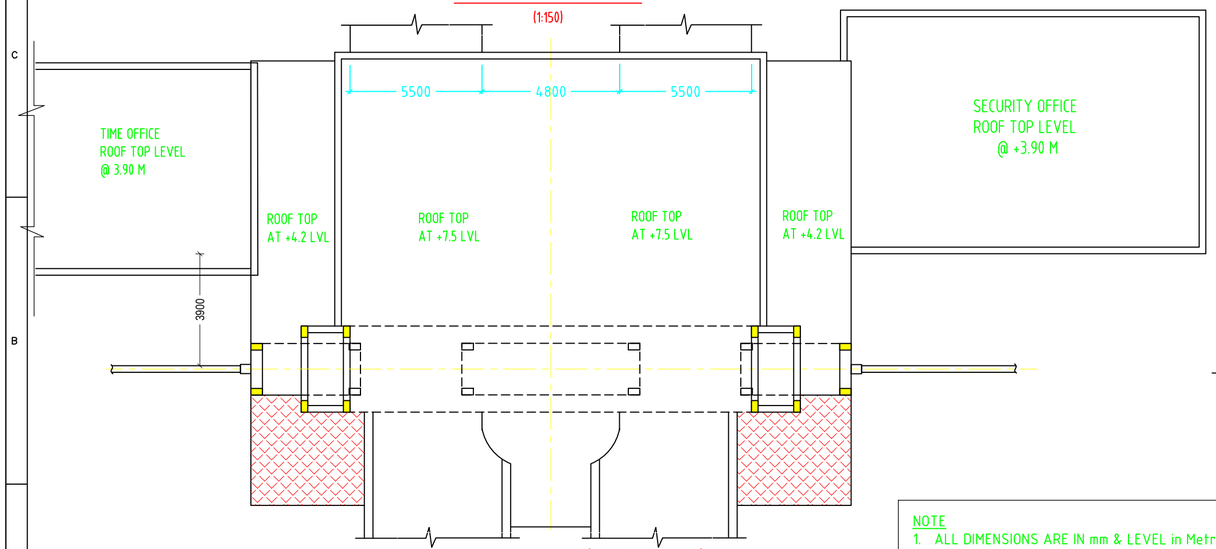

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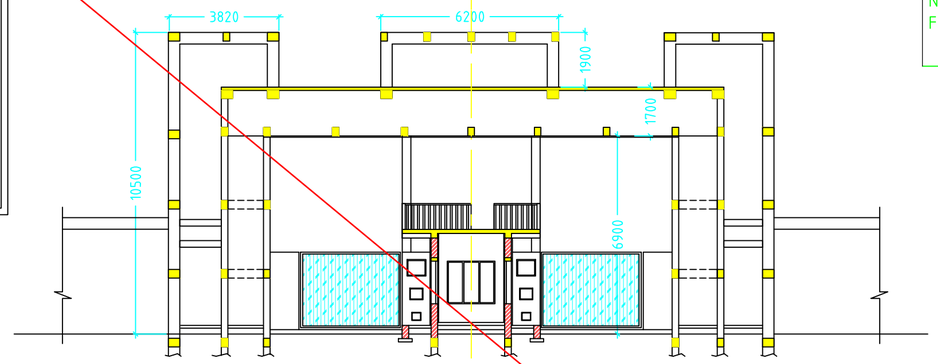

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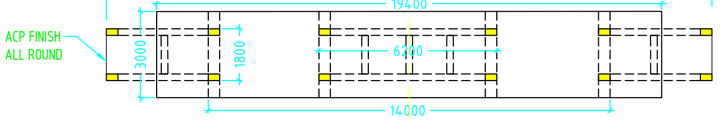

PLAN AT +9.00 m LEVEL
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NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
4. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
5. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
6. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
7. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
8. ANTI-TERMITE TREATMENT SHALL BE PROVIDED FOR THE BUILDING.

JOINERY SCHEDULE:-

D.....ALUMINIUM GLAZED DOOR.....900X2100
FG1..FIXED GLASS WITH ALUMINIUM FRAME WITH SAFETY GRILL PROTECTION.....1500X1500
FG2..WINDOW WITH ALUMINIUM FRAME WITH SAFETY GRILL PROTECTION.....900X1500

NGL... NATURAL GROUND LEVEL
FGL... FINISHED GROUND LEVEL (0.00)

ANNEXURE DRG NO.
B8

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

REV.	DATE	AMENDMENTS	DEE/D	DCE/D	ACM/D	CM/D	DGM/C	GM/C/D

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DCE/D		
ACM/D		
CM/D		
DGM/C		
GM/C/ Designs		

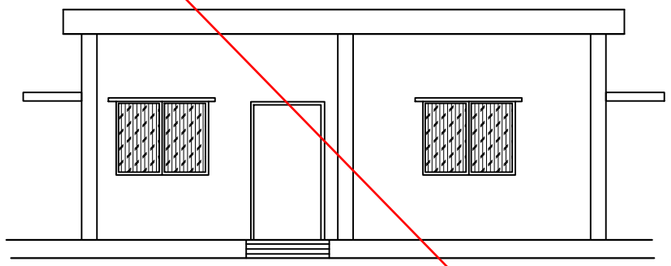
NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU

OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

GATE COMPLEX NTTPP

A2	SCALE: 1:150, 1:100	ARCHITECTURAL DETAILS	DRG No: CGMC/ /2020

S:\Design Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B8 Gate Complex.dwg



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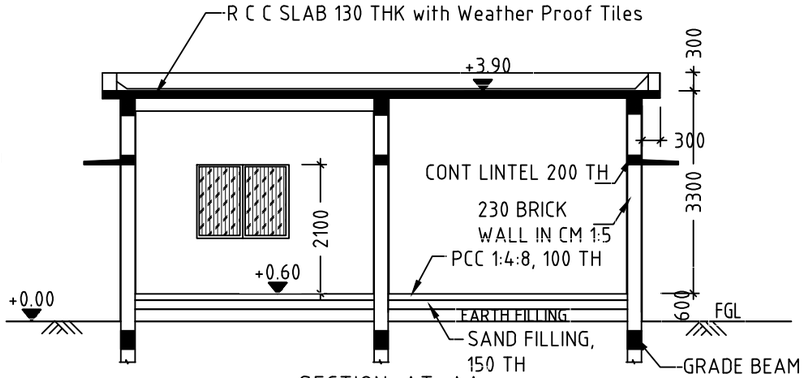
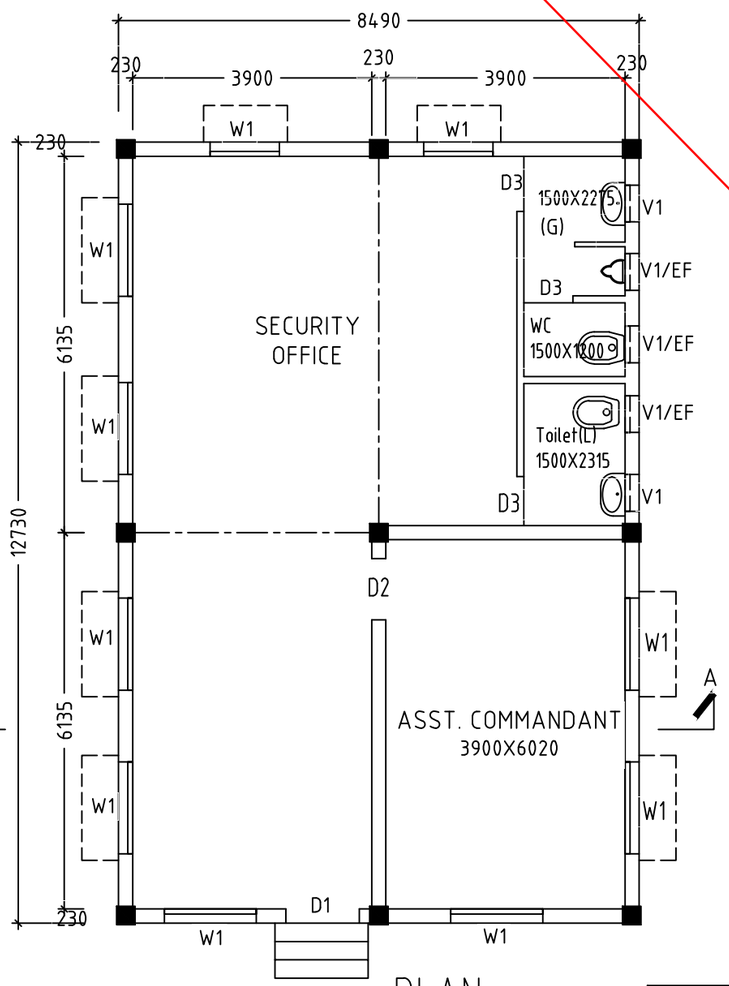


SECTION AT AA

(1:100)



PLAN

(1:100)

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
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4. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
5. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
6. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
7. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING TOILET FIXTURES.
8. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
9. PLINTH PROTECTION 750 mm WIDE SHALL BE PROVIDED ALL AROUND THE BUILDING WITH DRAIN.

SPECIAL NOTE:

1. ALL 230 THICK WALLS UP TO BASEMENT SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:5.
2. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLYASH BRICKS IN CM 1:5.

JOINERY SCHEDULE:-

D1.....FLUSH DOOR	1200X2100
D2.....FLUSH DOOR	1000X2100
D3.....FRP DOOR	800X2100
W1.....PRE-PAINTED STEEL GLAZED WINDOW WITH GRILL PROTECTION	1500X1200
V1.....PRE-PAINTED STEEL GLAZED VENTILATOR	600X450

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET - ANTISKID CERAMIC FLOORING (#)

DADOOING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES

ROOFING :
- FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

ANNEXURE DRG NO.

B9

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

REV.	DATE	AMENDMENTS	DCE/D	ACM/D	CM/D	DGM/C	GM/C	GM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DCE/D		
CM/D		
DGM/C		
GM/C Design		

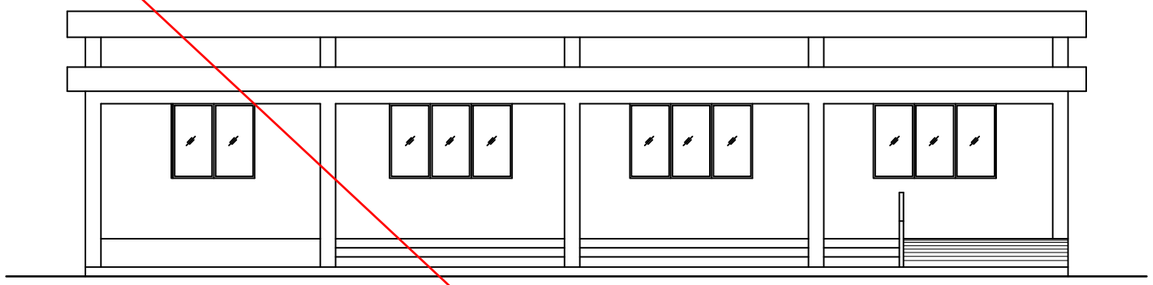
NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU

CREATING WEALTH FOR WELL BEING

OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

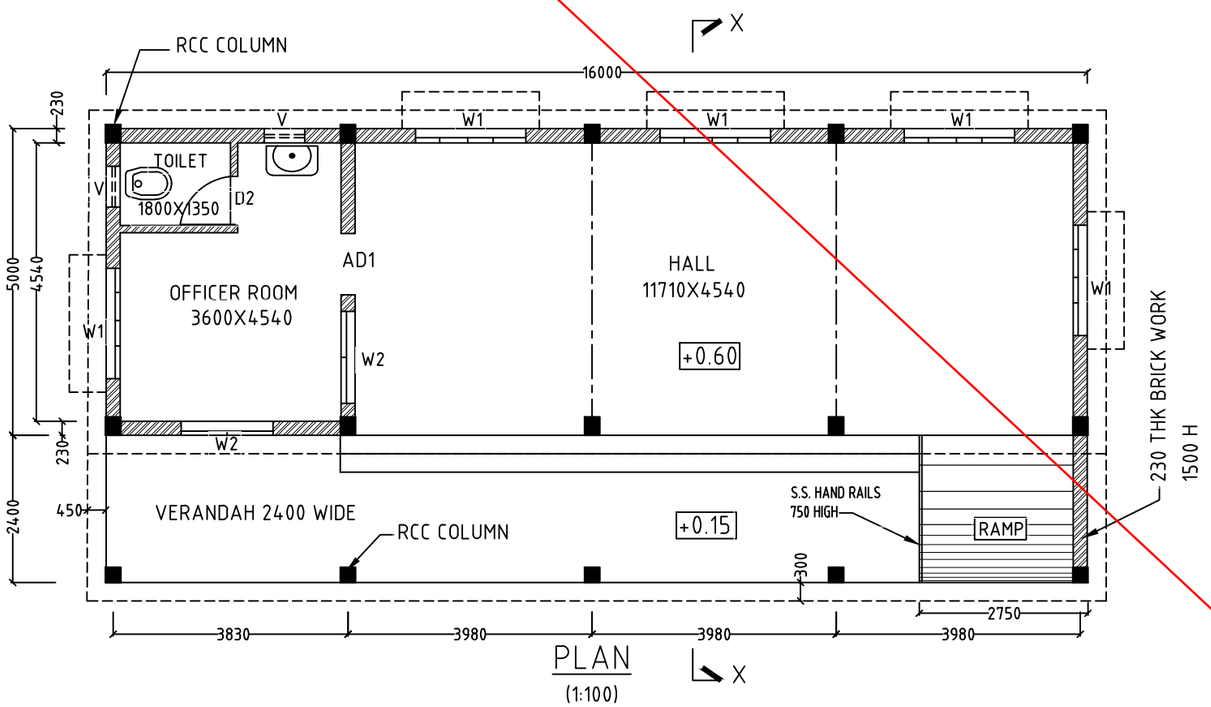
SECURITY OFFICE NEAR GATE COMPLEX NTTPP

A3	SCALE: 1:100,1:30	ARCHITECTURAL DETAILS	DRG No:



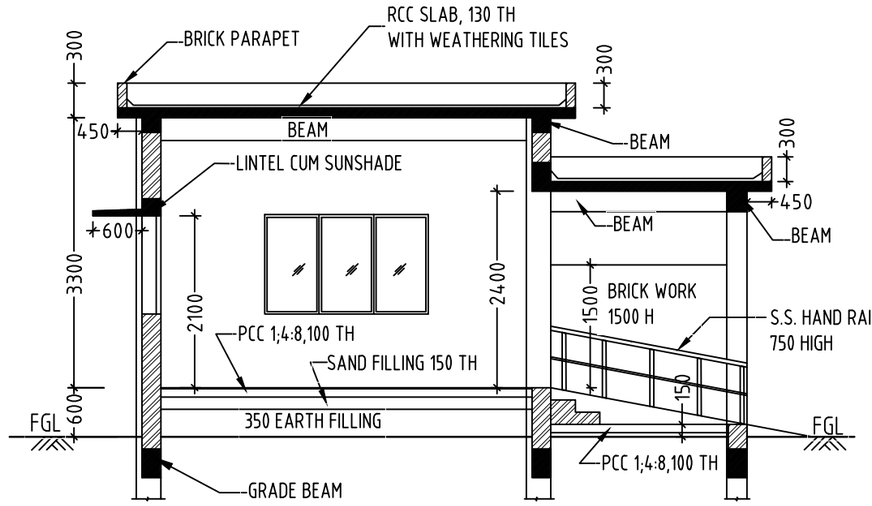
ELEVATION

(1:100)



PLAN

(1:100)



SECTION XX

(1:75)

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
8. PLINTH PROTECTION 750 mm WIDE SHALL BE PROVIDED ALL AROUND THE BUILIDNG ALONG WITH DRAIN.

ANNEXURE DRG NO.

B10

INDICATIVE FINISHING SCHEDULE:

PLASTERING :

- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :

- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :

- ALL ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, VERANDAH & RAMP - ANTISKID CERAMIC FLOORING (#)

DADOOING/SKIRTING :

- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES

ROOFING :

- FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

SPECIAL NOTE:

1. ALL 230 THICK WALLS UP TO BASEMENT SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:5.
2. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLYASH BRICKS IN CM 1:5.
3. ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:4.

SCHEDULE OF JOINERY:-

1. AD1...DOOR (PARTLY GLAZED/ PANELLED) WITH ALUMINIUM FRAME	1000X2100
2. D2...F R P DOOR	800X2000
3. W1....WINDOW WITH AL. FRAME&GLASS SHUTTERS	1800X1200
4. W2....WINDOW WITH AL. FRAME&GLASS SHUTTERS	1200X1200
5. V.....GLAZED VENTILATOR WITH AL. FRAME	600X450

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

REV.	DATE	AMENDMENTS	DCE/D	ACM/D	CM/D	DGM/C	GM/C/D

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU. S. S	
DEE/D		
ACM/D		
ADGM/D		
DGM/D		
DGM/C		

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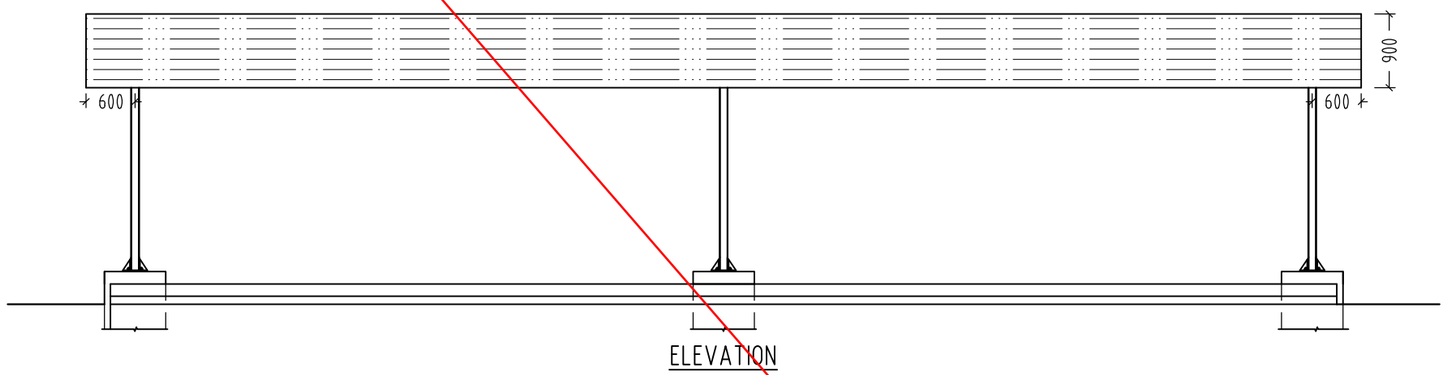
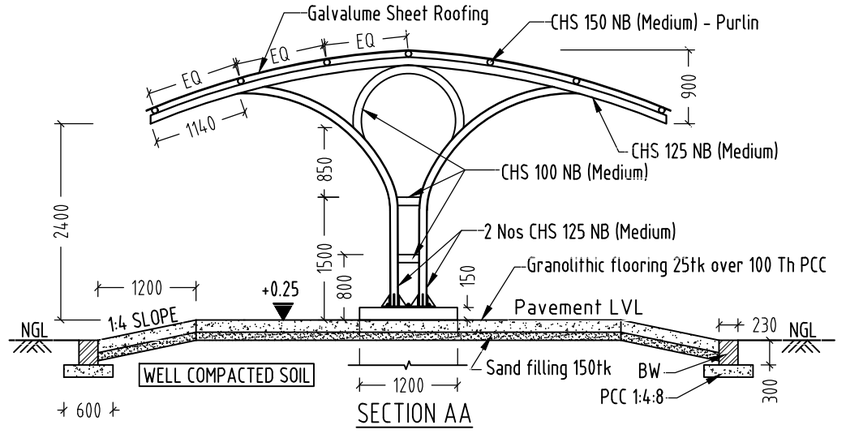
OFFICE OF THE GENERAL MANAGER / CIVIL / CTO

TIME OFFICE
NTTPP

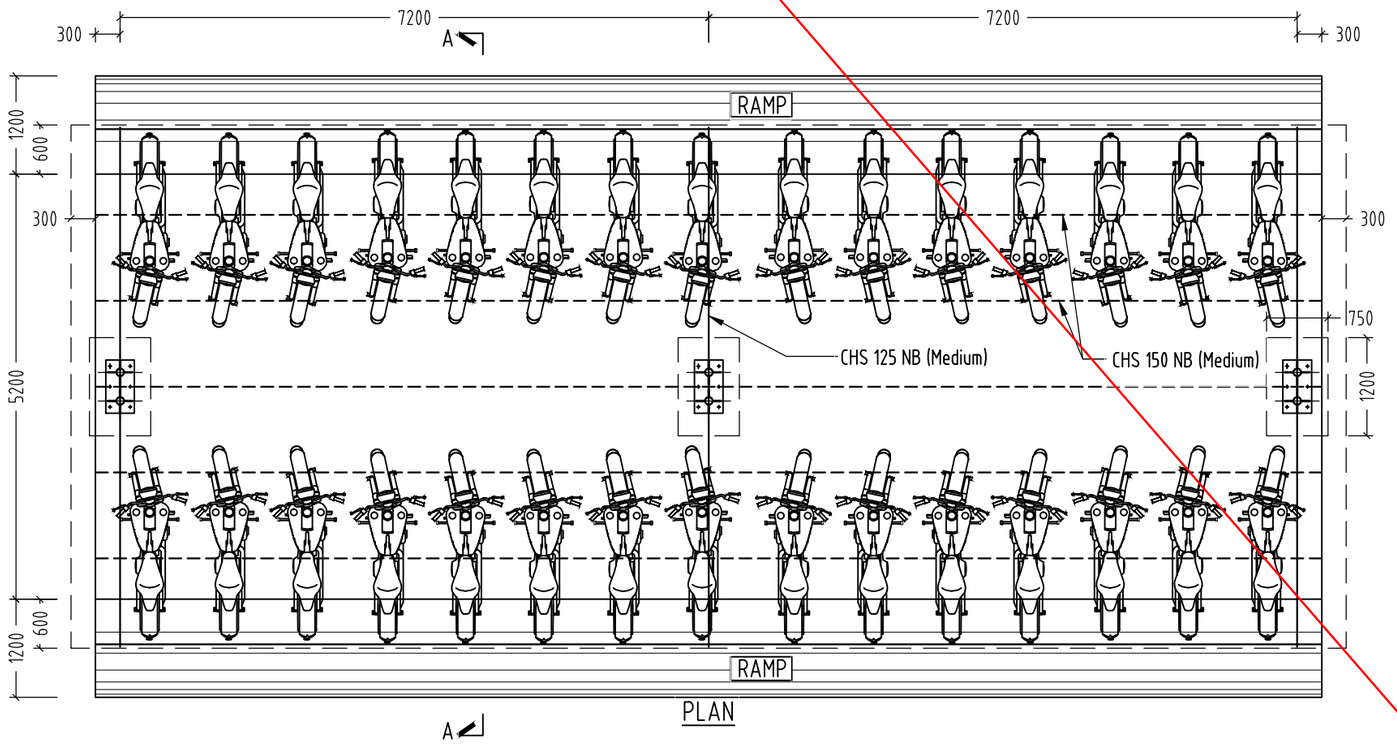
A3	SCALE: 1:100, 1:75	ARCHITECTURAL DETAILS	DRG No: CGM/C/ /2020



ELEVATION



SECTION AA



PLAN

NOTE:
1. ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METRE.
2. CHS-CIRCULAR HOLLOW SECTION.
3. ALL CHS SHALL CONFIRM TO IS-1161 WITH YST-310 N/MM2.
4. ALL WELD SHALL BE 4MM FILLET WELD ALL ROUND.
5. FOUNDATION DEPTH GIVEN IS TENTATIVE AND SHALL BE DECIDED BASED ON FINAL SOIL INVESTIGATION REPORT
6. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
7. STRUCTURE SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
8. NUMBERS OF TWO WHEELERS IN PARKING AREA - 150 NOS (30X5 SHEDS) (APPROX).
9. PROVIDE WIND TIES OVER ROOF SHEETING.
10. ALL STRUCTURAL STEEL MEMBERS SHALL BE PAINTED WITH TWO COATS OF ANTI CORROSIVE PAINT OVER A COAT OF PRIMER.
11. NO.OF TWO WHEELERS IN PARKING AREA-150 NO.S (APPROX)-30X5 SHEDS

ANNEXURE DRG NO.

B11

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/D		
DGM/C		

INDIA CREATING WEALTH FOR WELL BEING

NLC India Limited
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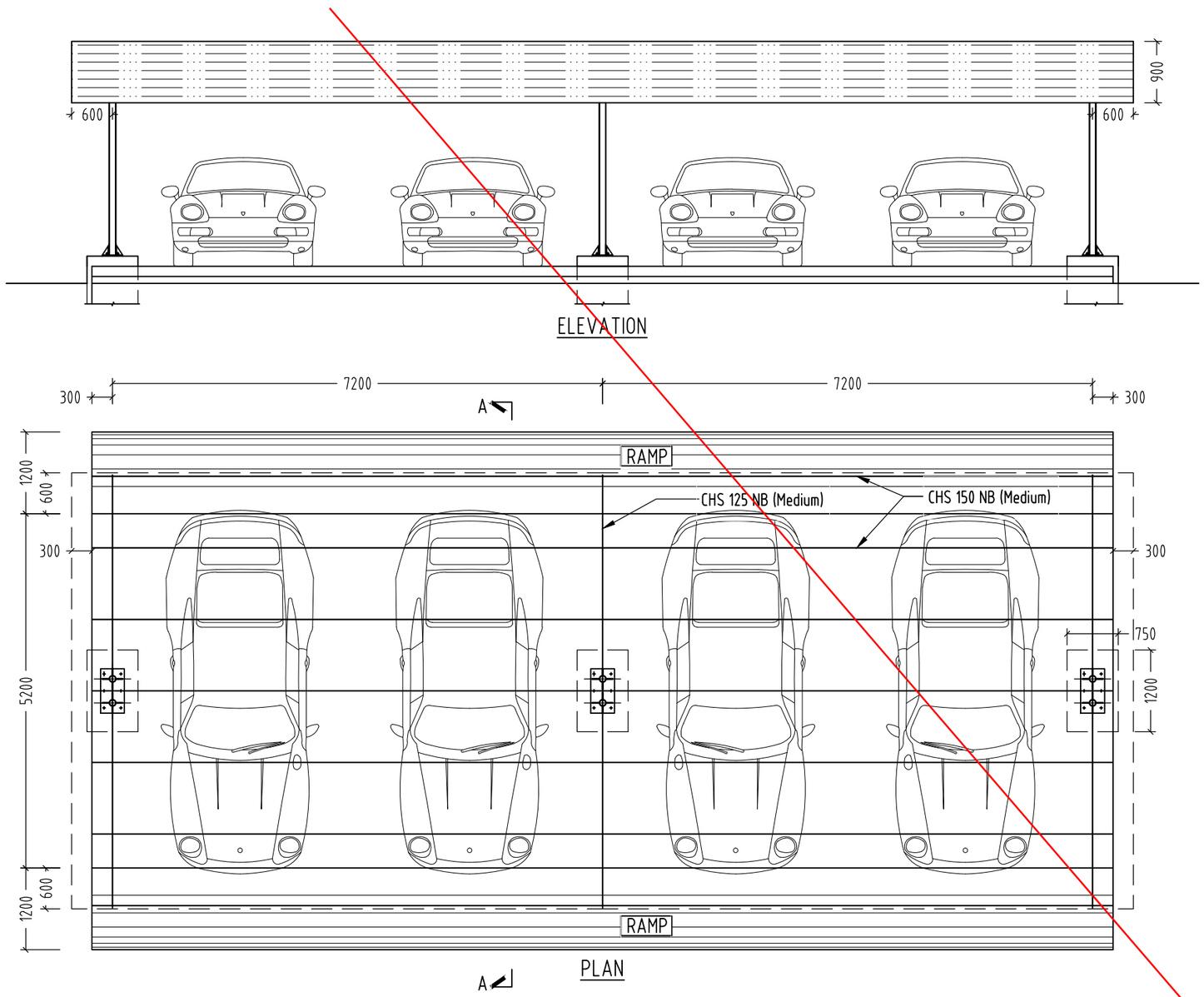
NEYVELI- 607 801,TAMIL NADU

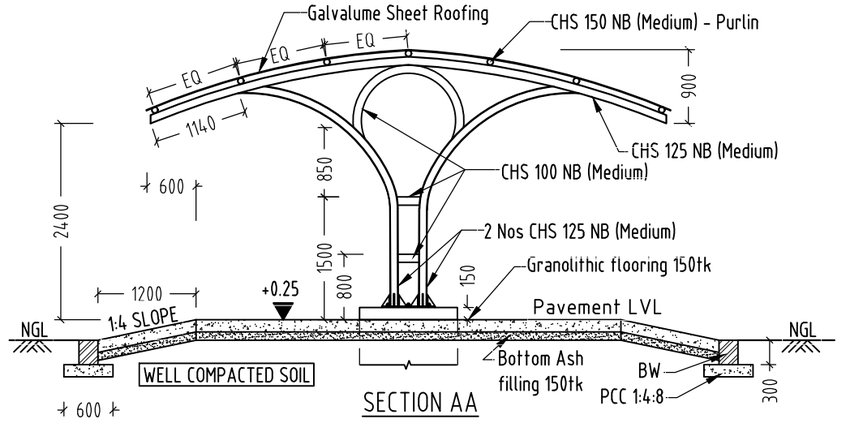
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

TWO WHEELER PARKING SHED NTTPP

A3	SCALE: 1:100, 1:75, 1:20	ARCHITECTURAL & STRUCTURAL DETAILS	DRG No: CGMC/ /2020

07.11.2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B11 Two Wheeler Parking Shed.dwg





NOTE:
1. ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METRE.
2. CHS-CIRCULAR HOLLOW SECTION.
3. ALL CHS SHALL CONFIRM TO IS-1161 WITH YST-310 N/MM2.
4. ALL WELD SHALL BE 4MM FILLET WELD ALL ROUND.
5. FOUNDATION DEPTH GIVEN IS TENTATIVE AND SHALL BE DECIDED BASED ON FINAL SOIL INVESTIGATION REPORT
6. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
7. STRUCTURE SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
8. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
9. NO OF CARS IN POWER PLANT ENTRANCE PARKING AREA - 100 NOS (4X25 SHEDS) (APPROX).
10. PROVIDE WIND TIES OVER ROOF SHEETING.
11. FOR STRUCTURAL STEEL MEMBERS TWO COATS OF ANTI-CORROSIVE PAINTING SHALL BE DONE OVER PRIME COAT.

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

ANNEXURE DRG NO.
B12

REV.	DATE	AMENDMENTS	DEE/D	DCE/D	ADGM/D	DGM/C	CGM/C/ DESIGN

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/C		
CGM/C/ DESIGN		

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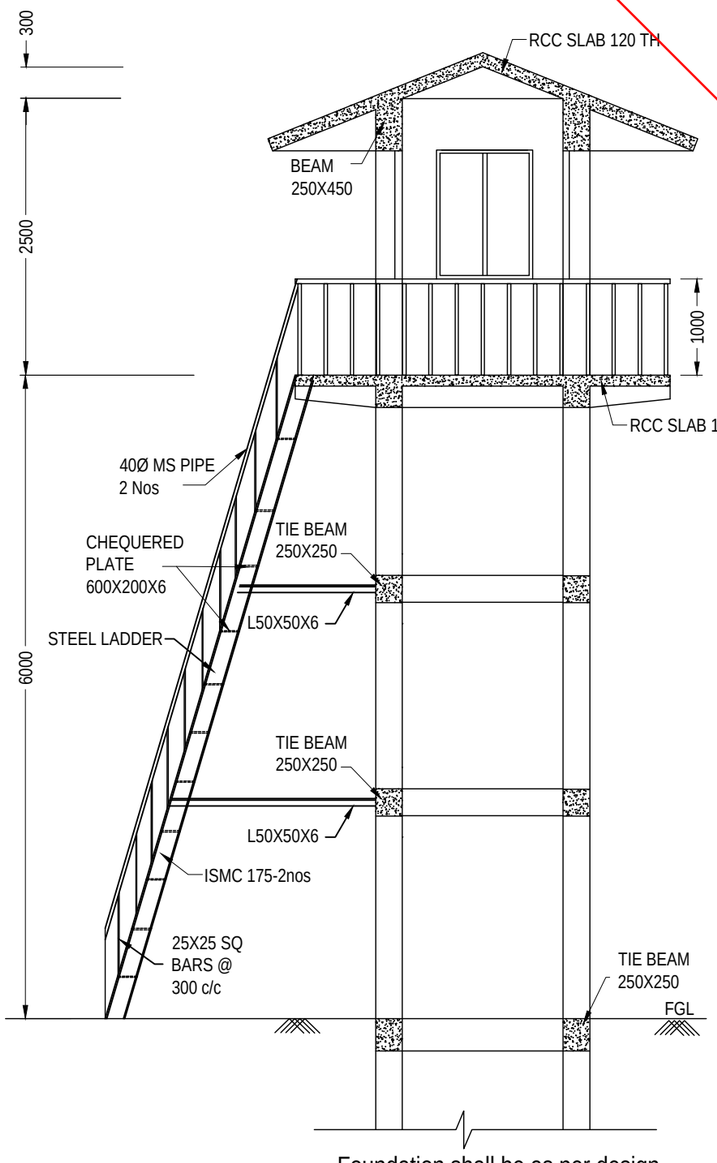
CAR PARKING SHED NTTPP

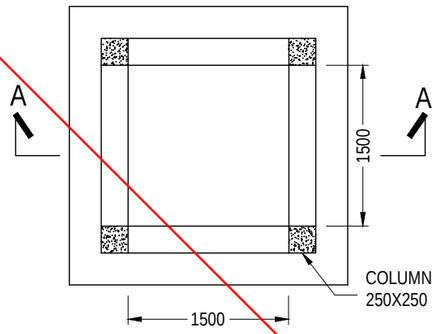
A3	SCALE: 1:100, 1:75, 1:20	ARCHITECTURE & STRUCTURAL DETAILS	DRG No:

S:\Design\Documents\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B12 Car Parking Shed.dwg

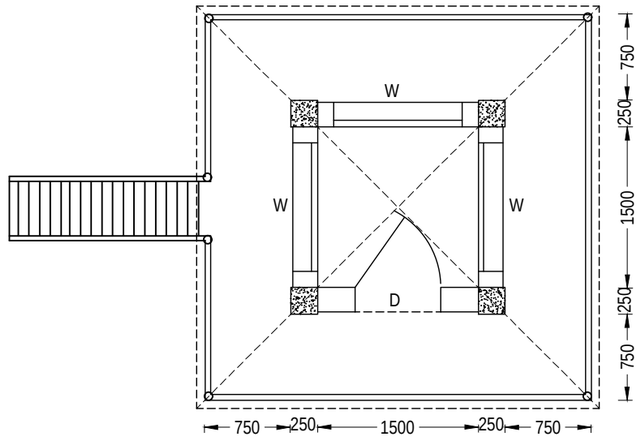


Foundation shall be as per design

CROSS SECTION ON AA



PLAN AT FOUNDATION LVL



PLAN AT PLATFORM LVL

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL DETAILS SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. STRUCTURE SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
8. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION.
9. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
10. ALL STEEL SURFACES SHALL BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT OVER A COAT OF PRIMER.

SPECIAL NOTE:

1. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLYASH BRICKS IN CM 1:5.

INDICATIVE FINISHING SCHEDULE:

PLASTERING :

- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :

- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

ROOFING :

- SLOPED RCC ROOF - TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

EMULSION PAINT SHALL BE OF APPROVED QUALITY AND COLOUR

JOINERY SCHEDULE

D....STEEL DOOR.....800 X 2000
W...STEEL GLAZED WINDOW.....1200 X 1200

ANNEXURE DRG NO.

B13

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

	SIGNATURE	DATE
DCE/D		
DCE/D		
CM/D		
CM/D		
DGM/C		
GM/C/ic		

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NEYVELI- 607 801,TAMIL NADU

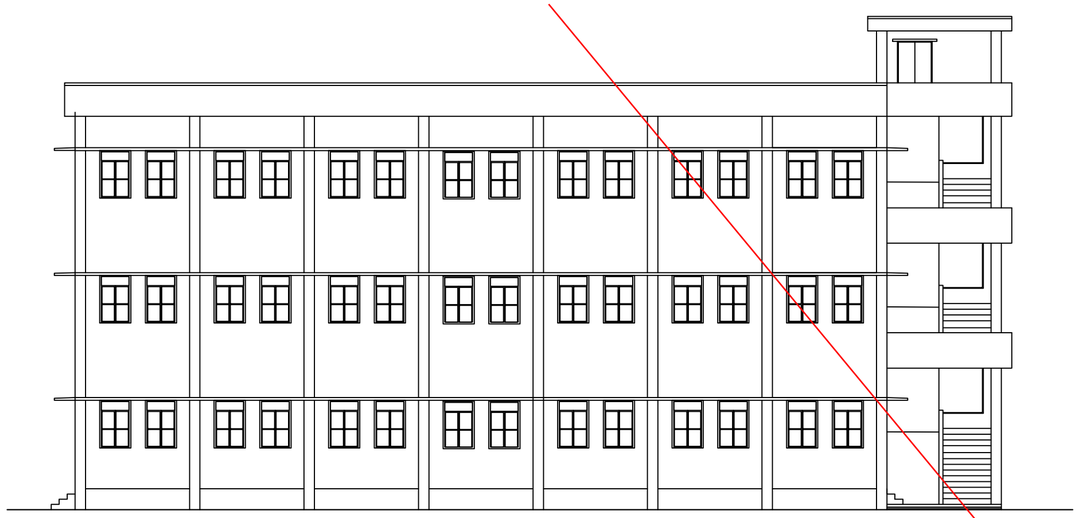
CREATING WEALTH FOR WELL BEING

OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

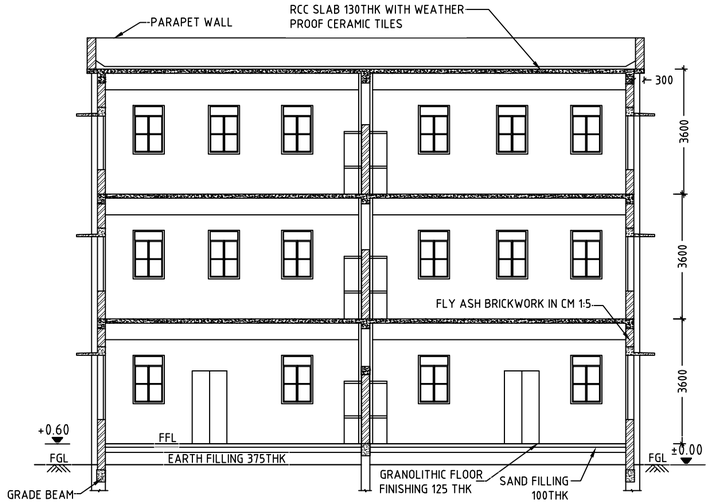
RCC WATCH TOWER 6M NTTPP

A3	SCALE: 1:50	PLAN & SECTION	DRG. No. CGMC/ /2020

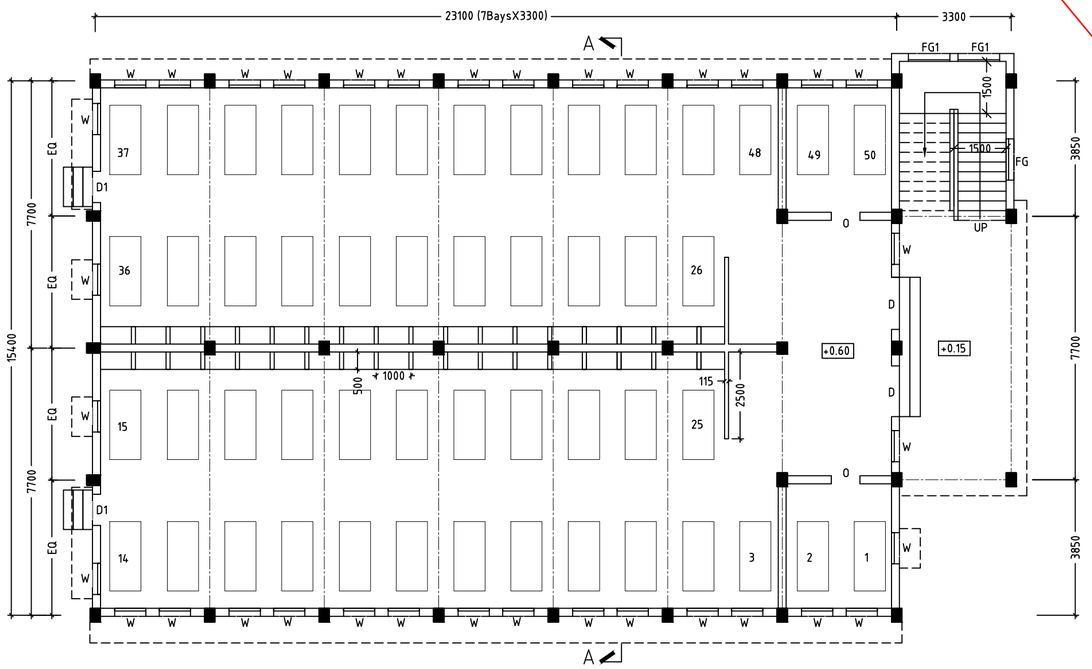
03.11.2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B13 Watch tower.dwg



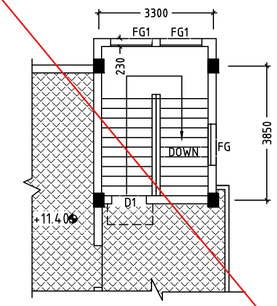
ELEVATION
(1:100)



SECTION AA
(1:100)



GROUND FLOOR PLAN
(1:100)



HEAD ROOM PLAN
(1:100)

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS - GRANOLITHIC FLOOR FINISH 125 THK
- PORTICO - CEMENT CONCRETE TILES (#)
- STAIRCASE - ANTISKID STEP TILES (#)

DADOOING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- CORRIDOR - 900 HT.

ROOFING :
- FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES

ALL BEDROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

ANNEXURE DRG NO.
B14

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE AND AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
8. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION.
9. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
10. PLINTH PROTECTION 750mm WIDTH WITH OUTSIDE DRAIN SHALL BE PROVIDED ALROUND THE BUILDING.
11. NUMBER OF CISF PERSONNEL TO BE ACCOMMODATED - 150 NOS.

JOINERY SCHEDULE:-

D - COUNTRY WOOD DOUBLE LEAF FLUSH DOOR WITH 450 VENTILATOR HEAD.....1500 X 2550
D1 - COUNTRY WOOD DOUBLE LEAF FLUSH .....1000 X 2100
W - PRE-PAINTED STEEL WINDOW WITH GRILL PROTECTION.....900 X 1650
FG - FIXED GLASS WITH GRILL PROTECTION.....1500X1500
FG1- FIXED GLASS WITH GRILL PROTECTION.....1200X1000
O - OPENING.....900 X 2100

LEGEND:

NGL - Natural Ground Level
FGL - Finished Ground Level
FFL - Finished Floor Level

SPECIAL NOTE:
1. ALL 230 THICK WALLS UP TO BASEMENT SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:5.
2. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLYASH BRICKS IN CM 1:5.
3. ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:4.

REV.	DATE	AMENDMENTS	DCE/D	CM/D	ADGM/D	DGM/D	DGM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
ADGM/D		
DGM/D		
DGM/C		

NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
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NEYVELI- 607 801,TAMIL NADU
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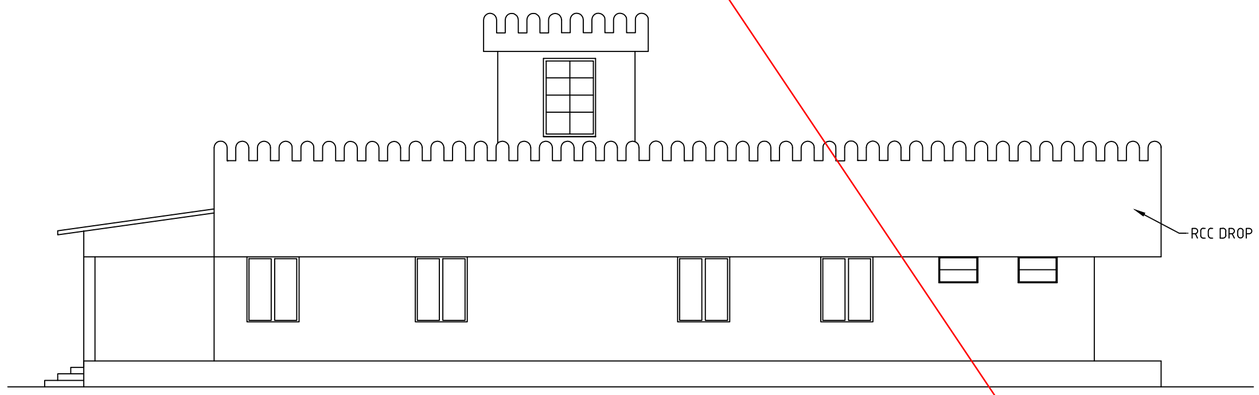
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

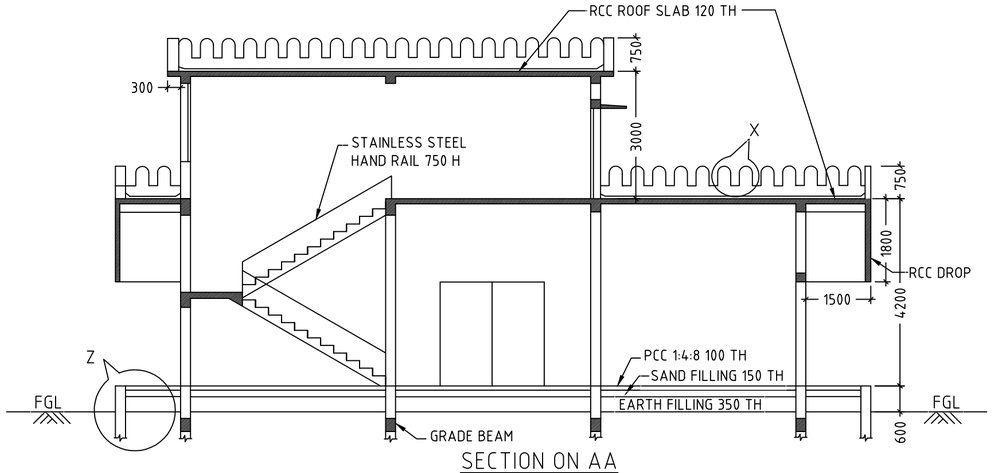
BARRACKS FOR CISF
NTTPP

A2	SCALE: 1:100	ARCHITECTURAL DETAILS	DRG No: CGMC/ /2020

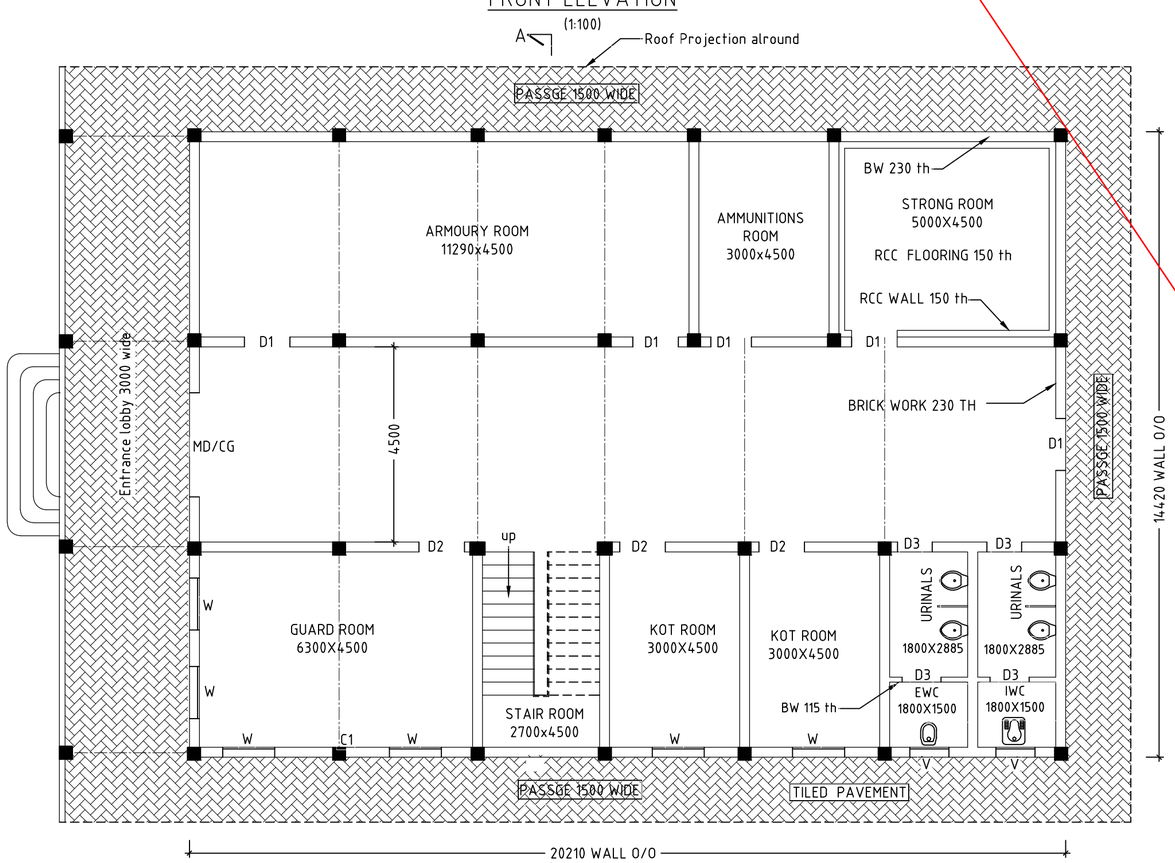
02/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B14 CISF Barracks.dwg



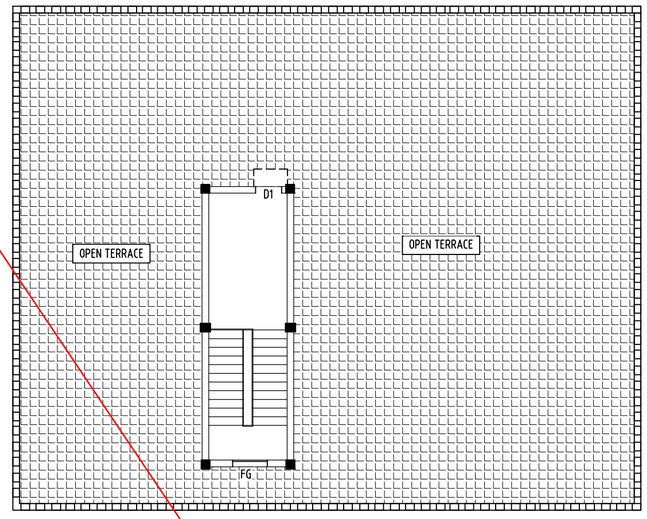
FRONT ELEVATION
(1:100)



SECTION ON AA
(1:100)



GROUND FLOOR PLAN
(1:100)



FIRST FLOOR PLAN
(1:100)

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

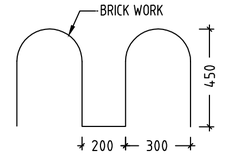
FLOORING :
- GUARD ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET & STEPS - ANTISKID CERAMIC FLOORING (#)
- STRONG ROOM - RCC FLOORING 150 TH WITH PLASTER FINISH.
- ALL OTHER AREAS - GRANOLITHIC FINISH 125 TH.

DADOOING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES
- CORRIDOR - 900 HT.

ROOFING :
- IN CASE OF FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

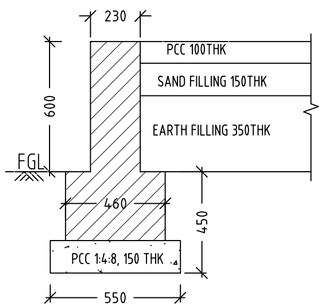
SPECIAL NOTE:
1. ALL 230 THICK WALLS UP TO BASEMENT SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:5.
2. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLYASH BRICKS IN CM 1:5.
3. ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:4.



DETAIL AT X
(1:20)

B15

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY



DETAIL 'Z'
(1:20)

JOINERIES

MD/CG - TW FLUSH MAIN DOOR WITH COLLAPSIBLE GATE	2400X2400
D1 - TW DOUBLE LEAF FLUSH DOOR	1200X2400
D2 - TW D/L FLUSH DOOR	1000X2400
D3 - PVC DOOR	900X2100
FG - FIXED GLASS WITH ALUMINUM FRAME	1200X1800
W - PRE PAINTED STEEL GLAZED WINDOW	1200X1500
V - PRE PAINTED STEEL GLAZED VENTILATOR	900X600

NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
4. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
5. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
6. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE AND SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
7. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING TOILET FIXTURES.
8. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
9. PLINTH PROTECTION 1000 mm WIDE SHALL BE PROVIDED ALL AROUND THE BUILDING ALONG WITH DRAIN.
10. INCLINED ROOF FOR ENTRANCE LOBBY ROOF PLASTERING WITH WATER PROOFING COMPOUND.
11. STRONG ROOM - ADDITIONAL RCC WALL 150 TH BESIDE BRICK WALL

REV.	DATE	AMENDMENTS	DCE/D	CM/D	ADGM/D	DGM/D	DGM/C

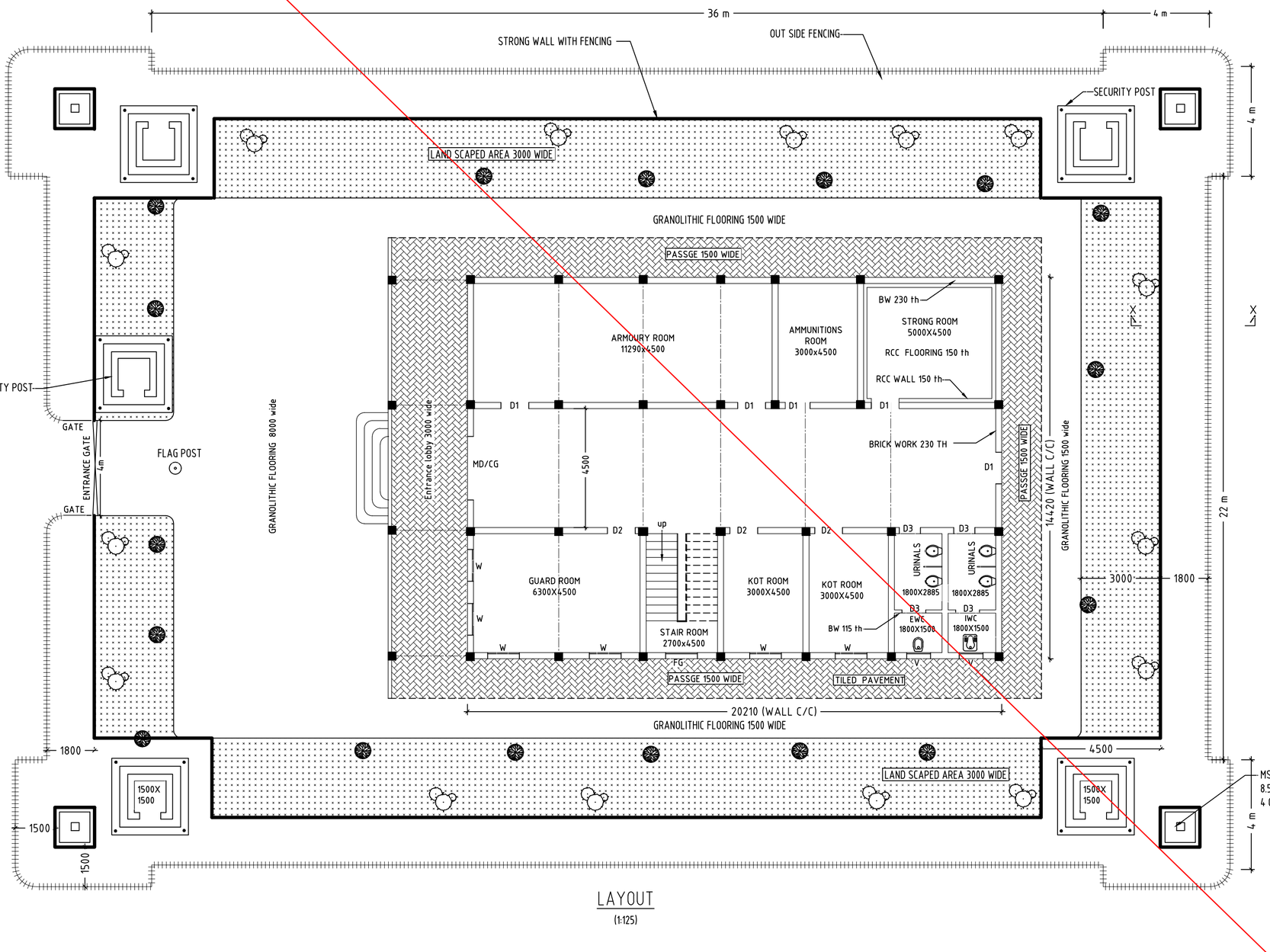
	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
ADGM/D		
DGM/D		
DGM/C		

NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU
CREATING WEALTH FOR WELL BEING
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

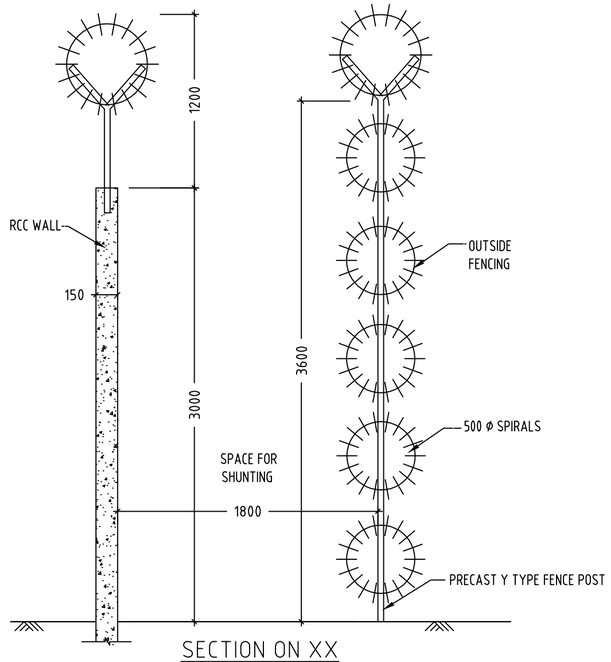
ARMOURY AND QUARTER GUARD OFFICE FOR CISF, NTTPP

A2	SCALE: 1:100, 1:20	ARCHITECTURAL DRAWING	DRG No: CGMC/ /2020

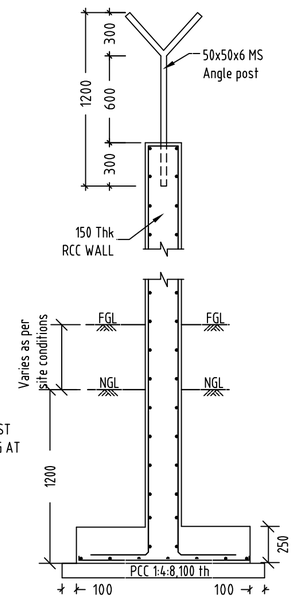
02/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B15 CISF Armoury And Quarter Guard.dwg



LAYOUT
(1:125)



SECTION ON XX
(1:30)



FOUNDATION FOR RCC WALL
(1:30)

B16

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL.
4. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
5. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
6. PROVIDE EXPANSION JOINT @ 25M INTERVAL IN RCC COMPOUND WALL.

LEGEND:-
NGL -- NATURAL GROUND LEVEL
FGL -- FINISHED GROUND LEVEL

REV.	DATE	AMENDMENTS	DCE/D	CM/D	ADGM/D	DGM/D	DGM/C

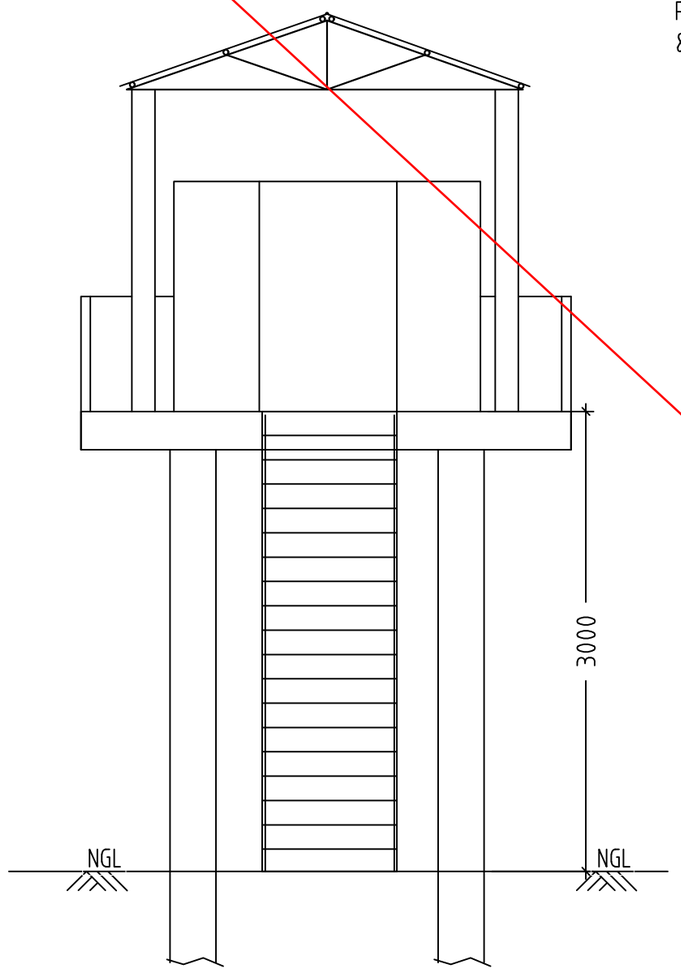
	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
ADGM/D		
DGM/D		
DGM/C		

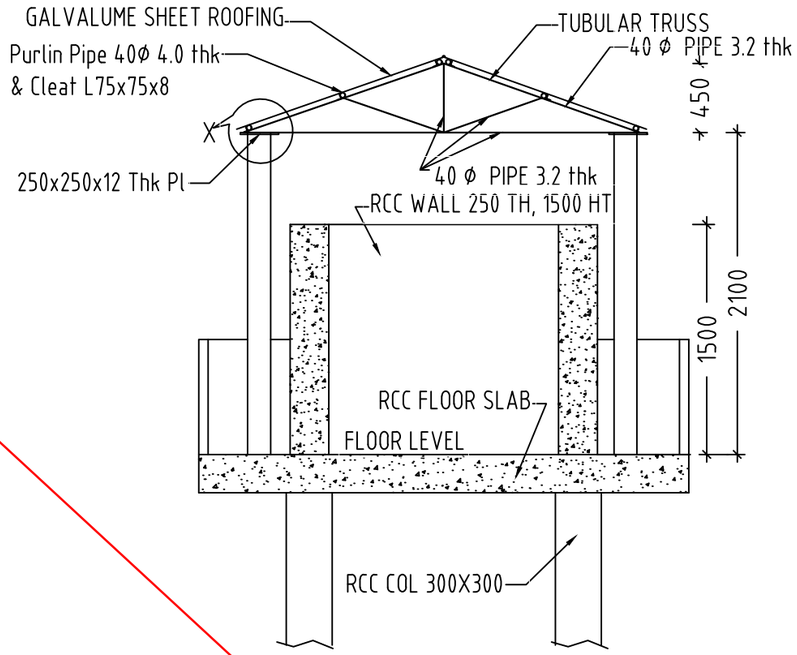
NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU
CREATING WEALTH FOR WELL BEING
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

ARMOURY AND QUARTER GUARD OFFICE FOR CISF, NTTPP

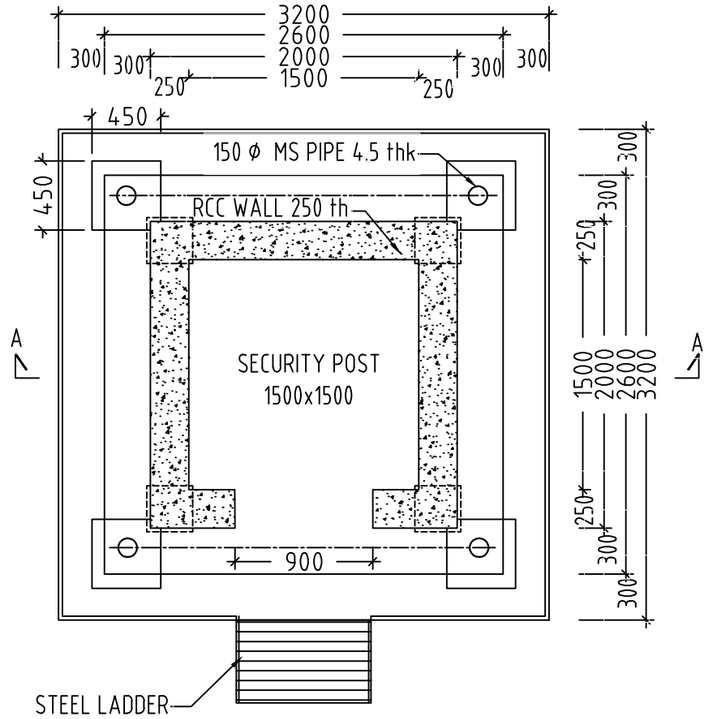
A2	SCALE: 1:125, 1:100, 1:30	LAYOUT	DRG No: CGMC/ /2020

02/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B16 CISF Armoury And Quarter Guard Layout.dwg





SECTION ON AA
(1:50)



PLAN
(1:50)

NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL DETAILS SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. STRUCTURE SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016.
7. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
8. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
9. PROVIDE WIND TIES OVER ROOF SHEETING.
10. FOR STRUCTURAL STEEL MEMBERS TWO COATS OF ANTI-CORROSIVE PAINTING SHALL BE DONE OVER PRIME COAT.
11. CHS-CIRCULAR HOLLOW SECTION.
12. ALL CHS SHALL CONFIRM TO IS-1161 WITH YST-310 N/MM2.
13. ALL STRUCTURAL STEEL MEMBERS SHALL BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT OVER A COAT OF PRIMER.

B17

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

REV.	DATE	AMENDMENTS	DEE/D	CM/D	ADGM/D	DGM/D	DGM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
GET/D		
DEE/D		
ADGM/D		
DGM/D		
DGM/C		

NLC India Limited
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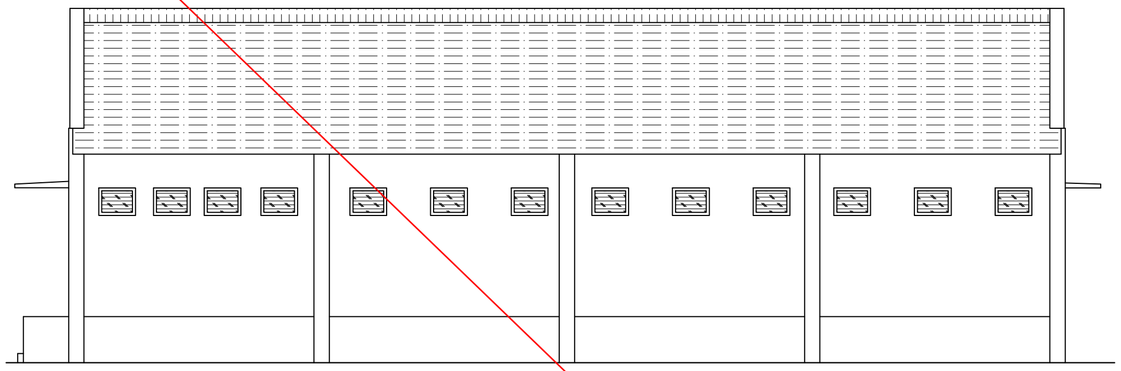
NEYVELI- 607 801,TAMIL NADU

OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

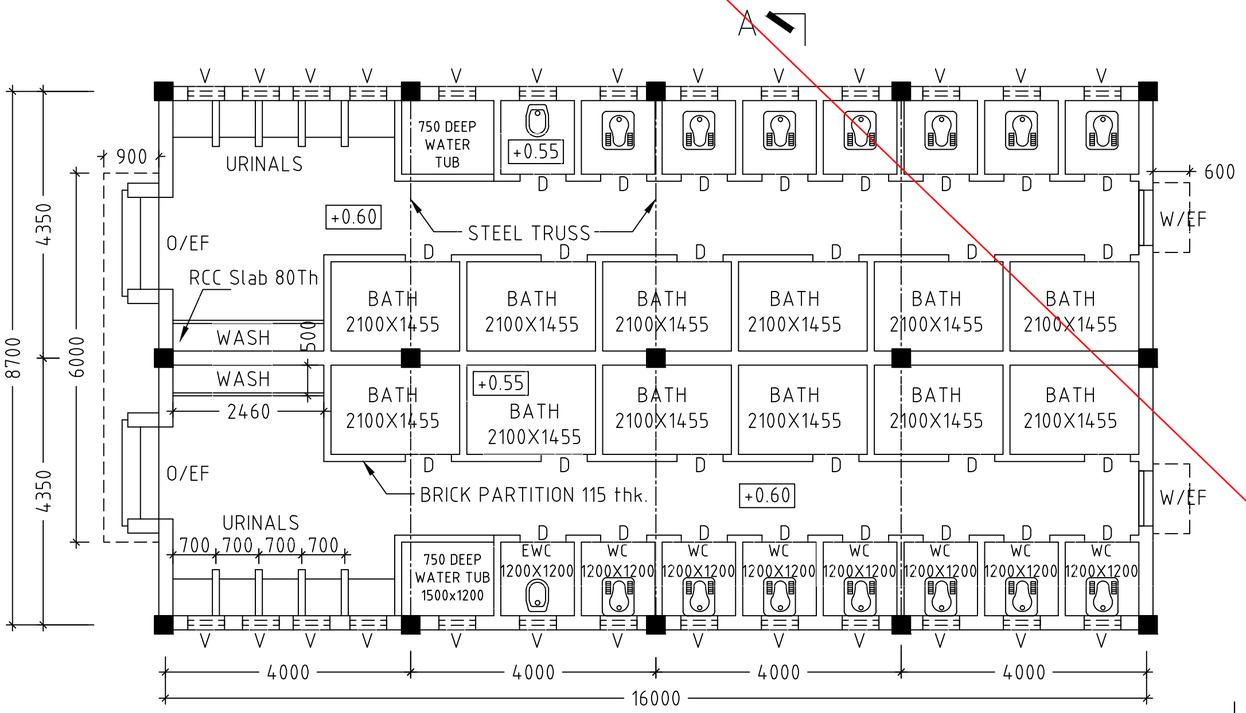
SECURITY CHECK POST FOR ARMORY AND QUARTER GUARD OFFICE FOR CISF, NTTPP

A3	SCALE: 1:100, 1:50	Architectural Details	DRG No: CGMC / / 2020

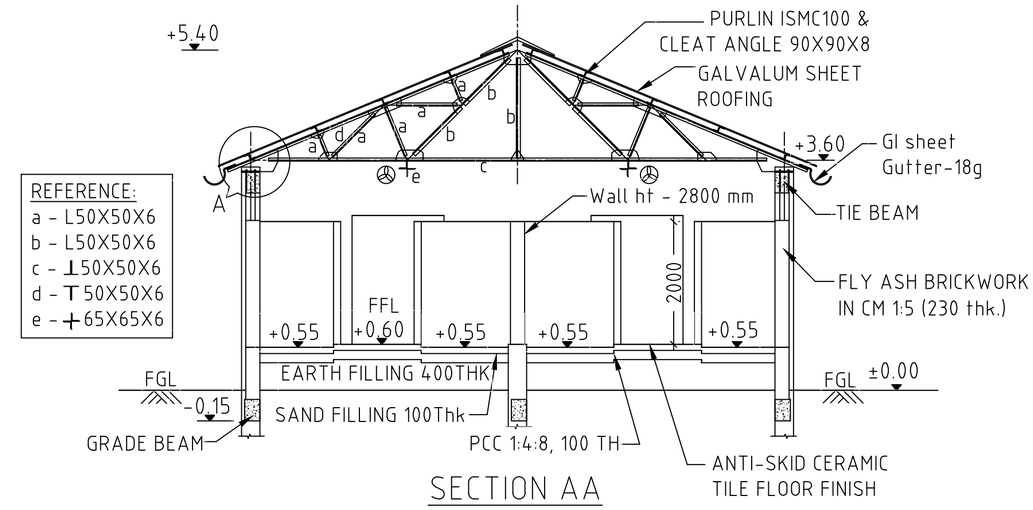
02/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B17 CISF Security Check Post.dwg



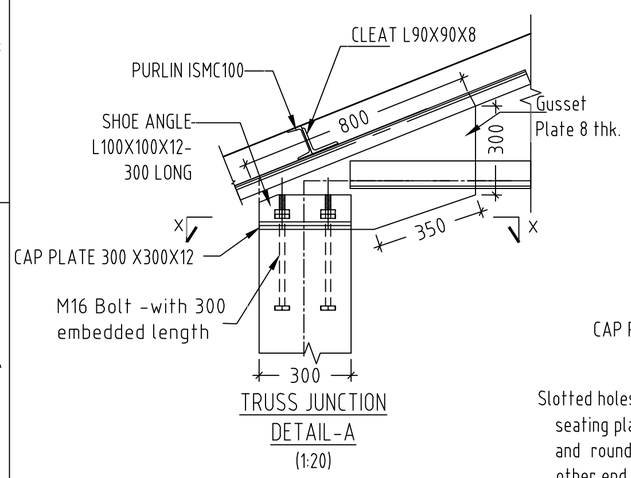
ELEVATION



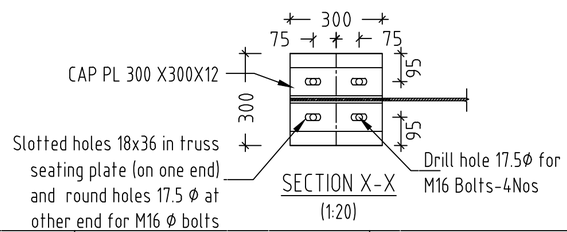
PLAN A



SECTION AA



TRUSS JUNCTION DETAIL-A (1:20)



SECTION X-X (1:20)

JOINERY SCHEDULE:-

D - FRP DOOR	750 X 1800
W - PRE PAINTED STEEL WINDOW WITH GLAZED SHUTTERS	900 X 1200
O - OPEN	1500 X 2100
V - PRE PAINTED STEEL GLAZED VENTILATOR	600X450

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE.
8. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING TOILET FIXTURES.
9. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
10. PLINTH PROTECTION 750 mm WIDE SHALL BE PROVIDED ALL-AROUND THE BUILDING.
11. ALL STRUCTURAL STEEL MEMBERS SHALL BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT OVER ONE COAT OF PRIMER.

SPECIAL NOTE:

1. ALL 230 THICK WALLS UP TO BASEMENT SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:5.
2. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLYASH BRICKS IN CM 1:5.
3. ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:4.

ANNEXURE DRG NO. B18

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

REV.	DATE	AMENDMENTS	DCE/D	CM/D	ADGM/D	DGM/D	DGM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
ADGM/D		
DGM/D		
DGM/C		

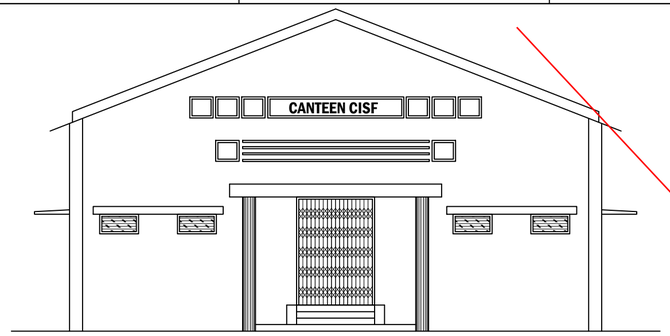
INDIA
CREATING WEALTH FOR WELL BEING

NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

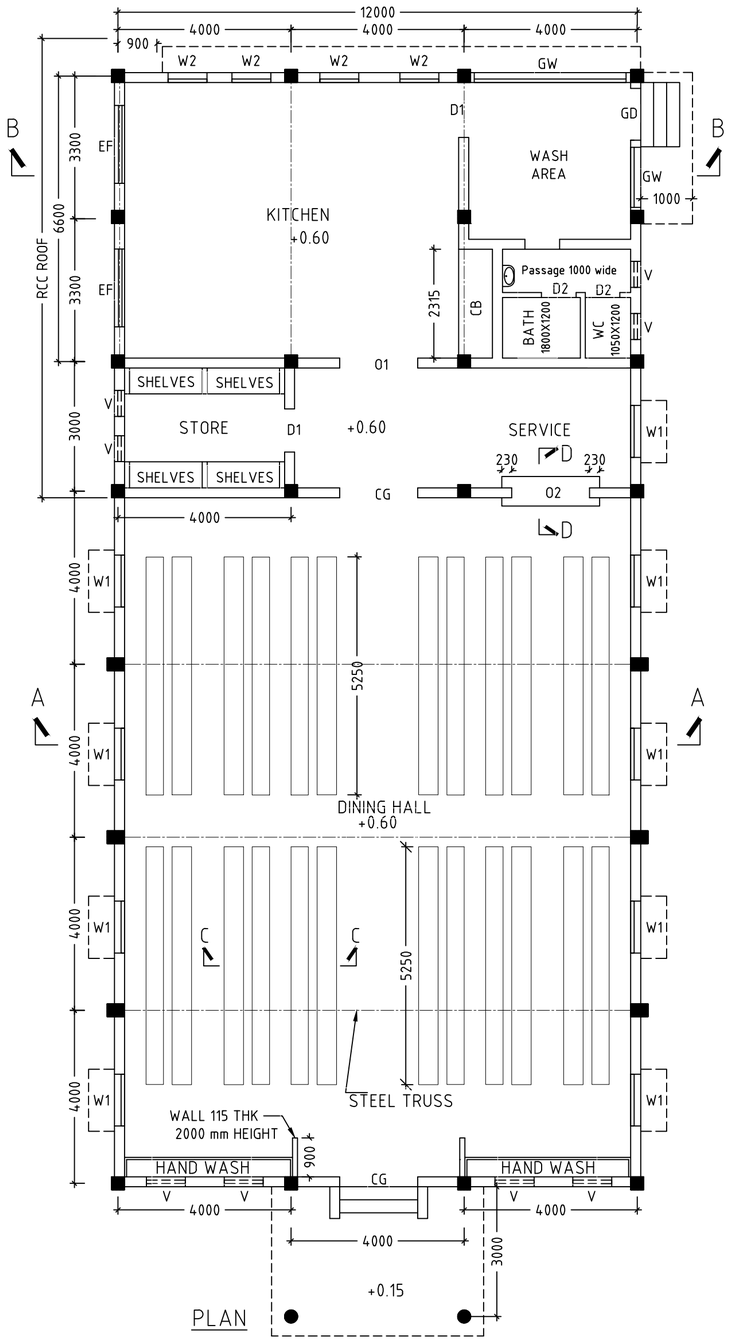
TOILET BLOCK FOR CISF NTTPP

A3	SCALE: 1:100, 1:20	PLAN, ELEVATION & SECTION DETAILS	DRG No: CGMC/ /2020

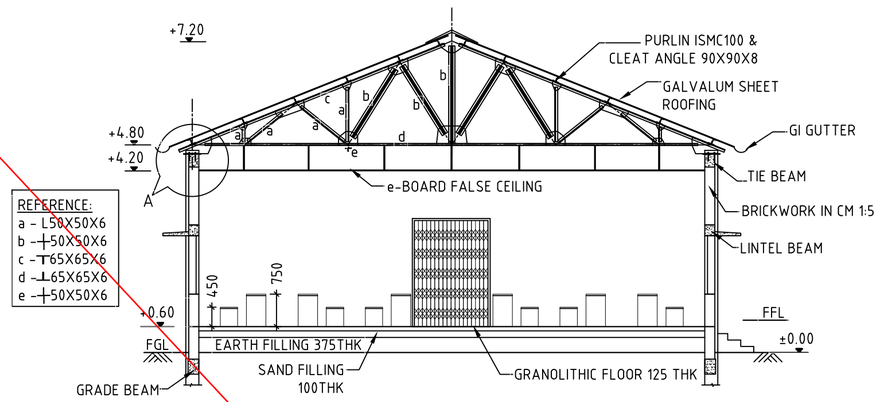
02/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B18 CISF Toilet Block.dwg



ELEVATION

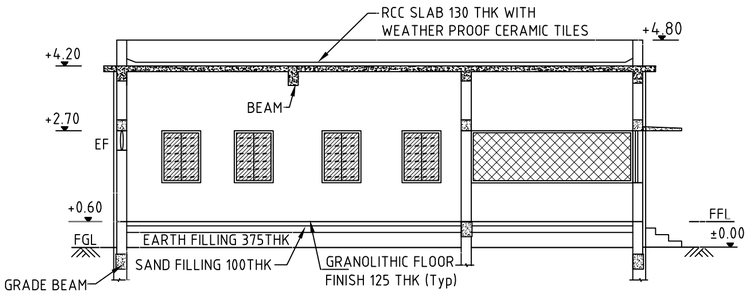


PLAN

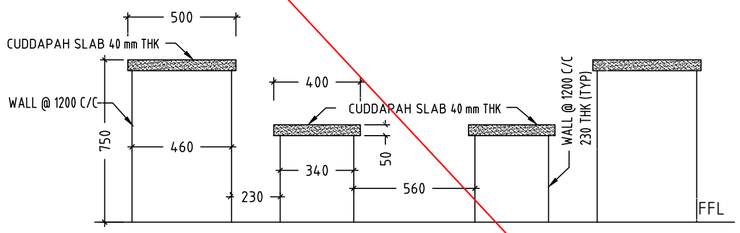


REFERENCE:
a - L50X50X6
b - ┼50X50X6
c - ┬65X65X6
d - ⊥65X65X6
e - ┼50X50X6

SECTION AA



SECTION BB



SECTION CC

NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
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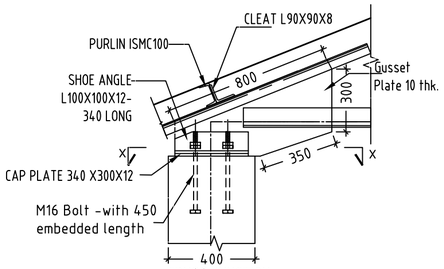
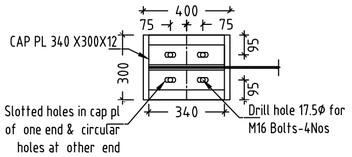
6. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE AND SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
7. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN FIXTURES.
8. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
9. PLINTH PROTECTION 750 mm WIDE SHALL BE PROVIDED ALL AROUND THE BUILDING ALONG WITH DRAIN.
10. ALL STRUCTURAL STEEL MEMBERS SHALL BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT OVER A COAT OF PRIMER

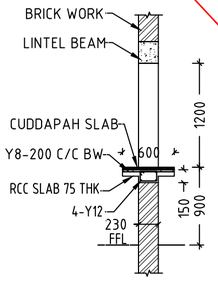
JOINERY SCHEDULE:-
CG - COLLAPSIBLE GATE ..... 1800 X 2500
D1 - COUNTRY WOOD DOUBLE LEAF FLUSH DOOR ..... 1200 X 2100
D2 - FRP DOOR ..... 800 X 2000
GD - GRILL DOOR ..... 1200 X 2100
W1 - PRE-PAINTED STEEL WINDOW WITH GRILL PROTECTION ..... 1200 X 1350
W2 - PRE-PAINTED STEEL WINDOW WITH GRILL PROTECTION ..... 900 X 1200
GW - M.S. GRILLS
V - PRE-PAINTED STEEL VENTILATOR ..... 600 X 450
EF - EXHAUST FAN ..... 600 X 600
O1 - OPENING ..... 1800 X 2500
O2 - OPENING ..... 1800 X 1200 (900 MM ABOVE GL)



TRUSS JUNCTION
DETAIL-A
(1:20)



SECTION X-X
(1:20)



SECTION DD
O2 - OPENING 1500X1200
(900 ABOVE FFL)
(1:50)

SPECIAL NOTE:
1. ALL 230 THICK WALLS UP TO BASEMENT SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:5.
2. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLYASH BRICKS IN CM 1:5.
3. ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICKS IN CM 1:4.

INDICATIVE FINISHING SCHEDULE:
PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)

FLOORING :
- BATH, TOILET & STEPS - ANTISKID CERAMIC FLOORING (#)
- ALL OTHER AREAS - GRANOLITHIC FLOORING.

DADOOING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES
- HAND WASH AREA - 600 HT CERAMIC TILES

e-BOARD FALSE CEILING PROVISION IN DINING HALL.

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

LEGEND:
NGL - Natural Ground Level
FGL - Finished Ground Level
FFL - Finished Floor Level

B19

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

REV.	DATE	AMENDMENTS	DEE/D	CM/D	ADGM/D	DGM/D	DGM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
ADGM/D		
DGM/D		
DGM/C		

NLC India Limited
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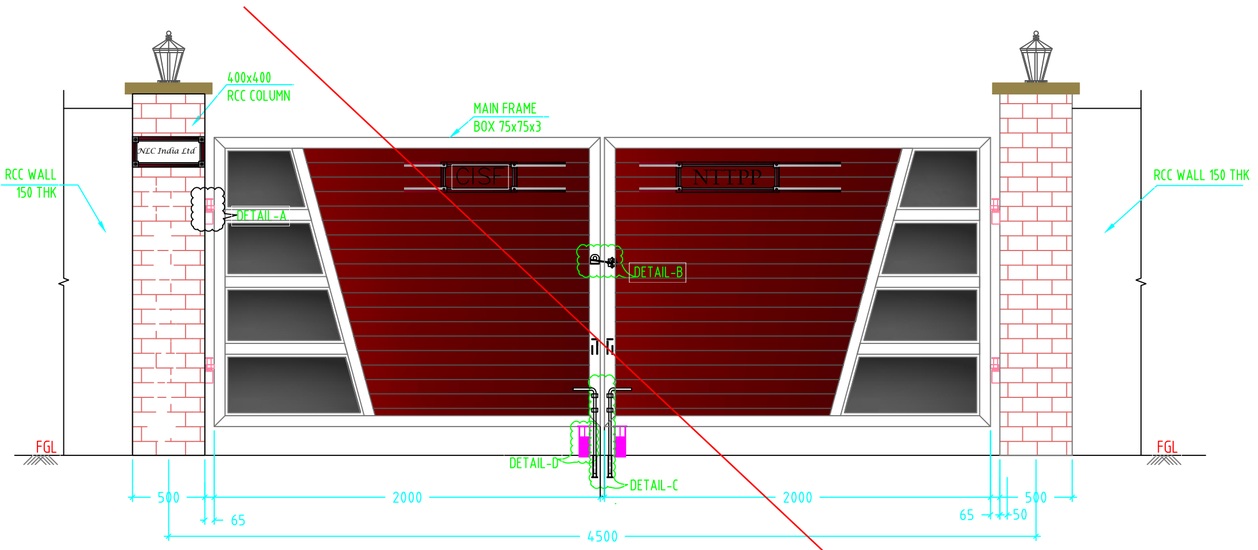
NEYVELI- 607 801,TAMIL NADU
INDIA
CREATING WEALTH FOR WELL BEING
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

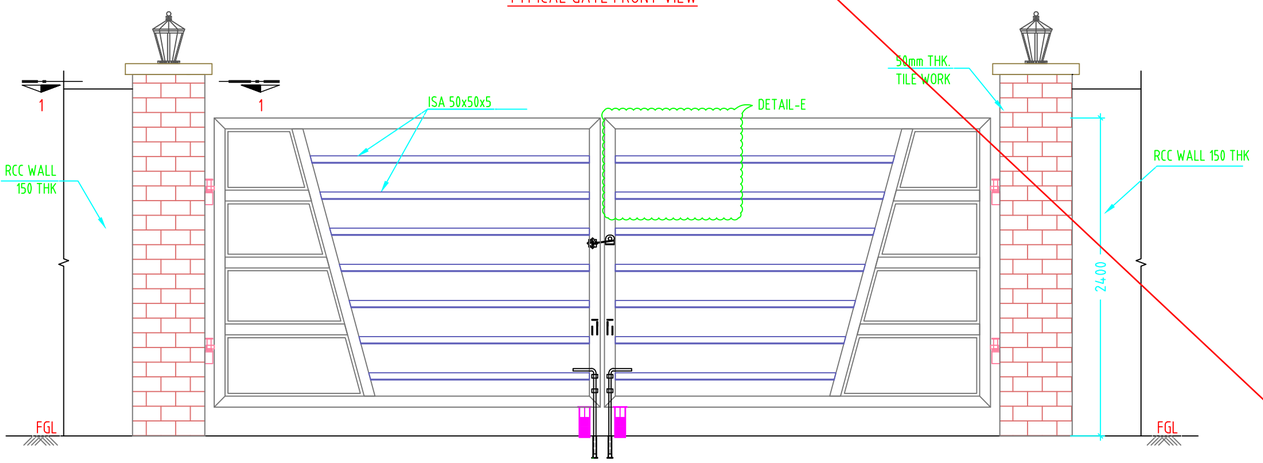
CANTEEN FOR CISF NTTPP

A2	SCALE: 1:100, 1:50, 1:20	ARCHITECTURAL DRAWING	DRG No: CGMC/ /2020

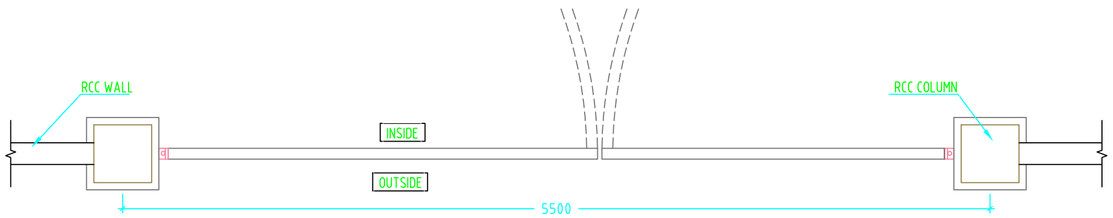
16/03/2017 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B19 CISF Canteen.dwg



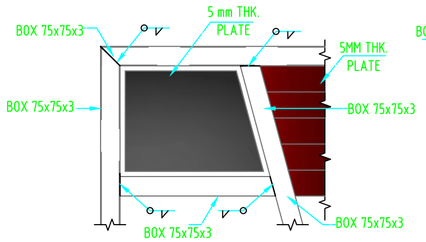
TYPICAL GATE FRONT VIEW



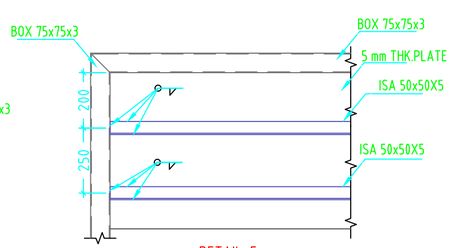
TYPICAL GATE REAR VIEW



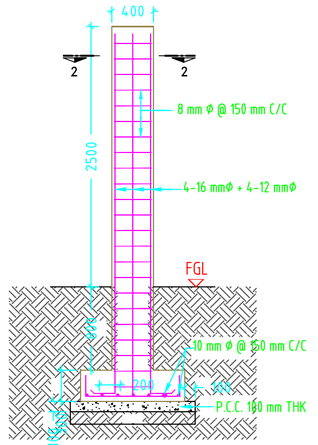
PLAN



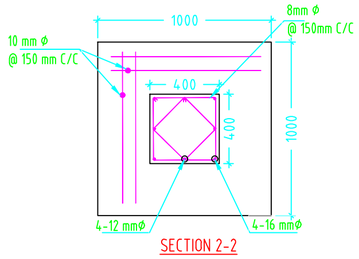
SLIDING GATE FRAME
CONNECTION DETAILS



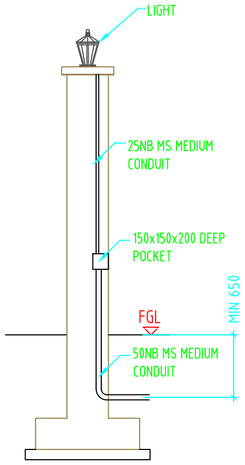
DETAIL-E
(ISA 50x50x5 CHANNEL
CONNECTION DETAILS)



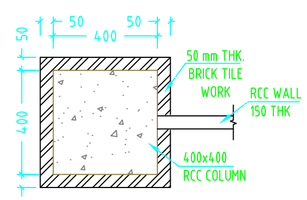
TYP REINFORCEMENT
DETAIL FOR COLUMN



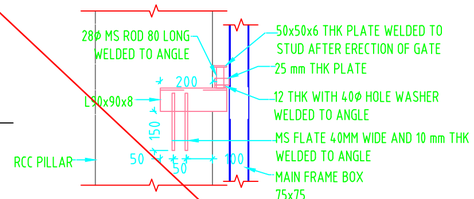
SECTION 2-2



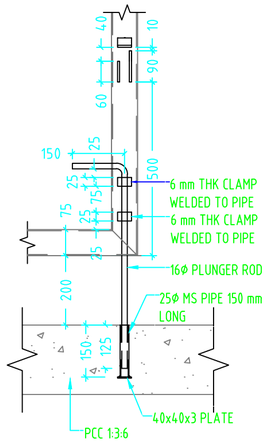
OUTLINE ARRANGEMENT



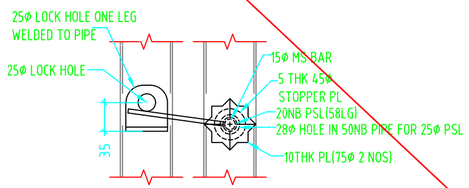
SECTION 1-1



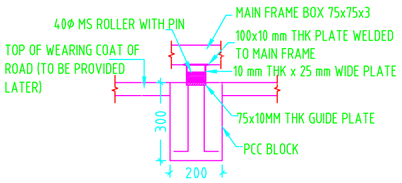
DETAIL-A



DETAIL-C



DETAIL-B



DETAIL-D

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL DETAILS SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL.
4. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
5. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
6. ALL STEEL SURFACES OF GATES SHALL BE PROVIDED WITH 2 COATS OF SYNTHETIC ENAMEL PAINT OF APPROVED QUALITYAND SHADE OVER 2 COATES OF ZINC CHROMATE PRIMER.
7. ALL WELDS ARE 6mm THK. CONTINUOS.
8. ELECTRICAL CONDUITS SHALL BE SUITABLY PLUGGED BEFORE CONCRETING.
9. BEFORE CONCRETING OF GATE PILLARS IS TAKEN UP, IT SHALL BE ENSURED THAT ALL ANCHORAGES/INSERTS, ELECTRICAL CONDUITS ETC ARE PLACED IN CORRECT LOCATIONS/ELEVATIONS.

MARETIAL SPECIFICATION:

S.No	DESCRIPTION	SPECIFICATION
1.	PAINTING	2 COATS OF SYNTHETIC ENAMEL PAINT
2.	CONCRETE	M25 GRADE CONCRETE
3.	TILES	MODULAR BRICK TILE

B20

PRELIMINARY DRAWING FOR
TENDER PURPOSE ONLY

REV.	DATE	AMENDMENTS	DEE/D	DCE/D	ADGM/D	DGM/D	DGM/C

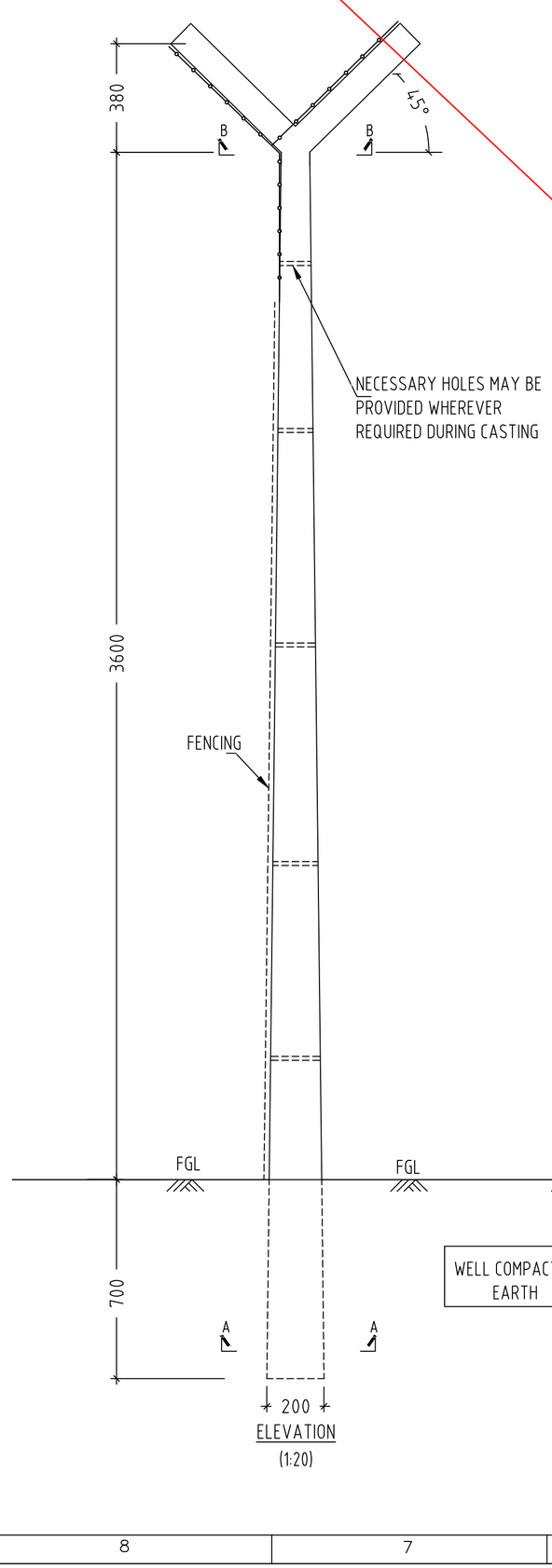
	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/D		
DGM/C		

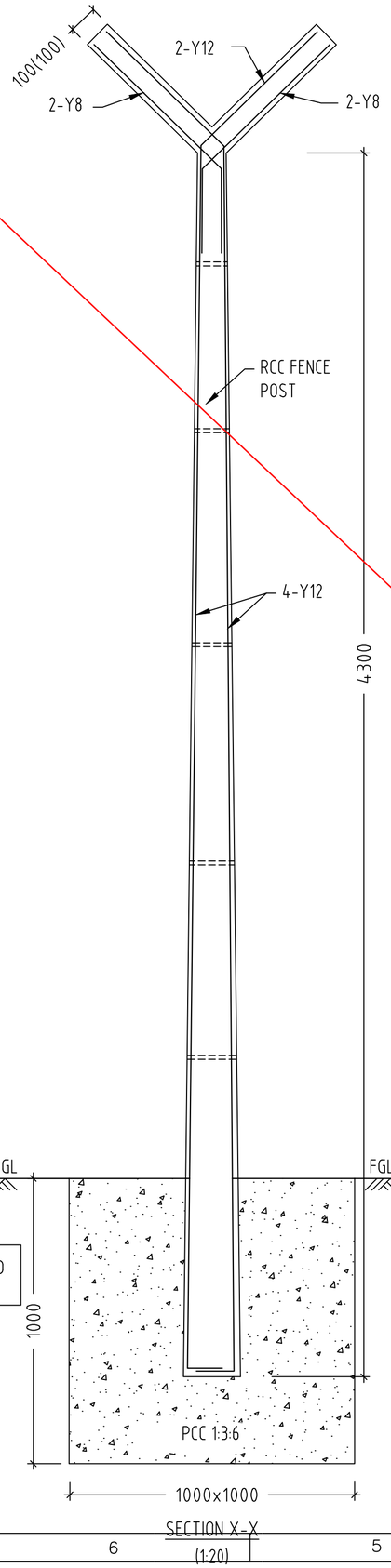
NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU
CREATING WEALTH FOR WELL BEING
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

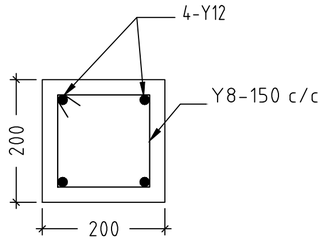
GATE 4 m
FOR CISF,NTTPP

A2	SCALE: 1:100, 1:150, 1:30	DETAILS	DRG No: CGMC/ /2020

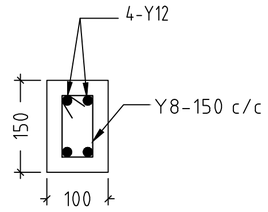
02/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B20 CISF Gate.dwg







SECTION- AA
(1:10)



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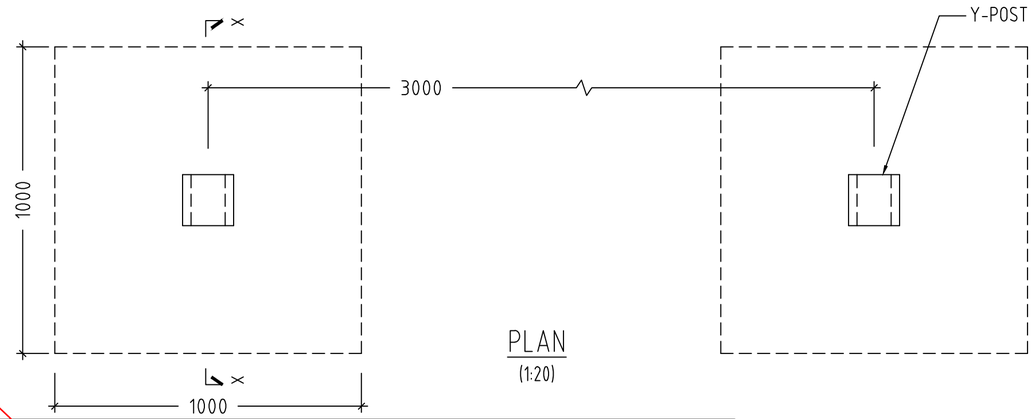
(1:10)



PLAN
(1:20)

NOTE
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2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL DETAILS SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL.
4. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
5. FOUNDATION DEPTH SHALL BE VARIED TO SUIT SITE CONDITIONS. IF ANY LOOSE SOIL IS MET, THE SAME SHALL BE REMOVED AND FILLED WITH GOOD SOIL AND WELL COMPACTED.

B21

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

REV.	DATE	AMENDMENTS	DEE/D	CM/D	ADGM/D	DGM/D	DGM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
ADGM/D		
DGM/D		
DGM/C		

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OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

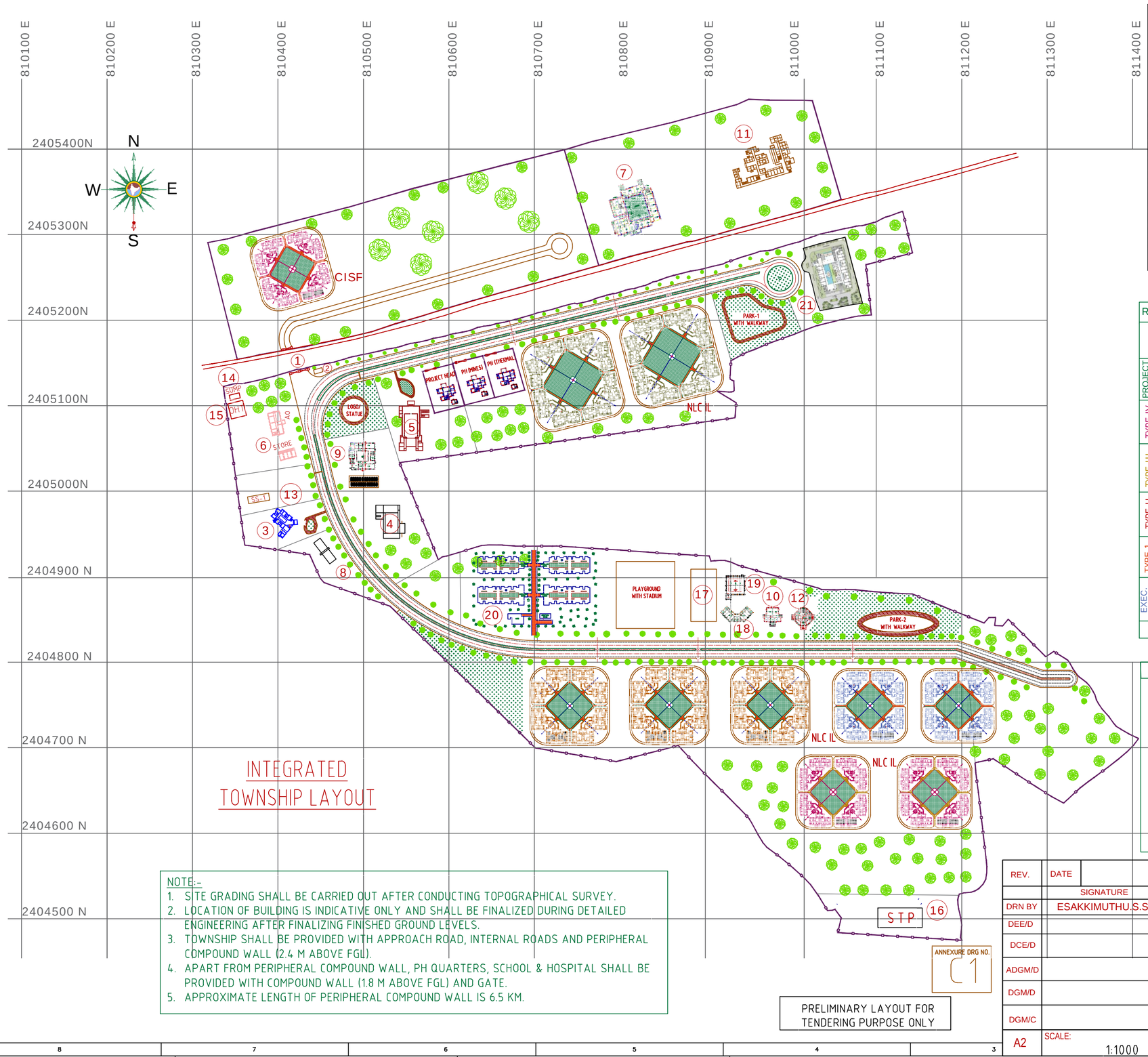
CREATING WEALTH FOR WELL BEING

PRECAST 'Y' TYPE FENCE POST - CISF NTTPP

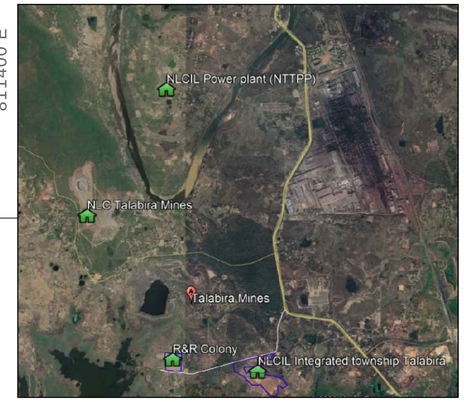
A3	SCALE: 1:100, 1:20, 1:10	STRUCTURAL DETAIL	DRG No: CGMC / / 2020

02/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(B) THERMAL POWER PLANT AREA\B21 CISF Fencing.dwg

Annex drg No.	List of Annexure drawings
(C) INTEGRATED TALABIRA TOWNSHIP	
C1	Township layout
C2	PH Quarters
C3	Type IV Quarters
C4	Type III Quarters
C5	Type II Quarters
C6	Excecutive hostel
C7	Shopping complex
C8	Guest house
C9	Recreation club
C10	Sports office
C11	Badminton court
C12	Swimming pool
C13	Auditorium
C14	Community hall
C15	Hospital
C16	School
C17	Township Administration office
C18	Two wheeler parking shed
C19	Four wheeler parking shed
C20	Library
C21	Compound wall
C22	Security cabin
C23-SHEET 1	Township road cross section
C23-SHEET 2	Dedicated approach road from Township to Powerplant
C24	RCC Underground storage tank
C25	RCC Overhead water tank
C26	Township preliminary contour drawing
C27	TA Estate office store rooms
C28	Servant's qrtrs for PH



INTEGRATED TOWNSHIP LAYOUT



LOCATION MAP

RESIDENTIAL BUILDINGS (NLCIL, CISF & SUPPORT STAFF)			
NO. OF BLOCKS		NO. OF HOUSES IN A BLOCK IN A FLOOR	TOTAL NO. OF HOUSES
PROJECT HEAD	3	----	3 Nos. (Independent house)
TYPE IV	2	16 Nos.	NLCIL- 16X4X2=128 Nos. (Stilt + 4)
TYPE III	3	16 Nos.	NLCIL- 16X4X3=192 Nos. (Stilt + 4)
TYPE II	2	16 Nos.	NLCIL- 16X4X2=128 Nos. (Stilt + 4)
TYPE 1	2 CISF-1	16 Nos.	NLCIL- 16X3X2=96 Nos. CISF- 16X3X1=48 Nos. (Stilt + 3)
EXEC. HOSTEL	4	12 Nos.	NLCIL- 12X4X2=96 Nos.
		TOTAL	691 Nos

NON-RESIDENTIAL BUILDINGS	
1.ENTRANCE ARCH	11.HOSPITAL
2.SECURITY CABIN	12.LIBRARY
3.GUEST HOUSE	13.SUB STATION
4.COMMUNITY HALL	14. G.L SUMP 1 LAKH LITRES
5.AUDITORIUM	15. OHT 3 LAKH LITRES
6.TOWNSHIP ADMINISTRATION	16. STP 1 MLD
7.SCHOOL & PLAYGROUND	17. SWIMMING POOL
8.SPACE FOR BANK & POST OFFICE	18. RECREATION CLUB
9.SHOPPING COMPLEX	19. INDOOR BADMINTON COURT
10.SPORTS OFFICE	20. EXECUTIVE HOSTEL
	21.VIP GUEST HOUSE

NOTE:-
1. SITE GRADING SHALL BE CARRIED OUT AFTER CONDUCTING TOPOGRAPHICAL SURVEY.
2. LOCATION OF BUILDING IS INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING AFTER FINALIZING FINISHED GROUND LEVELS.
3. TOWNSHIP SHALL BE PROVIDED WITH APPROACH ROAD, INTERNAL ROADS AND PERIPHERAL COMPOUND WALL (2.4 M ABOVE FGL).
4. APART FROM PERIPHERAL COMPOUND WALL, PH QUARTERS, SCHOOL & HOSPITAL SHALL BE PROVIDED WITH COMPOUND WALL (1.8 M ABOVE FGL) AND GATE.
5. APPROXIMATE LENGTH OF PERIPHERAL COMPOUND WALL IS 6.5 KM.

ANNEXURE DRG NO. C1

PRELIMINARY LAYOUT FOR TENDERING PURPOSE ONLY

REV.	DATE	AMENDMENTS	DEE/D	DCE/D	ADGM/C	DGM/D	DGM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/D		
DGM/C		

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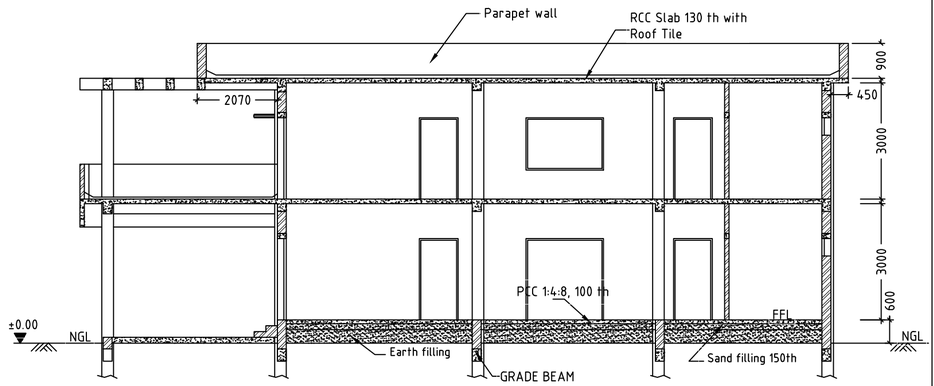
CREATING WEALTH FOR WELL BEING
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

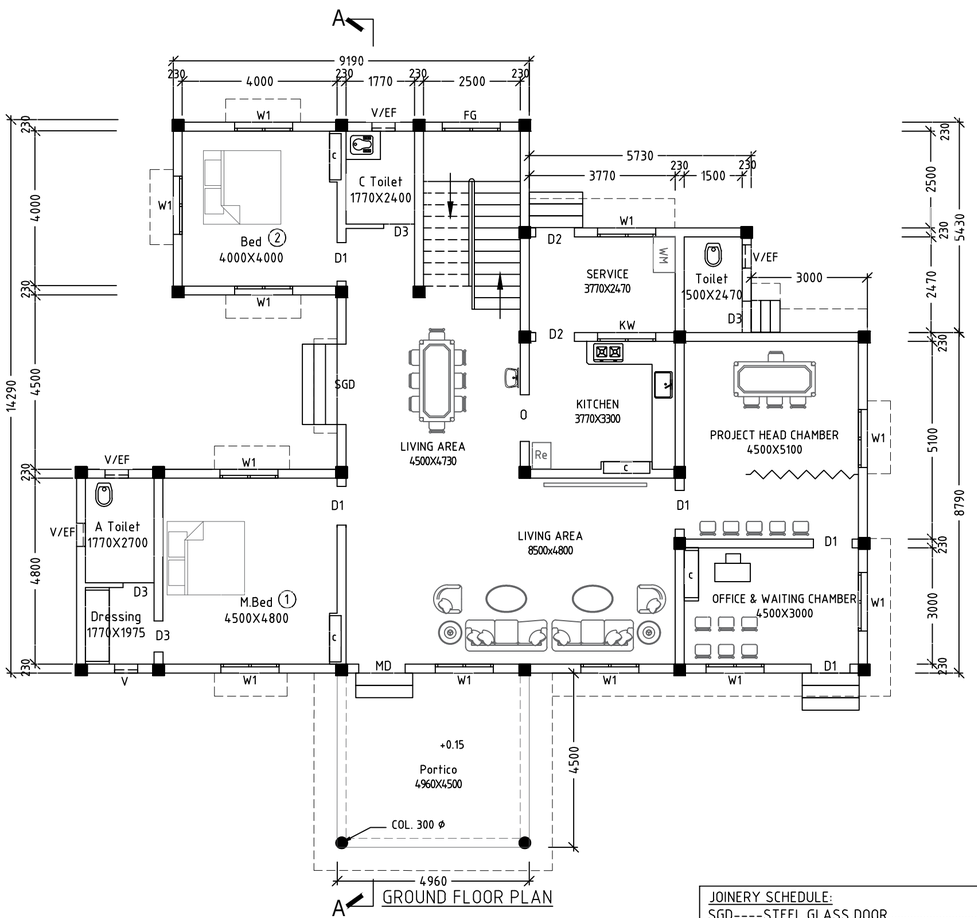
INTEGRATED TOWNSHIP FOR
NTTPP & TALABIRA II & III OCP MINES
ODISHA

A2	SCALE: 1:1000	LAYOUT	DRG No:

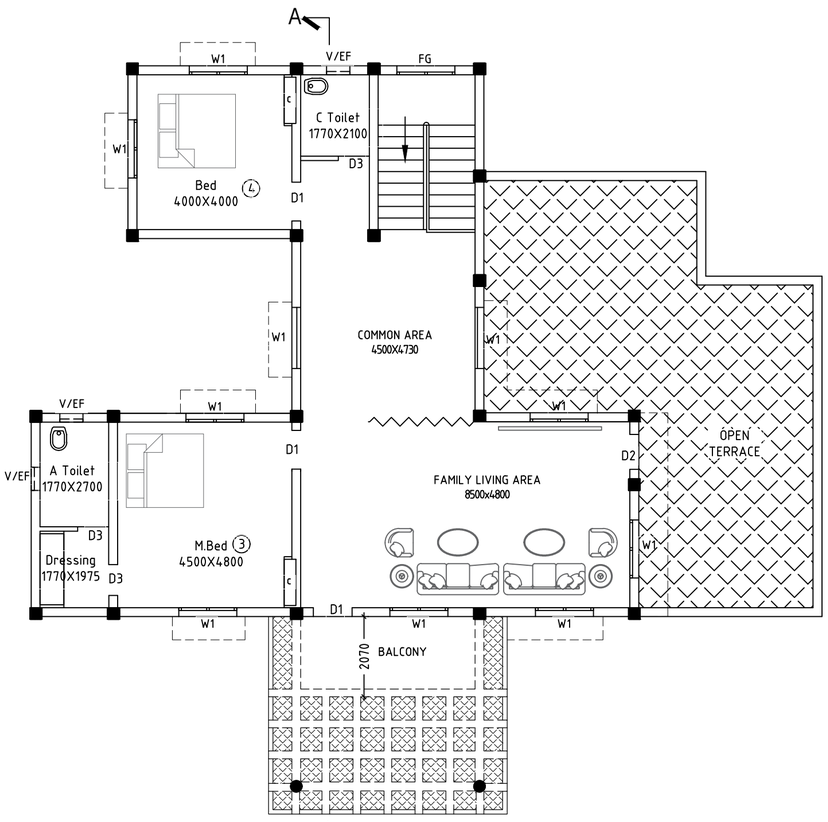
FRONT ELEVATION



CROSS SECTION ON AA



GROUND FLOOR PLAN



FIRST FLOOR PLAN

NOTE
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2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE. ZONE-3 SHALL BE TAKEN FOR SEISMIC DESIGN OF BUILDING. BASIC WIND SPEED SHALL BE AS PER IS 875 PART III.
8. PARKING SHED FOR PARKING 2 CARS SHALL BE PROVIDED ADJACENT TO PH QUARTERS. COMPOUND WALL SHALL BE PROVIDED AROUND PH QUARTERS.
9. NECESSARY LANDSCAPING AND GREENERY SHALL BE PROVIDED IN FRONT AND BESIDE PH QUARTERS.
10. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES. 3D REVIT MODEL SHALL BE SUBMITTED ALONGWITH ARCHITECTURAL DRAWING.
11. LOADING CALCULATION, STAAD DESIGN, DESIGN DOCUMENT SHALL BE SUBMITTED FOR NLCIL APPROVAL.
12. ALL PARAPET WALLS, SERVICE AREAS, BALCONY AND CORRIDORS SHALL BE PROVIDED WITH 900 HT BRICK WALL WITH 300 HT SS HANDRAILS OVER IT.
13. NECESSARY SERVICE DUCTS SHALL BE PROVIDED FOR ROUTING WATER/DRAINAGE PIPELINES. SERVICE DUCTS SHALL BE EASILY ACCESSIBLE FROM MAINTENANCE POINT OF VIEW.
14. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN AND TOILET FIXTURES.
15. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
16. ANTI-TERMITE TREATMENT SHALL BE PROVIDED FOR ALL THE BUILDINGS.

SPECIAL NOTE-
1. CHAMBER BURNT BRICK WALL 230 THK UPTO BASEMENT IN CM 1:5
2. FLY ASH BRICK WALL 230 THK ABOVE BASEMENT IN CM 1:5
3. CHAMBER BURNT BRICK WORK 115 THK ABOVE AND BELOW BASEMENT IN CM 1:4

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, BALCONY & CORRIDOR - ANTISKID CERAMIC FLOORING (#)
- STAIRCASE - ANTISKID STEP TILES (#)
- PORTICO - ANTISKID EUROCON TILES FLOORING (#)

DADOOING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES
- KITCHEN TABLE WITH GRANITE FINISH AND WALL TILES UPTO 600 HT ABOVE WORKING TABLE

ROOFING :
- IN CASE OF FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES
- IN CASE OF SLOPED RCC ROOF - TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

ALL KITCHEN AND BEDROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

SPECIAL NOTE-
3 Nos of PH quarters shall be provided in township. Out of three quarters, one quarter shall be provided with a guest room of minimum 30 sqm area in first floor, in addition to the facilities shown in drawing.

JOINERY SCHEDULE:

SGD----STEEL GLASS DOOR	2000X2100
MD-----TW MAIN DOOR (DL)	1200X2100
D1 ----- TW DOOR (SL)	1000X2100
D2----- TW DOOR (SL)	900X2100
D3----- FRP SINGLE LEAF DOOR	750X2100
O ----- OPENING	1235X2100
O1----- OPENING	900X2100
W1----- TW WINDOW WITH GRILL PROTECTION	1500X1350
KW----- TW WINDOW WITH GRILL PROTECTION	1200X900
FG -----FIXED GLASS WINDOW WITH GRILL PROTECTION	1500X1200
V-------TW VENTILATOR	600X450
EX-----EXHAUST FAN	

ANNEXURE DRG NO.
C2

PRELIMINARY DRAWING
FOR TENDERING PURPOSE ONLY

REV.	DATE	AMENDMENTS	GET/D	DEE/D	ADGM/D	DGM/D	DGM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
GET/D		
DEE/D		
ADGM/D		
DGM/D		
DGM/C		

INDIA CREATING WEALTH FOR WELL BEING

NLC India Limited
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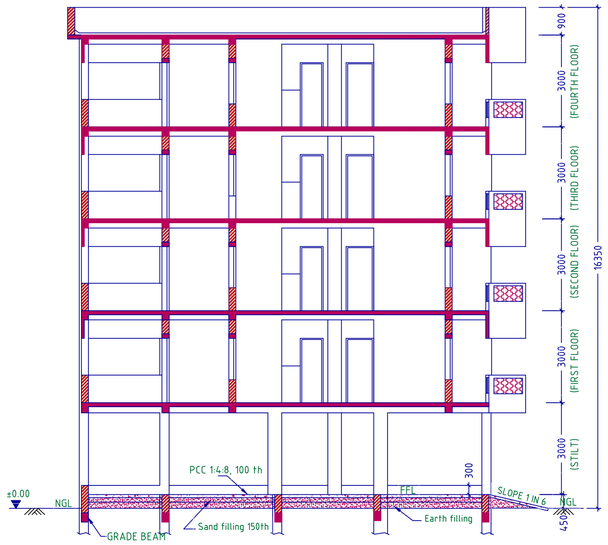
NEYVELI- 607 801,TAMIL NADU
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

PH QUARTERS
INTEGRATED TOWNSHIP,
TALABIRA

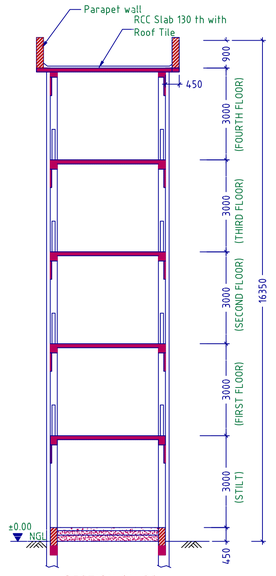
A2	SCALE: 1:100	TYPICAL PLAN	DRG No:

04-Sep-20 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C2 - PH Quarters R1.dwg

ELEVATION FROM SIDE- X



CROSS SECTION ON AA



SECTION ON BB

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, BALCONY & CORRIDOR - ANTISKID CERAMIC FLOORING (#)
- STAIRCASE - ANTISKID STEP TILES (#)
- STILT FLOOR/PARKING AREA - ANTISKID EUROCON TILES FLOORING (#)

DADOOING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES
- KITCHEN TABLE WITH GRANITE FINISH AND WALL TILES UPTO 600 HT ABOVE WORKING TABLE
- CORRIDOR - 900 HT.
- STILT FLOOR - 115 BW AROUND COLUMN FOR 900 MM HT.

ROOFING :
- IN CASE OF FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES
- IN CASE OF SLOPED RCC ROOF - TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

ALL KITCHEN AND BEDROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

INDICATIVE JOINERY SCHEDULE:

AGD-----ALUMINIUM GRILL DOOR.....1200X2100
MD-----TW MAIN DOOR (DL).....1200X2100
D1 ----- TW DOOR (SL).....1000X2100
D2----- FRP SINGLE LEAF DOOR.....750X2100
D3----- TW DOOR (SL).(HEAD ROOM).....900X2100
SD -----STEEL DOOR (DL).(Electrical room).....1000X2100
W1----- TW WINDOW WITH GRILL PROTECTION.....1200X1350
W2----- TW WINDOW WITH GRILL PROTECTION.....1200X900
ASW--- AL SLIDING WINDOW WITH GRILL PROTECTION.....1200X1350
SW----- STEEL WINDOW WITH GRILL PROTECTION.....1200X1350
FW -----FIXED GLASS WINDOW WITH GRILL PROTECTION.....1500X2400
V------TW VENTILATOR.....600X450
EX-----EXHAUST FAN

NOTE
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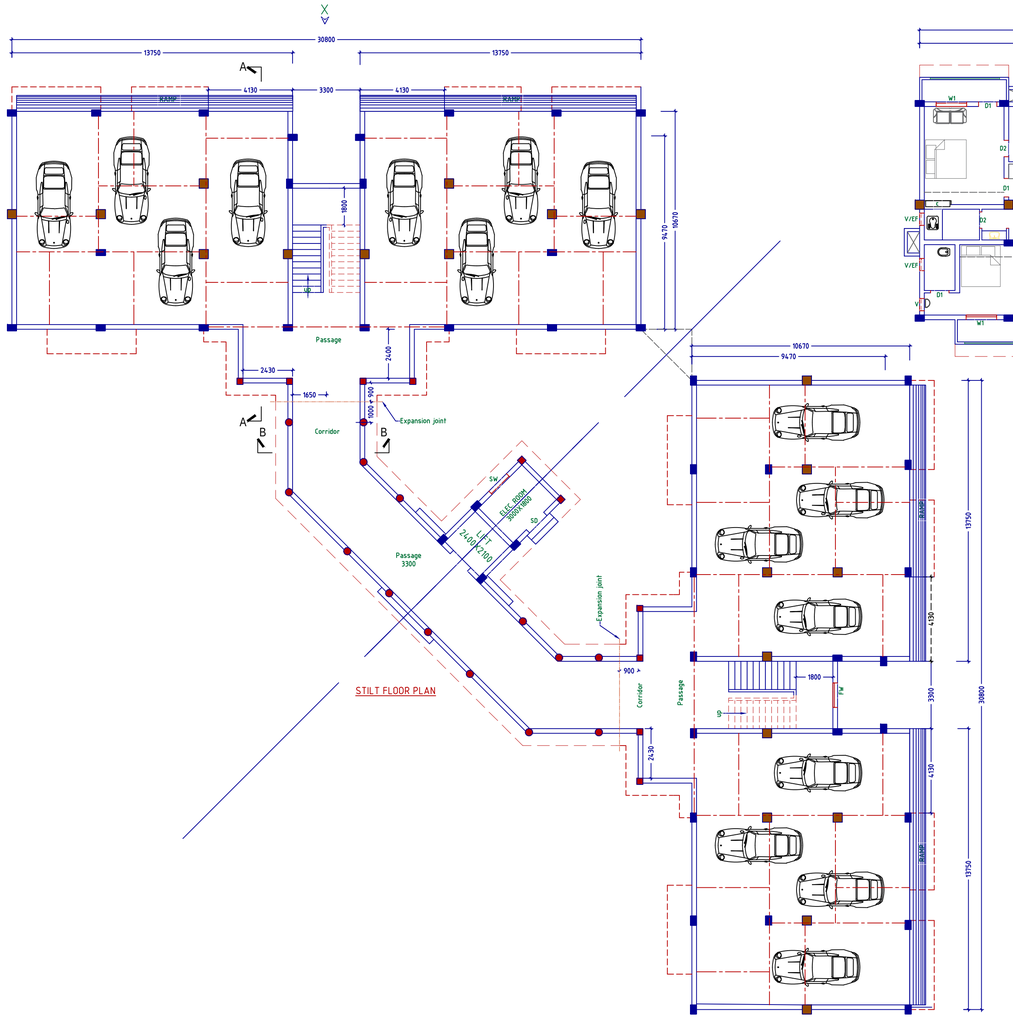
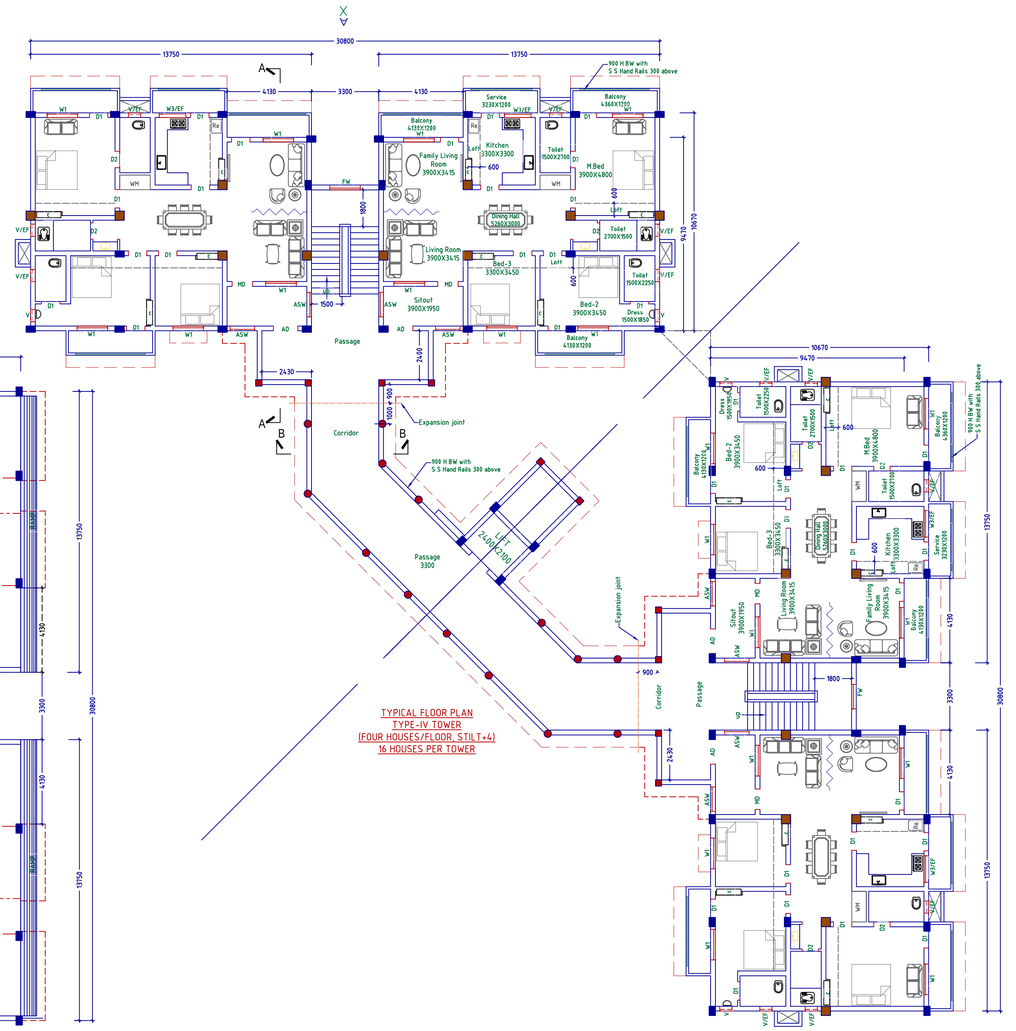
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE FOR STILT+4 WITH HEADROOM AND MACHINE ROOM FOR LIFT. MINIMUM HEIGHT OF EACH FLOOR SHALL BE 3000 MM (FLOOR TO FLOOR). ZONE-3 SHALL BE TAKEN FOR SEISMIC DESIGN OF BUILDING. BASIC WIND SPEED SHALL BE AS PER IS 875 PART III.
8. SUFFICIENT SPACE FOR PARKING 16 CARS SHALL BE AVAILABLE IN EACH BUILDING IN STILT FLOOR.
9. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES. 3D REVIT MODEL SHALL BE SUBMITTED ALONGWITH ARCHITECTURAL DRAWING.
10. LOADING CALCULATION, STAAD DESIGN, DESIGN DOCUMENT SHALL BE SUBMITTED FOR NLCIL APPROVAL.
11. ALL PARAPET WALLS, SERVICE AREAS, BALCONY AND CORRIDORS SHALL BE PROVIDED WITH 900 HT BRICK WALL WITH 300 HT SS HANDRAILS OVER IT.
12. NECESSARY SERVICE DUCTS SHALL BE PROVIDED FOR ROUTING WATER/DRAINAGE PIPELINES. SERVICE DUCTS SHALL BE EASILY ACCESSIBLE FROM MAINTENANCE POINT OF VIEW.
13. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN AND TOILET FIXTURES.
14. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
15. ANTI-TERMITE TREATMENT SHALL BE PROVIDED FOR ALL BUILDINGS.



STILT FLOOR PLAN



TYPICAL FLOOR PLAN
TYPE-IV TOWER
(FOUR HOUSES/FLOOR, STILT+4)
16 HOUSES PER TOWER

ANNEXURE DRG NO.
C3

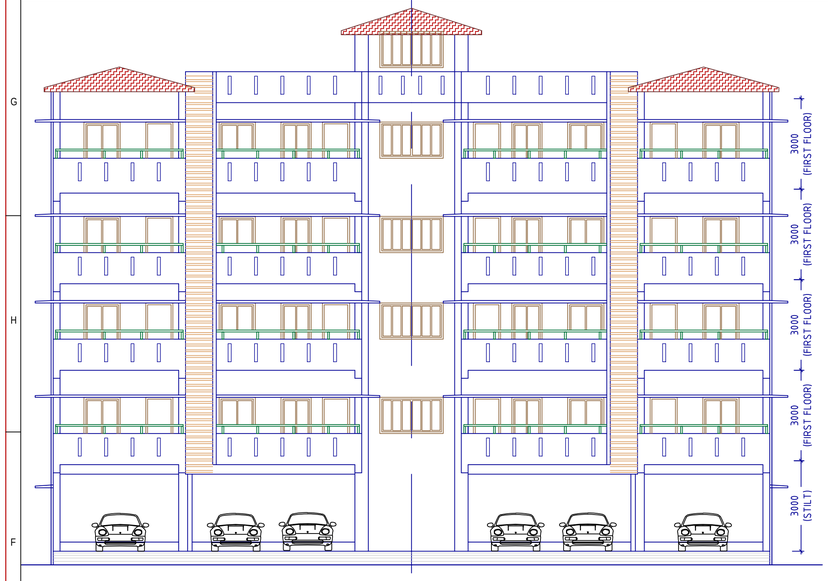
PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/D		
ED/C		

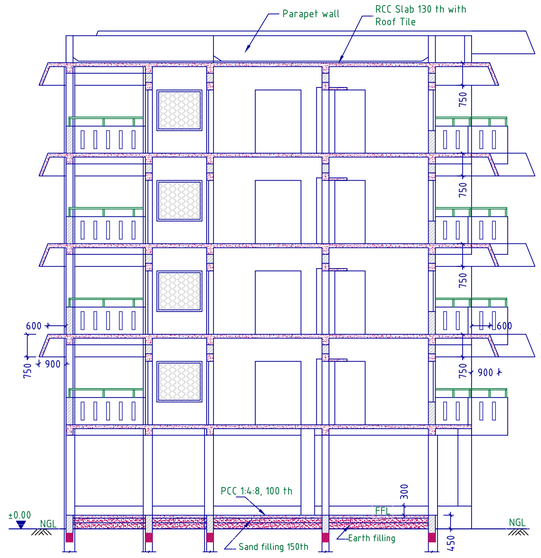
NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

TYPICAL QUARTERS-IV
INTEGRATED TOWNSHIP,
TALABIRA

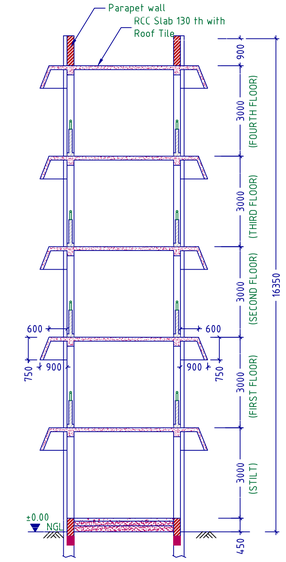
A1 | SCALE: 1:100, 1:30 | ARCHITECTURAL DRAWING | DRG No:



ELEVATION FROM SIDE- X



CROSS SECTION ON AA



SECTION ON BB

INDICATIVE JOINERY SCHEDULE:

AGD	ALUMINIUM GRILL DOOR 1200X2100
MD	TW MAIN DOOR (DL) 1200X2100
D1	TW DOOR (SL) 1000X2100
D2	FRP SINGLE LEAF DOOR 750X2100
D3	TW DOOR (SL)..(HEAD ROOM) 900X2100
SD	STEEL DOOR (DL)..(Electrical room) 1000X2100
O	OPENING 1200X2100
O1	OPENING 1500X2100
W1	TW WINDOW WITH GRILL PROTECTION 1200X1350
W2	TW WINDOW WITH GRILL PROTECTION 1200X900
W3	TW WINDOW WITH GRILL PROTECTION 1000X1350
ASW	AL. SLIDING WINDOW WITH GRILL PROTECTION 1200X1350
SW	STEEL WINDOW WITH GRILL PROTECTION 1200X1350
FW	FIXED GLASS WINDOW WITH GRILL PROTECTION 1500X2400
V	TW VENTILATOR 600X450
EX	EXHAUST FAN

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. 3.DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE FOR STILT+4 WITH HEADROOM AND MACHINE ROOM FOR LIFT. MINIMUM HEIGHT OF EACH FLOOR SHALL BE 3000 MM (FLOOR TO FLOOR). ZONE-3 SHALL BE TAKEN FOR SEISMIC DESIGN OF BUILDING. BASIC WIND SPEED SHALL BE AS PER IS 875 PART III.
8. SUFFICIENT SPACE FOR PARKING 16 CARS SHALL BE AVAILABLE IN EACH BUILDING IN STILT FLOOR.
9. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES. 3D REVIT MODEL SHALL BE SUBMITTED ALONGWITH ARCHITECTURAL DRAWING.
10. LOADING CALCULATION, STAAD DESIGN, DESIGN DOCUMENT SHALL BE SUBMITTED FOR NLCIL APPROVAL.
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12. NECESSARY SERVICE DUCTS SHALL BE PROVIDED FOR ROUTING WATER/DRAINAGE PIPELINES. SERVICE DUCTS SHALL BE EASILY ACCESSIBLE FROM MAINTENANCE POINT OF VIEW.
13. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN AND TOILET FIXTURES.
14. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
15. ANTI-TERMITE TREATMENT SHALL BE PROVIDED FOR ALL BUILDINGS.

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE – 15 mm thick in CM 1:5
- CEILING – 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL – INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL – EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING – INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS – VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, BALCONY & CORRIDOR – ANTISKID CERAMIC FLOORING (#)
- STAIRCASE – ANTISKID STEP TILES (#)
- STILT FLOOR/PARKING AREA – ANTISKID EUROCON TILES FLOORING (#)

DADOOING/SKIRTING :
- ALL ROOMS – SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC – DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES
- KITCHEN TABLE WITH GRANITE FINISH AND WALL TILES UPTO 600 HT ABOVE WORKING TABLE
- CORRIDOR – 900 HT.
- STILT FLOOR – 115 BW AROUND COLUMN FOR 900 MM HT.

ROOFING :
- IN CASE OF FLAT RCC ROOF – CERAMIC WEATHER PROOF ROOF TILES
- IN CASE OF SLOPED RCC ROOF – TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

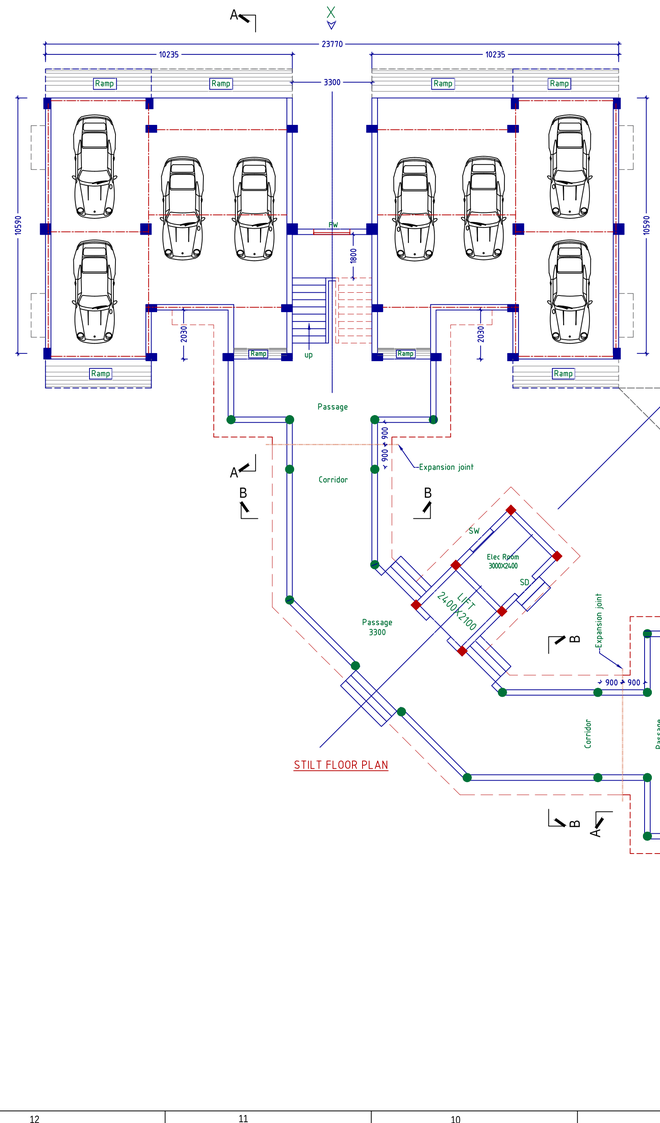
ALL KITCHEN AND BEDROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

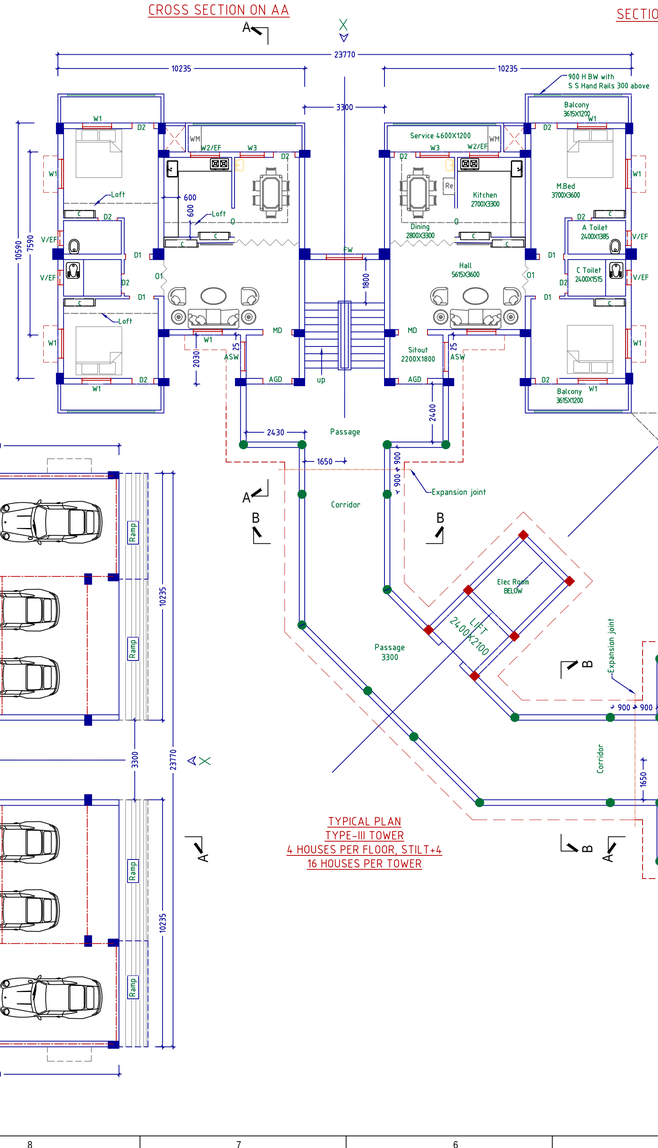
EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

SPECIAL NOTE-

1. CHAMBER BURNT BRICK WALL 230 THK UPTO BASEMENT IN CM 1:5
2. FLY ASH BRICK WALL 230 THK ABOVE BASEMENT IN CM 1:5
3. CHAMBER BURNT BRICK WORK 115 THK ABOVE AND BELOW BASEMENT IN CM 1:4



STILT FLOOR PLAN



TYPICAL PLAN
TYPE-III TOWER
4 HOUSES PER FLOOR, STILT+4
16 HOUSES PER TOWER

ANNEXURE DRG NO.
C4

PRELIMINARY DRAWING FOR TENDERING PURPOSE ONLY

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/D		
DGM/C		

NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
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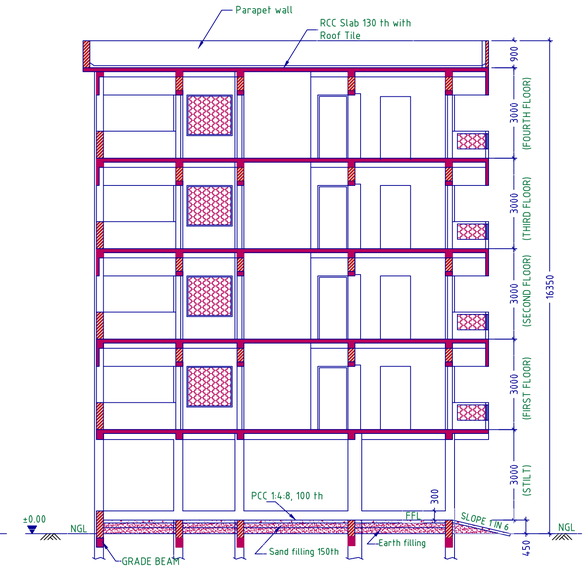
NEYVELI- 607 801,TAMIL NADU
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

TYPE III TOWER
INTEGRATED TOWNSHIP,
TALABIRA

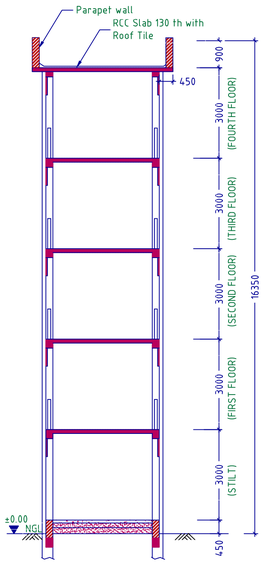
A1 | SCALE: 1:100, 1:20 | PLAN | DRG No:

09/10/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C4 - Type III Quarters.dwg

ELEVATION FROM SIDE- X



CROSS SECTION ON AA



SECTION ON BB

INDICATIVE JOINERY SCHEDULE:

AGD	ALUMINIUM GRILL DOOR 1200X2100
MD	TW MAIN DOOR (DL) 1200X2100
D1	TW DOOR (SL) 1000X2100
D2	FRP SINGLE LEAF DOOR 750X2100
D3	TW DOOR (SL)..(HEAD ROOM) 900X2100
SD	STEEL DOOR (DL)..(Electrical room) 1000X2100
O	OPENING 1235X2100
O1	OPENING 900X2100
W1	TW WINDOW WITH GRILL PROTECTION 1200X1350
W2	TW WINDOW WITH GRILL PROTECTION 1200X900
W3	TW WINDOW WITH GRILL PROTECTION 1000X1350
ASW	AL. SLIDING WINDOW WITH GRILL PROTECTION 1200X1350
SW	STEEL WINDOW WITH GRILL PROTECTION 1200X1350
FW	FIXED GLASS WINDOW WITH GRILL PROTECTION 1500X2400
V	TW VENTILATOR 600X450
EX	EXHAUST FAN

NOTE

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INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE – 15 mm thick in CM 1:5
- CEILING – 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL – INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL – EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING – INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS – VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, BALCONY & CORRIDOR – ANTISKID CERAMIC FLOORING (#)
- STAIRCASE – ANTISKID STEP TILES (#)
- STILT FLOOR/PARKING AREA – ANTISKID EUROCON TILES FLOORING (#)

DADOOING/SKIRTING :
- ALL ROOMS – SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC – DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES
- KITCHEN TABLE WITH GRANITE FINISH AND WALL TILES UPTO 600 HT ABOVE WORKING TABLE
- CORRIDOR – 900 HT.
- STILT FLOOR – 115 BW AROUND COLUMN FOR 900 MM HT.

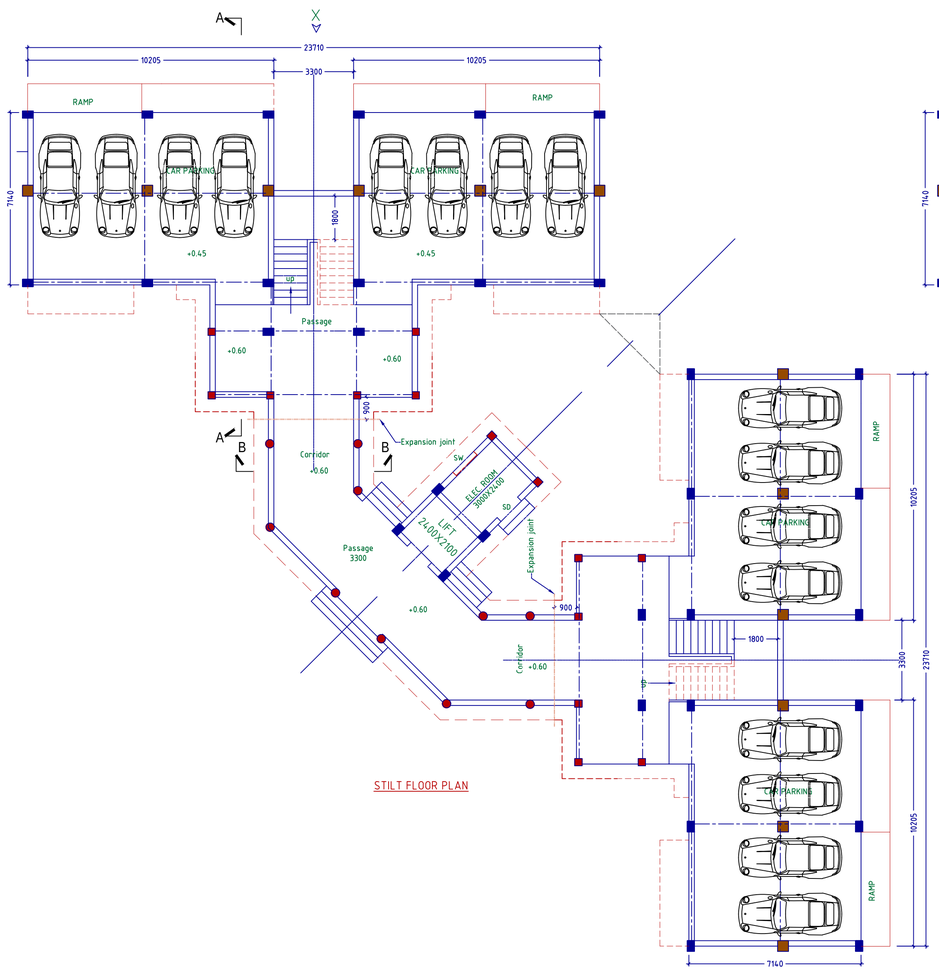
ROOFING :
- IN CASE OF FLAT RCC ROOF – CERAMIC WEATHER PROOF ROOF TILES
- IN CASE OF SLOPED RCC ROOF – TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

ALL KITCHEN AND BEDROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

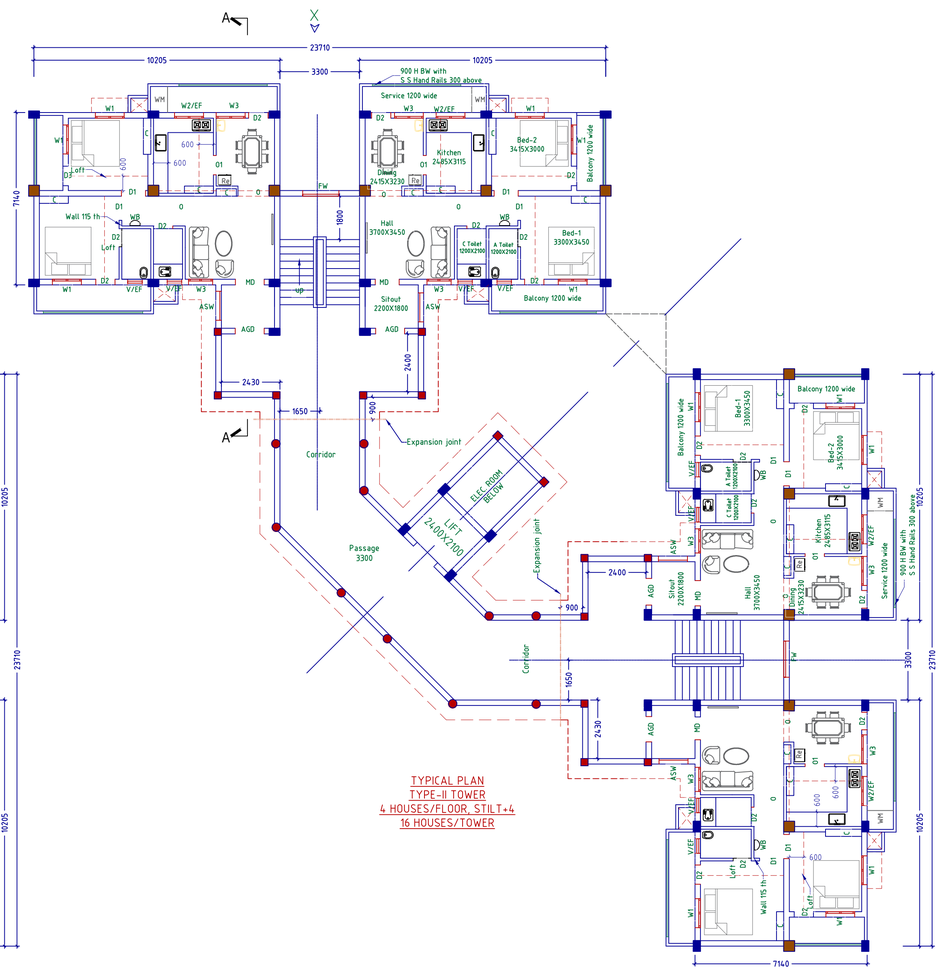
SPECIAL NOTE:-
1. CHAMBER BURNT BRICK WALL 230 THK UPTO BASEMENT IN CM 1:5
2. FLY ASH BRICK WALL 230 THK ABOVE BASEMENT IN CM 1:5
3. CHAMBER BURNT BRICK WORK 115 THK ABOVE AND BELOW BASEMENT IN CM 1:4



STILT FLOOR PLAN

CROSS SECTION ON AA

SECTION ON BB



TYPICAL PLAN
TYPE-II TOWER
4 HOUSES/FLOOR, STILT+4
16 HOUSES/TOWER

ANNEXURE DRG NO.
C5

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/D		
GM/C/ic		

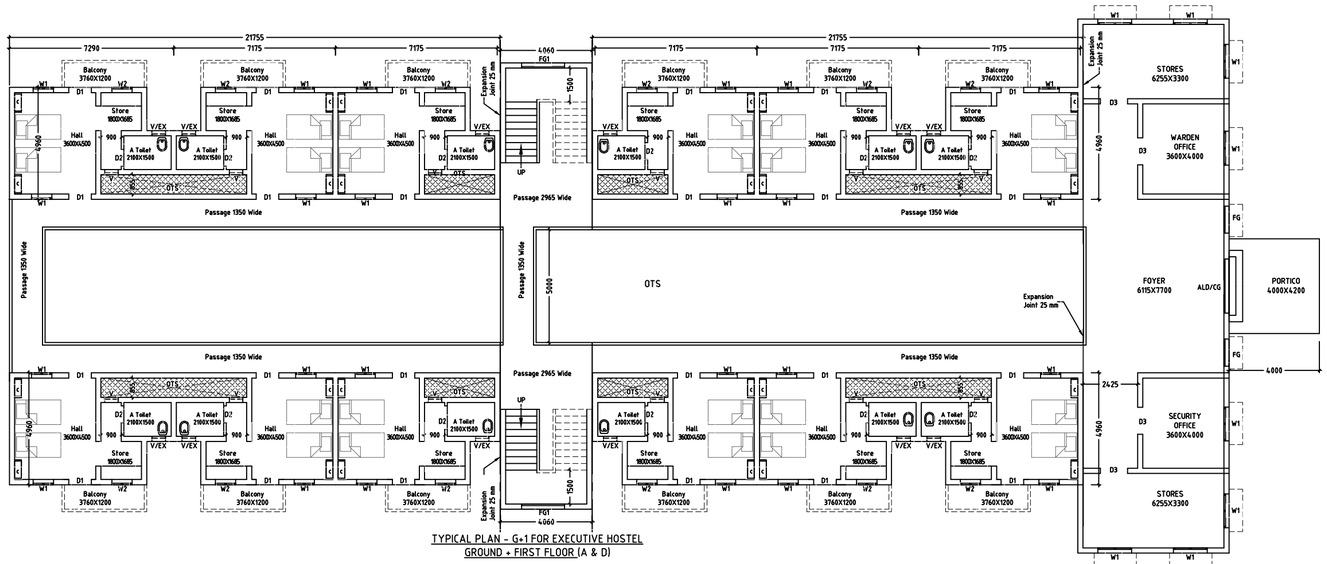
NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU

CREATING WEALTH FOR WELL BEING

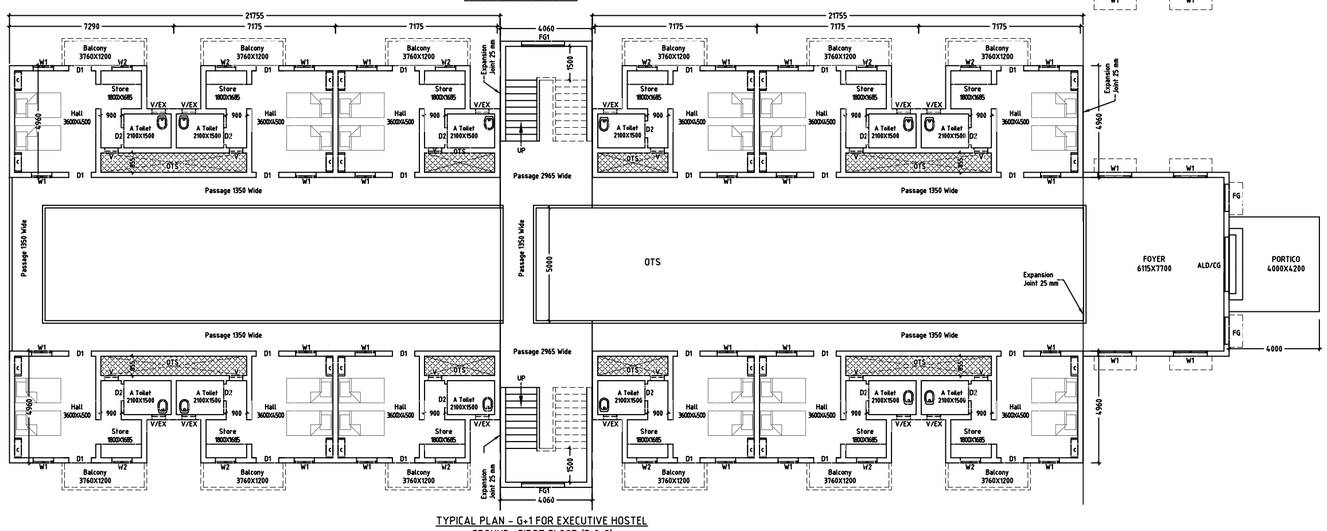
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

TYPE II TOWER
INTEGRATED TOWNSHIP,
TALABIRA

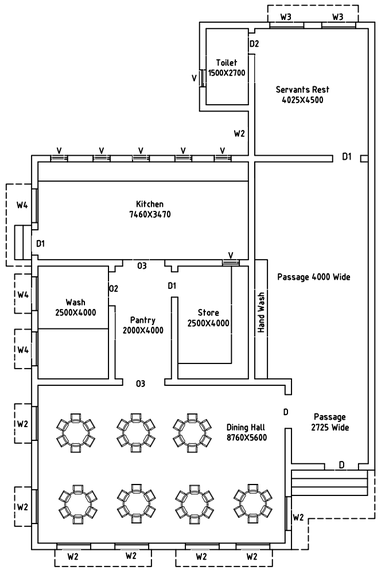
A1 | SCALE: 1:100, 1:25 | ARCHITECTURAL DETAILS | DRG No:



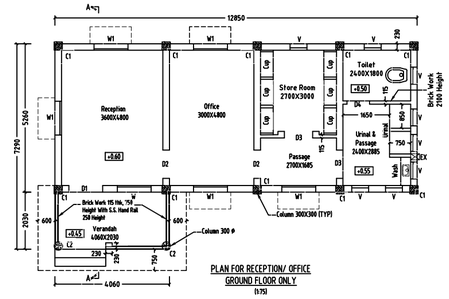
TYPICAL PLAN - G+1 FOR EXECUTIVE HOSTEL
GROUND + FIRST FLOOR (A & D)



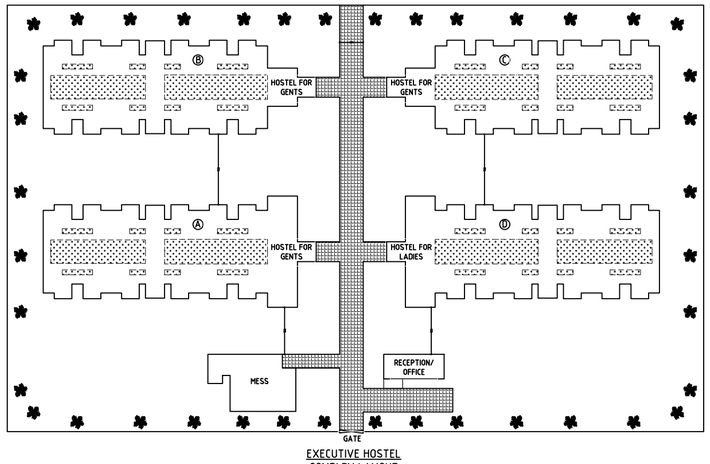
TYPICAL PLAN - G+1 FOR EXECUTIVE HOSTEL
GROUND +FIRST FLOOR (B & C)



TYPICAL PLAN
FOR MESS
GROUND FLOOR



PLAN FOR RECEPTION/ OFFICE
GROUND FLOOR ONLY



EXECUTIVE HOSTEL
COMPLEX LAYOUT

JOINERY SCHEDULE (BACHELOR'S HOSTEL):

SGD-----	STEEL GLASS DOOR.....2000X2100
MD-----	TW MAIN DOOR (DL).....1200X2100
D1 -----	TW DOOR (SL).....1000X2100
D2-----	TW DOOR (SL).....900X2100
D3-----	FRP SINGLE LEAF DOOR.....750X2100
O -----	OPENING.....1235X2100
O1-----	OPENING 900X2100
W1-----	TW WINDOW WITH GRILL PROTECTION.....1500X1350
KW-----	TW WINDOW WITH GRILL PROTECTION.....1200X900
FG -----	FIXED GLASS WINDOW WITH GRILL PROTECTION.....1500X1200
V------	TW VENTILATOR.....600X450
EX-----	EXHAUST FAN

JOINERY SCHEDULE (MESS & RECEPTION/OFFICE):

D1 -----	TW DOOR (SL).....1000X2100
D2-----	TW DOOR (SL).....900X2100
D3-----	FRP SINGLE LEAF DOOR.....750X2100
O -----	OPENING.....1235X2100
W1-----	TW WINDOW WITH GRILL PROTECTION.....1200X1350
W2-----	TW WINDOW WITH GRILL PROTECTION.....1200X900
V------	TW VENTILATOR.....600X450

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, BALCONY & CORRIDOR - ANTISKID CERAMIC FLOORING (#)
- STAIRCASE - ANTISKID STEP TILES (#)
- PORTICO - ANTISKID EUROCON TILES FLOORING (#)

DADOOING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES
- KITCHEN TABLE WITH GRANITE FINISH AND WALL TILES UPTO 600 HT ABOVE WORKING TABLE

ROOFING :
- IN CASE OF FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES
- IN CASE OF SLOPED RCC ROOF - TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

ALL HOSTEL STORE AND ROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

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SPECIAL NOTE-
1. CHAMBER BURNT BRICK WALL 230 THK UPTO BASEMENT IN CM 1:5
2. FLY ASH BRICK WALL 230 THK ABOVE BASEMENT IN CM 1:5
3. CHAMBER BURNT BRICK WORK 115 THK ABOVE AND BELOW BASEMENT IN CM 1:4

ANNEXURE DRG NO.
C6

PRELIMINARY DRAWING FOR
TENDER PURPOSE ONLY

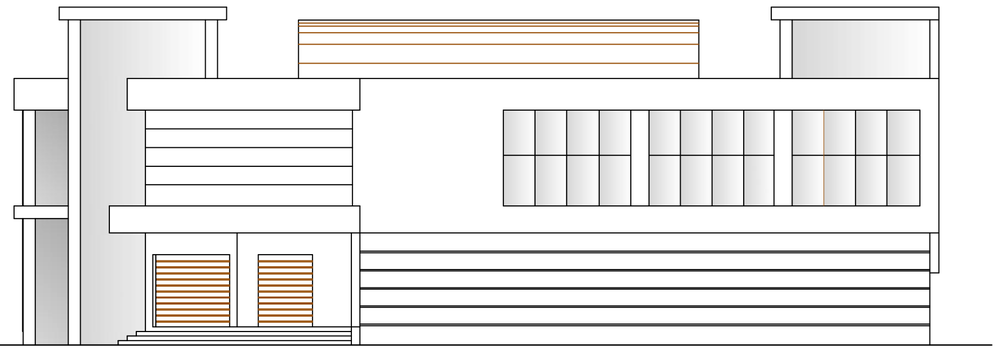
	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
ADGM/D		
DGM/D		
ED/C		

NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU
CREATING WEALTH FOR WELL BEING
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

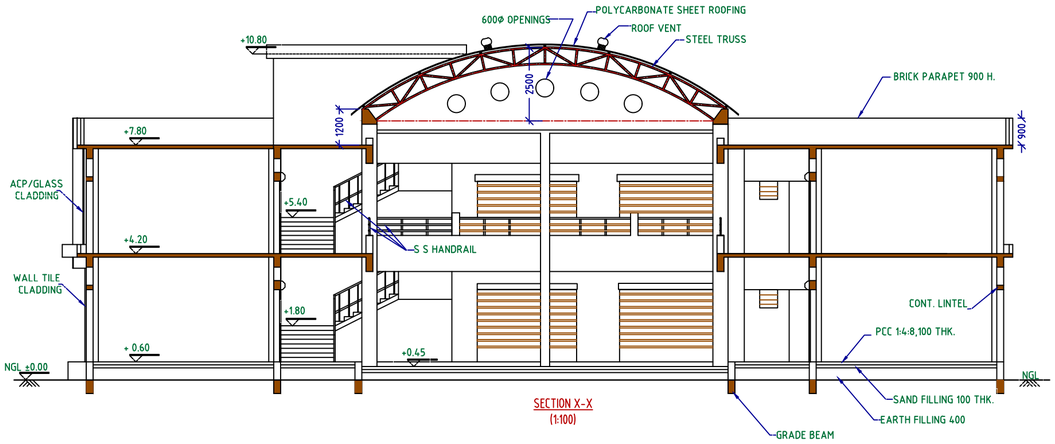
EXECUTIVE HOSTEL (96 ROOMS)
INTEGRATED TOWNSHIP, TALABIRA

A1 | SCALE: 1:100, 1:30 | ARCHITECTURAL DRAWING | DRG No:

05/05/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C6 - Executive hostel.dwg



FRONT ELEVATION



SECTION X-X
(1:100)

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL SHOPS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET & CORRIDOR - ANTISKID CERAMIC FLOORING (#)
- STAIRCASE - ANTISKID STEP TILES (#)
- STILT FLOOR/PARKING AREA - ANTISKID EUROCON TILES FLOORING (#)

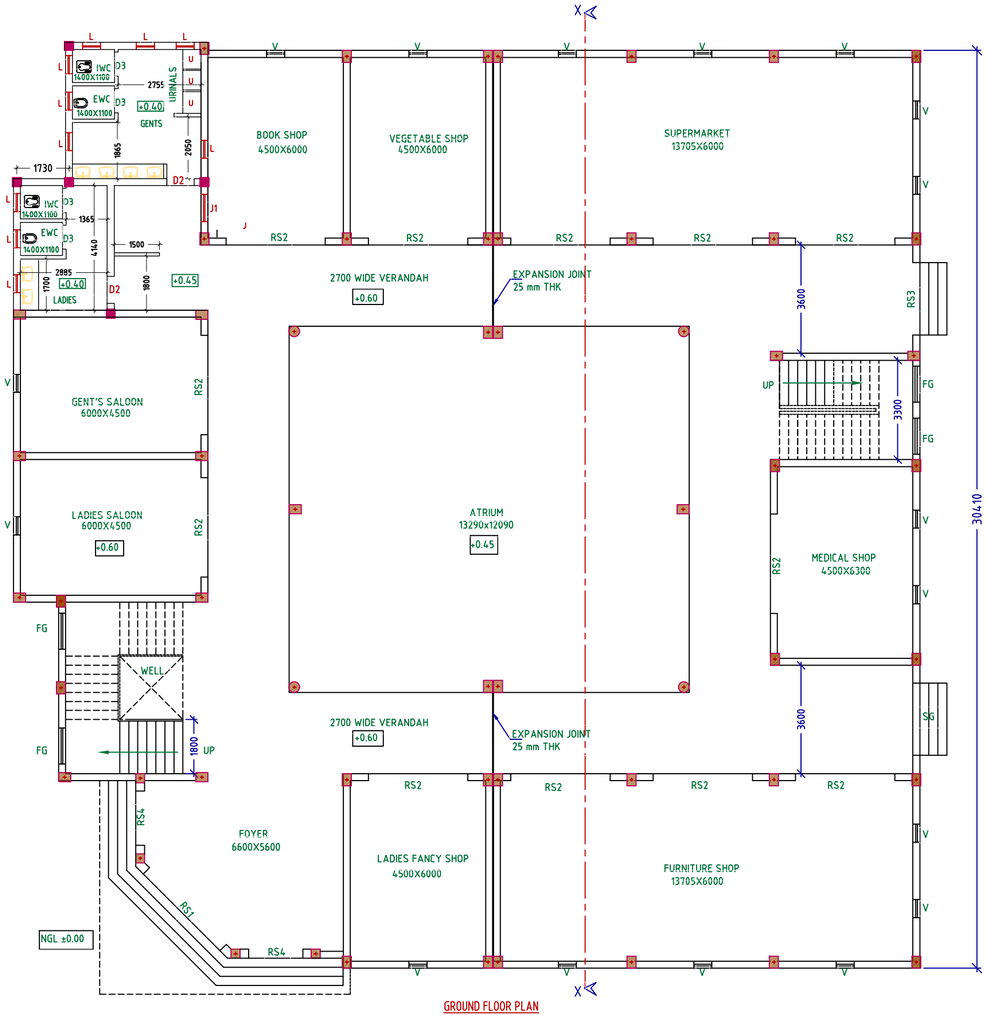
DADOING/SKIRTING :
- ALL SHOPS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADOING 2100 HT WITH CERAMIC BATH ROOM TILES
- CORRIDOR - 900 HT.
- BASEMENT PARKING - 115 BW AROUND COLUMN FOR 900 MM HT.

ROOFING :
- IN CASE OF FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES
- IN CASE OF SLOPED RCC ROOF - TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

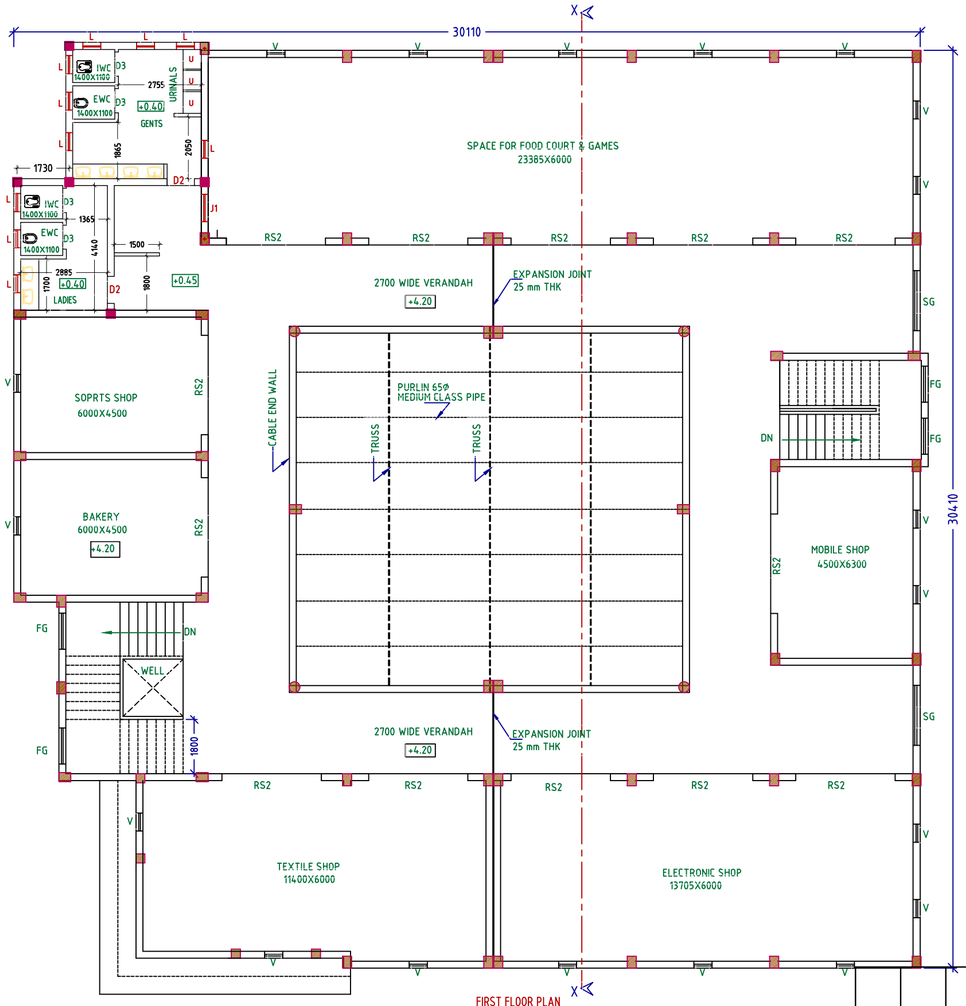
ALL KITCHEN AND BEDROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR



GROUND FLOOR PLAN
(1:100)



FIRST FLOOR PLAN
(1:100)

NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. STRUCTURE SHALL BE DESIGNED AS RCC FRAMED STRCUTURE FOR G+1. ZONE-3 SHALL BE TAKEN FOR SEISMIC DESIGN OF BUILDING. BASIC WIND SPEED SHALL BE AS PER IS 875 PART III.
8. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES. ACP CLADDING, PARTITION WALLS AND GLASS PANELLING SHALL BE PROVIDED SUITABLY TO INCREASE ARCHITECTURAL APPEARANCE AND FROM UTILITY POINT OF VIEW. JOINEY DETAILS INDICATED ARE ALSO TENTATIVE AND SHALL BE FINALISED DURING DETAILED ENGINEERING.
9. LOADING CALCULATION, STAAD DESIGN, DESIGN DOCUMENT SHALL BE SUBMITTED FOR NLCIL APPROVAL.
10. ALL PARAPET WALLS AND CORRIDORS SHALL BE PROVIDED WITH 900 HT BRICK WALL WITH 300 HT SS HANDRAILS OVER IT.
11. NECESSARY SERVICE DUCTS SHALL BE PROVIDED FOR ROUTING WATER/DRAINAGE PIPELINES. SERVICE DUCTS SHALL BE EASILY ACCESSIBLE FROM MAINTENANCE POINT OF VIEW.
12. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN AND TOILET FIXTURES.
13. ANTI-TERMITE TREATMENT SHALL BE PROVIDED FOR ALL BUILDINGS.
14. PLINTH PROTECTION TO A MINIMUM WIDTH OF 0.75 m WITH 75mm THICK OF CEMENT CONCRETE 1:2:4 OVER 75mm BED OF DRY BRICK BALLAST 40MM NOMINAL SIZE WELL RAMMED AND CONSOLIDATED AND GROUTED WITH FINE SAND INCLUDING FINISHING THE TOP WITH SUITABLE SLOPE & EDGE DRAIN.
15. ALL WINDOWS AND VENTILATORS OF ALL BUILDINGS SHALL BE PROVIDED WITH SUITABLE MS GRILL PROTECTION
16. RAIN GUTTER & PVC (110 MM DIA.) RAIN WATER DOWN TAKE PIPE, SHALL BE PROVIDED WHEREVER REQUIRED FOR EFFICIENT DISPOSAL OF RAINWATER FROM SLOPED ROOF.
17. THE BUILDING SHALL BE FITTED LED LIGHTS, AUTO FLUSH WASH FOR REST ROOMS, AUTO HAND WASH, EXHAUST FANS, ACTIVE SMOKE DETECTORS, AND FIRE FIGHTING EQUIPMENTS.

SPECIAL NOTE-
1. CHAMBER BURNT BRICK WALL 230 THK UPTO BASEMENT IN CM 1:5
2. FLY ASH BRICK WALL 230 THK ABOVE BASEMENT IN CM 1:5
3. CHAMBER BURNT BRICK WORK 115 THK ABOVE AND BELOW BASEMENT IN CM 1:4

ANNEXURE DRG NO.
C7

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

SCHEDULE OF JOINERY:

RS1.....ROLLING SHUTTER...3600X2400
RS2.....ROLLING SHUTTER...3300X2400
RS3.....ROLLING SHUTTER...2400X2400
RS4.....ROLLING SHUTTER...2000X2400
D1.....CW FLUSH DOOR.....1000X2100
D2.....CW FLUSH DOOR.....900X2100

V.....GLAZED VENTILATOR WITH PPS FRAME 600X6000
W.....GLAZED WINDOW WITH PPS FRAME 1200X1500
FG.....FIXED GLASS WITH PPS FRAME.....1200X1200
SG..... M S GRILLS.....1800X1500
L ..FIXED GLASS LOUVERS WITH PPS FRAME.....600X600
D3.....FRP DOOR.....800X2000
××PPS-PREPAINTED STELL

REV.	DATE	AMENDMENTS	SEE/D	ACM/D	CM/D	DGM/C	GM/C

	SIGNATURE	DATE
DRN BY D' MAN	ESAKKIMUTHU.S.S	
DEE/D		
EE/D		
ACM/D		
ACM/D		
CM/D		
DGM/C		
GM/C		

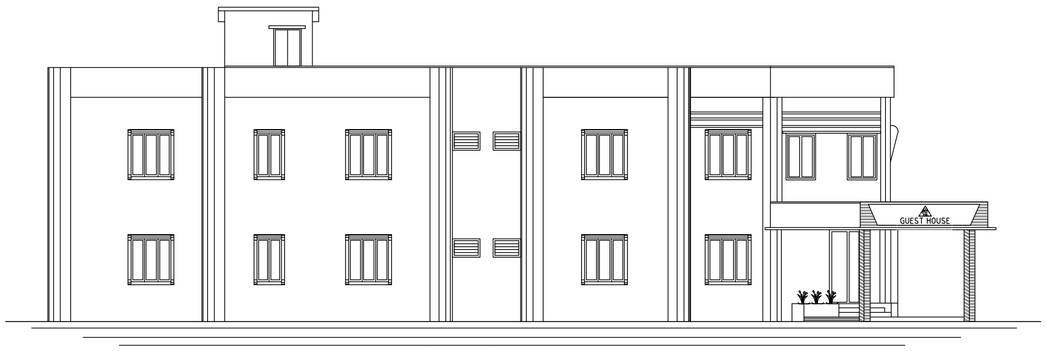
NEYVELI LIGNITE CORPORATION LTD
('NAVARATNA' -A GOVT. OF INDIA ENTERPRISES)
NEYVELI- 607 801,TAMIL NADU

OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL/CTO

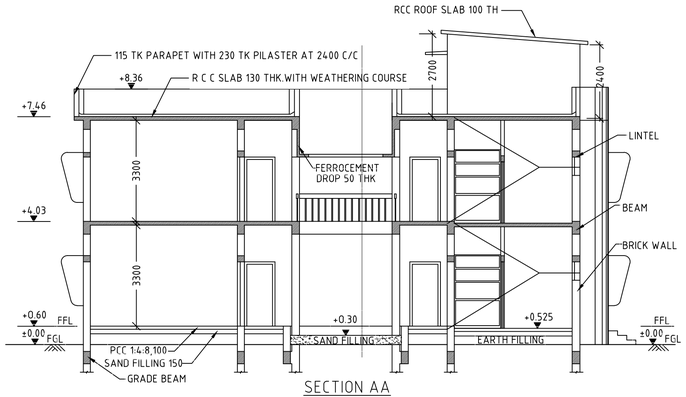
SHOPPING COMPLEX
INTEGRATED TOWNSHIP,
TALABIRA

A1	SCALE 1:100, 1:20	ARCHITECTURAL DETAILS	DRG NO:

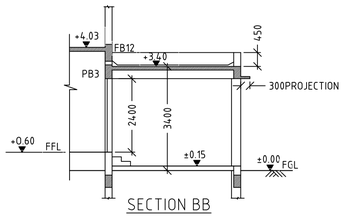
04/01/2014 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C7 - Shopping Complex.dwg



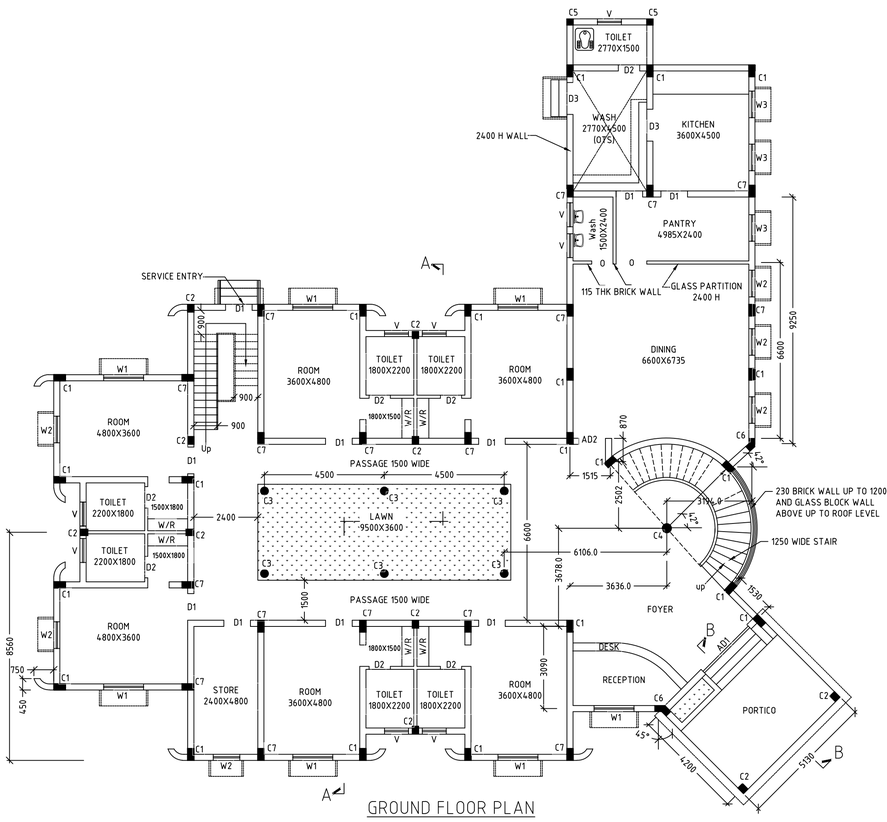
FRONT ELEVATION



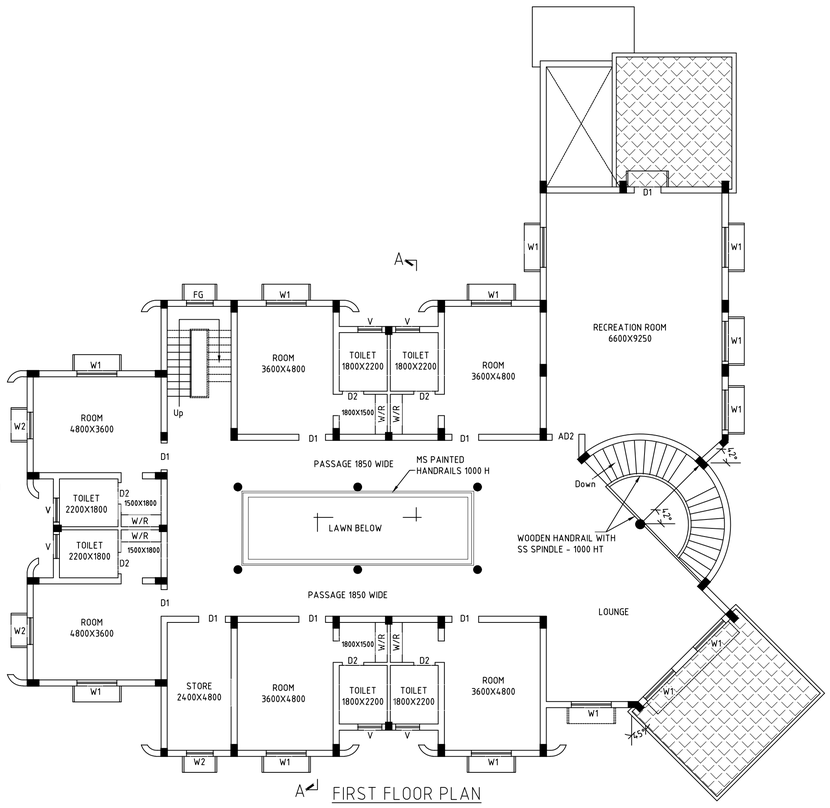
SECTION AA



SECTION BB



GROUND FLOOR PLAN



FIRST FLOOR PLAN

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :
- ALL ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, BALCONY & CORRIDOR - ANTISKID CERAMIC FLOORING (#)
- STAIRCASE - ANTISKID STEP TILES (#)
- PORTICO- ANTISKID EUROCON TILES FLOORING (#)

DADOOING/SKIRTING :
- ALL ROOMS - SKIRTING OF 100 MM HT WITH VITRIFIED CERAMIC TILES
- TOILET & WC - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES
- KITCHEN TABLE WITH GRANITE FINISH AND WALL TILES UPTO 600 HT ABOVE WORKING TABLE
- CORRIDOR - 900 HT.

ROOFING :
- IN CASE OF FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES
- IN CASE OF SLOPED RCC ROOF - TERACOTTA RED CLAY ROOF TILES/MANGALORE PATTERN TILES

ALL KITCHEN AND BEDROOM LOFTS/CUPBOARDS SHALL BE PROVIDED WITH CLOSED CABINET ARRANGEMENTS WITH MAGNETIC CATCHER.

FURNITURES SHOWN IN PLAN ARE INDICATIVE ONLY AND NOT IN THE SCOPE OF EPC CONTRACTOR.

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR

SPECIAL NOTE-
1. CHAMBER BURNT BRICK WALL 230 THK UPTO BASEMENT IN CM 1:5
2. FLY ASH BRICK WALL 230 THK ABOVE BASEMENT IN CM 1:5
3. CHAMBER BURNT BRICK WORK 115 THK ABOVE AND BELOW BASEMENT IN CM 1:4

C8

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

SCHEDULE OF JOINERY:

1. AD1..ALUMINIUM GLAZED DOOR (2 SWING+2 FIXED)WITH 450 GLAZED HEAD	2400X2400
2. AD2..ALUMINIUM GLAZED DOOR	1200X2100
3. D1..TEAK WOOD FLUSH DOOR	1000X2100
4. D2.. MOULDED DOOR	800X2000
5. D3 ...CW PANELLED DOOR (D/L)	1200X2100
6. D4....STEEL DOOR	1000X2100
7. W1.....T W GLAZED WINDOW.....	1500X1350
8. W2.....T W GLAZED WINDOW.....	1000X1350
9. W3.....T W GLAZED WINDOW.....	1000X1200
10. V1.....T W GLAZED VENTILATOR.....	900X600
11. FG.....FIXED GLASS	1200X1350

NOTE
1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
7. BUILDING SHALL BE AESTHETICALLY DESIGNED WITH ARCHITECTURAL FEATURES.
8. LOADING CALCULATION, STAAD DESIGN, DESIGN DOCUMENT SHALL BE SUBMITTED FOR NLCIL APPROVAL.
9. ALL PARAPET WALLS, SERVICE AREAS, BALCONY AND CORRIDORS SHALL BE PROVIDED WITH 900 HT BRICK WALL WITH 300 HT SS HANDRAILS OVER IT.
10. NECESSARY SERVICE DUCTS SHALL BE PROVIDED FOR ROUTING WATER/DRAINAGE PIPELINES. SERVICE DUCTS SHALL BE EASILY ACCESSIBLE FROM MAINTENANCE POINT OF VIEW.
11. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN AND TOILET FIXTURES.
12. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
13. ANTI-TERMITE TREATMENT SHALL BE PROVIDED FOR ALL BUILDINGS.
14. PLINTH PROTECTION 0.75m WIDE WITH EDGE DRAIN SHALL BE PROVIDED.

LEGEND:-

FGL ----- FINISHED GROUND LEVEL

FFL ----- FINISHED FLOOR LEVEL

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REV.	DATE	AMENDMENTS	DCE/D	CM/D	DGM/C	GM/C

	SIGNATURE	DATE
DCE/D		
DCE/D		
CM/D		
DGM/C		
DGM/C		

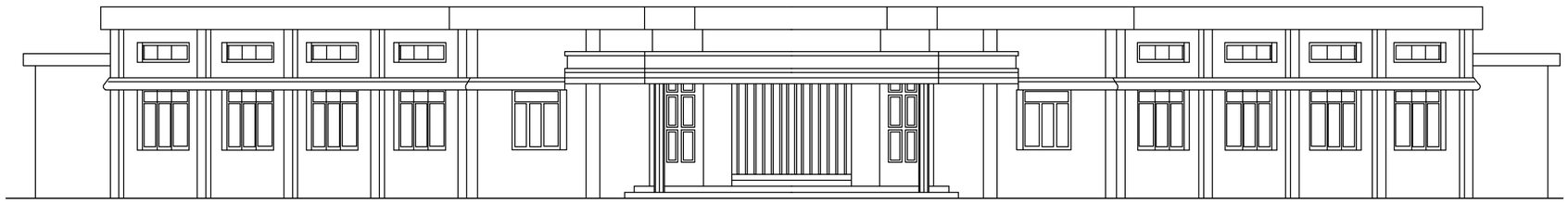
NEYVELI LIGNITE CORPORATION LTD
('NAVRATNA' -A GOVT. OF INDIA ENTERPRISE)
NEYVELI- 607 801,TAMIL NADU

OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL/CTO

GUEST HOUSE
INTEGRATED TOWNSHIP,
TALABIRA

A1	SCALE: 1:115, 1:100, 1:30	ARCHITECTURAL DRAWING	DRG No:

09/03/2016 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C8 - Guest House.dwg



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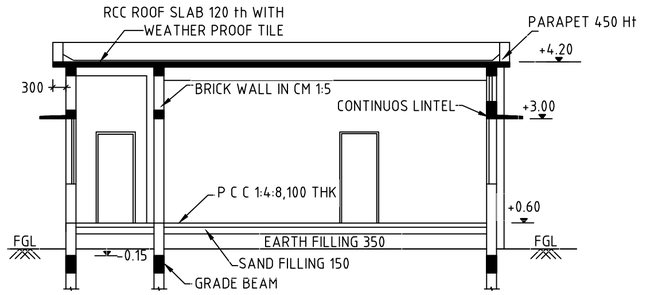
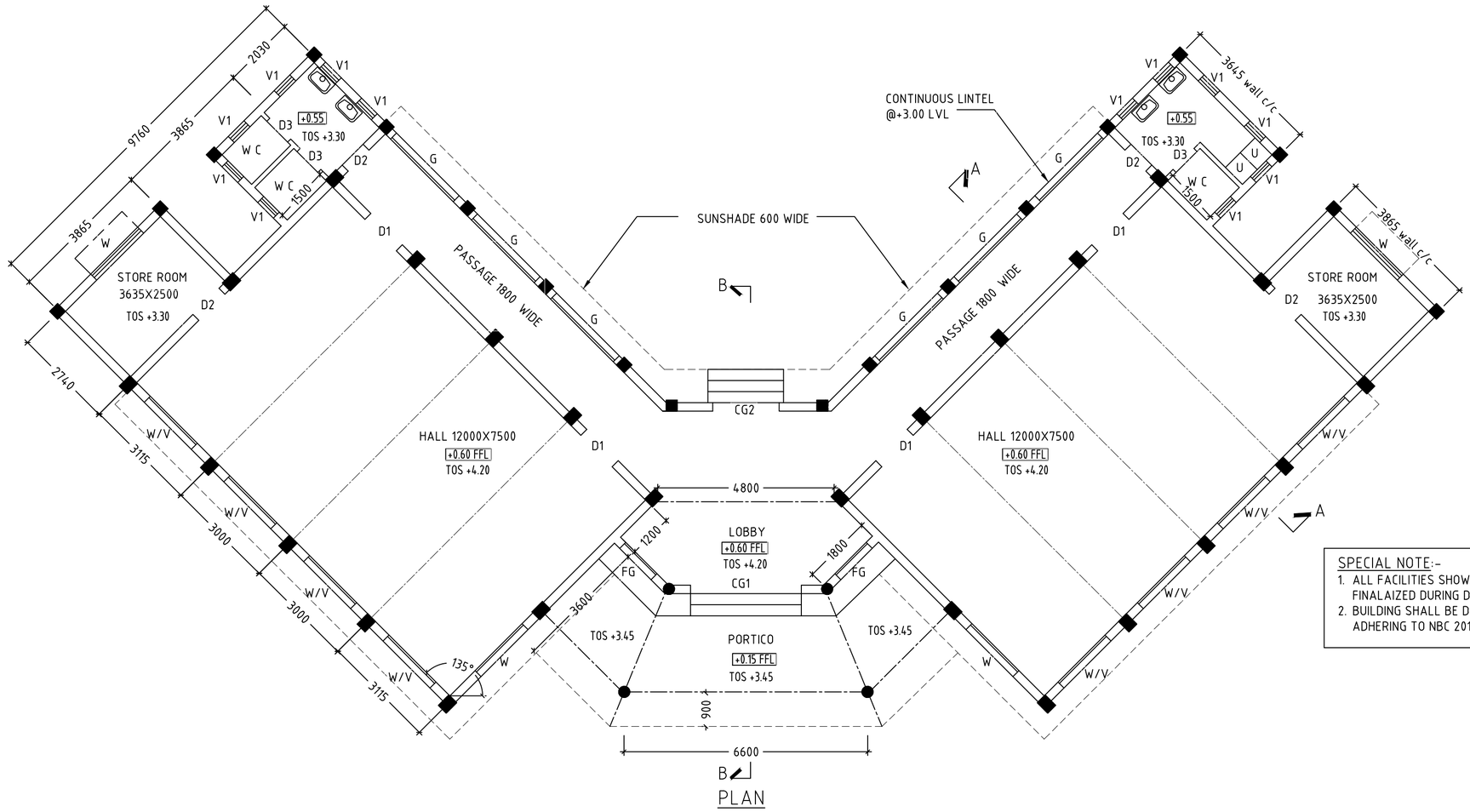
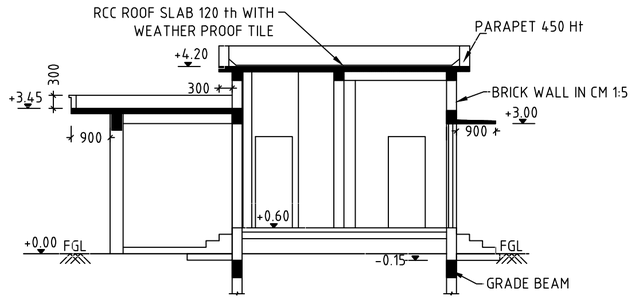


SECTION A A



PLAN



SECTION BB

LEGEND:
NGL - Natural Ground Level
FGL - Finished Ground Level
FFL - Finished Floor LEvel
TOS - Top of Roof Slab

SPECIAL NOTE:-
1. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALAIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL.
2. BUILDING SHALL BE DESIGNED AND CONSTRUCTED AS PER STANDARDS AND ADHERING TO NBC 2016

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

ANNEXURE DRG NO.
C9

JOINERY SCHEDULE:

D1..TW PANELLED DOOR (D/L)	1200X2100
D2...TW PANELLED DOOR(S/L)	900X2100
D3... FRP DOOR	800X2100
CG1.. COLLAPSIBLE GATE	3000X2400
CG2..COLLAPSIBLE GATE	1800X2400
G....M S GRILLS	2400X1500
FG...FIXED GLASS WITH STEEL FRAME×	1500X2100
W....GLAZED WINDOW WITH STEEL FRAME× .. WITH GRILL PROTECTION	1800X1500
V....GLAZED VENTILATOR WITH STEEL FRAME×	900X600
V1....GLAZED VENTILATOR WITH STEEL FRAME×	600X450

(× WITH PREPAINTED STEEL SECTIONS)

NOTE:-
1. ALL DIMENSIONS ARE IN mm & LEVELS IN METRES.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe 500.
3. ALL 230 THICK WALLS UP TO BASEMENT IN CM 1:5 & ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICK IN CM 1:4.
4. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLY ASH BRICKS IN CM 1:5
5. ANTI-TERMITE TREATMENT SHALL BE PROVIDED
6. PLINTH PROTECTION 750 mm WIDE SHALL BE PROVIDED.
7. PVC OVER HEAD TANK - 500 LITRESx2 Nos.

INDICATIVE FINISHING SCHEDULE:-

PAINTING:
- INTERIOR WALL-INTERIOR EMULSION
- EXTERIOR WALL-EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY
- CEILING-INTERIOR EMULSION

FLOORING
- CERAMIC TILE FLOORING FOR ALL ROOMS AND PASSAGE.
- TOILET- ANTISKID CERAMIC TILES
- DADOOING 1500 H IN WASH AREA& 2100 H IN TOILET

ROOFING
- FLAT RCC ROOF -CERAMIC WEATHER PROOF TILES

REV.	DATE	AMENDMENTS	DCE/D	CM/D	ADGM/C	DGM/C	GM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
ADGM/D		
DGM/D		
GM/C		

NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
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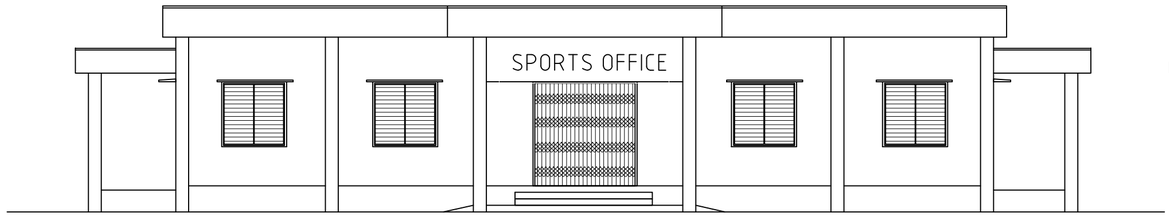
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

RECREATION CLUB
INTEGRATED TOWNSHIP
NTTTPP

A2	SCALE: 1:100	ARCHITECTURAL DRAWING	DRG No: CGMC/ /2020

04/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C9 - Recreation Club.dwg



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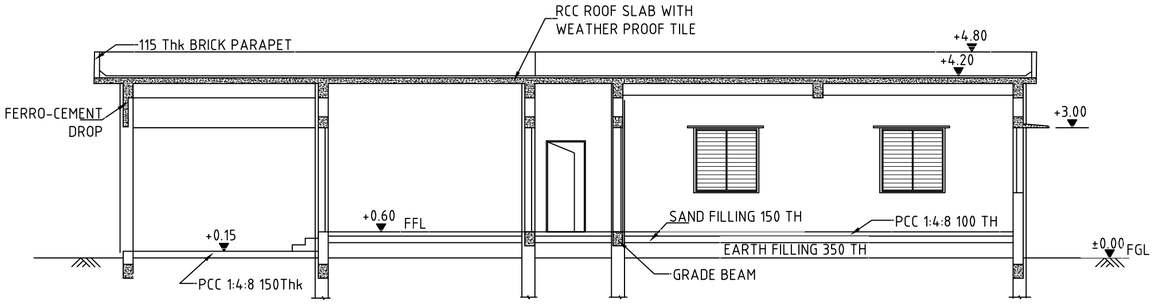
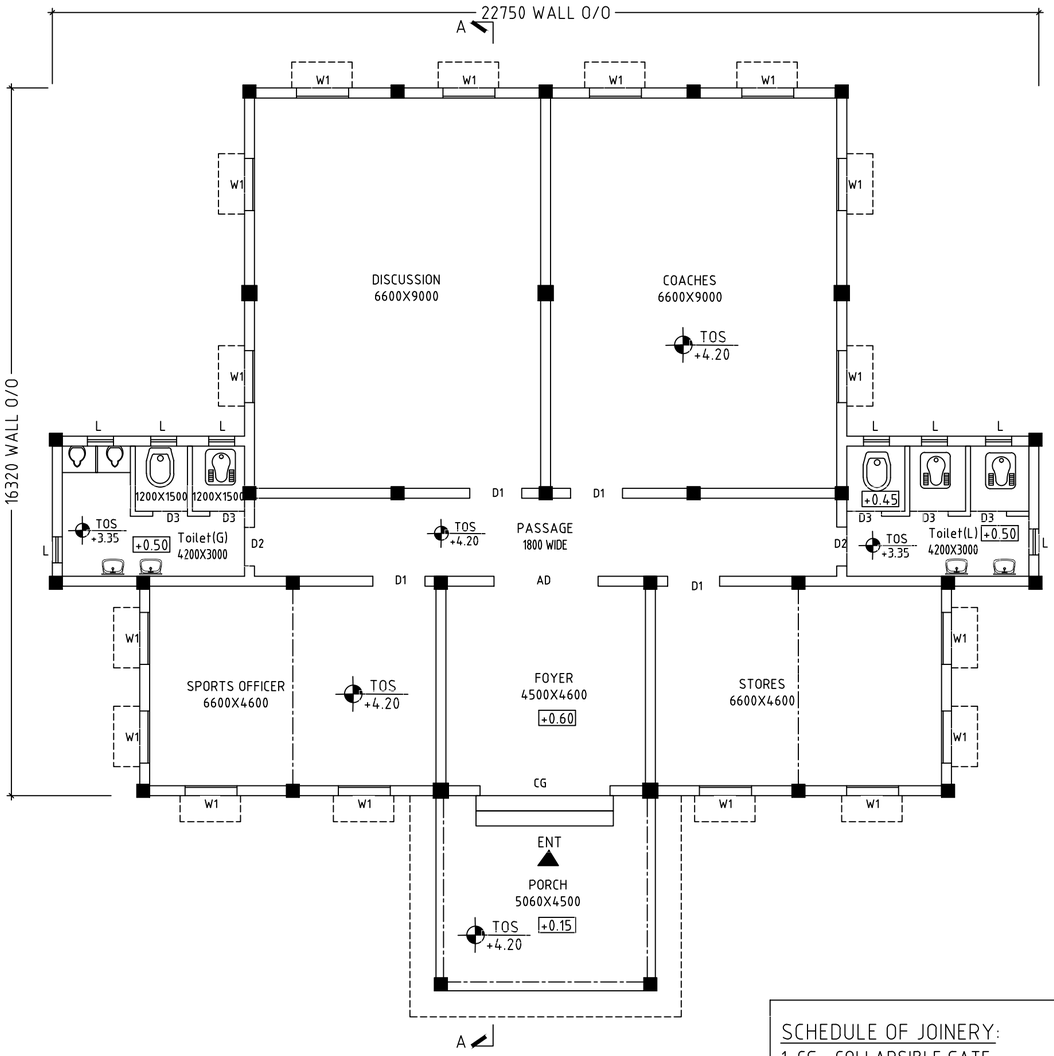


SECTION A A



PLAN

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
4. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
5. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
6. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING TOILET FIXTURES.
7. BRICK WORK UPTO BASEMENT IN CM 1:5 ,230 THICK WALL ABOVE BASEMENT FLY ASH BRICK WITH CM 1:5, 115 THICK WALL WITH BRICK WORK IN CM 1:4
8. ANTI-TERMITE TREATMENT SHALL BE PROVIDED FOR THE BUILDING.
9. PLINTH PROTECTION 0.75m WIDE WITH SIDE DRAIN TO BE PROVIDED.

INDICATIVE FINISHING SCHEDULE:

PLASTERING :

- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :

- INTERIOR WALL - INTERIOR EMULSION (#) OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY(#)
- CEILING - INTERIOR EMULSION (WHITE COLOR) (#)

FLOORING :

- ALL ROOMS - VITRIFIED CERAMIC TILES (Min. 600 mm x 600 mm) (#)
- TOILET, CORRIDOR&PORCH - ANTISKID CERAMIC FLOORING (#)

DADOOING/SKIRTING :

- ALL ROOMS - SKIRTING OF 100 mm HT WITH VITRIFIED CERAMIC TILES
- TOILET - DADOOING 2100 HT WITH CERAMIC BATH ROOM TILES

ROOFING :

- FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES

FALSE CEILING TO BE PROVIDED IN ALL ROOMS (Except Toilet)

EMULSION PAINT, VITRIFIED CERAMIC TILES AND ANTI SKID CERAMIC TILES SHALL BE OF APPROVED QUALITY AND COLOUR.

SCHEDULE OF JOINERY:

1. CG ...COLLAPSIBLE GATE 3000X2400
2. AD ...ALUMINIUM GLAZED DOOR 3000X2400
3. D1.. TW SINGLE LEAF FLUSH DOOR..... 1200X2400
4. D2.. TW SINGLE LEAF FLUSH DOOR..... ..900X2100
5. D3 ...F R P MOULDED DOOR 800X2100
5. W1.....STEEL GLAZED WINDOW WITH STEEL GRILL PROTECTION 1200X1500
7. L.....LOUVRE..... ..600X600

ANNEXURE DRG NO.
C10

PRELIMINARY DRAWING FOR TENDER PURPOSE

REV.	DATE	AMENDMENTS	DEE/D	DCE/D	CM/D	ADGM/C	DGM/C	GM/C

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
DGM/C		
GM/C		
GM/C		

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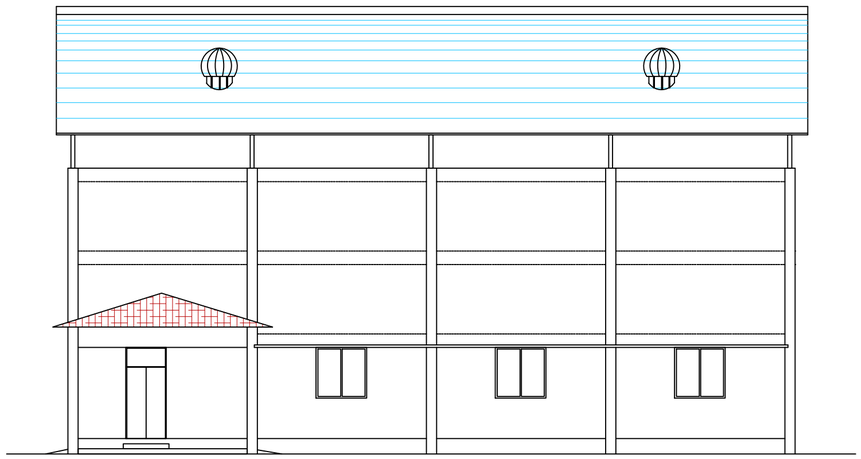
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU

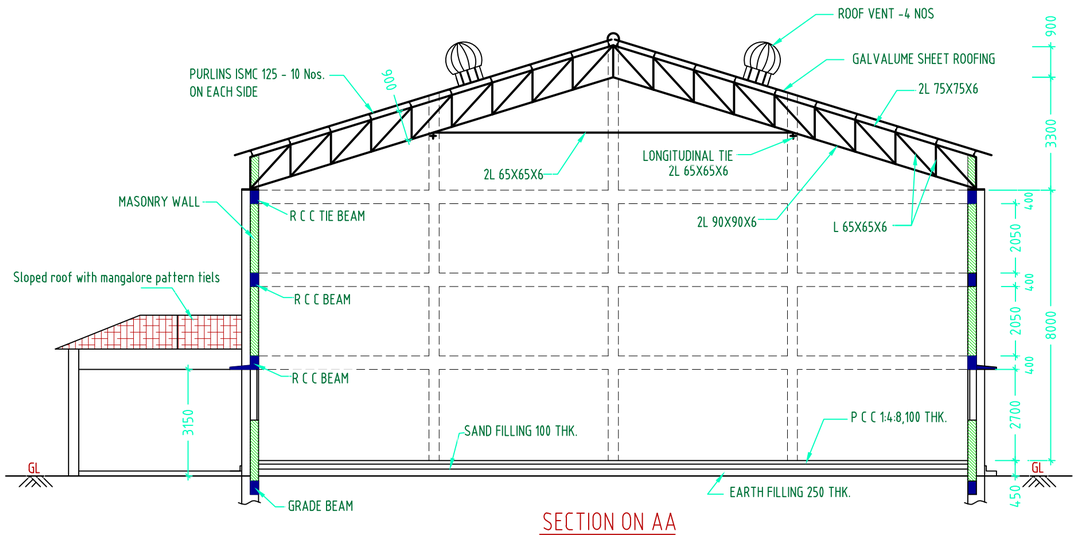
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

SPORTS OFFICE
INTEGRATED TOWNSHIP
NTTPP

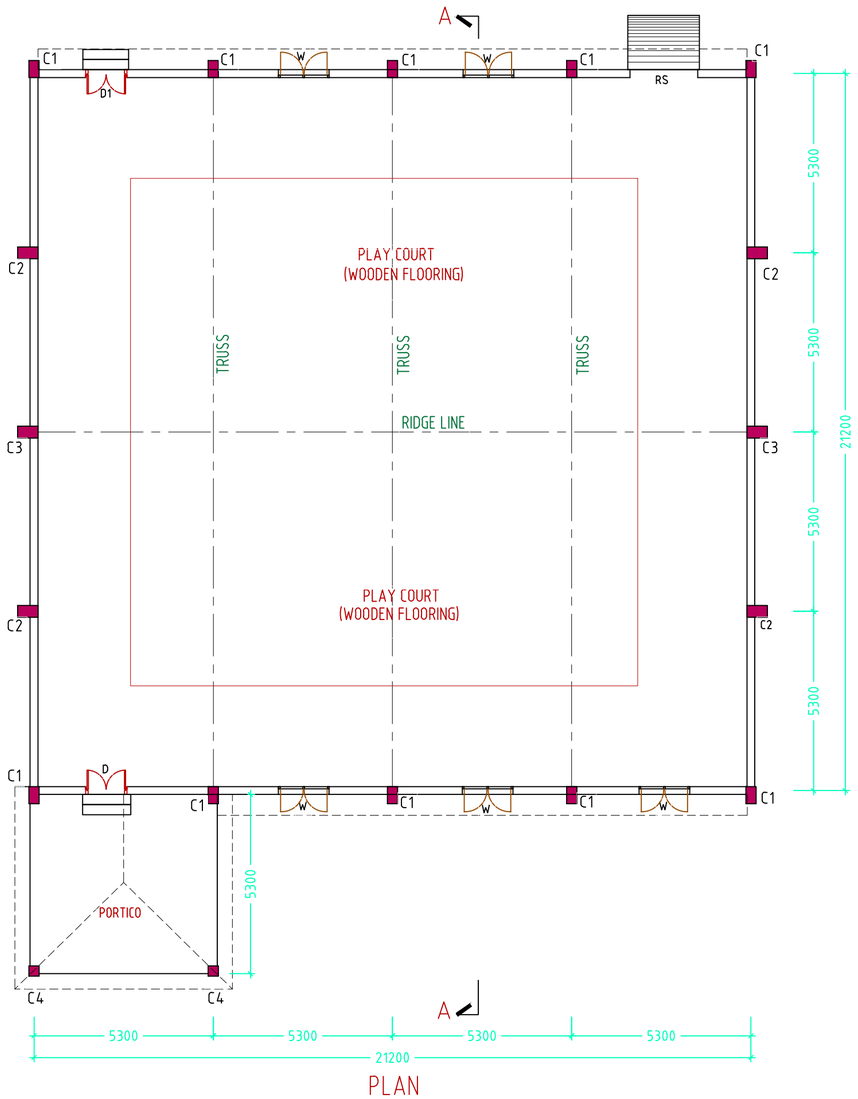
SCALE:	ARCHITECTURAL DETAILS	DRG No:
A2 1:100,1:20		CGMC/ /2020



ELEVATION



SECTION ON AA



PLAN

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016.
7. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION,WATER SUPPLY&DRAINAGE ARRANGEMENTS.
8. CHAMBER BURNT BRICK WALL 230 THK UPTO BASEMENT IN CM 1:5
9. FLY ASH BRICK WALL 230 THK ABOVE BASEMENT IN CM 1:5
10. CHAMBER BURNT BRICK WORK 115 THK ABOVE AND BELOW BASEMENT IN CM 1:4
11. ANTI-TERMITE TREATMENT SHALL BE PROVIDED.
12. PLINTH PROTECTION 0.75M WIDE SHALL BE PROVIDED

INDICATIVE FINISHING SCHEDULE:

PLASTERING :

- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5

PAINTING :

- INTERIOR WALL - INTERIOR EMULSION
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY
- STEEL MEMBERS SHALL BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT OVER A COAT OF PRIMER.

FLOORING :

- PLAY AREA - WOODEN FLOORING.
- PORCH -ANTISKID EUROCON TILES

JOINERY SCHEDULE		
DGN	DESCRIPTION	DIMENSIONS(WXD)
D	STEEL DOOR WITH 600 MM GLAZED HEAD	1200X2700
RS	ROLLING SHUTTER	2000X2700
W	STEEL WINDOW(NCL)WITH GLAZED SHUTTER&600 GL.HEAD	1200X1800

ANNEXURE DRG NO.
C11

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S.	
DEE/D		
CM/D		
ADGM/C		
DGM/C		
GM/C		

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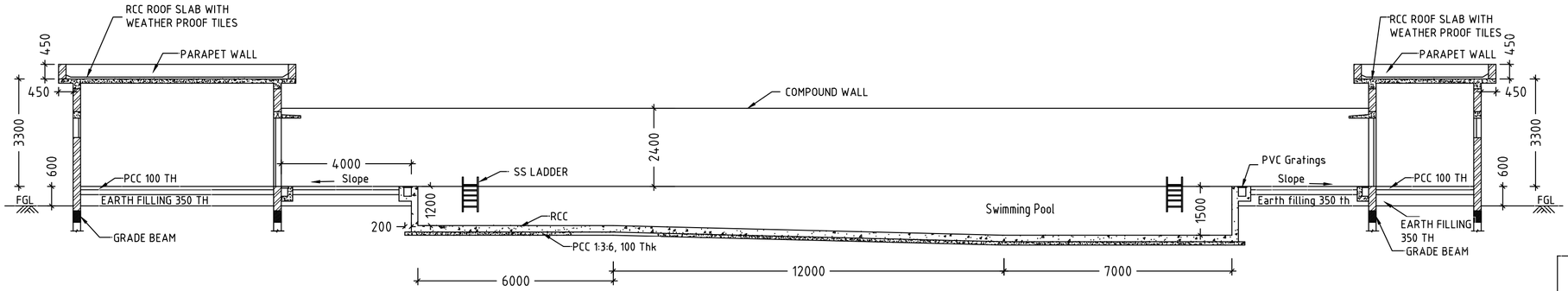
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

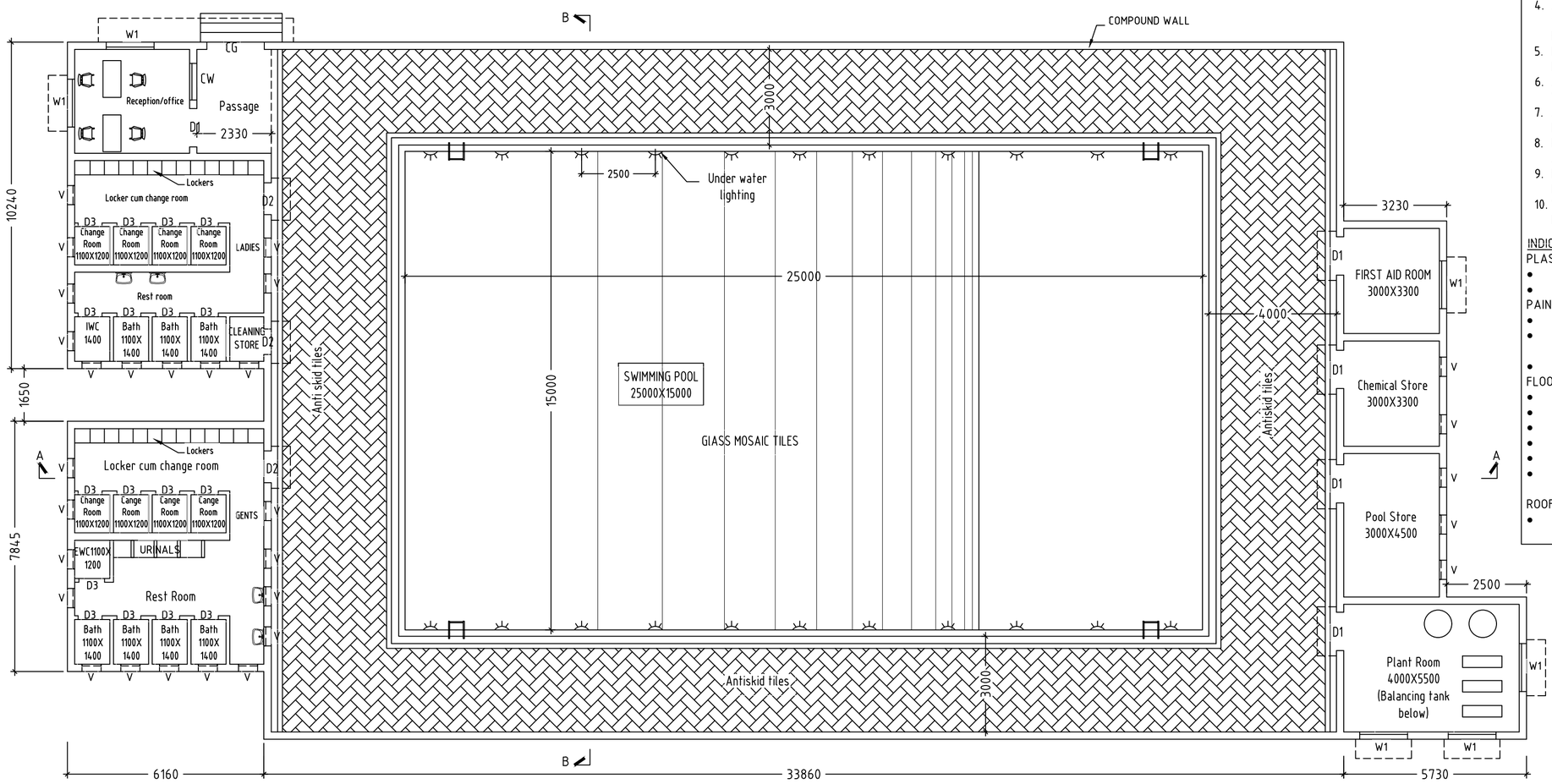
INDOOR SHUTTLE COURT INTEGRATED TOWNSHIP, TALABIRA

A2	SCALE: 1:125, 1:20	ARCHITECTURAL DETAILS	DRG. No.

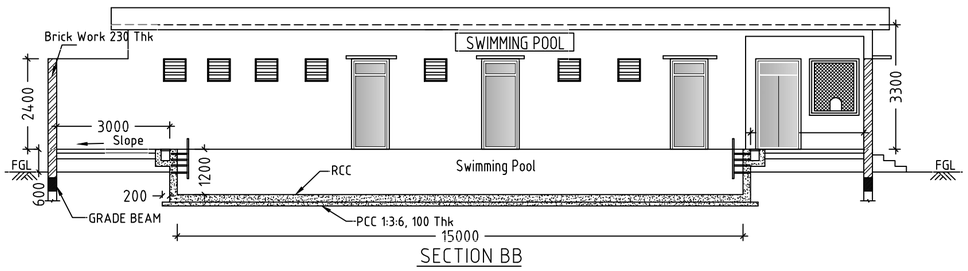
10/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C11 - Indoor Badminton Court.dwg



SECTION A A



PLAN



SECTION BB

SCHEDULE OF JOINERY:

1. CG ...COLLAPSIBLE GATE.....1800X2400
2. D1.. TW SINGLE LEAF FLUSH DOOR 900X2100
3. D2.. ALUMINUM FRAME WITH TOP SEMI TRANSPARENT GLASS BOTTOM PANELLED.....1000X2100
4. D3 ...F R P MOULDED DOOR 800X2100
5. W1.....ALUMINIUM GLAZED WINDOW.....1500X1200
6. CW.....ALUMINIUM COUNTER WINDOW.....1200X1200
7. V.....GLAZED VENTILATOR.....600X600

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M30 & STEEL REINFORCEMENT GRADE Fe500.
3. SWIMMING POOL SHALL BE PROVIDED WITH ALL THE NECESSARY MEP PROVISIONS FOR ITS CONTINUOUS&EFFECTIVE USE.PLANT ROOM SHALL CONSIST OF ALL NECESSARY ARRANGEMENTS SUCH AS FILTER UNIT,CHEMICAL UNIT,PUMPING UNIT,OZONATOR ...ETC
4. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALAIZED DURING DETAILED ENGINEERING BASED ON REQUIRMENTS AND APPROVAL OF NLCIL
5. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
6. ALL 230 THICK WALLS UP TO BASEMENT IN CM 1:5 & ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICK IN CM 1:4.
7. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLY ASH BRICKS IN CM 1:5
8. POOL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
9. BALANCING TANK OF SUFFICIENT CAPACITY SHALL BE PROVIDED AND IT SHALL BE CONNECTED WITH SWIMMING POOL.
10. WATER PROOF PLASTERING SHALL BE PROVIDED FOR SWIMMING POOL&BALANCING TANK

INDICATIVE FINISHING SCHEDULE:

PLASTERING :
- INSIDE AND OUTSIDE - 15 mm thick in CM 1:5
- CEILING - 10 mm thick in CM 1:3

PAINTING :
- INTERIOR WALL - INTERIOR EMULSION OVER PUTTY COAT
- EXTERIOR WALL - EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY
- CEILING - INTERIOR EMULSION (WHITE COLOR)

FLOORING :
- OFFICE ROOM-VITRIFIED TILE
- LOCKER/CHANGE ROOM & REST ROOM-ANTISKID CERAMIC TILE
- PASSAGE AROUND POOL-ANTISKID CERAMIC TILE
- GLASS MOSAIC TILES FOR POOL INNER SURFACE
- PVC GRATINGS FOR OVERFLOW TROUGH & DIRT WATER TROUGH
- DADOOING- 2100 HT WITH CERAMIC BATH ROOM TILES FOR TOILET &1500 HT FOR URINALS

ROOFING :
- FLAT RCC ROOF - CERAMIC WEATHER PROOF ROOF TILES

PRELIMINARY DRAWING FOR TENDER PURPOSE ONLY

ANNEXURE DRG NO.
C12

REV.	DATE	AMENDMENTS	DEE/D	ADGM/D	DGM/D	DGM/C
	SIGNATURE	DATE				
DRN BY	ESAKKIMUTHU.S.S					
DEE/D						
ADGM/D						
DGM/D						
DGM/C						

NLC India Limited
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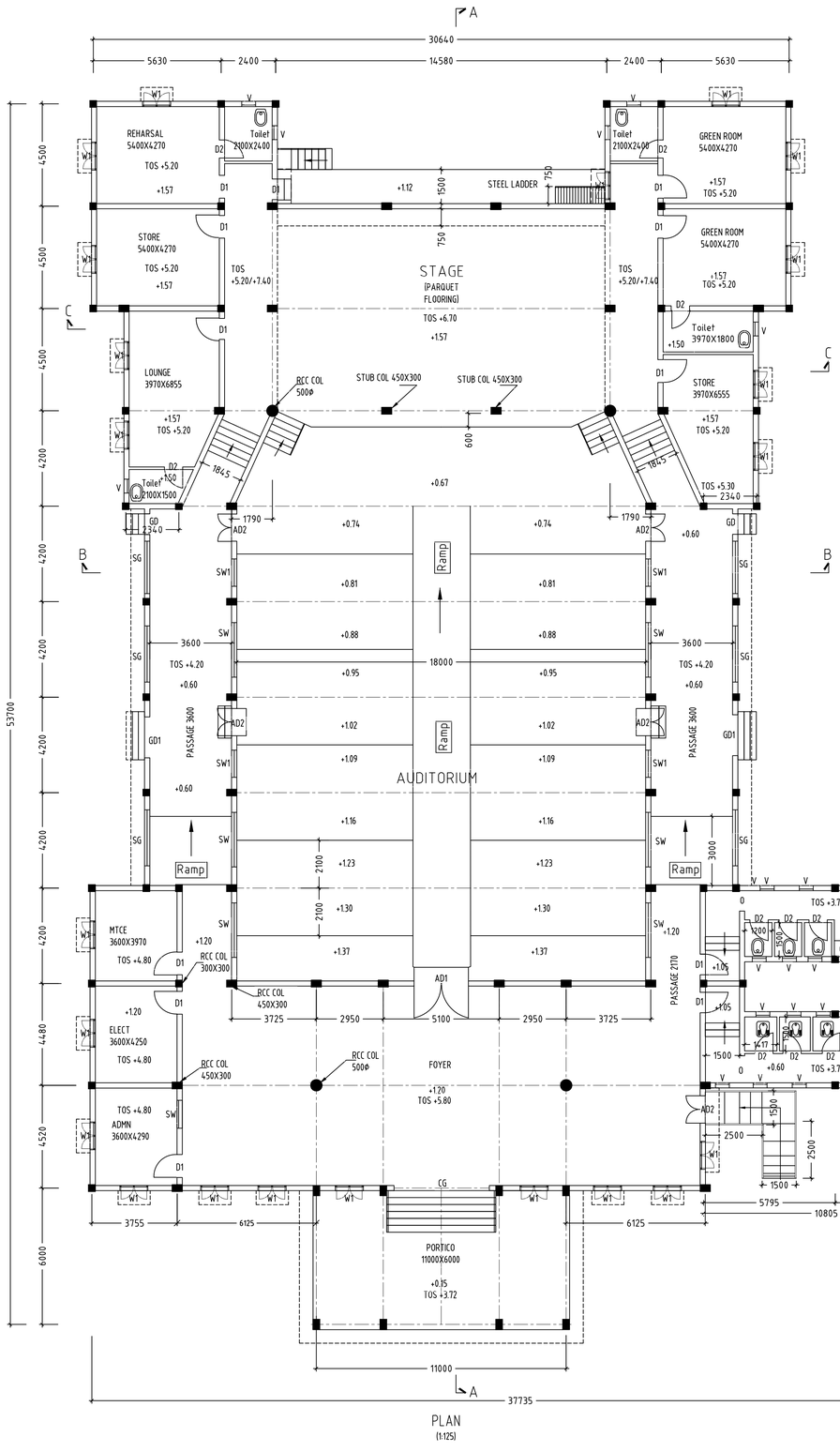
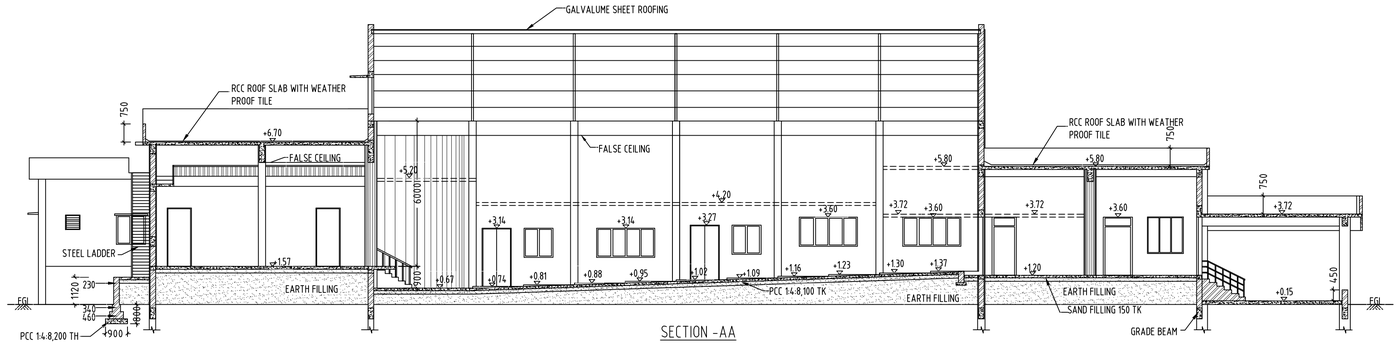
OFFICE OF THE GENERAL MANAGER / CIVIL / CTO

SWIMMING POOL
INTEGRATED TOWNSHIP
NTTPP

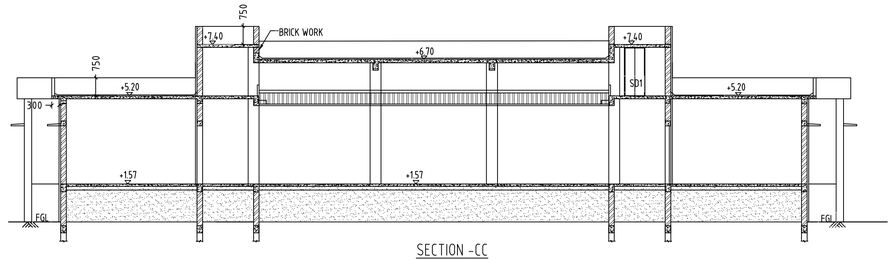
A2	SCALE: 1:115, 1:100	ARCHITECTURAL DRAWING	DRG No: CGMC/ /2020

08/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C12-Swimming Pool (25 M X 15 M X 1.50 M).dwg

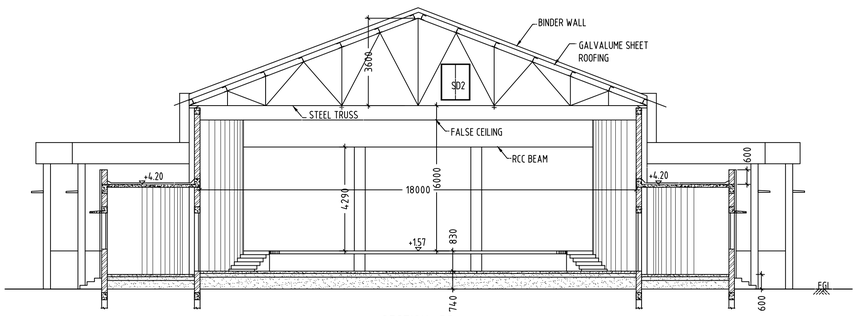




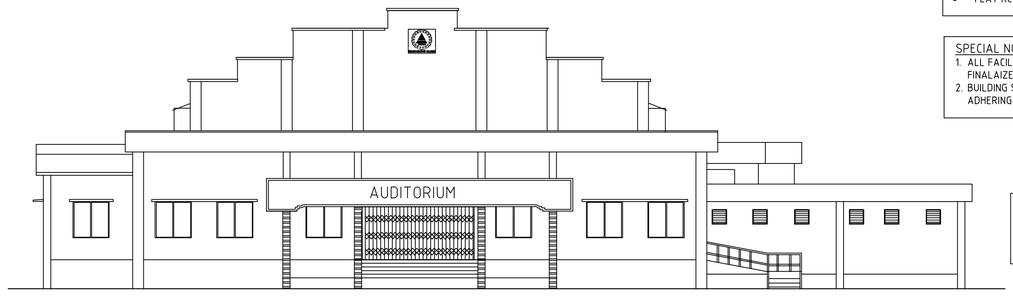
SECTION -AA



SECTION -CC



SECTION -BB



ELEVATION

JOINERY SCHEDULE:-

AD1...ALUMINIUM GLASS DOOR	2400X2400
AD2...ALUMINIUM GLASS DOOR	1200X2400
D1.SINGLE LEAF FLUSH DOOR WITH 300 VENTILATOR HEAD...	1000X2400
D2....SINGLE LEAF FRP DOOR	800X2100
GD...GRILL DOOR	1000X2400
GD1...GRILL DOOR	1800X2540
W1... GLAZED WINDOW WITH PREPAINTED STEEL FRAME WITH SAFETY GRILL PROTECTION	1500X1500
CG... COLLAPSIBLE GATE	4200X2400
O... OPENING	900X2100
SW...ALUMINIUM SLIDING WINDOW GLAZED	2400X1200
SW1..ALUMINIUM SLIDING WINDOW GLAZED	1200X1200
SG .... STEEL GRILL	2400X1500
SD1... STEEL DOOR	900X2000
SD2... STEEL DOOR	1000X1200
V..GLAZED VENTILATOR WITH PREPAINTED STEEL FRAME	600X600

NOTE:-

1. ALL DIMENSIONS ARE IN mm & LEVELS IN METRE.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500
3. DON'T SCALE DIMENSIONS FROM THE DRAWING.
3. ALL 230 THICK WALLS UP TO BASEMENT IN CM 1:5 & ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICK IN CM 1:4.
4. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLY ASH BRICKS IN CM 1:5
5. ANTI-TERMITE TREATMENT SHALL BE PROVIDED
6. PLINTH PROTECTION 750 mm WIDE WITH EDGE DRAIN SHALL BE PROVIDED.
7. TOILET ROOM HEIGHT 3000 mm & PARITION WALL HT 2100 mm.

INDICATIVE FINISHING SCHEDULE:-

PAINTING:

- INTERIOR WALL-INTERIOR EMULSION
- EXTERIOR WALL-EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY
- CEILING-INTERIOR EMULSION
- STRUCTURAL STEEL WITH 2 COATS OF ANTI-CORROSIVE PAINT OVER ONE COAT OF PRIMER

FLOORING

- VITRIFIED CERAMIC TILES FOR ROOMS & FOR TOILETS ANTI-SKID CERAMIC TILES.
- PARQUET TILE FLOORING FOR STAGE.
- ORDINARY CEMENT FLOORING FOR AUDITORIUM HALL WITH CARPET.
- DADOOING FOR TOILET WALLS 2100MM HEIGHT ABOVE FFL.
- PORTICO-ANTISKID EUROCON TILES

ROOFING

- FLAT RCC ROOF -CERAMIC WEATHER PROOF TILES

SPECIAL NOTE:-

1. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALAIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL.
2. BUILDING SHALL BE DESIGNED AND CONSTRUCTED AS PER STANDARDS AND ADHERING TO NBC 2016

PRELIMINARY DRAWING FOR TENDER PURPOSE

ANNEXURE DRG NO. C13

REV.	DATE	AMENDMENTS	DEE/D	DCE/D	CM/D	DGM/C	GM/C/ DESIGN

	SIGNATURE	DATE
DRN BY	ESAKKIMUTHU.S.S	
DEE/D		
DCE/D		
CM/D		
CM/D		
DGM/C		
GM/C/ DESIGN		

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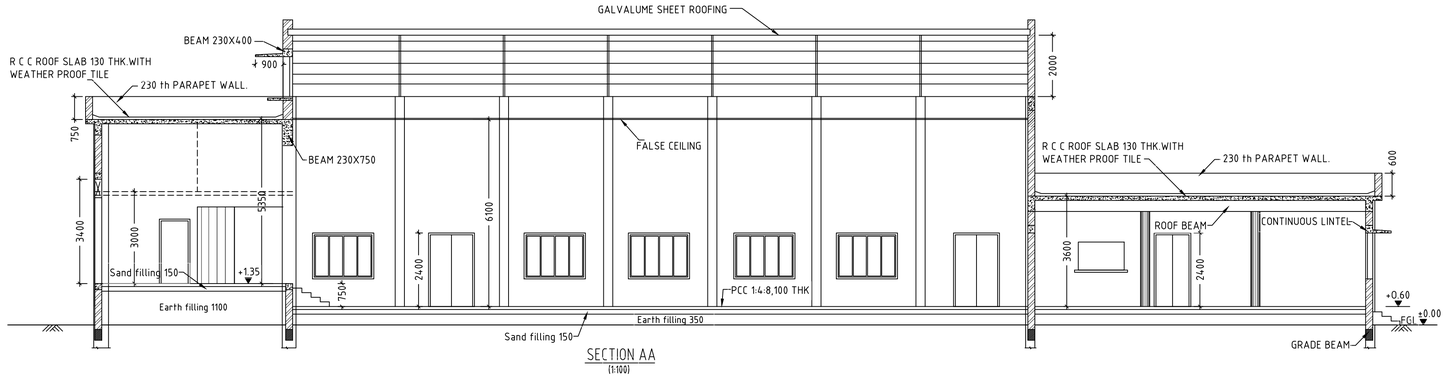
NEYVELI- 607 801,TAMIL NADU

OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

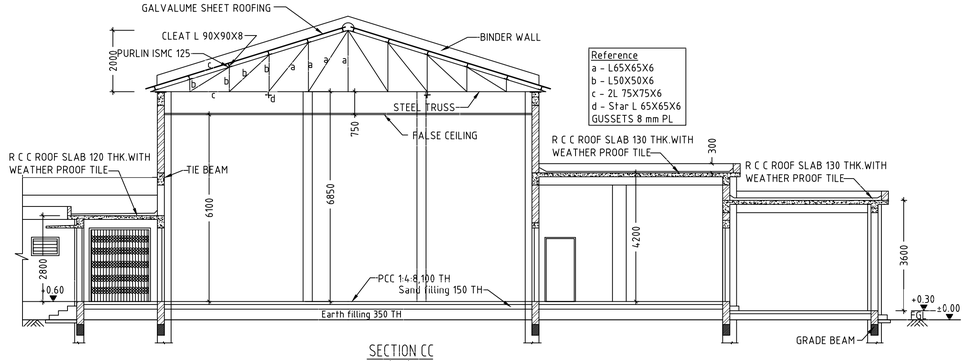
AUDITORIUM
INTEGRATED TOWNSHIP
NTTPP

A1	SCALE: 1:125, 1:100, 1:40	ARCHITECTURAL DRAWING	DRG No: CGMC / / 2020

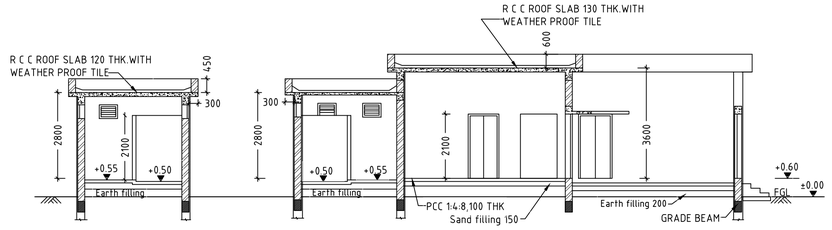
07/11/2020 S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C13 - Auditorium.dwg



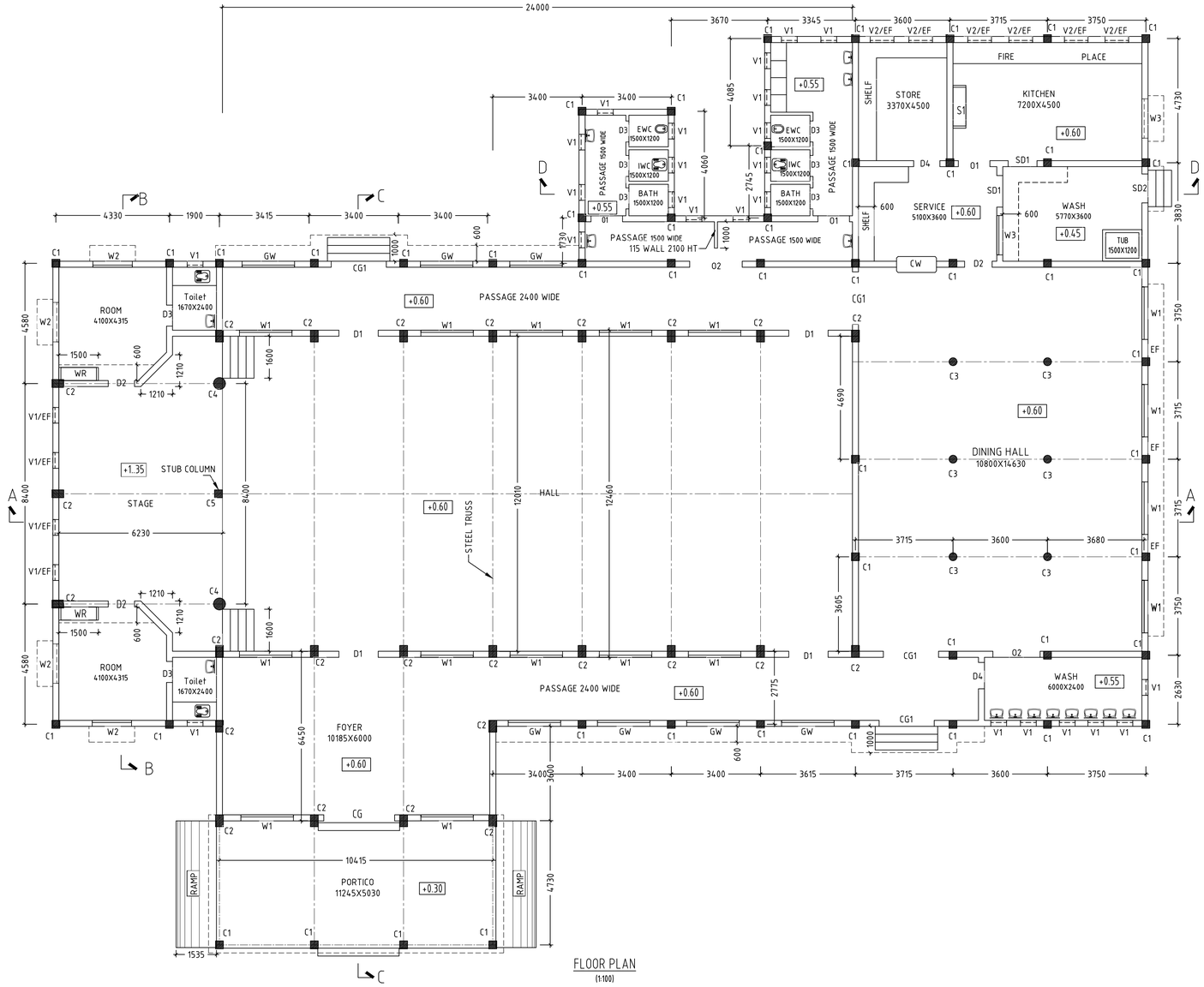
SECTION AA
(1:100)

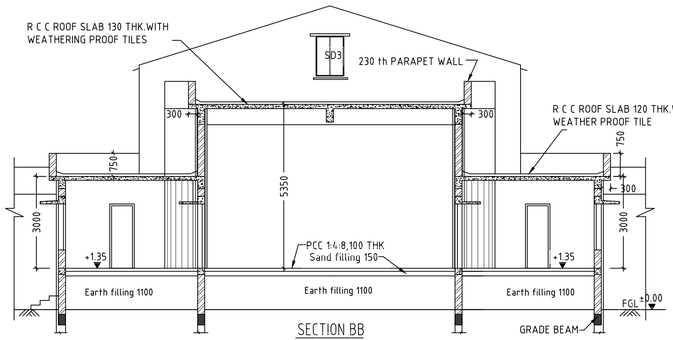


SECTION CC
(1:100)



SECTION DD
(1:100)





SECTION BB
(1:100)

JOINERY SCHEDULE:-

CG	COLLAPSIBLE GATE....2700X2400
CG1	COLLAPSIBLE GATE....2100X2400
D1	FLUSH DOOR...(WITH 450 GLAZED HEAD)....1500X2400
D2	FLUSH DOOR....1050X2100
D3	FRP DOOR....800X2100
D4	FLUSH DOOR....1000X2100
SD1	STEEL DOOR....1200X2100
SD2	STEEL DOOR....900X2100
SD3	STEEL DOOR....900X1600
W1	ALUMINIUM GLAZED WINDOW SLIDING (WITH 450 GLAZED HEAD)....2000X1500
W2	ALUMINIUM GLAZED WINDOW WITH GRILL WORK....1500X1350
W3	ALUMINIUM GLAZED WINDOW WITH GRILL WORK....1500X1200
GW	GRILL WINDOW....2000X1500
CW	COUNTER WINDOW....1500X900
V1	GLAZED VENTILATOR....600X450
V2	GLAZED VENTILATOR....900X600
01	OPENING....1200X2100
02	OPENING....2000X2400
EF	EXHAUST FAN
WR	WARD ROBE WITH SHUTTER....1500X2100X600
S1	SHELF WITHOUT SHUTTER....1500X2100X300

NOTE:-
1. ALL DIMENSIONS ARE IN mm & LEVELS IN METRES.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe 500.
3. ALL 230 THICK WALLS UP TO BASEMENT IN CM 1:5 & ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICK IN CM 1:4.
4. ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLY ASH BRICKS IN CM 1:5
5. ANTI-TERMITE TREATMENT SHALL BE PROVIDED
6. PLINTH PROTECTION 750 mm WIDE WITH EDGE DRAIN SHALL BE PROVIDED

SPECIAL NOTE:-
1. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALAIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL.
2. BUILDING SHALL BE DESIGNED AND CONSTRUCTED AS PER STANDARDS AND ADHERING TO NBC 2016

INDICATIVE FINISHING SCHEDULE:-

PAINTING:
- INTERIOR WALL-INTERIOR EMULSION
- EXTERIOR WALL-EXTERIOR EMULSION OF ANTI-FUNGAL WEATHERPROOF QUALITY
- CEILING-INTERIOR EMULSION
- STRUCTURAL STEEL-2 COATS OF ANTI-CORROSIVE PAINT OVER A COAT OF PRIMER.

FLOORING
- DINING HALL, LOBBY & PASSAGE-VITRIFIED TILE
- KITCHEN, WASH AREA,PANTRY & HAND WASH AREA-ANTI-SKID CERAMIC TILE
- PORTICO-ANTISKID EUROCON TILES
- DADOOING 1500 H IN WASH AREA& 2100 H IN TOILET

ROOFING
- FLAT RCC ROOF - WEATHER PROOF TILES

LEGEND:-
NGL ----- NATURAL GROUND LEVEL
FGL ----- FINISHED GROUND LEVEL
FFL ----- FINISHED FLOOR LEVEL

PRELIMINARY DRAWING FOR TENDER PURPOSE

ANNEXURE DRG NO.
C14

REV.	DATE	AMENDMENTS	DEE/D	DCE/D	CM/D	DGM/C	GM/C/D

	SIGNATURE	DATE
DRN BY		
DEE/D		
DCE/D		
CM/D		
DGM/C		
GM/C Designs		

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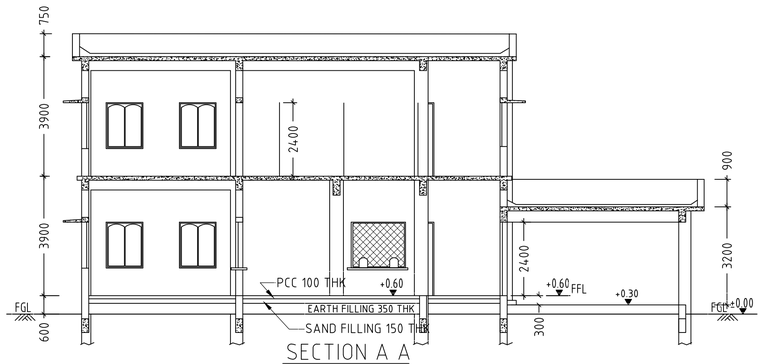
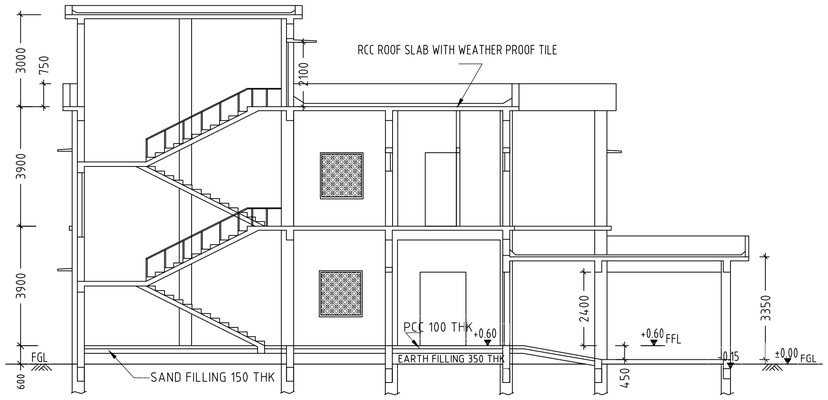
NEYVELI- 607 801,TAMIL NADU
OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

COMMUNITY HALL
INTEGRATED TOWNSHIP,NTTPP

SCALE:	ARCHITECTURAL DETAILS	DRG No: CGMC / / 2020
A1	1:100, 1:30, 1:20	



SECTION A A



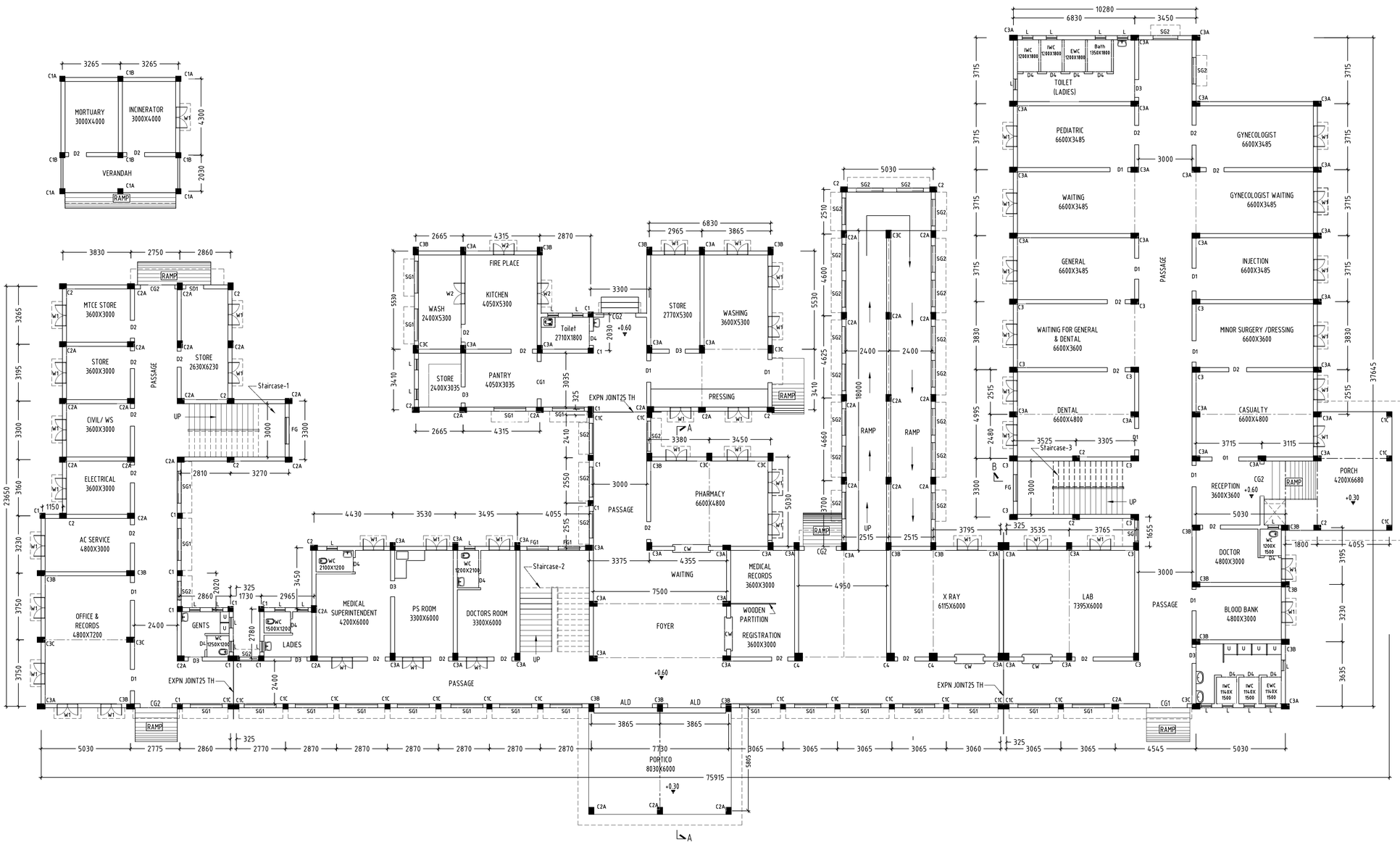
SECTION BB

SCHEDULE OF JOINERY:

1. CG1 ..COLLAPSIBLE GATE	2100X2400
2. CG2 ..COLLAPSIBLE GATE	1800X2400
3. SD1.. STEEL DOOR	1000X2400
4. D1.. TW DOOR DOUBLE LEAF	1200X2400
5. D2.. TW DOOR DOUBLE LEAF	1000X2400
6. D3.. TW SINGLE LEAF FLUSH DOOR	900X2400
7. D4 ...F R P MOULDED DOOR	800X2100
8. W1....STEEL GLAZED WINDOW WITH STEEL GRILL PROTECTION	1200X1500
9. L.....LOUVRE	600X600
10. SG1 ... STEEL GRILL	1800X1500
11. SG2 ... STEEL GRILL	1500X1500
12. O1 ... ...OPEN	1500X2400
13. O2 .....OPEN	900X2400
14. ALD...ALUMINIUM GLAZED DOOR	3000X2400
15 . CW...COUNTER WINDOW	1800X1500
16 . FG...FIXED GLASS	1500X1500
17 . FG1...FIXED GLASS	1200X1500

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
4. FOUNDATION SHALL BE FINALIZED AFTER CONDUCTING DETAILED SOIL INVESTIGATION.
5. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
6. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN AND TOILET FIXTURES.
7. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
8. ANTI-TERMITE TREATMENT SHALL BE PROVIDED .
9. ENTIRE HOSPITAL SHALL BE DESIGNED FOR G+1 (GROUND + FIRST)
10. PLINTH PROTECTION 0.75m WIDE WITH EDGE DRAIN TO BE PROVIDED.
11. ALL 230 THICK WALLS UP TO BASEMENT IN CM 1:5 & ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICK IN CM 1:4.
    ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLY ASH BRICKS IN CM 1:5
12. READ ALONG WITH FIRST FLOOR ARCHITECTURAL DRAWING C15 SHEET 2



PLAN-GROUND FLOOR

- SPECIAL NOTE

TWO LIFTS (1PASSENGER+1-SERVICE) EACH HAVING 16 PERSON CAPACITY SHALL BE PROVIDED AT SUITABLE LOCATIONS

INDICATIVE FINISHING SCHEDULE:-

PAINTING:

- INTERIOR WALL-INTERIOR EMULSION
- EXTERIOR WALL-EXTERIOR EMULSION OF ANTI-FUNGAL WEATHER PROOF QUALITY
- CEILING-INTERIOR EMULSION

FLOOR FINISHING& DADOOING

- FOR ROOMS, PASSAGE- CERAMIC VITRIFIED TILES
  FOR KITCHEN&TOILET ANTISKID CERAMIC TILES, DADOOING 2100 H IN WASH & TOILET
  FOR RAMP, STAIR & PORTICO EUROCON/ ULTRA CC TILES (ANTISKID)
  DADOOING FULL HEIGHT FOR OPERATION THEATRE WITH FALSE CEILING

ROOFING

- FLAT RCC ROOF -CERAMIC WEATHER PROOF TILES

ANNEXURE DRG NO.
C15
SHEET 1 OF 2

PRELIMINARY DRAWING
FOR TENDER PURPOSE

REV.	DATE	AMENDMENTS	DEE/D	DCE/D	CM/D	DGM/C	GM/C/D
		SIGNATURE	DATE				
DRN BY		ESAKKIMUTHU.S.S					
DEE/D							
DCE/D							
CM/D							
DGM/C							
GM/C/ Designs							

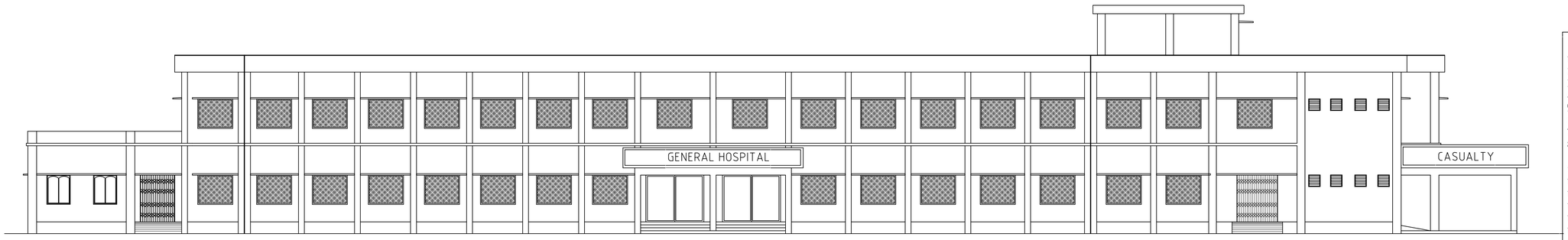
NLC India Limited
(formerly Neyveli Lignite Corporation Limited)
('Navratna' - A Government of India Enterprise)
NEYVELI- 607 801,TAMIL NADU

OFFICE OF THE CHIEF GENERAL MANAGER / CIVIL / CTO

HOSPITAL (30 BEDS)
INTEGRATED TOWNSHIP
NTTPP

SCALE:	ARCHITECTURAL DRAWING GROUND FLOOR	DRG No: CGMC / / 2020
A1	1:125	

S:\Design_Comments\ODISHA TPP\CTO WORKS IN EPC SCOPE\(C) INTEGRATED TOWNSHIP\C15 - Hospital.dwg



FRONT ELEVATION

SCHEDULE OF JOINERY:

1. CG1 ..COLLAPSIBLE GATE	2100X2400
2. CG2 ..COLLAPSIBLE GATE	1800X2400
3. SD1.. STEEL DOOR	1000X2400
4. D1.. TW DOOR DOUBLE LEAF	1200X2400
5. D2.. TW DOOR DOUBLE LEAF	1000X2400
6. D3.. TW SINGLE LEAF FLUSH DOOR	900X2400
7. D4 ...F R P MOULDED DOOR	800X2100
8. W1....STEEL GLAZED WINDOW.WITH STEEL GRILL PROTECTION	1200X1500
9. L.....LOUVRE	600X600
10. SG1 ... STEEL GRILL	1800X1500
11. SG2 ... STEEL GRILL	1500X1500
12. O1 ... ...OPEN	1500X2400
13. O2 .....OPEN	900X2400
14. ALD...ALUMINIUM GLAZED DOOR	3000X2400
15 . CW...COUNTER WINDOW	1800X1500
16 . FG..FIXED GLASS	1500X1500
17 . FG1...FIXED GLASS	1200X1500

INDICATIVE FINISHING SCHEDULE:-

PAINTING:

- INTERIOR WALL-INTERIOR EMULSION
- EXTERIOR WALL-EXTERIOR EMULSION OF ANTI-FUNGAL WEATHER PROOF QUALITY
- CEILING-INTERIOR EMULSION

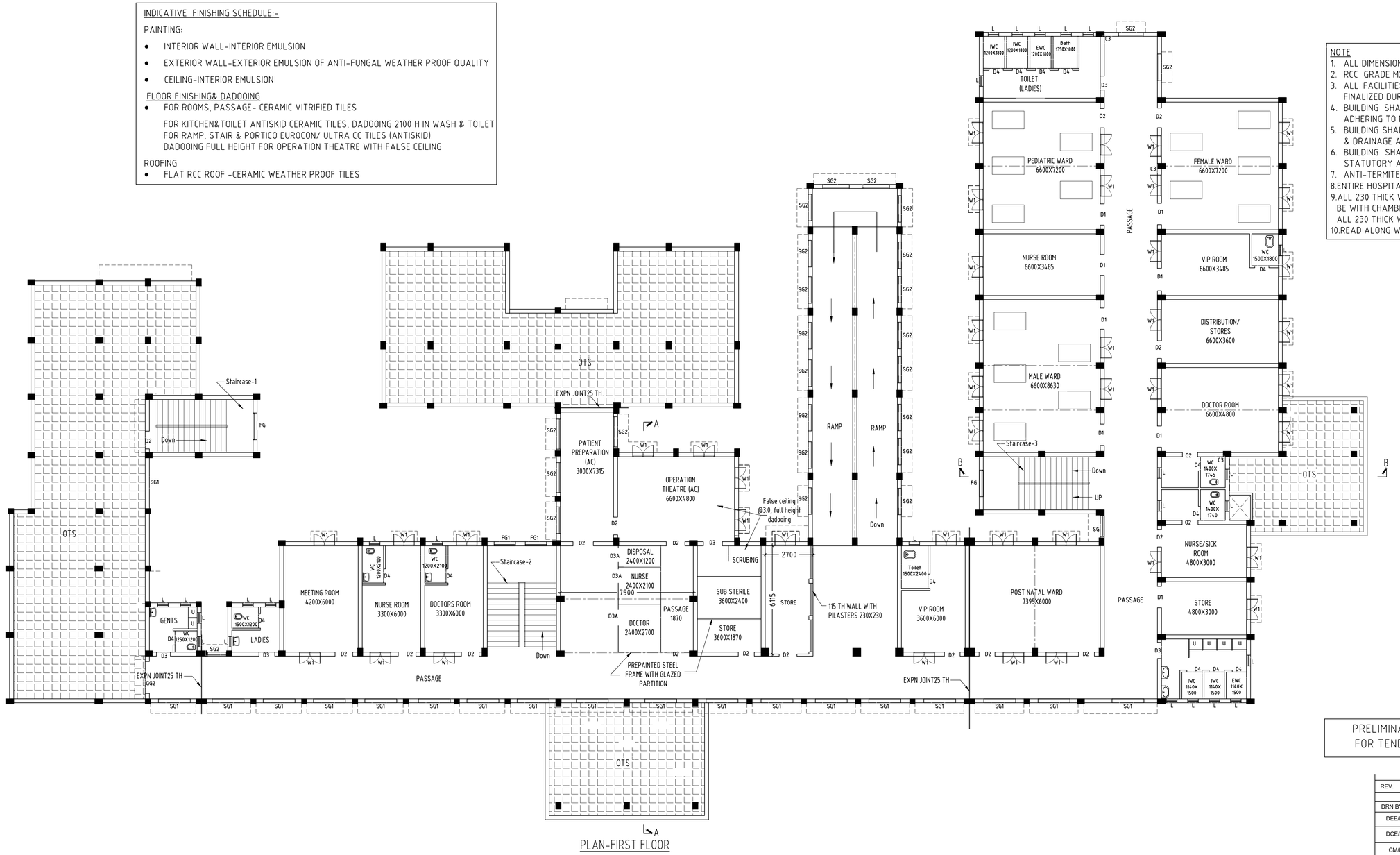
FLOOR FINISHING& DADOOING

- FOR ROOMS, PASSAGE- CERAMIC VITRIFIED TILES

  FOR KITCHEN&TOILET ANTISKID CERAMIC TILES, DADOOING 2100 H IN WASH & TOILET
  FOR RAMP, STAIR & PORTICO EUROCON/ ULTRA CC TILES (ANTISKID)
  DADOOING FULL HEIGHT FOR OPERATION THEATRE WITH FALSE CEILING

ROOFING

- FLAT RCC ROOF -CERAMIC WEATHER PROOF TILES



PLAN-FIRST FLOOR

NOTE

1. ALL DIMENSIONS ARE IN mm & LEVEL in Metre.
2. RCC GRADE M25 & STEEL REINFORCEMENT GRADE Fe500.
3. ALL FACILITIES SHOWN IN THE DRAWING ARE INDICATIVE ONLY AND SHALL BE FINALIZED DURING DETAILED ENGINEERING ON APPROVAL OF NLCIL
4. BUILDING SHALL BE DESIGNED & CONSTRUCTED AS PER IS STANDARDS AND ADHERING TO NBC 2016
5. BUILDING SHALL BE PROVIDED WITH INTERNAL ELECTRIFICATION, WATER SUPPLY & DRAINAGE ARRANGEMENTS INCLUDING KITCHEN AND TOILET FIXTURES.
6. BUILDING SHALL BE CONSTRUCTED AFTER OBTAINING APPROVAL FROM ALL STATUTORY AUTHORITIES.
7. ANTI-TERMITE TREATMENT SHALL BE PROVIDED
8. ENTIRE HOSPITAL SHALL BE DESIGNED FOR G+1 (GROUND + FIRST)
9. ALL 230 THICK WALLS UP TO BASEMENT IN CM 1:5 & ALL 115 THICK WALLS SHALL BE WITH CHAMBER BURNT BRICK IN CM 1:4.
   ALL 230 THICK WALLS ABOVE BASEMENT SHALL BE WITH FLY ASH BRICKS IN CM 1:5
10. READ ALONG WITH GROUND FLOOR ARCHITECTURAL DRAWING C15 SHEET 1

ANNEXURE DRG NO.
C15
SHEET 2 OF 2

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