REPLIES TO PRE BID QUERIES LOT 2 DATED 10.08.2022
NIT NO : PNMM/PC 183/E 4017/NCB Dated 20.06.2022
SUB:GRID CONNECTIVITY TO TFL TO SUPPLY 90 MW POWER AND CONSTRUCTION OF 220 KV LILO GIS AT TALCHER FERTILIZERS LTD

	REFERENCE OF TENDER DOCUMENT					Bidders Query	PMC/OWNER Reply
Sl.No	SECTION NO.	PAGE NO	CLAUSE NO	SUBJECT	Description as in Tender Specification		
1	Sr. No. 60.03	Civil Price Schedule	Price Bid Schedule -2C (Civil-Erection)	Site Levelling	N/A	As we know, presently plot area is undulated. Please confirm that plot area will be leveled by TFL.	Land grading & levelling of LILO Substation area is under Owner's scope. Only micro-grading shall be done by the bidders. However, site grading and levelling works for those areas where Transmission towers are coming shall be in bidder's scope.
2	Sr. No. 73.03	Civil Price Schedule	Price Bid Schedule -2C (Civil-Erection)	7.0 Mtr. Wide Bituminous Road with shoulder & kerb stones at both sides from nearest approach road to the main gate of the switchyard	N/A	Please confirm, distance (approach road) from nearest main road to main gate	Bidders are requested to visit the Site and accertain the requirement on their own before quoting.
3	Sr. No. 80	Civil Price Schedule	Price Bid Schedule -2C (Civil-Erection)	Stone Pitching & Toe wall	N/A	Please confirm, total required area of Stone pitching.	Bidders are requested to access the requirement based on their engineering on their own before quoting.
4	Instruction to Bidders (ITB)			Tender Bid Security / Earnest Money Deposit (EMD)		As per the Tender documents EMD value: Rs. 65.37 Lakh (Rupees Sixty Five Lakh and Thirty Seven Thousand Only) is Exempted Bidders (i.e. MSEs, Start-ups and Govt. Dept./PSUs) and submit declaration for Bid security as per Form F-2B (Refer clause no.16 of ITB). Kindly enclosed herewith MSME Certificate. Request you to confirm Exemption towards Tender Bid Security / Earnest Money Deposit (EMD) shall be allowed as per enclosed MSME certificate for further participation of above subjected tender.	Tender Provisions in this regard are amply clear; Bidders are requested to refer Clause No. 40 of Section "Instruction To Bidders (ITB)". Further, exemption from paying EMD Fee shall only be ascertained after examination of documents of Bidder's organization after opening of Bids.
5	Section-II			Bidders Eligibility Criteria	A.1 The bidder must have completed at least one "Similar work", having completed value of not less than INR 38.57 Crore (including tax & duties) during the last Seven (07) years reckoned from the original bid opening date.	A.1 The bidder must have completed at least one "Similar work", having completed value of not less than INR 30 Crore (including tax & duties) during the last Seven (07) years reckoned from the original bid opening date.	Provision of the Tender Document in this regard shall prevail
6	Section-II			Bidders Eligibility Criteria	"Similar work" shall mean the following: Design/ Engineering/ Detail Engineering, Procurement/ Supply, Erection/ Installation, Testing/ Commissioning including civil works of 220kV or above voltage class Indoor Double Bus Gas Insulated Substation (GIS) / Switchyard.	"Similar work" shall mean the following: Design/ Engineering/ Detail Engineering, Procurement/ Supply, Erection/ Installation, Testing/ Commissioning including civil works of 220kV or above voltage class Indoor Double Bus Gas Insulated Substation (GIS) / Switchyard. OR Design/ Engineering/ Detail Engineering, Procurement/ Supply, Erection/ Installation, Testing/ Commissioning including civil works of 1 new 132kV or above GIS Substation and atleast 2 bays extension of 220kV or above GIS or Hybrid GIS (HGIS) Bays and one project of transmission line of min 50km of 220kV or above voltage And The Bidder should have executed single order of transmission projects of min Rs.150Cr of single order in last 5 years as on bid submission date to assess the project management capabilities OR Design/ Engineering/ Detail Engineering, Procurement/ Supply, Erection/ Installation, Testing/ Commissioning including civil works of Gas Insulated Switchgear (GIS) new Substation/ switchyard of 132kV or above voltage level and Two (2) numbers of 220kV or above AIS Substation having 5 bays each and also one project of transmission line of min 50km of 220kV or above voltage And The Bidder should have executed single order of transmission projects of min Rs.150Cr of single order in last 5 years as on bid submission date to assess the project management capabilities	Provision of the Tender Document in this regard shall prevail
7	Section-II			Bidders Eligibility Criteria	"Similar work" shall mean the following: Design/ Engineering/ Detail Engineering, Procurement/ Supply, Erection/ Installation, Testing/ Commissioning including civil works of 220kV or above voltage class Indoor Double Bus Gas Insulated Substation (GIS) / Switchyard.	We request you to kindly relax your Qualifying Requirement to One No. 132kV GIS substation along with 220kV AIS substation instead of 220kV GIS Substation	Provision of the Tender Document in this regard shall prevail
8	Section-II			Bidders Eligibility Criteria	(A) Technical Criteria: A.1 The bidder must have completed at least one "Similar work", having completed value of not less than INR 38.57 Crore (including tax & duties) during the last Seven (07) years reckoned from the original bid opening date. "Similar work" shall mean the following: Design/ Engineering/ Detail Engineering, Procurement/ Supply, Erection/ Installation, Testing/ Commissioning including civil works of 220kV or above voltage class Indoor Double Bus Gas Insulated Substation (GIS) / Switchyard.	(A) Technical Criteria: A.1 The bidder must have completed at least one "Similar work", having completed value of not less than INR 38.57 Crore (including tax & duties) during the last Seven (07) years reckoned from the original bid opening date. "Similar work" shall mean the following: Design/ Engineering/ Detail Engineering, Procurement/ Supply, Erection/ Installation, Testing/ Commissioning including civil works of 220kV or above voltage class, Indoor Double Bus "Gas Insulated Substation (GIS) " or "Outdoor Air Insulated Substation (AIS) " / Switchyard Justification & Benifit: EPC bidder is required to submit MOU from GIS OEM.Construction of AIS sub-station offers more challenges Inclusion of EPC players with AIS expereince will offer Healthy competition and discovery of competitive Market Price.	Provision of the Tender Document in this regard shall prevail
9	Section VI	331 of 1622	section I of section VI	PROJECT DESCRIPTION	Brief Scope of Work	It is suggested that 33KV outdoor Switchyard should be dropped and instead 33KV double bus Indoor GIS shall be adopted, for Reliability, Safety, cost competitiveness and faster execution	Provision of the Tender Document in this regard shall prevail. Bidders are requested to quote as per the Price Schedule.
10	Section VI	331 of 1622	section I of section VI	PROJECT DESCRIPTION	Brief Scope of Work	It is suggested that instead GIB, we should go for 220KV Cable, to achieve greater flexibility in terms of orientation, better layout, less complexity, less Gas monitoring, less inventory of spares, faster execution time, more reliability and possibly less cost.	Provision of the Tender Document in this regard shall prevail. Bidders are requested to quote as per the Price Schedule.
11	Section VI	331 of 1622	section I of section VI	PROJECT DESCRIPTION	Brief Scope of Work	In Incoming Line side, there is no Isolator needed	The Isolator has been considered for Isolation between Incoming Line and GIS Switchgear and the same has been approved by the end user i.e. OPTCL. Bidders are requested to quote as per the Price Schedule.
12	Section VI	331 of 1622	section I of section VI	PROJECT DESCRIPTION	Brief Scope of Work	Confirm whether there is no 220KV cable laying work involved in this tender, however underground cable trench and Joint Pit is to be considered in the scope.	Provision of the Tender Document and Price Schedule are amply clear in this regard and same shall prevail.
13	Section VI	331 of 1622	section I of section VI	PROJECT DESCRIPTION	Brief Scope of Work	Confirm 220KV Joints supply and Installation is not part of this tender while both ends Terminations supply and installation is part of this tender.	Provision of the Tender Document and Price Schedule are amply clear in this regard and same shall prevail.
14	Section VI	331 of 1622	section I of section VI	PROJECT DESCRIPTION	Brief Scope of Work	Confirm the other end OLTE and Line differential or distance protection relay supply & Installation is part of this tender scope or not?	Making suitable changes w.r.t. communication and protection at Remote End Substation/s is in Bidder's Scope.
15	Section VI	331 of 1622	section I of section VI	PROJECT DESCRIPTION	Brief Scope of Work	220KV/33KV Transformer can be both side Cable terminations for better layout and better reliability by avoiding oil to Air bushings	Provision of the Tender Document in this regard shall prevail. Bidders are requested to quote as per the Price Schedule.
16	Section VI	331 of 1622	section I of section VI	PROJECT DESCRIPTION	Brief Scope of Work	Outdoor Metering CT, PT can be avoided in outgoing feeders if the metering CT and PTs are already installed at MRSS end	Provision of the Tender Document in this regard shall prevail. Bidders are requested to quote as per the Price Schedule.
17	Section II	14 of 1622	1 (A)(A.1)	Technical Criteria: Similar Work	The bidder must have completed at least one "Similar work", having completed value of not less than INR 38.57 Crore (including tax & duties) during the last Seven (07) years reckoned from the original bid opening date.	Kindly relax some PQR for MSEs as single PO of 38 Cr may not be available with MSEs.	Provision of the Tender Document in this regard shall prevail
18	Section II	15 of 1622	A4, VI	Additional Notes to Technical Criteria	Bids from Consortium/ Joint Venture shall not be accepted	We request you to allow Consortium / JV Partner to quote the bid	Provision of the Tender Document in this regard shall prevail

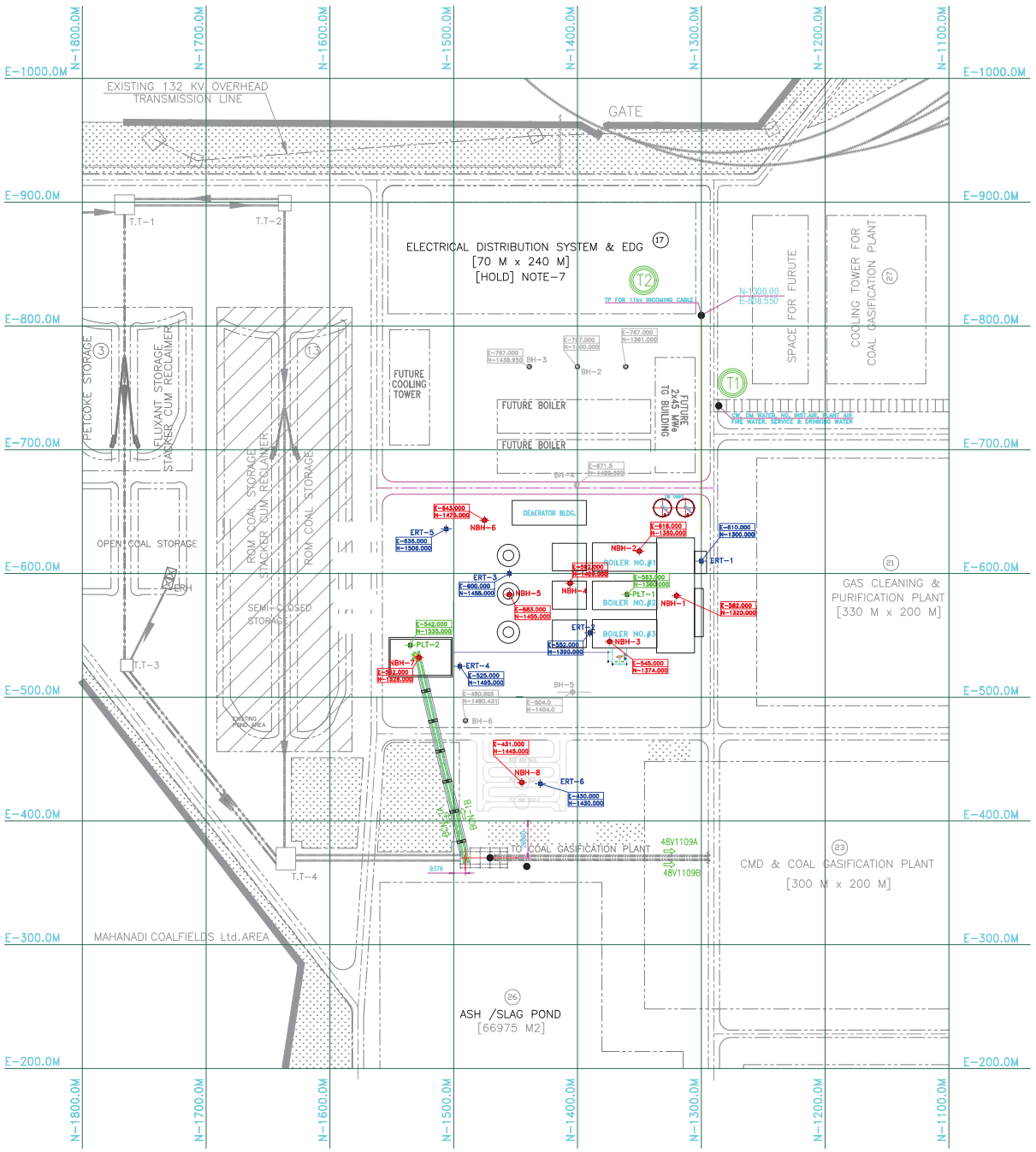
19	Section VI	395 of 1622	5	Statutory compliance	All statutory requirements like compliance of the applicable provisions of Standards on Grid Connectivity and Grid standards specified by CEA, IEGC, OGC and SEGC in force, PTCC approval, Inspection by the Electrical Inspectorate, Odisha and compliance of observations, OERC guidelines and norms and all other requirements as applicable under the law of the land shall be complied by the Contractor. Employer may assist for such compliance, as and when required.	All statutory compliance as specified by CEA, IEGC, OGC and SEGC in force, PTCC approval, Inspection by the Electrical Inspectorate, Odisha and compliance of observations, OERC guidelines and norms and all other requirements as applicable. Query: Request you to exculde statutory approvals from the scope of bidder.	Provision of the Tender Document in this regard shall prevail
20	Section VI	398 of 1622	8	Solving Right of Way	Solving Right of Way	Solving Right of Way : The responsibilities of acquiring Right of Way (ROW) for Transmission Line including all compensation, from the scope of the bidder. Query: Request you to exclude solving right of way & compension issue.	Provision of the Tender Document in this regard shall prevail
21	Section VI	437 of 1622	17	Type Test	The type test report shall not be older than 7 years from the date of bid opening.	The type test report shall not be older than 7 years from the date of bid opening. Request: Type Test Reports shall be acceptable till 10 years from the date of test as per CEA guidlines.	Bidders are requested to refer Amendment 1 in this regard (Revised Reply:Under review. Amendment If any shall follow shortly)
22	Section VI	1420 of 1622	2.1.5	WAY-LEAVE AND TREE CUTTING	WAY-LEAVE AND TREE CUTTING	Way Leave and Tree Cutting is in the bidder's scope. Query: Please remove oit from bidder's scope.	Provision of the Tender Document in this regard shall prevail
23	Section VI	Price Schedule	Sl no. 33.01	Price Schedule	Price Schedule	Cost of Short Circuit Test of 20MVA power transformer Query: Request to exclude this from the scope of bidder as it is time taking activity and can delay the completion period of the project.	Provision of the Tender Document in this regard shall prevail. Bidders are requested to quote as per the Price Schedule
24	Section III	69 of 1622	ITB Page 29, Cl. No. 12.5	BID PRICES	Prices quoted by the Bidder, shall remain firm and fixed and valid till completion of the Contract and will not be subject to variation on any account unless any price escalation/variation is allowed elsewhere in Tender Document.	Nowadays, prices of major commodities are fluctuating a lot and hence we request you to kindly accept variable prices for all equipment/materials as per price variation formula of IEEMA without any ceiling. Kindly confirm.	Provision of the Tender Document in this regard shall prevail
25	Section V	260 of 1622	SCC, Page 4 of 39, Cl. 1.3 Brief Scope of Work and SCC, Page 36 of 39, Cl. 45.4	SCC & Brief Scope of Work	The 220kV GIS Switching Substation would essentially consist Construction of (1) 220kV Line in Line out (LILO) Transmission Line (including associated Civil Works & RoW clearances) from OPTCL's existing 220kV TTPS – Rengali Transmission Line to proposed 220kV Switching Substation …. …. It may be noted that successful bidder will be responsible to arrange all the requisite clearances including RoW.	We request you to kindly accept/provide the following: (a) ROW for 220kV LILO work shall be kept in Purchaser/Owner scope. Kindly confirm. (b) Please provide the route survey report of 220kV LILO work. (c) ROW for 220kV cabling work shall be kept in Purchaser/Owner scope. Kindly confirm. (d) Please provide the route survey report of 220kV cabling work.	Following may be noted; (a) Provision of the Tender Document in this regard shall prevail (b) Route Survey Report of 220kV LILO Line is already part of the Tender Document. Bidder May refer Pg. No. 1463 of the Tender Document. Further, additional available information is being shared separately through Amendment 1. (c) 220kV U/G Cabling works is within TFL's area of juricidisction.. (d) Route Survey of 220kV U/G Cabling works is in Bidder's Scope. (Revised Reply: Refer Amendment-IV in this regard)
26	Section VI	437 of 1622	Cl. 17, Page No. 111 of 1296, TECHNICAL SPECIFICATION FOR 220kV SF6 GAS INSULATEDMETAL ENCLOSED SWITCHGEAR	TYPE TESTS:	The test reports of the above type tests for GIS (including type test report on Circuit breaker, Disconnectors, Grounding switches, Current and Voltage transformers as per relevant IEC and type tests of SF6/Air & Oil bushing as per IEC 60137 shall be submitted for approval as per Section project, Technical Specification. The type test report shall not be older than 7 years from the date of bid opening.	As per CEA guidelines for the validity period of type tests conducted on major electrical equipment including GIS is 10 years. Request you to kindly accept the same.	Bidders are requested to refer Amendment 1 lin this regard (Revised Reply: Refer Amendment-IV in this regard)
27	Section III	78 of 1622	ITB Page 38, Cl. No. 26.3, Reverse Auction	Reverse Auction	OWNER shall finalize tender after conducting reverse auction except in those cases where less than four techno-commercially acceptable offers are available.	For the purpose of healthy competition, we request Purchaser/Owner to remove Reverse Auction process. Kindly confirm.	Provision of the Tender Document in this regard shall prevail
28	Section V	282 of 1622	SCC, Page 26 of 39, Cl. 40.0	TERMS OF PAYMENT	Terms of Payment: Payment shall be released after submitting valid Tax Invoice. GST no. of Contractor as well as Owner should be mentioned by the Contractor on Invoice. Following terms of payment shall be applicable:	We request you to kindly accept the following payment terms: For Supply part: • 10% interest free down payment against submission of Advance Bank Guarantee (ABG) of equivalent amount valid up to 30 days beyond the scheduled date of receipt of last consignment of supplies at site. This Advance BG amount shall be reconciled once in three months with the advance adjusted against paid invoices. The value of Advance BG shall be reduced accordingly. • 5% on approval of major engineering deliverables within 7 days of invoice submission. • 80% payment of the Ex-Works value of the goods (including Mandatory Spares) upon dispatch along with 100% taxes and duties shall be paid through irrevocable and confirmed sight LC. LC for the 80% of the contract value shall be opened at the time of manufacturing clearance. LC opening, maintenance & negotiation charges will be borne by Purchaser. LC shall remain open till the last supply completed under the supply contract. • 5% payment shall be retained out of the invoice raised and shall be released against commissioning within 30 days though sight LC. However, in case of delay in commissioning by more than 60 days from date of readiness of commissioning due to reasons not attributable to Bidder, payment shall be released. The said 5% payment shall be released on submission of 5% PBG for the warranty period and on completion of punch points. For Services part: • 15% interest free down payment against submission of Advance Bank Guarantee (ABG) of equivalent amount within 30 days of Contract signing valid up to 30 days beyond the scheduled date of receipt of last consignment of supplies at site. This Advance BG amount shall be reconciled once in three months with the advance adjusted against paid invoices. The value of Advance BG shall be reduced accordingly. • 80% Pro-rata along with 100% taxes – Payment against submission of	Provision of the Tender Document in this regard shall prevail
29	Section II	14 of 1622	1-A-A.1	BID EVALUATION CRITERIA (BEC)-Technical Criteria:	(A) Technical Criteria: A.1 The bidder must have completed at least one "Similar work", having completed value of not less than INR 38.57 Crore (including tax & duties) during the last Seven (07) years reckoned from the original bid opening date. "Similar work" shall mean the following: Design/ Engineering/ Detail Engineering, Procurement/ Supply, Erection/ Installation, Testing/ Commissioning including civil works of 220kV or above voltage class Indoor Double Bus Gas Insulated Substation (GIS) / Switchyard.	Our Submission / Request Kindly be informed that we have already executed work of 132 KV and 33 KV GIS of similar nature. In addiction to above we have executed 220 KV / 132 KV AIS for state utilities . 400 KV / 132 KV /33 KV AIS for PGCIL. We are well established and well known firm with EPC. Hence we request to kindly make relaxation in your Technical QR and allow the firm executed similar nature of work up to voltage class of 132 KV , so that we can give you competitive bidding and quality work.	Provision of the Tender Document in this regard shall prevail
30	SECTION-VI	331 of 1622	1	Section I-Introduction	220KV DC Transmission line of approx. 5.0K M from TTPS - Rengali tap off point.	As per BOQ,Only 27.3 KM conductor given but According to Scope Line length is 5KM which means Altleast 30 km of conductor is used with considering any jumper or Span.Plesae confirm.	Bidders are requested to quote as per the Price Schedule. Any deviation in the quantity during execution shall be dealt separately as per the
	SECTION-VI	331 of 1622	1	BOQ	ACSR Zebra (54/7/3.18mm)		
31	SECTION-VI	331 of 1622	1	Section I-Introduction	220kV D/C U/G Cable from proposed GIS Substation to TFL receiving Substation.	Please confirm , Route length of under cabling work.	The Approx. Route Length is 750 Mtrs. Bidders are also requested to refer Part-I i.e. "Project Technical Specifications" in this regard
32	SECTION-VI	331 of 1622	1	Section I-Introduction	220kV D/C U/G Cable from proposed GIS Substation to TFL receiving Substation.	6 run * 1000 sq.mm should be buried or through cable trench , please confirm.	The Cable Laying shall be Burried. Bidders are requested to quote as per the Price Schedule.
33	SECTION-VI	1292 of 1622		GIS Substation Plan Layout	PLAN LAYOUT	As per overall layout plan drawing attached with tender documents ,On side of 33kv ICT bay .Due to span of approx. 28 meters its will require Gantry tower between them to avoid greater Sag .Please confirm	Provision of the Tender Document in this regard are amply clear. Bidders are requested to quote as per the Price Schedule.

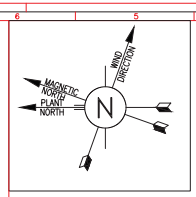
34	Section-II	14 of 1622	1.A.3	MOU	1)The bidder must submit a MOU (Memorandum of Understanding) with one or more of approved GIS OEM's as listed above. 2)Further, bidder must also submit a legally enforceable undertaking (jointly with the GIS Manufacturer) to guarantee quality, timely supply, performance and warranty obligations as specified for the equipment(s).	Format of MOU and Leagally enforceably undertaking is not present in tender documents. Kindly confirm if bidder has to furnish MOU and Undertaking in their format.	**Noted**
35	Section IV	238 of 1622	87 (vi)	GCC	SCHEDULE OF RATES CANNOT BE ALTERED: For WORK under unit rate basis, no alteration will be allowed in the Schedule of Rates by reason of works or any part of them being modified, altered, extended, diminished or committed. The Schedule of Rates are fully inclusive of rates which have been fixed by the CONTRACTOR and agreed to by the EMPLOYER and cannot be altered. For lumpsum CONTRACTS, the payment will be made according to the WORK actually carried out, for which purpose an item wise, or work wise Schedule of Rates shall be furnished, suitable for evaluating the value of WORK done and preparing running account bill.Payment for any additional work which is not covered in the Schedule of Rates, shall only be released on issuance of change order.	As the market is really volatile right now and prices of raw materials are varying everyday, requesting you to include a price adjustment clause for this project	Provision of the Tender Document in this regard shall prevail
36	Section VI	1587 of 1622	Schedule 2A	Schedule 2A-SS SUPPLY BOQ	BOQ	We understand the items quantified in BOQ are firm. Please confirm if there is any scope of optimisation in quantity ?	Bidder's understanding in this regard is correct. Quantity Optimization shall be dealt separately during execution of the Works as per the relevant clause of the Tender Document.
37	Section VI	1587 of 1622	Schedule 2A	Schedule 2A-SS SUPPLY BOQ	BOQ	We understand that its an unit rate tender and if any increase or decrease in Qty, the same will be payable to successful bidder accordingly. Please confirm	Bidder's understanding in this regard is correct. Quantity Variation shall be dealt as per the relevant clause of the Tender Document.
38	Section VI	397 of 1622	8	Solving Right of Way	Brief Scope of Work: The 220kV GIS Switching Substation would essentially consist Construction of (1) 220kV Line in Line out (LILO) Transmission Line (including associated Civil Works & RoW clearances) from OPTCL's existing 220kV TTPS – Rengali Transmission Line to proposed 220kV Switching Substation. iv) The responsibilities of acquiring Right of Way (ROW) for Transmission Line lies with contractor at his risk and cost. However, Employer shall make all endeavors to facilitate process of securing the ROW. Employer shall assist the Contractor for getting clearances from Private/Govt./Statutory bodies.	We understand that all the statutory charges/fees like Tree cutting, Forest clearance, Rod Crossing, Railway Crossing, River Crossing, Nalla Crossings and Crop compensation &etc and any other Right way issue for obtaining NOCs from various government department, forest clearances, police protection, private land owner/Authority/Body & TILR charges etc. will be reimbursed to the contractor by owner on valid documentary proof. Please COnfirm our understanding.	Bidder's understanding in this regard is correct.
39	Section-II	19 of 1622	F	(F) Authentication of documents submitted against BEC	All documents in support of "Technical Criteria" of Bid Evaluation Criteria (BEC) furnished by the bidders shall be verified and certified by any one of the following independent third party inspection agency (as per prescribed format): …… Further, TPIA will provide in addition a certificate toward verification and certification of documents pertaining to Technical Bid Evaluation Criteria (BEC) as per prescribed proforma and the same will be submitted by bidder in their bid.	If any bidder submitted BEC documents with authentication from one of these Third Party inspection agency for recent TFL Tender and became successful bidder and received the order for similar type of tender and he wish to produce same BEC documents for this tender, Then we understand that there is no need to do Re-authentication of documents from one of these Third Party agency. Further, we understanf that Bidder can submit old authenticated documents for BEC. Please confirm our understanding.	Bidder can submit previously authenticated documents for BEC submitted in TFL tender provided the NIT no and item should not be repeated
40	Section VI	1588 of 1622	Sl No. 4.05	220KV Outdoor equipment-	245kV 3150 Double break isolator	We request to clarify the purpose of air insulated isolator in line side, wherein all other equipment are part of GIS?	The Isolator has been considered for Isolation between Incoming Line and GIS Switchgear and the same has been approved by the end user i.e. OPTCL. Bidders are requested to quote as per the Price Schedule.
41	Section VI	1588 of 1622	Sl. No 5.03	BOQ- 220KV Outdoor equipment:	CT /PT console box	We understand it is standard common marshalling box for CT/PT .	Bidder's understanding in this regard is correct.
42	Section VI	1588 of 1622	Sl. No 6	BOQ- Tariff meter for main and check meter for metering	Tariff meter for main and check meter for metering	Request you to please provide the quantity and type of meters	Bidders are requested to quote as per the Price Schedule. However, Type and model of the Meter shall be as per OPTCL requirement during execution and approval Stage. Bidders are requested to make themselves aware of the OPTCL requirement.
43	Section VI	1294 of 1622	Sl No. 30.6	BOQ- Triple pole structure for double circuit 33kV line	Triple pole structure for double circuit 33kV line	Request you to please provide provide any typical standard drawing for Triple pole structure with equipment if available	Bidders are requested to refer Amendment in this regard
44	Section VI	1618 of 1622	GIS substation Plan Layout	220/33kV GIS switching S/S plan - TFL/PDIL/PTC/PLAN-03	Dimension of buildings	We understand the size of 220kV GIS building ,control building and other buildings shown in this layout are finalised. Please confirm if there is any scope of optimisation in size of the building	Bidders are requested to quote as per the Building Area mentioned in the Price Schedule. Drawings included in the Bidding Document are for reference purpose only. Any scope of optimization shall be dealt separately during Execution stage.
45	Section VI	1619 of 1622	GIS substation Plan Layout	220/33kV GIS switching S/S plan - TFL/PDIL/PTC/PLAN-04	clearances between equipment	We understand the electrical clearance for outdoor equipment shown in this layout is finalised. Please confirm if there is any scope of optimisation further to optimise the plot size .	Bidders are requested to quote as per the Price Schedule. Any scope of optimization shall be dealt separately during Execution stage.
46	Section VI	1619 of 1622	GIS substation Plan Layout	220/33kV GIS switching S/S plan - TFL/PDIL/PTC/Section	Height of buildings	We understand the height of building shown in this layout is finalised. Please confirm if there is any scope of optimisation.	Bidders are requested to quote as per the Building Area mentioned in the Price Schedule. Drawings included in the Bidding Document are for reference purpose only. Any scope of optimization shall be dealt separately during Execution stage.
47	Section VI	1620 of 1622	GIS substation Plan Layout	220/33kV GIS switching S/S plan - TFL/PDIL/PTC/Fire fighting	Dimension of buildings	We understand the size of fire fighting pump house is finalised. Please confirm if there is any scope of optimisation in size of the building	Bidders are requested to quote as per the Building Area mentioned in the Price Schedule. Drawings included in the Bidding Document are for reference purpose only. Any scope of optimization shall be dealt separately during Execution stage.
48	Section VI	347 of 1622	2	Section Project/ Scope of civil works	Soil Investigation report and contour plan	Please furnish, 1. Tender purpose Soil Investigation report or SBC Value 2. Contour plan or Avg NGL and proposed FGL level of Switchyard to ascertain the Site development work.	(1)Soil investigation report for the proposed area is not available. Soil related data of near by area is attached only for Reference purpose, As per NIT, Bidder has to conduct soil investigation within their area for detail design. Also, The Bidder may visit the Site to ascertain the Soil Parameters. Any variation in Soil Data shall not constitute a valid reason for any Additional Cost and shall not affect the Terms and Conditions of the Contract. Nothing extra what so ever shall be paid to the Bidder on account of any variation in Sub Soil Properties / Conditions. (2) Land development plan drawing and contour survey drawing is attached herewith for reference prurpose.

49	Section VI	1601 of 1622	1. Sr No 60.03, 2. Sr No 60.031 3. Sr No 60.031	Price bid Sch-2C (Civil-Erection)	1. SITE LEVELLING Providing, neatly dressing up and levelling of substation area to a required level as decided by the Engineer in Charge, the work includes removal, clearing of the entire area from vegetation, trees, bushes, uprooting of plants and disposal of surplus earth and unusable material from the site by means of any mechanical transport, if required as per direction of the Project In charge and as per Site Requirement, approved drawing and specification. This also includes excavation in all type of soils or rocks, back filling and disposal of excess earth or rocks to make the area to a level for construction as per scope and as per approved drawing and specification. 2. Cutting of earth & filling of excavated soil-100 Cum 3. Filling with borrowed earth beyond 100 meters lead- 100 Cum	We understand, 1a. we understand that Site development & other related activities mentioned to be carried out for whole area inside boundary wall including space for quarters. Please confirm. 1b. Excavated Material not suitable or not required for Backfill shall be disposed off in Area's as directed by the Purchaser up to a maximum lead of 2.0 km. 2. We understand as per site visit, Maximum plot area is in Cutting. However, mentioned Quantity is only 100 Cum. We understand, the actual cutting during execution will paid. Please confirm. 3. We understand " filling with borrowed earth beyond 100m lead" this item covers supply of borrowed earth which was staked beyond 100m lead. Please confirm.	Completely levelled land i.e. upto Finished Ground Level (FGL) for construction of the Switchyard shall be handed over to the Sucessful Agency. Provision of Cutting & Filling Quantaties have been kept for Minor Changes by the Agency, if required. Disposal of all unserviceable materials/earth etc shall be in scope of bidder for all leads.
50	Section VI	1190 of 1622	Part 27	Part-27-GENERAL SUB STATION LIGHTING SYSTEM	*** Contractor to furnish the design details for the locations (like Switch yard area, Road street light, Control room building area, Quarter ,Gate etc.,), which can be adopted after approval from OPTCL. Design to be carried out as per the LUX level indicated at the beginning of this chapter.	We understand any type of work related to quarter is not in Bidder's scope. Please confirm.	Bidder's understanding in this regard is correct.
51	Section VI	1235 of 1622	4 2) Sr No -77.	1) 4.0 ANTIWEED TREATMENT AND SITE SURFACING/	4.1 SCOPE OF WORK: Stone Spreading along with Cement Concrete Layer shall be done in the Areas of the Switchyard under Scope of Work including Future Bays as per Section – 1 (Project). The Stone spreading along with Cement Concrete Layer in Future Areas within the Fenced Area shall also be provided in case Step Potential without Stone Layer is not well within Safe Limits. After due compaction of the surface of the entire switchyard area shall be provided with plain cement concrete of 75 mm thickness after proper compaction, and antiweed treatment having cement concrete ratio 1:4:8. 4.2 GENERAL REQUIREMENT/4.2.8: Over the prepared sub grade, 75 mm thick base layer of Cement Concrete in 1:5:10 (1 Cement : 5 Fine / Coarse Sand : 10 Burnt Brick Aggregate) shall be provided in the Area excluding Roads, Drains, Cable Trenches as per detailed engineering drawing. For easy drainage of water, the Slope of 1:1,000 is to be provided from the Ridge to the nearest drain. The Ridge shall be suitably located at the center of the area between the nearest drains. The above slope shall be provided at the top of base layer of Cement Concrete in 1:5:10. A layer of Cement Slurry of Mix 1:6 (1 Cement: 6 Fine Sand) shall be laid uniformly over Cement Concrete Layer. The Cement	We found ambiguity for Grade of PCC in Switchyard before Metal spreading work The same was not mentioned in Sch-2c (Civil-Erection) Sr No-77. Please confirm which is to be followed? 4.1- 75mm thick (1:4:8) OR 4.2- 75mm thick (1:5:10).	Bidders are requested to refer Tender clause No. 4.2.8 of "Standard Civil Works" wherein the ratio of PCC has been mentioned as 1:5:10.
52	Section VI	1605 of 1622	Sr No -74.	Price bid Sch-2C (Civil-Erection)	DRAINAGE SYSTEM: Supply & storage of Material/Raw Material i.e. Cement, water, reinforcement steel, coarse and fine aggregates (Sand and Metal Chips etc.), Manpower, Tools & Plants, Machinery along with other required material for Design, engineering and construction of storm water drainage scheme (RCC type), road-culverts as per specification and approved drawing. This also includes excavation in all types of soil or rocks, back filling, and disposal of excess earth as per the direction of Engineer In charge. All the switch yard bays , roads water drainage shall be connected to the main surface drain. As per approved drawing and specification. 74.01) Storm water drain (RCC type) 74.02) Road-culverts, drain crossings (RCC type) pipe	1. We found ambiguity in type of Strom water drain i.e. of Brick Masonry type as specified in 5.7 clause of relevant Specification OR RCC type as specified in price bid line item 74.01. Please confirm which is to be followed?. 2. Open surface/pipe drains shall be provided on Both sides of roads as specified in 5.80 clause of relevant Specification. Please confirm. 3. Pipe drain shall be with RCC NP2 class pipe except road/rail crossing & shall be connected through Man Holes at an interval of maximum 30.0 meters. For Road crossing suitable NP3 class pipe and for Rail Crossing Suitable NP4 class pipe to be used. Please confirm. 4&5. Please furnish the invert level of outfall point or HFL. Further, please furnish the GPS location of outfall point or confirm the Max distance of outfall point (i.e. suitable location or location approved by Purchaser) from Switchyard Boundary premises.	1) Storm Water Drain shall be RCC Type 2) Open storm water drains shall be provided on both sides of the Roads. Bidders are requested to quote as per the provision of the Price Schedule. 3) As per Tender Specification referred at Pg No. 1238, Cl. No. 5.7, For Pipe drains, concrete pipe of class NP2 shall be used. However, for road crossings higher strength pipe of class NP3 shall be provided and for Rail crossings NP4 class shall be provided. 4 & 5) The drain shall be given a minimum slope of 1:500 in the Longitudinal direction. The drain outflow point shall be decided during detailed engineering and after finalization of Contour Survey & GA Layout.
53	Section VI	1238 of 1622	5	SITE DRAINAGE:	1) 5.7. Open Surface Drains shall be provided with Bricks of Class designation 105 in Cement Mortar 1: 4 including 100 mm thick Bed Concrete of Grade 1: 1½: 3 and 12 mm Thick Cement Plaster 1: 4 with a floating coat of Neat Cement inside the Drains, its top and exposed sides as per design and drawing approved by the Purchaser. For Expansive Soils, the Guidelines of IS: 9451 shall be followed. 2) 5.8. In General, all Plant Effluent Drainage shall be through buried Concrete Pipes and all Storm Water Drainage shall be through Open Drains / Pipe Drains. Open Storm Water Drains shall be provided on both sides of the Roads and shall be designed to drain the Road Surface as well as all the free and covered Areas etc. 3) 5.90. Pipe Drains shall be connected through Man Holes at an interval of maximum 30.0 meters. Plant Effluents shall be suitably treated by the Bidder to meet all the prevalent statutory requirements and Local Pollution Control Norms and Treated Effluents shall be conveyed to the Storm Water Drainage System at a suitable location for its final disposal. 4) 5.10. Invert Level of the Drainage System at outfall point shall be decided in such a way that the Water can easily be discharged above the High Flood Level (HFL) Outside Sub Station Boundary Wall at suitable Location and approved by Purchaser. 5) 5.11 All Internal Site Drainage System, including the Final Connection / Disposal to Purchaser acceptance points shall be part of Bidder's Scope, including all required Civil Work, Mechanical and	1. We found ambiguity in type of Strom water drain i.e. of Brick Masonry type as specified in 5.7 clause of relevant Specification OR RCC type as specified in price bid line item 74.01. Please confirm which is to be followed?. 2. Open surface/pipe drains shall be provided on Both sides of roads as specified in 5.80 clause of relevant Specification. Please confirm. 3. Pipe drain shall be with RCC NP2 class pipe except road/rail crossing & shall be connected through Man Holes at an interval of maximum 30.0 meters. For Road crossing suitable NP3 class pipe and for Rail Crossing Suitable NP4 class pipe to be used. Please confirm. 4&5. Please furnish the invert level of outfall point or HFL. Further, please furnish the GPS location of outfall point or confirm the Max distance of outfall point (i.e. suitable location or location approved by Purchaser) from Switchyard Boundary premises.	
54	Section VI	1602 of 1622 1607 of 1622	Sr No -64 & Sr No- 84.	Price bid Sch-2C (Civil-Erection)	RAIN WATER HARVESTING: Rain water harvesting system as per Technical specification and approved drawing BOREWELL: Including supply, fixing and commissioning of 1 Nos. 3 HP submersible water pump with starter and other protection.	We understand, Bore well and Re-charge well is not allowed in Talcher Premises. Please confirm. If allowed, we understand the requirement is separate for each building i.e. Control Room Building, GIS and Fire-fighting (3 Nos)	Only One Nos. Re-Charge well (Rainwater Harvesting) is envasaged i.e. for all the Buildings.
55	Section VI	1238 of 1622	5	SITE DRAINAGE	1) 5.17 In addition to Drainage of Rainwater, the Bidder shall arrange for Rainwater Harvesting. 2) 5.18 Rainwater Harvesting shall be done by providing two numbers Recharge Structures with bore wells. The Recharge Structures shall be suitably located within the Substation. Branch Drains from the main drain carrying rainwater from entire Switchyard shall be connected to the Recharge Structures. 3) 5.19 Bore well shall be done by suitable soil as per soil strata for control room building, GIS and fire fighting.	We understand, Bore well and Re-charge well is not allowed in Talcher Premises. Please confirm. If allowed, we understand the requirement is separate for each building i.e. Control Room Building, GIS and Fire-fighting (3 Nos)	
56	Section VI	1605 of 1622	Sr No 73.03	Price bid Sch-2C (Civil-Erection)	7.0 Metres wide Bituminous Road with shoulder & kerb stones at both sides from nearest Approach Road to the Main Gate of the Switchyard	We understand distance from nearest approach road to main gate shall be with in 50m. Please confirm.	Bidder's are requested to visit the Site and accertain the requiremnt on their own before quoting.

57			GENERAL	GENERAL	Billing Breakup for LOT items	We understand Stage wise Billing Breakup for the Lump sum Items are accepted. Please confirm.	Provision of the Tender Document in this regard are amply clear. Bidders are requested to refer 'Note' under Clause No. 40.3 in Special Conditions of Contract (SCC)
58	Section IV	200 of 1622	2 & 2.4	2. General Information/ 2.4 Power Supply	2.4.1 Subject to availability, EMPLOYER will supply power at 400/440 V at only one point at the nearest sub-station, from where the CONTRACTOR will make his own arrangement for temporary distribution. The point of supply will not be more than 500 m away from the CONTRACTOR'S premises. All the works will be done as per the applicable regulations and passed by the ENGINEER-IN-CHARGE. The temporary line will be removed forthwith after the completion of work or if there is any hindrance caused to the other works due to the alignment of these lines, the CONTRACTOR will re-route or remove the temporary lines at his own cost. The CONTRACTOR at his cost will also provide suitable electric meters, fuses, switches, etc. for purposes of payment to the EMPLOYER which should be in the custody and control of the EMPLOYER.	We understand, "Subject to availability, EMPLOYER will supply Uninterrupted power at 400/440 V at only one point at the nearest sub-station" for Construction work at at Prevailing charges and further distribution shall be done by Bidder at their own cost and the same will not be more than 500 m away from the Switchyard Premises. Please confirm.	Provision of the Tender Document in this regard are amply clear. Bidders are requested to refer Clause No. 2.4 "Power Supply" in General Conditions of Contract (GCC)
59			GENERAL	GENERAL	Grade of PCC, RCC & Reinforcement steel	We understand Mini. Grade of, 1) PCC i.e. lean concrete will be M10- 1:3:6 with 75mm thickness. 2) RCC will be M25 (Design mix) for all type of foundations, Column/ Footing trenches, walls etc. below GL as well as for superstructure works. 3) Reinforcement TMT will be Fe-500 D (CRS)	Bidder's understanding in this regard is correct.
60			GENERAL	GENERAL	The grade of Rail Section to be used for Transformer foundation	We presumed that the rails shall be of Broad gauge rail of 52 kg/m	Provision of the Tender Document in this regard are amply clear. Bidders are requested to quote accordingly
61			GENERAL	GENERAL	Use of 'M sand'	We would like to propose for using of Manufacture Sand for all civil works (i.e. Structural & Non-structural purposes) since scarcity of river sand and mining restriction by the Govt. Kindly confirm	Any proposal deviating from the Technical Specifications or Price Schedule shall be dealt during Detailed Engineering. Bidders are requested to quote as per the provisions of the Price Schedule and Technical Specifications.
62			GENERAL	GENERAL	Use of Fly ash bricks	We would like to propose for Fly ash bricks as an option along with Bunt clay & Block. Please accept our proposal.	Any proposal deviating from the Technical Specifications or Price Schedule shall be dealt during Detailed Engineering. Bidders are requested to quote as per the provisions of the Price Schedule and Technical Specifications.
63			GENERAL	GENERAL	Special type of coating/Paint on Concrete surface below GL for protection	We have not envisaged any special type of coating/Paint on Concrete surface below GL for protection. Please confirm.	Any proposal deviating from the Technical Specifications or Price Schedule shall be dealt during Detailed Engineering. Bidders are requested to quote as per the provisions of the Price Schedule and Technical Specifications.
64	Section VI	350 of 1622	5	Tests	Tests: a) Unless otherwise specified in respective section, all equipment shall be subjected routine, acceptance and type test as covered and specified in any standard in presence of the authorized representative of the OWNER.	As per reffered clause,please let un know validity period for type test of various equipments.	Bidders are requested to refer Amendment 1 lin this regard (Revised Reply: Refer Amendment-IV in this regard)
65				General	LT AC-DC SLD	Kindly provide the LT AC-DC SLD schematic drawing.	Bidders are requested to refer Amendment 1 lin this regard (Revised Reply: Refer Amendment-IV in this regard)
66				General	Remote End Work	We assumed that our scope of work is limited for 220kV GIS switching Substation. Kindly confirm.	Making suitable changes w.r.t. communication and protection at Remote End Substation/s is in Bidder's Scope.
67	Section VI	332 of 1622		Project summary: cable laying	Supply and laying of approx. 750m, Double circuit 220kV 1000sq.mm Copper XLPE cable from the GIS Substation to MRSS, including Cable seal end and its support structure at Switching substation end and suitable Cable termination at MRSS end.	Kindly provide the type of suitable termination at MRSS end to be considered.	The 220kV Cable shall be directly terminated in the 220kV MRSS GIS. However, the type and additional detils of the Termination shall be finalized during detailed engineering and finalization of MRSS GIS
68	Section VI	1071 of 1622	part 24	250kVA DIESEL GENERATOR SET	250kVA Diesal Generator Set	Kindly clarify the housing type for DG set, whether it is placed inside the building or can be placed in outdoor condition.	DG set will be placed in Outdoor Condition. Provision of the Tender Document and Price Schedule is amply clear in this regard.
69	Section VI	1190 of 1622	part 27	GENERAL SUB STATION LIGHTING SYSTEM	GENERAL SUB STATION LIGHTING SYSTEM	The Lux level requirement for switchyard is 30 mentioned in NIT. Kindly clarify at what level of height it shall be fulfilled.	The required Lux Levels at various locations of the Switchyard has been mentioned in Clause No. 1 of Part-27 "General Substation Lighting System" and bidders are requested to refer same.
70	Section VI	347 of 1622	Clause no-1/A/x	Electrical	Supply and putting of sub-station illumination system. All the light fittings shall be LED type & these fittings shall be mounted on switch yard portal structures such as columns & beams. No separate lighting mast is required.	In NIT clause-1/A/x of section-IV, it is mentioned that no separate lighting mast is required for lighting whereas in NIT part-28, for illumination, High Mast Lighting can be used. Kindly clarify whether we can use LM for lighting or not.	Lightning Mast shall be used for the purpose of Switchyard Lighting. Provision of Price Schedule in this regard is amply clear.
71	Section VI	1300 of 1622	Sl. No. 15	Earthing	Earthing	we understand that the earthing shall be done only for present scope of work. Pls. confirm the same.	Earthing shall be done completely inside the switchyard boundary area but excluding designated area for Quarters.
72	Section VI	1593 of 1622	Sl. No. 23	BOQ SCHEDULE 2A-SS (SUPPLY)	EOT Crane for GIS building for 220kV GIS station (5T Capacity)	Please clarify crane shall be Double Girder or Single Girder.	Sizing calculations of EOT Crane is in Bidder's Scope. Bidders are requested to quote accordingly.
73	Section VI	1591 of 1622	SL. No. 17	BOQ SCHEDULE 2A-SS (SUPPLY)	220kV GIS hall-ventilation system through ducting (Pressurization type ventilation system) at AHU room as per technical specification	We have not found any Technical Specification for Ventilation System of GIS hall & other area. Please provide the same.	Bidders are requested to refer Amendment 1 lin this regard (Revised Reply: Refer Amendment-IV in this regard)
74	Section VI	1082 of 1622	Part 25	NIT Document, PART-25-FIRE FIGHTING SYSTEM	Water Supply System, Water for hydrant & HVW system shall be supplied by one electrical motor driven pump of rated capacity 410m3/hr. at 70MWC head,	As per reffered clause, 410m3/hr Main Motor driven pump shall be provide which can be optimized as transformer rating is only 20MVA. Further Water Tank & Pump house size can also be optmized. Please provide your confirmation for optimization.	Bidders are requested to quote as per the provisions of the Tender Document and Price Schedule. Any deviation during detailed engineering shall be dealt separately as per the provisions of the Tender Document.
75	Section VI	1605 of 1622	Sl. No 70	BOQ SCHEDULE 2A-SS (SUPPLY)	FIRE FIGHTING PUMP HOUSE BUILDING & ASSOCIATED RCC WATER TANKS: (Approx. Area of the FFPH Building: 50 Sq. Mtr.);	50sqmt FFPH area is too less to accommodate Fire Water Pump House Equipment. Please check	50 Sq Mt. has been provisioned for FFPH Building only. The Water Tanks shall be constructed in addition to this Building.
76	Section VI	360 of 1622	p	CIVIL AND STRUCTURAL WORK	Construction of Overhead Water Tank to meet the requirement for Control Room cum GIS and Deluge valve room Building for Transformers firefighting protection.	We understand that, Water requirement for Deluge valve room Building for Transformers firefighting protection shall be fullfilled by dedicated aboveground Fire Water Tank & Pump House. Please confirm.	Bidder's understanding in this regard is correct
77	Section VI	348 of 1622	i	NIT Section-VI, Part-1, Project Technical specification, Section-IV, Scope of Works, General-2) Civil	i. Designing, fabrication, galvanizing and erection of structures on respective foundations detailed in specification for civil works. Supply of all structural materials (columns & beams, hardware & fasteners etc.) as per requirement. The contractor shall preferably adopt OPTCL designed standard structures for use in various substation.	Kindly provide OPTCL standard structural drawings (Gantry Structures & Equipment support structures) for refrence for respective BOQ & Cost estimation	Provisions of the Price Schedule in this regard shall prevail, Bidders are requested to quote accordingly

78	Section VI	348 of 1622	iii	NITMIN Section-VI, Part-1, Project Technical specification, Section-IV, Scope of Works, General-2) Civil, (Pg 22 of 1296)	iii. Site development including levelling, filling & compacting of the sub-station area to the desired height	Please share the area's contour level along with the required FGL to be achieved to work out the earthwork quantities	Completely levelled land i.e. upto Finished Ground Level (FGL) for construction of the Switchyard shall be handed over to the Sucessful Agency. Provision of Cutting & Filling Quantaties have been kept for Minor Changes by the Agency, if required.
79	Section VI	348 of 1622	Xiii	NITMIN Section-VI, Part-1, Project Technical specification, Section-IV, Scope of Works, General-2) Civil, (Pg 22 of 1296)	xiii. There shall be provision of store shed, and open yard platform to store the materials like transformer bushing, CT, CVT and other equipment.	Please share the technical specification/details of required Store shed & open yard platform with exact size requirement, as Store size is given 15x15m in TS while the same is shown 8x6m in GA	Bidders are requested to quote as per the provision of the Price Schedule. Bidders are also requested to refer Amendment 1 in this regard. (Revised Reply: Refer Amendment-IV in this regard)
80	Section VI	348 of 1622	XV	NITMIN Section-VI, Part-1, Project Technical specification, Section-IV, Scope of Works, General-2) Civil, (Pg 22 of 1296)	xv. Construction of drainage system of the sub-stations & flood water discharge systems. Miscellaneous works like manholes soak pits, RCC trench, fencing, etc. in the switch yard.	Please confirm, if the Substation stormwater discharge shall be connected to existing services, if yes, kinldy provide the distance of existing connection point from substation boundary	Bidders are requested to visit the Site and accertain the requiremnt on their own before quoting.
81	Section VI	348 of 1622	XVIII	NITMIN Section-VI, Part-1, Project Technical specification, Section-IV, Scope of Works, General-2) Civil, (Pg 22 of 1296)	xviii. Construction of approach road to the new sub-station as per requirement. Construction of periphery roads inside the fencing. The roads inside the switch yard, at the periphery shall be of 3.75 metres wide & shall be of concrete road as per technical specification. The other roads main and approach road shall be 7 metres wide. The Main Road shall be of concrete & the approach road shall be of bitumen. Road in front of transformer shall be 7.0 metres wide concrete road.	Please confirm the length of Approach road as the same is not funished in Layout & given as Lot item in Price schedule	Bidder's are requested to visit the Site and accertain the requiremnt on their own before quoting.
82	Section VI	350 of 1622	7	NITMIN Section-VI, Part-1, Project Technical specification, Section-IV, Scope of Works, General-7) (Pg 24 of 1296)	7) OPTCL adopted standard switch yard structure	Please provide the weight of OPTCL standard equipment structures also	Provisions of the Price Schedule in this regard shall prevail, Bidders are requested to quote accordingly
83	Section VI	360 of 1622	p	NITMIN Section-VI, Part-1, Project Technical specification, Section-IV, Scope of Works, CIVIL AND STRUCTURAL WORK (Pg 34 of 1296)	(p) Construction of Overhead Water Tank to meet the requirement for Control Room cum GIS and Deluge valve room Building for Transformers firefighting protection.	Please confirm the required capacity for overhead water tanks Also we understand that there is no requirement of underground water tanks for respective buildings, please confirm	The Overhead Tank shall RCC Type of suitable capicity. . Bidder's understanding w.r.t. Underground Tank is correct.
84	Section VI	381 of 1622		NITMIN Section-VI, Part-1, Project Technical specification, Section-V	CLIMATIC CONDITIONS	Please share the maximum rainfall intensity to work out the drain section & respective quantity	The maximum rainfall intensity is 116mm per hour.
85	Section VI	381 of 1622		NITMIN Section-VI, Part-1, Project Technical specification, Section-V	CLIMATIC CONDITIONS	If understand the area is not under cyclonic prone region as per IS 875 Part3-2015, for k4 values consideration, please confirm	Noted. However, basic wind speed to be considered as 50 m/sec.
86	Section-VI	1241 of 1622	7	NITMIN Section-VI, Part-1, Project Technical specification, Section-29, STANDARD CIVIL WORKS, Chapter 2, 7	7.0 POWER TRANSFORMER FOUNDATION, RAIL TRACK / ROAD CUM RAIL TRACK:	Please confirm type or Transformer foundation Block type or plinth type.	The Transformer Foundation shall be Plinth Type
87	Section-VI	1283 of 1622	20.6	NITMIN Section-VI, Part-1, Project Technical specification, Section-29, STANDARD CIVIL WORKS, Chapter 2, 20.6	20.6 BUILDING AREAS: 220kV Control room building shall be Single Storey building. 220kV GIS building shall be single storey building, height depends upon the GIS Equipment clearance. Car parking area shall be 80 sq.m and provision for 3 nos. of Four Wheelers and 2 nos. of two wheelers. Security post area shall be 12 sq.m.	We understand this clause is not applicable, please confirm	Provisions of the Price Schedule in this regard shall prevail, Bidders are requested to quote accordingly
88	Section-VI	1283 of 1622	20.7.1	NITMIN Section-VI, Part-1, Project Technical specification, Section-29, STANDARD CIVIL WORKS, Chapter 2, 20.7.1	20.7.1 PARKING SHED:- There shall be one no vehicle parking shed inside the sub-station area. The size of the parking area shall be 15mtrs X 15 mtrs, out of the entire area there shall be provision of shed for 5 mtrs X 15 mtrs and rest of the area shall be without shed.	Please share the other respective details i.e. Flooring, periphery brick work requirement, RCC or steel etc.	Bidders are requested to refer Amendment 1 lin this regard (Revised Reply: Refer Amendment-IV in this regard)
89	Section-VI	1283 of 1622	Sl. No 63.01/63.02/63.03/63.04	NITMIN Section-VI, Annexure XII, PROJECT BILL OF QUANTITY	63.01 Section 1-1 (1275MM X 1400MM) 63.02 Section 2- 2 (1275MM X900MM) 63.03 Section 3-3 (1075MM X900MM) 63.04 Section 4-4 (545MM X 250MM)	Please furnish respective cable trench section drawing for quantity computation	Bidders are requested to refer Amendment 1 lin this regard (Revised Reply: Refer Amendment-IV in this regard)
90				General	Soil Investigation Report	We understand that Soil investigation is under contractor scope of work after award of project, but at the tender stage kindly share the soil report with SBC recommendations to work out various Foundation quantities	Bidders are requested to refer Amendment 1 lin this regard (Revised Reply: Refer Amendment-IV in this regard)





LEGEND:

- NBH-NEW BORE HOLE TO BE EXECUTED (NBH-1 TO NBH-8)
- ERT-NEW ERT TO BE EXECUTED (ERT-1 TO ERT-5)
- PLT-PLATE LOAD TEST (PLT-1 & PLT-2)
- BH-OLD BORE HOLE (ONLY FOR INFORMATION)

DETAILS OF FIELD OPERATION

DETAILS OF BOREHOLES (NBH):

NBH NO.	Plant Co-Ordinates		Existing Ground Level in (m)	Termination Depth in (m)	Ground Water Level (m)
	EASTING	NORTHING			
01	582.00	1320.00	98.100	15.00	3.40
02	618.00	1350.00	98.950	10.00	3.60
03	545.00	1374.00	98.050	10.00	3.55
04	592.00	1406.00	97.240	10.00	0.90
05	583.00	1455.00	97.200	10.00	1.30
06	643.00	1475.00	97.100	10.00	0.90
07	532.00	1528.00	97.215	10.00	2.40
08	431.00	1445.00	99.600	10.00	3.50

DETAILS OF TRAILPIT (FOR PLT):

TP NO.	Plant Co-Ordinates		Existing Ground Level in (m)
	EASTING	NORTHING	
PLT-01	583.00	1360.00	98.070
PLT-02	542.00	1535.00	97.050

DETAILS OF DYNAMIC CONE PENETRATION TEST:

DCPT NO.	Plant Co-Ordinates		Existing Ground Level in (m)
	EASTING	NORTHING	
01	575.00	1403.00	97.050
02	643.00	1403.00	98.100

DETAILS OF ERT:

ERT NO.	Plant Co-Ordinates	
	EASTING	NORTHING
01	610.00	1300.00
02	552.00	1390.00
03	600.00	1455.00
04	525.00	1495.00
05	636.00	1506.00
06	430.00	1430.00

ANALYSIS OF STRATUM

NBH No: 01

N Bore Hole 01 was driven up to a depth of 15.00M.The sub-soil of the bore hole is given in Lithological form and summarized as follows:

Stratum – I

The strata below an average depth of 0.00m to 5.50m consist of Clayey sand. The 'N' value varies from 79 to 95.The stratum is Hard to Very dense.

Stratum-II

The strata below an average depth of 5.50m to 15.00m consist of Soft Disintegrated Rock. The 'N' value is greater than 100.The stratum is Very dense.

NBH No: 02

N Bore Hole 02 was driven up to a depth of 10.00M.The sub-soil of the bore hole is given in Lithological form and summarized as follows:

Stratum – I

The strata below an average depth of 0.00m to 6.00m consist of Clayey sand. The 'N' value varies from 54 to 92.The stratum is Hard to Very dense.

Stratum-II

The strata below an average depth of 6.00m to 10.00m consist of Soft Disintegrated Rock. The 'N' value is greater than 100.The stratum is Very dense.

NBH No: 03

N Bore Hole 03 was driven up to a depth of 10.00M.The sub-soil of the bore hole is given in Lithological form and summarized as follows:

Stratum – I

The strata below an average depth of 0.00m to 4.50m consist of Clayey sand. The 'N' value varies from 44 to 89.The stratum is Hard to Very dense.

Stratum-II

The strata below an average depth of 4.50m to 10.00m consist of Soft Disintegrated Rock. The 'N' value is greater than 100.The stratum is Very dense.

NBH No: 04

N Bore Hole 04 was driven up to a depth of 10.00M.The sub-soil of the bore hole is given in Lithological form and summarized as follows:

Stratum – I

The strata below an average depth of 0.00m to 4.50m consist of Clayey sand. The 'N' value varies from 48 to 102.The stratum is Hard to Very dense.

Stratum-II

The strata below an average depth of 4.50m to 10.00m consist of Soft Disintegrated Rock. The 'N' value is greater than 100.The stratum is Very dense.

NBH No: 05

N Bore Hole 05 was driven up to a depth of 10.00M.The sub-soil of the bore hole is given in Lithological form and summarized as follows:

Stratum – I

The strata below an average depth of 0.00m to 3.00m consist of Clayey sand. The 'N' value is 60.The stratum is Hard to Very dense.

Stratum-II

The strata below an average depth of 3.00m to 10.00m consist of Soft Disintegrated Rock. The 'N' value is greater than 100.The stratum is Very dense.

NBH No: 06

N Bore Hole 06 was driven up to a depth of 10.00M.The sub-soil of the bore hole is given in Lithological form and summarized as follows:

Stratum – I

The strata below an average depth of 0.00m to 3.00m consist of Clayey sand. The 'N' value is 48.The stratum is Hard to Dense.

Stratum-II

The strata below an average depth of 3.00m to 10.00m consist of Soft Disintegrated Rock. The 'N' value is greater than 100.The stratum is Very dense.

NBH No: 07

N Bore Hole 07 was driven up to a depth of 10.00M.The sub-soil of the bore hole is given in Lithological form and summarized as follows:

Stratum – I

The strata below an average depth of 0.00m to 1.50m consist of Clayey sand. The 'N' value is greater than 100 .The stratum is Hard to Very dense.

Stratum-II

The strata below an average depth of 1.50m to 10.00m consist of Soft Disintegrated Rock. The 'N' value is greater than 100.The stratum is Very dense.

NBH No: 08

N Bore Hole 08 was driven up to a depth of 10.00M.The sub-soil of the bore hole is given in Lithological form and summarized as follows:

Stratum – I

The strata below an average depth of 0.00m to 5.50m consist of Clayey sand. The 'N' value varies from 44 to greater than 100 .The stratum is Hard to Very dense.

Stratum-II

The strata below an average depth of 5.50m to 10.00m consist of Soft Disintegrated Rock. The 'N' value is greater than 100.The stratum is Very dense.

The Sub-stratification and respective index and engineering properties have been described. Based on the above, the design parameters are summarized for foundation analysis of various areas in the proceeding sections.

DESIGN PARAMETER

NBH-01

Stratum No.	Stratum Description	Depth of Stratum		Thickness of Stratum (m)	Ground Water Table (m)	'N' Value	Corrected 'N' Value	Unit Weight		Natural Moisture content (%)	Shear Parameters		Atterberg's Limit	
		Start Depth	End Depth					Bulk Density	Dry Density		C (t/m²)	Ø (°)	LL	PL
1	Clayey sand	0.00	5.50	5.50	3.40	79-95	47-55	1.89	1.57	21	0.90	26	32	21
2	Soft Disintegrated Rock	5.50	15.00	9.50		100	57.50	1.92	1.64	17	0.00	31	-	-

NBH-02

Stratum No.	Stratum Description	Depth of Stratum		Thickness of Stratum (m)	Ground water Table (m)	'N' Value	Corrected 'N' Value	Unit Weight		Natural Moisture content (%)	Shear Parameters		Atterberg's Limit	
		Start Depth	End Depth					Bulk Density	Dry Density		C (t/m²)	Ø (°)	LL	PL
1	Clayey sand	0.0	6.00	6.00	3.60	54-92	34.50 - 53.50	1.87	1.55	21	1.00	24	32	21
2	Soft Disintegrated Rock	6.00	10.00	4.00		100	57.50	1.93	1.64	18	0.00	32	-	-

NBH-03

Stratum No.	Stratum Description	Depth of Stratum		Thickness of Stratum (m)	Ground Water Table (m)	'N' Value	Corrected 'N' Value	Unit Weight		Natural Moisture content (%)	Shear Parameters		Atterberg's Limit	
		Start Depth	End Depth					Bulk Density	Dry Density		C (t/m²)	Ø (°)	LL	PL
1	Clayey sand	0.0	4.50	4.50	3.55	44-89	29.50 - 52.00	1.88	1.57	20	1.00	24	33	22
2	Soft Disintegrated Rock	4.50	10.00	5.50		100	57.50	1.94	1.66	17	0.00	33	-	-

NBH-04

Stratum No.	Stratum Description	Depth of Stratum		Thickness of Stratum (m)	Ground Water Table (m)	'N' Value	Corrected 'N' Value	Unit Weight		Natural Moisture content (%)	Shear Parameters		Atterberg's Limit	
		Start Depth	End Depth					Bulk Density	Dry Density		C (t/m²)	Ø (°)	LL	PL
1	Clayey sand	0.0	4.50	4.50	0.90	48-100	31.50 - 57.50	1.89	1.55	22	0.90	25	33	22
2	Soft Disintegrated Rock	4.50	10.00	5.50		100	57.50	1.92	1.66	16	0.00	32	-	-

NBH-05

Stratum No.	Stratum Description	Depth of Stratum		Thickness of Stratum (m)	Ground Water Table (m)	'N' Value	Corrected 'N' Value	Unit Weight		Natural Moisture content (%)	Shear Parameters		Atterberg's Limit	
		Start Depth	End Depth					Bulk Density	Dry Density		C (t/m²)	Ø (°)	LL	PL
1	Clayey sand	0.00	3.00	3.00	1.30	60	37.50	1.88	1.55	21	1.00	25	31	20
2	Soft Disintegrated Rock	3.00	10.00	7.00		100	57.50	1.94	1.66	17	0.00	33	-	-

NBH-06

Stratum No.	Stratum Description	Depth of Stratum		Thickness of Stratum (m)	Ground Water Table (m)	'N' Value	Corrected 'N' Value	Unit Weight		Natural Moisture content (%)	Shear Parameters		Atterberg's Limit	
		Start Depth	End Depth					Bulk Density	Dry Density		C (t/m²)	Ø (°)	LL	PL
1	Clayey sand	0.00	3.00	3.00	0.90	48	31.50	1.89	1.58	20	1.10	23	32	20
2	Soft Disintegrated Rock	3.00	10.00	7.00		100	57.50	1.94	1.66	17	0.00	33	-	-

NBH-07

Stratum No.	Stratum Description	Depth of Stratum		Thickness of Stratum (m)	Ground Water Table (m)	'N' Value	Corrected 'N' Value	Unit Weight		Natural Moisture content (%)	Shear Parameters		Atterberg's Limit	
		Start Depth	End Depth					Bulk Density	Dry Density		C (t/m²)	Ø (°)	LL	PL
1	Clayey sand	0.00	1.50	1.50	2.40	100	57.50	1.89	1.56	21	1.00	24	-	-
2	Soft Disintegrated Rock	1.50	10.00	8.50		-	-	1.93	1.67	16	0.00	32	-	-

NBH-08

Stratum No.	Stratum Description	Depth of Stratum		Thickness of Stratum (m)	Ground Water Table (m)	'N' Value	Corrected 'N' Value	Unit Weight		Natural Moisture content (%)	Shear Parameters		Atterberg's Limit	
		Start Depth	End Depth					Bulk Density	Dry Density		C (t/m²)	Ø (°)	LL	PL
1	Clayey sand	0.00	5.50	5.50	3.50	44-100	29.50 - 57.50	1.89	1.56	21	0.90	26	31	21
2	Soft Disintegrated Rock	5.50	10.00	4.50		100	57.50	1.92	1.66	16	0.00	31	-	-

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-01):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on				
		Shear Consideration		Total Permissible Settlement up to (mm)		
		GSBC	NSBC	25	40	75
1.00	1 x 1	29.05	28.07	42.08	67.33	-
	2 x 2	28.54	27.56	28.28	45.25	-
	3 x 3	29.70	28.72	24.17	38.67	-
	4 x 4	31.28	30.30	22.35	35.76	-
	5 x 5	33.02	32.04	21.50	34.40	-
	6 x 6	33.60	32.62	20.45	32.72	61.35
2.00	1 x 1	48.77	46.82	53.09	84.94	-
	2 x 2	44.13	42.18	35.28	56.46	-
	3 x 3	43.91	41.96	29.46	47.13	-
	4 x 4	44.80	42.85	26.48	42.37	-
	5 x 5	46.13	44.18	24.87	39.79	-
	6 x 6	44.56	42.61	22.37	35.79	67.10
2.50	1 x 1	59.85	57.41	55.47	88.75	-
	2 x 2	52.53	50.09	37.74	60.39	-
	3 x 3	51.42	48.98	31.35	50.17	-
	4 x 4	51.87	49.43	28.10	44.95	-
	5 x 5	52.93	50.49	26.03	41.65	-
	6 x 6	50.21	47.77	23.10	36.96	69.29
3.00	1 x 1	71.74	68.81	82.10	131.36	-
	2 x 2	61.35	58.42	48.39	77.43	-
	3 x 3	59.21	56.28	37.81	60.49	-
	4 x 4	59.14	56.21	32.80	52.48	-
	5 x 5	59.90	56.97	29.78	47.65	-
	6 x 6	55.97	53.04	25.45	40.72	76.35

Table-1

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-01):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 1.5	27.66	26.68	34.44	55.11
	2 x 3	27.44	26.46	25.88	41.40
	3 x 4.5	28.37	27.39	23.24	37.18
	4 x 6	29.58	28.60	21.78	34.85
	5 x 7.5	30.90	29.92	20.92	33.47
2.00	1 x 1.5	45.58	43.63	43.15	69.04
	2 x 3	42.48	40.53	31.01	49.61
	3 x 4.5	42.44	40.49	27.36	43.77
	4 x 6	43.16	41.21	25.26	40.42
	5 x 7.5	44.20	42.25	24.21	38.74
2.50	1 x 1.5	55.43	52.99	45.74	73.18
	2 x 3	50.44	48.00	34.53	55.25
	3 x 4.5	49.77	47.33	28.73	45.96
	4 x 6	50.18	47.74	26.48	42.36
	5 x 7.5	51.03	48.59	25.06	40.09
3.00	1 x 1.5	65.86	62.93	61.18	97.89
	2 x 3	58.69	55.76	41.19	65.91
	3 x 4.5	57.30	54.37	32.81	52.49
	4 x 6	57.35	54.42	29.58	47.34
	5 x 7.5	57.98	55.05	27.63	44.20

Table-2

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-01):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 2	28.09	27.11	30.82	49.31
	2 x 4	27.70	26.72	24.43	39.08
	3 x 6	28.23	27.25	22.02	35.24
	4 x 8	29.00	28.02	21.04	33.66
	5 x 10	29.86	28.88	20.52	32.83
2.00	1 x 2	45.66	43.71	39.03	62.44
	2 x 4	42.94	40.99	28.86	46.17
	3 x 6	42.70	40.75	25.87	41.39
	4 x 8	43.08	41.13	24.38	39.00
	5 x 10	43.70	41.75	23.22	37.15
2.50	1 x 2	55.17	52.73	40.69	65.11
	2 x 4	50.93	48.49	30.34	48.55
	3 x 6	50.18	47.74	27.14	43.42
	4 x 8	50.30	47.86	25.24	40.38
	5 x 10	50.77	48.33	24.29	38.87
3.00	1 x 2	65.15	62.22	51.52	82.42
	2 x 4	59.15	56.22	37.08	59.32
	3 x 6	57.81	54.88	30.34	48.55
	4 x 8	57.64	54.71	28.08	44.93
	5 x 10	57.94	55.01	26.44	42.30

Table-3

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-02):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on				
		Shear Consideration		Total Permissible Settlement up to (mm)		
		GSBC	NSBC	25	40	75
1.00	1 x 1	25.06	24.10	29.56	47.29	-
	2 x 2	24.36	23.40	19.87	31.78	-
	3 x 3	25.10	24.14	16.98	27.16	-
	4 x 4	26.20	25.24	15.70	25.11	-
	5 x 5	27.44	26.48	15.10	24.16	-
	6 x 6	27.20	26.24	14.36	22.98	43.09
2.00	1 x 1	40.93	39.01	40.70	65.12	-
	2 x 2	36.83	34.91	27.05	43.28	-
	3 x 3	36.44	34.52	22.58	36.14	-
	4 x 4	36.98	35.06	20.30	32.48	-
	5 x 5	37.89	35.97	20.30	32.48	-
	6 x 6	35.93	34.01	17.15	27.44	51.45
2.50	1 x 1	49.77	47.37	48.15	77.05	-
	2 x 2	43.53	41.13	32.77	52.43	-
	3 x 3	42.42	40.02	27.22	43.55	-
	4 x 4	42.60	40.20	24.39	39.03	-
	5 x 5	43.29	40.89	22.60	36.16	-
	6 x 6	40.43	38.03	20.05	32.08	60.15
3.00	1 x 1	59.23	56.35	89.79	143.67	-
	2 x 2	50.53	47.65	50.17	80.27	-
	3 x 3	48.60	45.72	38.31	61.29	-
	4 x 4	48.37	45.49	32.82	52.50	-
	5 x 5	48.82	45.94	29.56	47.29	-
	6 x 6	45.01	42.13	25.12	40.19	75.35

Table-4

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-02):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 1.5	23.86	22.90	24.19	38.71
	2 x 3	23.48	22.52	18.18	29.08
	3 x 4.5	24.08	23.12	16.32	26.12
	4 x 6	24.94	23.98	15.30	24.48
	5 x 7.5	25.88	24.92	14.69	23.51
2.00	1 x 1.5	38.22	36.30	33.08	52.93
	2 x 3	35.48	33.56	23.77	38.04
	3 x 4.5	35.29	33.37	20.97	33.56
	4 x 6	35.75	33.83	19.37	30.99
	5 x 7.5	36.47	34.55	18.56	29.70
2.50	1 x 1.5	46.06	43.66	39.71	63.53
	2 x 3	41.81	39.41	29.98	47.97
	3 x 4.5	41.12	38.72	24.94	39.90
	4 x 6	41.33	38.93	22.99	36.78
	5 x 7.5	41.89	39.49	21.75	34.81
3.00	1 x 1.5	54.33	51.45	64.71	103.54
	2 x 3	48.35	45.47	41.74	66.78
	3 x 4.5	47.09	44.21	32.68	52.29
	4 x 6	47.01	44.13	29.20	46.72
	5 x 7.5	47.40	44.52	27.11	43.37

Table-5

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-02):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 2	24.31	23.35	21.65	34.64
	2 x 4	23.85	22.89	17.16	27.45
	3 x 6	24.18	23.22	15.47	24.75
	4 x 8	24.71	23.75	14.78	23.64
	5 x 10	25.33	24.37	14.41	23.06
2.00	1 x 2	38.36	36.44	29.92	47.87
	2 x 4	35.99	34.07	22.12	35.40
	3 x 6	35.69	33.77	19.83	31.74
	4 x 8	35.91	33.99	18.69	29.90
	5 x 10	36.33	34.41	17.80	28.48
2.50	1 x 2	45.92	43.52	35.33	56.52
	2 x 4	42.33	39.93	26.34	42.15
	3 x 6	41.62	39.22	23.56	37.70
	4 x 8	41.64	39.24	21.91	35.05
	5 x 10	41.94	39.54	21.09	33.74
3.00	1 x 2	53.83	50.95	53.41	85.45
	2 x 4	48.85	45.97	37.10	59.35
	3 x 6	47.68	44.80	29.95	47.91
	4 x 8	47.45	44.57	27.51	44.02
	5 x 10	47.61	44.73	25.78	41.26

Table-6

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-03):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on				
		Shear Consideration		Total Permissible Settlement up to (mm)		
		GSBC	NSBC	25	40	75
1.00	1 x 1	25.14	24.16	24.55	39.28	-
	2 x 2	24.44	23.46	16.50	26.40	-
	3 x 3	25.18	24.20	14.10	22.56	-
	4 x 4	26.29	25.31	13.04	20.86	-
	5 x 5	27.55	26.57	12.54	20.07	-
	6 x 6	27.31	26.33	11.93	19.09	35.79
2.00	1 x 1	41.08	39.13	40.70	65.12	-
	2 x 2	36.98	35.03	27.05	43.28	-
	3 x 3	36.59	34.64	22.58	36.14	-
	4 x 4	37.14	35.19	20.30	32.48	-
	5 x 5	38.05	36.10	19.07	30.50	-
	6 x 6	36.10	34.15	17.15	27.44	51.45
2.50	1 x 1	49.97	47.53	49.37	79.00	-
	2 x 2	43.71	41.27	33.60	53.76	-
	3 x 3	42.61	40.17	27.91	44.65	-
	4 x 4	42.79	40.35	25.01	40.01	-
	5 x 5	43.49	41.05	23.17	37.07	-
	6 x 6	40.63	38.19	20.56	32.89	61.68
3.00	1 x 1	59.47	56.54	61.80	98.87	-
	2 x 2	50.75	47.82	42.50	67.99	-
	3 x 3	48.83	45.90	35.15	56.24	-
	4 x 4	48.60	45.67	31.42	50.27	-
	5 x 5	49.05	46.12	29.06	46.50	-
	6 x 6	45.24	42.31	27.45	43.91	75.42

Table-7

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-03):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 1.5	23.94	22.96	20.09	32.15
	2 x 3	23.56	22.58	15.09	24.15
	3 x 4.5	24.17	23.19	13.56	21.69
	4 x 6	25.03	24.05	12.71	20.33
	5 x 7.5	25.98	25.00	12.20	19.52
2.00	1 x 1.5	38.37	36.42	33.08	52.93
	2 x 3	35.62	33.67	23.77	38.04
	3 x 4.5	35.44	33.49	20.97	33.56
	4 x 6	35.90	33.95	19.37	30.99
	5 x 7.5	36.62	34.67	18.56	29.70
2.50	1 x 1.5	46.25	43.81	40.71	65.14
	2 x 3	41.99	39.55	30.74	49.18
	3 x 4.5	41.30	38.86	25.57	40.91
	4 x 6	41.51	39.07	23.57	37.71
	5 x 7.5	42.08	39.64	22.31	35.69
3.00	1 x 1.5	54.57	51.64	50.90	81.44
	2 x 3	48.57	45.64	38.30	61.28
	3 x 4.5	47.31	44.38	31.75	50.80
	4 x 6	47.23	44.30	29.23	46.76
	5 x 7.5	47.63	44.70	27.64	44.22

Table-8

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-03):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 2	24.39	23.41	17.98	28.77
	2 x 4	23.93	22.95	14.25	22.80
	3 x 6	24.26	23.28	12.85	20.56
	4 x 8	24.80	23.82	12.27	19.64
	5 x 10	25.42	24.44	11.97	19.15
2.00	1 x 2	38.51	36.56	29.92	47.87
	2 x 4	36.14	34.19	22.12	35.40
	3 x 6	35.84	33.89	19.83	31.74
	4 x 8	36.06	34.11	18.69	29.90
	5 x 10	36.48	34.53	17.80	28.48
2.50	1 x 2	46.11	43.67	36.22	57.95
	2 x 4	42.52	40.08	27.01	43.21
	3 x 6	41.81	39.37	24.16	38.65
	4 x 8	41.82	39.38	22.46	35.94
	5 x 10	42.12	39.68	21.62	34.60
3.00	1 x 2	54.07	51.14	45.24	72.38
	2 x 4	49.07	46.14	35.52	56.83
	3 x 6	47.90	44.97	29.98	47.96
	4 x 8	47.68	44.75	28.18	45.09
	5 x 10	47.84	44.91	26.78	42.86

Table-9

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-04):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on				
		Shear Consideration		Total Permissible Settlement up to (mm)		
		GSBC	NSBC	25	40	75
1.00	1 x 1	25.75	24.78	27.05	43.29	-
	2 x 2	25.19	24.22	18.18	29.09	-
	3 x 3	26.10	25.13	15.54	24.86	-
	4 x 4	27.38	26.41	14.37	22.99	-
	5 x 5	28.80	27.83	13.82	22.11	-
	6 x 6	28.98	28.01	13.15	21.03	39.44
2.00	1 x 1	42.90	40.97	40.70	65.12	-
	2 x 2	38.75	36.82	27.05	43.28	-
	3 x 3	38.47	36.54	22.58	36.14	-
	4 x 4	39.15	37.22	20.30	32.48	-
	5 x 5	40.22	38.29	19.07	30.50	-
	6 x 6	38.53	36.60	17.15	27.44	51.45
2.50	1 x 1	52.50	50.09	51.20	81.92	-
	2 x 2	46.05	43.64	34.84	55.75	-
	3 x 3	45.00	42.59	28.94	46.31	-
	4 x 4	45.29	42.88	25.93	41.50	-
	5 x 5	46.13	43.72	24.03	38.45	-
	6 x 6	43.44	41.03	21.32	34.11	63.96
3.00	1 x 1	62.80	59.90	68.73	109.97	-
	2 x 2	53.70	50.80	47.27	75.63	-
	3 x 3	51.76	48.86	39.10	62.56	-
	4 x 4	51.62	48.72	34.95	55.92	-
	5 x 5	52.19	49.29	32.32	51.71	-
	6 x 6	48.47	45.57	27.96	44.74	83.89

Table-10

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-04):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 1.5	24.55	23.58	22.14	35.43
	2 x 3	24.27	23.30	16.64	26.62
	3 x 4.5	25.00	24.03	14.94	23.90
	4 x 6	25.98	25.01	14.00	22.41
	5 x 7.5	27.07	26.10	13.45	21.51
2.00	1 x 1.5	40.14	38.21	33.08	52.93
	2 x 3	37.36	35.43	23.77	38.04
	3 x 4.5	37.25	35.32	20.97	33.56
	4 x 6	37.82	35.89	19.37	30.99
	5 x 7.5	38.65	36.72	18.56	29.70
2.50	1 x 1.5	48.67	46.26	42.22	67.55
	2 x 3	44.27	41.86	31.88	51.00
	3 x 4.5	43.63	41.22	26.52	42.43
	4 x 6	43.92	41.51	24.44	39.11
	5 x 7.5	44.59	42.18	23.13	37.01
3.00	1 x 1.5	57.72	54.82	56.61	90.58
	2 x 3	51.44	48.54	42.60	68.16
	3 x 4.5	50.18	47.28	35.31	56.50
	4 x 6	50.16	47.26	32.51	52.01
	5 x 7.5	50.64	47.74	30.74	49.18

Table-11

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-04):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 2	24.97	24.00	19.81	31.70
	2 x 4	24.57	23.60	15.70	25.12
	3 x 6	24.99	24.02	14.16	22.65
	4 x 8	25.61	24.64	13.53	21.64
	5 x 10	26.31	25.34	13.19	21.10
2.00	1 x 2	40.26	38.33	29.92	47.87
	2 x 4	37.84	35.91	22.12	35.40
	3 x 6	37.58	35.65	19.83	31.74
	4 x 8	37.87	35.94	18.69	29.90
	5 x 10	38.36	36.43	17.80	28.48
2.50	1 x 2	48.50	46.09	37.56	60.10
	2 x 4	44.78	42.37	28.01	44.82
	3 x 6	44.08	41.67	25.05	40.08
	4 x 8	44.15	41.74	23.29	37.27
	5 x 10	44.51	42.10	22.42	35.88
3.00	1 x 2	57.16	54.26	50.32	80.50
	2 x 4	51.92	49.02	39.51	63.21
	3 x 6	50.72	47.82	33.34	53.35
	4 x 8	50.54	47.64	31.35	50.15
	5 x 10	50.75	47.85	29.79	47.67

Table-12

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-05):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on				
		Shear Consideration		Total Permissible Settlement up to (mm)		
		GSBC	NSBC	25	40	75
1.00	1 x 1	27.10	26.13	29.56	47.29	-
	2 x 2	26.37	25.40	19.87	31.78	-
	3 x 3	27.21	26.24	16.98	27.16	-
	4 x 4	28.45	27.48	15.70	25.11	-
	5 x 5	29.85	28.88	15.10	24.16	-
	6 x 6	29.74	28.77	14.36	22.98	43.09
2.00	1 x 1	44.52	42.59	46.60	74.56	-
	2 x 2	40.04	38.11	30.97	49.56	-
	3 x 3	39.64	37.71	25.86	41.37	-
	4 x 4	40.26	38.33	23.24	37.19	-
	5 x 5	41.28	39.35	21.83	34.93	-
	6 x 6	39.29	37.36	19.63	31.41	58.90
2.50	1 x 1	54.25	51.84	57.30	91.68	-
	2 x 2	47.39	44.98	38.99	62.38	-
	3 x 3	46.20	43.79	32.39	51.82	-
	4 x 4	46.42	44.01	29.02	46.44	-
	5 x 5	47.20	44.79	26.89	43.02	-
	6 x 6	44.21	41.80	23.86	38.17	71.58
3.00	1 x 1	64.67	61.77	68.73	109.97	-
	2 x 2	55.09	52.19	47.27	75.63	-
	3 x 3	52.99	50.09	39.10	62.56	-
	4 x 4	52.76	49.86	34.95	55.92	-
	5 x 5	53.27	50.37	32.32	51.71	-
	6 x 6	49.23	46.33	27.96	44.74	83.89

Table-13

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-05):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 1.5	25.79	24.82	24.19	38.71
	2 x 3	25.40	24.43	18.18	29.08
	3 x 4.5	26.08	25.11	16.32	26.12
	4 x 6	27.04	26.07	15.30	24.48
	5 x 7.5	28.11	27.14	14.69	23.51
2.00	1 x 1.5	41.53	39.60	37.87	60.60
	2 x 3	38.53	36.60	27.22	43.55
	3 x 4.5	38.35	36.42	24.01	38.42
	4 x 6	38.88	36.95	22.17	35.48
	5 x 7.5	39.68	37.75	21.25	34.01
2.50	1 x 1.5	50.15	47.74	47.25	75.59
	2 x 3	45.47	43.06	35.67	57.08
	3 x 4.5	44.73	42.32	29.67	47.48
	4 x 6	44.98	42.57	27.35	43.76
	5 x 7.5	45.62	43.21	25.88	41.42
3.00	1 x 1.5	59.26	56.36	56.61	90.58
	2 x 3	52.67	49.77	42.60	68.16
	3 x 4.5	51.29	48.39	35.31	56.50
	4 x 6	51.21	48.31	32.51	52.01
	5 x 7.5	51.66	48.76	30.74	49.18

Table-14

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-05):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 2	26.25	25.28	21.65	34.64
	2 x 4	25.76	24.79	17.16	27.45
	3 x 6	26.14	25.17	15.47	24.75
	4 x 8	26.74	25.77	14.78	23.64
	5 x 10	27.43	26.46	14.41	23.06
2.00	1 x 2	41.65	39.72	34.26	54.81
	2 x 4	39.06	37.13	25.33	40.53
	3 x 6	38.74	36.81	22.71	36.33
	4 x 8	38.99	37.06	21.40	34.24
	5 x 10	39.46	37.53	20.38	32.61
2.50	1 x 2	49.95	47.54	42.04	67.26
	2 x 4	46.01	43.60	31.34	50.15
	3 x 6	45.24	42.83	28.03	44.85
	4 x 8	45.26	42.85	26.07	41.71
	5 x 10	45.60	43.19	25.09	40.15
3.00	1 x 2	58.66	55.76	50.32	80.50
	2 x 4	53.16	50.26	39.51	63.21
	3 x 6	51.88	48.98	33.34	53.35
	4 x 8	51.64	48.74	31.35	50.15
	5 x 10	51.83	48.93	29.79	47.67

Table-15

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-06):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on				
		Shear Consideration		Total Permissible Settlement up to (mm)		
		GSBC	NSBC	25	40	75
1.00	1 x 1	24.37	23.39	27.05	43.29	-
	2 x 2	23.55	22.57	18.18	29.09	-
	3 x 3	24.14	23.16	15.54	24.86	-
	4 x 4	25.09	24.11	14.37	22.99	-
	5 x 5	26.17	25.19	13.82	22.11	-
	6 x 6	25.56	24.58	13.15	21.03	39.44
2.00	1 x 1	39.10	37.14	40.70	65.12	-
	2 x 2	35.07	33.11	27.05	43.28	-
	3 x 3	34.59	32.63	22.58	36.14	-
	4 x 4	35.00	33.04	20.30	32.48	-
	5 x 5	35.77	33.81	19.07	30.50	-
	6 x 6	33.59	31.63	17.15	27.44	51.45
2.50	1 x 1	47.27	44.81	54.25	86.80	-
	2 x 2	41.24	38.78	36.92	59.06	-
	3 x 3	40.10	37.64	30.66	49.06	-
	4 x 4	40.17	37.71	27.48	43.97	-
	5 x 5	40.74	38.28	25.46	40.74	-
	6 x 6	37.73	35.27	22.59	36.14	67.77
3.00	1 x 1	55.98	53.03	68.73	109.97	-
	2 x 2	47.68	44.73	47.27	75.63	-
	3 x 3	45.77	42.82	39.10	62.56	-
	4 x 4	45.47	42.52	34.95	55.92	-
	5 x 5	45.81	42.86	32.32	51.71	-
	6 x 6	41.93	39.98	27.96	44.74	83.89

Table-16

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-06):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 1.5	23.19	22.21	22.14	35.43
	2 x 3	22.72	21.74	16.64	26.62
	3 x 4.5	23.21	22.23	14.94	23.90
	4 x 6	23.94	22.96	14.00	22.41
	5 x 7.5	24.77	23.79	13.45	21.51
2.00	1 x 1.5	36.45	34.49	33.08	52.93
	2 x 3	33.76	31.80	23.77	38.04
	3 x 4.5	33.51	31.55	20.97	33.56
	4 x 6	33.87	31.91	19.37	30.99
	5 x 7.5	34.48	32.52	18.56	29.70
2.50	1 x 1.5	43.68	41.22	44.73	71.57
	2 x 3	39.58	37.12	33.78	54.04
	3 x 4.5	38.86	36.40	28.09	44.95
	4 x 6	38.99	36.53	25.90	41.43
	5 x 7.5	39.46	37.00	24.51	39.21
3.00	1 x 1.5	51.28	48.33	56.61	90.58
	2 x 3	45.58	42.63	42.60	68.16
	3 x 4.5	44.33	41.38	35.31	56.50
	4 x 6	44.20	41.25	32.51	52.01
	5 x 7.5	44.50	41.55	30.74	49.18

Table-17

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-06):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 2	23.66	22.68	19.81	31.70
	2 x 4	23.14	22.16	15.70	25.12
	3 x 6	23.41	22.43	14.16	22.65
	4 x 8	23.86	22.88	13.53	21.64
	5 x 10	24.39	23.41	13.19	21.10
2.00	1 x 2	36.62	34.66	29.92	47.87
	2 x 4	34.30	32.34	22.12	35.40
	3 x 6	33.96	32.00	19.83	31.74
	4 x 8	34.12	32.16	18.69	29.90
	5 x 10	34.47	32.51	17.80	28.48
2.50	1 x 2	43.58	41.12	39.80	63.68
	2 x 4	40.13	37.67	29.68	47.48
	3 x 6	39.41	36.95	26.54	42.47
	4 x 8	39.38	36.92	24.68	39.49
	5 x 10	39.62	37.16	23.76	38.02
3.00	1 x 2	50.84	47.89	50.32	80.50
	2 x 4	46.10	43.15	39.51	63.21
	3 x 6	44.95	42.00	33.34	53.35
	4 x 8	44.70	41.75	31.35	50.15
	5 x 10	44.81	41.86	29.79	47.67

Table-18

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-07):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on				
		Shear Consideration		Total Permissible Settlement up to (mm)		
		GSBC	NSBC	25	40	75
1.00	1 x 1	25.42	24.22	29.56	47.29	-
	2 x 2	24.74	23.52	19.87	31.78	-
	3 x 3	25.52	24.27	16.98	27.16	-
	4 x 4	26.67	25.39	15.70	25.11	-
	5 x 5	27.96	26.65	15.10	24.16	-
	6 x 6	27.78	26.43	14.36	22.98	43.09
2.00	1 x 1	67.68	65.74	64.30	102.88	-
	2 x 2	64.92	62.98	42.73	68.37	-
	3 x 3	67.37	65.43	35.68	57.08	-
	4 x 4	71.11	69.17	32.07	51.31	-
	5 x 5	75.37	73.43	30.12	48.19	-
	6 x 6	80.26	78.32	27.09	43.34	81.27
2.50	1 x 1	88.22	85.79	66.44	106.30	-
	2 x 2	81.08	78.65	45.21	72.34	-
	3 x 3	82.06	79.63	37.56	60.09	-
	4 x 4	85.07	82.64	33.65	53.85	-
	5 x 5	88.89	86.46	31.18	49.89	-
	6 x 6	91.55	89.12	27.67	44.27	83.00
3.00	1 x 1	110.70	107.79	68.73	109.97	-
	2 x 2	98.19	95.28	47.27	75.63	-
	3 x 3	97.38	94.47	39.10	62.56	-
	4 x 4	99.50	96.59	34.95	55.92	-
	5 x 5	102.79	99.88	32.32	51.71	-
	6 x 6	103.11	100.20	27.96	44.74	83.89

Table-19

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-07):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 1.5	24.22	23.25	24.19	38.71
	2 x 3	23.85	22.88	18.18	29.08
	3 x 4.5	24.49	23.52	16.32	26.12
	4 x 6	25.37	24.40	15.30	24.48
	5 x 7.5	26.35	25.38	14.69	23.51
2.00	1 x 1.5	64.79	62.85	52.26	83.61
	2 x 3	62.94	61.00	37.56	60.09
	3 x 4.5	64.84	62.90	33.13	53.01
	4 x 6	67.68	65.74	30.60	48.95
	5 x 7.5	70.90	68.96	29.33	46.92
2.50	1 x 1.5	83.56	81.13	54.79	87.66
	2 x 3	78.54	76.11	41.36	66.18
	3 x 4.5	79.39	76.96	34.41	55.05
	4 x 6	81.71	79.28	31.71	50.74
	5 x 7.5	84.61	82.18	30.02	48.02
3.00	1 x 1.5	103.74	100.83	56.61	90.58
	2 x 3	94.84	91.93	42.60	68.16
	3 x 4.5	94.40	91.49	35.31	56.50
	4 x 6	96.07	93.16	32.51	52.01
	5 x 7.5	98.58	95.67	30.74	49.18

Table-20

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-07):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 2	24.67	23.70	21.65	34.64
	2 x 4	24.21	23.24	17.16	27.45
	3 x 6	24.57	23.60	15.47	24.75
	4 x 8	25.12	24.15	14.78	23.64
	5 x 10	25.76	24.79	14.41	23.06
2.00	1 x 2	64.51	62.57	47.27	75.63
	2 x 4	62.48	60.54	34.95	55.92
	3 x 6	63.49	61.55	31.33	50.13
	4 x 8	65.25	63.31	29.52	47.24
	5 x 10	67.32	65.38	28.12	44.99
2.50	1 x 2	64.51	80.43	48.74	77.99
	2 x 4	62.48	75.84	36.35	58.15
	3 x 6	63.49	75.99	32.51	52.01
	4 x 8	65.25	77.33	30.23	48.36
	5 x 10	67.32	79.14	29.10	46.56
3.00	1 x 2	102.33	99.42	50.32	80.50
	2 x 4	94.62	91.71	39.51	63.21
	3 x 6	93.72	90.81	33.34	53.35
	4 x 8	94.54	91.63	31.35	50.15
	5 x 10	96.04	93.13	29.79	47.67

Table-21

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-08):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on				
		Shear Consideration		Total Permissible Settlement up to (mm)		
		GSBC	NSBC	25	40	75
1.00	1 x 1	28.97	28.00	24.55	39.28	-
	2 x 2	28.45	27.48	16.50	26.40	-
	3 x 3	29.60	28.63	14.10	22.56	-
	4 x 4	31.17	30.20	13.04	20.86	-
	5 x 5	32.90	31.93	12.54	20.07	-
	6 x 6	33.47	32.50	11.93	19.09	35.79
2.00	1 x 1	48.60	46.66	34.80	55.68	-
	2 x 2	43.97	42.03	23.13	37.01	-
	3 x 3	43.74	41.80	19.31	30.90	-
	4 x 4	44.63	42.69	17.36	27.77	-
	5 x 5	45.95	44.01	16.30	26.08	-
	6 x 6	44.37	42.43	14.66	23.46	43.99
2.50	1 x 1	59.63	57.20	42.06	67.29	-
	2 x 2	52.34	49.91	28.62	45.79	-
	3 x 3	51.23	48.80	23.77	38.04	-
	4 x 4	51.66	49.23	21.30	34.09	-
	5 x 5	52.72	50.29	19.74	31.58	-
	6 x 6	49.99	47.56	17.51	28.02	52.54
3.00	1 x 1	71.47	68.56	76.61	122.58	-
	2 x 2	61.10	58.19	43.91	70.25	-
	3 x 3	58.97	56.06	33.90	54.24	-
	4 x 4	58.89	55.98	29.22	46.75	-
	5 x 5	59.64	56.73	26.42	42.27	-
	6 x 6	55.72	52.81	22.51	36.02	67.54

Table-22

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-08):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 1.5	27.58	26.61	20.09	32.15
	2 x 3	27.35	26.38	15.09	24.15
	3 x 4.5	28.27	27.30	13.56	21.69
	4 x 6	29.47	28.50	12.71	20.33
	5 x 7.5	30.79	29.82	12.20	19.52
2.00	1 x 1.5	45.42	43.48	28.29	45.26
	2 x 3	42.32	40.38	20.33	32.52
	3 x 4.5	42.28	40.34	17.93	28.70
	4 x 6	43.00	41.06	16.56	26.50
	5 x 7.5	44.03	42.09	15.87	25.40
2.50	1 x 1.5	55.22	52.79	34.68	55.49
	2 x 3	50.24	47.81	26.19	41.90
	3 x 4.5	49.58	47.15	21.78	34.85
	4 x 6	49.98	47.55	20.08	32.12
	5 x 7.5	50.82	48.39	19.00	30.40
3.00	1 x 1.5	65.60	62.69	56.09	89.75
	2 x 3	58.45	55.54	36.93	59.09
	3 x 4.5	57.06	54.15	29.16	46.65
	4 x 6	57.11	54.20	26.17	41.87
	5 x 7.5	57.73	54.82	24.37	38.98

Table-23

RECOMMENDATION FOR SAFE BEARING CAPACITY

(NBH-08):

Depth in 'm'	Width of Footing in 'm'	Safe Bearing Capacity (t/m^2) based on			
		Shear Consideration		Total Permissible Settlement up to (mm)	
		GSBC	NSBC	25	40
1.00	1 x 2	28.00	27.03	17.98	28.77
	2 x 4	27.61	26.64	14.25	22.80
	3 x 6	28.14	27.17	12.85	20.56
	4 x 8	28.90	27.93	12.27	19.64
	5 x 10	29.76	28.79	11.97	19.15
2.00	1 x 2	45.50	43.56	25.58	40.93
	2 x 4	42.79	40.85	18.92	30.27
	3 x 6	42.54	40.60	16.96	27.14
	4 x 8	42.91	40.97	15.98	25.57
	5 x 10	43.54	41.60	15.22	24.35
2.50	1 x 2	54.96	52.53	30.86	49.37
	2 x 4	50.73	48.30	23.01	36.81
	3 x 6	49.98	47.55	20.58	32.93
	4 x 8	50.10	47.67	19.13	30.62
	5 x 10	50.57	48.14	18.42	29.47
3.00	1 x 2	64.89	61.98	46.74	74.78
	2 x 4	58.90	55.99	33.03	52.84
	3 x 6	57.57	54.66	26.84	42.95
	4 x 8	57.40	54.49	24.75	39.60
	5 x 10	57.69	54.78	23.25	37.19

Table-24

Note:

1. Allowable bearing capacity is calculated based on the permissible settlement of 25mm in case of Soil and 12mm in case of Rock.
2. For Isolated/Strip Foundation, bearing capacity is considered upto 6m width and for Raft foundation bearing capacity is considered for >6m.
3. For Permissible Differential Settlement/ tilt shall be followed as per IS: 1904, 1986 and IS: 13063, 1991.
4. * However, the actual depth of Rock Strata shall be verified at the time of foundation laying.

*GSBC: Gross Safe Bearing Capacity

* NSBC: Net Safe Bearing Capacity

ABSTRACT OF SAFE BEARING CAPACITY (FROM PLT)

PLT NO	Depth	Plate Size	Footing Size	Allowable Settlement of Footing		Allowable Capacity from PLT graph	
	(m)	B_p (m)	B (m)	S_t (mm)		(When S_t=25mm)	(When S_t=40mm)
01	2.00	0.45	3	25	40	26.63	42.61
			5	25	40	21.76	34.81
02	2.00	0.45	3	25	40	32.14	51.42
			5	25	40	28.68	45.88

Table-25

RECOMMENDATIONS FOR BOARED CAST IN-SITU PILE

Pile Diameter (m)	Length of Pile in mtr (below cut-off level).	Safe load Capacity		
		Vertical Comp (MT)	Pull out (MT)	Lateral (MT)
0.45	7.00	22.86	13.17	7.20
0.50		26.38	14.70	8.01
0.60		34.03	17.79	9.61

Table-26

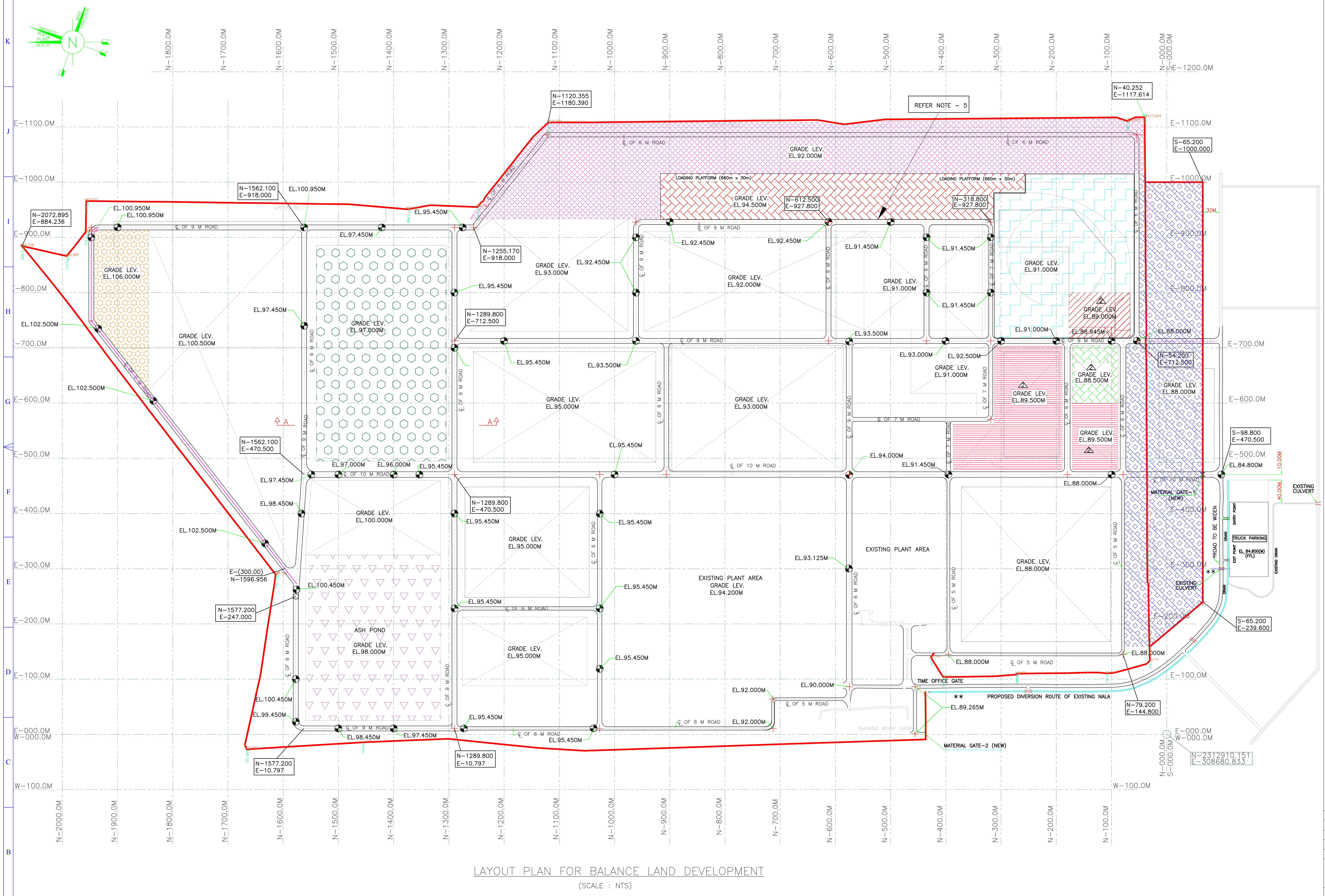
Note:
Cut-off level is considered as 3.00m below FGL.
Factor of Safety is considered as 3.
Depth of foundation of pile is calculated from FGL.

DISCUSSION AND RECOMMENDATIONS

Based on the field and laboratory test results and the given Recommendations the following are summarized below:

- The sub-surface conditions encountered at the site during the geotechnical investigation, following are the observations made:
- For N Boreholes-01 was carried out up to a depth an average depth of 15.00m in the location. It is observed that top strata is mostly clayey sand, underlain Soft Disintegrated Rock.
- For N Boreholes-02 to 08 were carried out up to a depth an average depth of 10.00m in the location. It is observed that top strata is mostly clayey sand, underlain Soft Disintegrated Rock.
- By interpreting the field and laboratory test results, analysis of Safe Bearing Capacity (SBC) in Shallow foundation was calculated and tabulated from Table – 01 to 24.
- Based on the capacities evaluated suitable foundations shall be considered. Please refer from Table -01 to 24 for recommended SBC values.
  Note: Consultant may adopt suitable type and size of footing, as per their loading requirement.
- Stratum at the founding level shall be thoroughly checked before placing the foundations on soil. If any loose soil pockets or cavities are present / noticed, the same shall be replaced with lean concrete before placing the foundations.
- From the laboratory test results and analysis, it reveals that does not possess any expansion. So, no special treatment is necessary.
- Chemical tests were conducted on water samples collected from the boreholes indicates that the chemical contents (pH, Chloride & Sulphate) are well within the permissible limits. Hence no special precautions are necessary for concreting job.
- Compaction tests, field & laboratory CBR test results are presented in the report. The design CBR of 9% in soaked condition may be used for pavement design wherever roads are to be constructed in cutting. Wherever roads are to be constructed in fill, the CBR value in soaked condition shall be determined from the filled material in laboratory.

S.NO.	REFERENCE DRG.	DRAWING NO.
1.	PLOT PLAN OF PROPOSED INTEGRATED COAL BASED FERTILIZER AND CHEMICALS COMPLEX	PC183-0000-0001

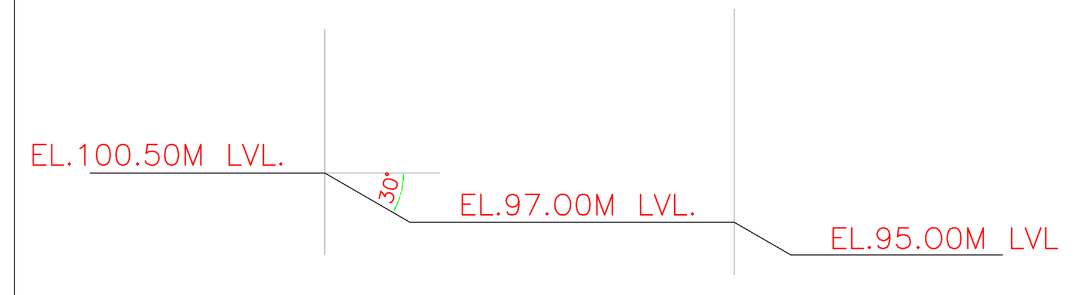


LAYOUT PLAN FOR BALANCE LAND DEVELOPMENT

(SCALE : NTS)

LEGEND:–

- EL.106.000M LVL.
- EL.98.000M LVL.
- EL.97.000M LVL.
- EL.94.500M LVL.
- EL.92.000M LVL.
- EL.91.000M LVL.
- EL.88.000M LVL. (REF. NOTE–7)
- EL.88.500M LVL.
- EL.89.500M LVL.
- EL.89.000M LVL.



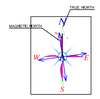
SECTION A–A

GENERAL NOTES:– (2)

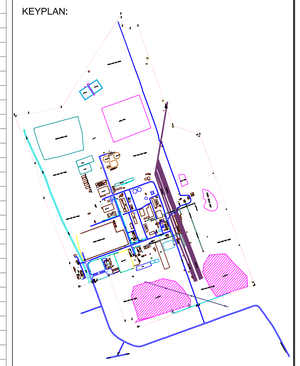
1. ALL DIMENSIONS ARE IN MM AND LEVELS IN M. UNLESS NOTED OTHERWISE.
2. THE DRAWING SHOULD NOT BE SCALED,ONLY FIGURE DIMENSION ARE TO BE FOLLOWED.
3. THE RESPECTIVE RLS. SHALL BE RECKONED FROM THE PERMANENT BENCH MARK.
4. MINIMUM SLOPE OF 1 VERTICAL AND 2 HORIZONTAL SHALL BE PROVIDED ON BOTH SIDE OF ROADS IF REQUIRED.
5. CONSIDERING ELEVATION DIFFERENCE, PROPER SLOPE IS TO BE PROVIDED BETWEEN BAGGING BUILDING ZONE AND WUHUAN BATTERY LIMIT, AS DECIDED BY EIC.
6. AS PER DPR PRODUCED BY RITES – THE DIFFERENCE IN LEVEL BETWEEN TFL BENCH MARK AND RAILWAYS MOTHER BENCH MARK IS 921MM. RAILWAY MOTHER BENCH MARK IS HIGHER". SITE TEAM TO VERIFY AND TAKE CARE ACCORDINGLY.
7. LAND GRADING WORKS IN RAILWAY SIDING AREA (TOWARDS SOUTH SIDE) SHALL CONSIST OF CLEANING AND REMOVAL OF TREE/BUSHES/VEGETATION ALONG WITH REMOVAL OF ASH/DEBRIS ETC. THEN CONTRACTOR SHALL INFORM PDIL/TFL FOR GETTING FURTHER ORDERS REGARDING CUTTING OR FILLING WORKS.
8. CONTRACTOR TO PROVIDE SUITABLE SLOPE WITH PROPER COMPACTION TO PLANT DRAINS WHILE PERFORMING LAND GRADING ACTIVITIES IN ALL AREAS SPECIALLY IN WTP/ETP/STP AREA AS PER DIRECTION OF TFL/PDIL EIC.
9. CONTRACTOR TO PROVIDE HORTICULTURE AS SUITED SITE AS PER DIRECTION OF TFL/PDIL EIC.

REV	DATE	DESCRIPTION	BY	CHKD	APPD.
2	23.05.22	REVISED AS MARKED (2)	JPR	SS	RNS
1	30.03.22	ISSUED FOR CONSTRUCTION	JPR	SS	RNS
0	16.02.22	ISSUED FOR CONSTRUCTION	JPR	SS	RNS

Talcher Fertilizers	M/S TALCHER FERTILIZER LIMITED	REV. 0 1 2 SHEET 1 OF 1
LOCATION	TALCHER, ANGUL DISTRICT, ODISHA (INDIA)	SCALE:–NTS
TITLE	LAYOUT PLAN FOR BALANCE LAND DEVELOPMENT WORKS	DRG. NO.– PC183-0000-205 FILE.– PC183-0000-205_R2
PDIL	PROJECTS & DEVELOPMENT INDIA LIMITED NOIDA	



KEYPLAN:



NOT TO SCALE

LEGENDS:-

BENCH MARK (BM–1)	
BOUNDARY LINE	
BUILDING	
WELL	
MANHOLE	
CONTOUR LINE	
DRAIN	
ROAD	
EP BOX	
ELECTRIC POLE	
LIGHT POST	
POND	
FENCE	
OIL TANKS	
PILLARS/BM	
CART TRACK	
HT LINE	
TRANSFORMER	
TREES	

S No.	EASTING	NORTHING	BOUNDARY POINT
1	308612.6882	2313338.705	BP-01
2	308646.8996	2313350.885	BP-02
3	308728.2198	2313380.348	BP-03
4	308839.837	2313071.146	BP-04
5	308886.7456	2313082.765	BP-05
6	308925.9836	2313029.852	BP-06
7	309329.1463	2313174.977	BP-07
8	309346.3689	2313181.112	BP-08
9	309725.7142	2313318.935	BP-09
10	309350.5445	2314349.789	BP-10
11	309164.6953	2314413.49	BP-11
12	309123.98	2314529.228	BP-12
13	309125.5362	2314530.889	BP-13
14	309117.9429	2314532.631	BP-14
15	309114.0339	2314533.569	BP-15
16	309117.0472	2314549.625	BP-16
17	308927.3725	2315091.623	BP-17
18	308874.1313	2315073.048	BP-18
19	308820.4837	2315090.554	BP-19
20	308813.099	2315148.103	BP-20
21	308810.1976	2315174.113	BP-21
22	308402.4483	2314534.259	BP-22
23	308179.0802	2314494.163	BP-23
24	308081.2887	2314482.212	BP-24
25	308223.3632	2314148.896	BP-25
26	308284.1339	2313911.26	BP-26
27	308460.3758	2313465.731	BP-27
28	308523.4476	2313306.011	BP-28

NOTES:-

1. ALL LEVELS AND DIMENSION ARE IN METER UNLESS MENTIONED
2. THE RL HAS BEEN CARRIED OUT FROM TALCHER RAILWAY STATION WITH DETAILS AS EASTING=312784.174 NORTHING=2315707.926 RL = 82.000M
3. SPOT LEVELS AND GRIDS ARE MARKED AT A DISTANCE OF 5.0Mx5.0M
4. CONTOUR INTERVAL IS 2.50M FOR MAJOR AND 0.50M FOR MINOR CONTOUR.
5. AREA OF PLANT IS 1832853.7810Sq.m or 183.285Hec or 452.908Acres.

DRAWN BY	DATE	CHECKED BY	APPROVED BY	DATE
BIJAY	28.11.17	TEJA	S.N.S	

CLIENT	TALCHER FERTILIZERS LIMITED
TITLE	TOPOGRAPHICAL SURVEY DRAWING
PROJECT	Carrying out Topographical Survey at proposed Fertilizer complex at Talcher, Angul District, Odisha.
PREPARED BY	M/s SWAYIN & ASSOCIATES 77, SATYANAGAR BHUBANESWAR - 751007(ORISSA) PH - (91-0674)2570015/2572971/2570458

SCALE:	DRAWING. NO.	REV
1:1000	SA/RCF/TALCHER/2017/TOPO-DWG	02