Corrigendum 2 dated June 05, 2015 to Tender Specification BHEL PSSR SCT 1585

A) The description of items of the following are MODIFIED / REVISED as below:

ST.No	EXISTING DESCRIPTION OF ITEM	MODIFIED / REVISED DESCRIPTION OF ITEM
215	Dismantling concrete work for all types of structures at all levels including stacking of servicable material to a lead of 500 m and disposal of unservicable material upto a lead of 2 km, cutting of reinforcement, labour, equipment, safety precautions etc all complete as per drawings, specification and instructions of engineer in charge.	Dismantling concrete work for all types of structures at all levels including stacking of servicable material to a lead of 500 m and disposal of unservicable material upto a lead of 2 km, cutting of reinforcement, labour, equipment, safety precautions etc all complete as per drawings, specification and instructions of engineer in charge. **Bidder to quote the rate taking into account the cost of serviceable materials including the reinforcement steel, hard and soft rock which he will be getting from the dismantled concrete.**

B) Some of the bidders had raised queries in the published tender specification. The Clarifications issued by BHEL are furnished below:

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
1)	Price bid ST No. 101, 103, 104 & 105	Earthwork in excavation	In excavation, shoring & strutting, if required, the actual effective area of shoring as approved by the Engineer, shall be measured in 'Sqm' as per Clause no.7.3.0 of Section-IV / Volume-VII-C of Tech. Specification. Hence, please provide a separate item for Shoring & Strutting with unit in Sqm in the Price Schedule. Please confirm.	As already been mentioned in description, shoring and strutting shall be considered under respective items of ST no. 101, 103, 104, 105. No change in item description.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
2)	Price bid ST No. 103, 104 & 105	Earthwork excavation in soft Rock and Hard Rock	Scope of special type of dewatering viz. Well Point Method is also excluded for these items. - Please confirm.	Bidder to quote in line with item description.
3)	Price bid ST No. 205 :	Grade Slab and paving using VDF	Please provide the tentative thickness of grade slab & paving for analysing the cost of VDF method per Cum i.e. to know the average surface area per cum of concrete.	Approx. thickness shall be 100mm to 200mm. Actual thickness will be provided during detailed engineering to the successful bidder.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
4)	Price Bid ST. No :206	Providing and laying Design Mix cement concrete conforming to IS:456 & IS 10262-2009 for …… …… …….. ……. ..& drawing for the following a) M25 Grade for all works above up to 20M b) M25 Grade Extra over and above item no 206 (a) for all works above 20M up to 40M c) M25 Grade Extra over and above item no 206 (a) for all works above 60M up to 80M d) M25 Grade Extra over and above item no 206 (a) for all works above 40M up to 60M e) M25 Grade Extra over and above item no 206 (a) for all works above 80M up to 90M	We request you to provide detailed drawings for all structures which are to be concreted at various heights i.e., upto 90m height as per BOQ along with cross sections etc.	Tender Drawings are attached. However, these drawings are for reference purpose only. Actual construction drawings shall be provided to the successful bidder during the execution of project.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
5)	Price bid ST No. 200 :	Concrete.	The admixtures/ plasticizer/super plasticizer required for concreting will be paid under which item	Bidder to quote in line with item description
6)	Price bid ST No. ISG 210, 1007, 1209	Welded wire mesh & chicken mesh	The payment for Welded wire mesh & chicken mesh will be paid under which item Please clarify.	Mild steel wire fabric shall be considered in place of chicken wire mesh. Also refer Item no 1010.
7)	Price bid ST No. ISG214.	RCC in water retaining / conveying Structures or underground structures etc	Application of Grouting on Structure, if necessary, shall be paid separately under relevant item (Item ISG801) - Please confirm.	Provided item's description under ISG214 & ISG 801 is clear.
8)	Price bid ST No. 215, 1828, 1830, 2312	Dismantling of structures	We request you to provide us the dimensions of the structures to be dismantled for our estimation purpose only.	Dimension of the structure / part of structure to be dismantled shall be known only during execution / engineering stage. Vendor to quote as per the item description under the relevant items.
9)	Price bid ST No.ISG221		Please confirm whether 6mm reinforcement steel is free of issue for the shotcreting item	Already mentioned in the items description under 221(a) that all the material supplies are in bidder's scope. However payment for 6 mm MS reinforcement will be paid under Item No 401.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
10)	Price bid ST No. ISG 221(a)		Kindly clarify the supply of 6mm MS reinforcement has already been included in the reinforcement item.	Already mentioned in the items description under 221(a) that all the material supplies are in bidder's scope. However payment for 6 mm MS reinforcement will be paid under Item No 401.
11)	Price bid ST No. ISG 221(a)		Kindly confirm that supply cost of wire mesh is to be included in the unit rates	Already mentioned in the items description under 221(a) that the material supplies are in bidder's scope.
12)	Price bid ST No. 401, 406, 2420 & 2422	Providing, straightening cutting, bending of reinforcement…	Please clarify that the supply of Reinforcement for these items are in bidders scope.	Yes. Item description is clear.
13)	Price Bid ST. No: ISG502	Providing and laying rigid insulation (extruded polystyrene blocks) as per relevant IS Code in suitable panels	Please indicate the density of Polystyrene Blocks.	Please refer IS 4671: 1984 for detail.
			As per item description no cement -sand plaster is envisaged for this item. - Please confirm.	Item description is clear
14)	Price bid ST No. A506 :	Elastomeric Membrane	Wearing course with PCC of specified proportion and thickness will be paid separately. - Please confirm.	Item description is clear

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
15)	Price bid ST No. A508 :	Pressed Precast Concrete Tiles	* Precast concrete tiles of size 600x600 mm with 20 mm thickness is not available. Please check it. We propose the size of tiles as 250x250 / 300x300 mm with thickness 22 mm to 25 mm. - Please confirm. * As per IS code IS-13801, the maximum size recommended is 300x300 mm. - Please check and amend item description accordingly.	BOQ specification prevails.
16)	Price bid ST No. ISG707	Rail Fixing Bolts	* Please indicate the approx weight of each Rail Fixing Bolts. * Also please confirm that Rail Fixing Bolt along with base plate, sim bolts, nuts etc., will be supplied as FIM from BHEL's site store.	* Rail fixing bolts details will be provided during detail design engineering only. Please refer the item description of ISG707 for scope of supply.
17)	Price bid ST No. 914	PVC Doors	* Please specify whether PVC frame is included in this item or not.	Item description is clear.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
18)	Price bid ST No. A921	Supplying, installing and commissioning of self sliding mechanism for aluminum door (double shutter) including photo operated sensors, fittings, motors, mechanical systems, electrical systems, warranty all inclusive in working condition as per specifications (aluminum and glazing to be paid separately)	Please provide us the general arrangement drawing indicating the size of doors & required accessories along with the relevant technical specifications. Further, request you to provide the list of Specialized Agencies with their contact details.	Drawing shall be provided during the execution stage. Bidder to quote as per the details mentioned in the item A921.
19)	Price bid ST No. A1004(a)	Brick Soling	Unit of this item may please be considered as "Sqm" in stead of "Cum".	Item description and UOM is clear. Bidder to quote accordingly.
20)	Price bid ST No. ISG 210, 1007, 1209	Welded wire mesh & chicken mesh	The payment for Welded wire mesh & chicken mesh will be paid under which item Please clarify.	Mild steel wire fabric shall be considered in place of chicken wire mesh. Also refer Item no 1010.

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21)	Price bid ST No. 1206	Providing and making decorative plaster of all types and … …….. ….. ….. …… ……. … including finishing all complete.	We request you to provide detailed technical specifications for this Item.	Bidder to quote in line with item description
22)	Price bid ST No. 1303, 1304 & 1305	Painting Works	Cost of Plaster of paris not included in these items. - Please confirm.	Item description is clear.
23)	Price bid ST No. 1401 & A1401	Concrete Flooring	Both the items appears identical (both of 50 mm thickness). - Please clarify.	Item description is clear. Bidder to quote in line with item description.
24)	Price bid ST No. A1428	Providing and laying flexible electric insulated PVC synthetic sheet as per IS 15652-2006 of Suntex Insulatic Pvt. Ltd. Or similar all complete as per specification.	Please provide us the contact details of the Vendor "Suntex Insulatic Pvt. Ltd."	Suntex Insulated Pvt Ltd is a reputed agency in the market. Contact details of the agency may be obtained by bidder from the market/ internet.
			Your approved Sub-vendor M/s. Suntex Insulatic Pvt. Ltd. has raised the query that two types of electric insulated sheet is available : - One for L.T (upto 3.3 KV) and other for H.T (upto 11 KV). So which type of electric insulated sheet will be applicable for this item. - Please clarify this.	Up to 3.3KV

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
25)	Price bid ST No. 1429	Removable type flooring system	Please specify height of removable type flooring system.	Height upto 600 mm shall be considered.
26)	Price bid ST No. A1606	Providing and fixing CALCIUM Silicate Board / Tiles in false ceiling of HILUX or AEROLITE or equivalent consisting of metal supporting grid system forming panels of specified size etc	Please indicate the size of panel and thickness of board.	12.5 mm Calcium Silicate Board / Tiles with panel size of 600 x 600mm
27)	Price bid ST No. ISG 1837	Providing and laying coal stock yard area with 150mm thick morrum. 50mm thick Fly ash & lime	Please provide the details of composition for 50mm thick Fly Ash & Lime layer.	Composition of Lime and fly ash shall be in the ratio of 1:4.
			* Please specify the proportion of mixing of Fly Ash and Lime. * Fly Ash may please be free supply at Fly Ash Silo point.	Composition of Lime and fly ash shall be in the ratio of 1:4. No change in the scope. As already mentioned in the item description, supply of all materials including fly ash shall be in the scope of bidder.
			It is requested to supply Fly Ash required for filling in coal stock yard free of cost by BHEL.	No change in the scope. As already mentioned in the item description, supply of all materials including fly ash shall be in the scope of bidder.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
28)	Price bid ST No. ISG 1839	Conducting Plate Load Test	IS-188 as mentioned in the item description is not matching with the scope of this item. - Please check it and confirm.	IS1888 shall be read in place of IS188.
29)	Price bid ST No. 2301 & A2302	Fabrication and erection of structural steel with mild steel rolled section……	Please clarify whether 2 coats of red oxide zinc chromate primer is included in Item no. 2301 as quantity mentioned in item no. A2302 is same for 2 coats of Zinc rich primer.	Item description is clear.
30)	Price bid ST No. 2308	Supplying, fabrication, erection and alignment of factory made galvanised welded grating …… …….. …….. …….. ……., edge preparation, etc. all complete.	Kindly clarify whether applying of red oxide zinc chromate primer is be to carried out, over & above galvanisation, under this item or whether the item corresponds to supply, fabrication, erection and alignment of factory made Galvanised welded grating unit only.	Galvanisation is excluded from item 2308.
			Please Clarify that Factory made welded Grating is to be supplied galvanized OR painted.	Galvanisation is excluded from item 2308.
31)	Price bid ST No. 2309	Extra over above ST NO. 2301/2307 for finishing the grating units with hot dipped galvanisation @ 610 gm/sqm over ……. …… …… …….. all complete	ST No. 2307 refers to galvanisation of electroforged grating units rather than painting with two coats of red oxide zinc chromate primer. Kindly clarify the job to be carried out under this item.	Items description shall be read as "Extra over above ST NO. 2301 for finishing the grating units with hot dipped galvanisation @ 610 gm/sqm over blast cleaned steel surfaces instead of painting with two coats of red oxide zinc-chromate primer all complete."

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
32)	Price bid ST No. A2309 :	Extra over above ST NO. 2301/2308 for finishing the grating units with hot dipped galvanisation @ 1000 gm/sqm over…… …… …… ……..all complete.	Whether item A2309 is extra over above ST no. 2301or 2308 or for both the items.	Galvanisation is excluded from item 2308. Description is clear for item no. A2309.
			Kindly reconfirm the deposition of galvanisation mentioned in the corresponding item for welded gratings only.	Item description is clear.
33)	Price bid ST No. 2	**Levelling & Grading** : Earth work in stripping of top soil upto a maximum depth of 0.30m below ground level ……. …. …….. …….. …….. by the engineer-in-charge.	Please specify the no. of trees	Bidder to visit site and quote in line with item specification
34)	Price bid ST No. 2402 :	Earth work in filling upto any depth below ground level for ……. …… ……	The good excavated soil can be use or we have to borrow murrum Pl . clarify.	Bidder to quote in line with item description.
35)	Price bid ST No. 2404 & 2405 :	Water Bound macadam	Please clarify, Whether stone aggregates should be crushed or we can use hand broken boulders.	As already mentioned under road works of BOQ, all materials, including aggregates shall be as per specification, drawing, relevant IRC & IS codes and as directed by the Engineer-in-charge.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
36)	Price bid ST No. A2418	Cement Concrete (M-30) using VDF	Thickness of road / pavement may please be indicated for computation of cost of VDF.	Approx. thickness shall be 100mm to 200mm. Actual thickness will be provided during detailed engineering to a successful bidder.
37)	Price bid ST No. 401, 406, 2420 & 2422	Providing, straightening cutting, bending of reinforcement…	Please clarify that the supply of Reinforcement for these items are in bidders scope.	Yes. Item description is clear.
38)	Price bid ST No. 2424	Providing and filling in position hot applied bitumen sealing compound…… …… …… …. ……. as directed by Engineer.	Please provide us the thickness for this item.	Size of gap shall be as per relevant IS code mentioned in the item description.
39)	Price Bid (Volume-II)	General	There are many items with word "ISG". - Please clarify.	It is items nomenclature.
40)	Price Bid (Volume-II)	General	We request you to allow us to submit our Price Bid in printed format there are many items and space for writing is insufficient. Please confirm.	The details like item description, quantity, unit of measurement in BHEL issued price bid shall be binding on the bidder in case the bidder submits the price bid typed again by him.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
41)	Techno commercial bid Volume – I Book - I Notice Inviting Tender Clause no 1.0 (vi)	Extension of due date for offer submission	Considering the scope of work, we earnestly request you to extend the due date for submission of tender bids by atleast 2 weeks after receiving of last Addendum / clarification / errata.	Refer corrigendum 1 issued on 03.06.2015
			The subject tender comprises of multidisciplinary works with involvement of various specialized sub-vendors. Considering the quantum of items involved, consequent interaction with sub-vendors and arriving at the reasonable price of bought-out items, we need some more time. Moreover, for such high value, voluminous and specific types of work based tender, detailed onsite and offsite survey required which resulting in more time involvement for preparation of offer. We also need reasonable time after getting all clarifications / input documents towards bidders' queries from you for incorporating the same in compilation and preparation of our competitive offer for the subject tender. In view of above, we request you to kindly extend the date of submission of bid for at least 15 (fifteen) days i.e. upto 24-06-2015. - Please confirm.	Refer corrigendum 1 issued on 03.06.2015

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
42)	Techno commercial bid Volume – I Book - I Notice Inviting Tender Clause no 1.0 (vi)	Extension of due date for offer submission	Considering the volume and integrity of work, we request you to kindly extend the due date of submission by at-least 15 days, i.e. up to 24.06.2015 to enable us to submit our best offer.	Refer corrigendum 1 issued on 03.06.2015
			As you are aware that the subject tender comprises of multidisciplinary works with involvement of various specialized works and we are still awaiting the quotations from the respective sub-vendors. Hence, we request your good officers to kindly extend the bid submission for minimum of Three (3) weeks from the schedule date of submission to enable us to submit our most competitive offer.	Refer corrigendum 1 issued on 03.06.2015
43)	Techno commercial bid Volume – I Book - I Notice Inviting Tender Annexure -1 PRE-QUALIFYING CRITERIA - Clause G	Consortium criteria- Not applicable	Request you to please allow the consortium partner. (Same terms & conditions prevailed in Tender no. BHEL:PSSR:SCT:1577 where the consortium has been allowed already)	PQR given in tender prevails

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
44)	Notice Inviting Tender Annexure -1 PRE-QUALIFYING CRITERIA - Clause G	Consortium criteria- Not applicable	Request your kindself to allow consortium bidding for the said project	PQR given in tender prevails
45)	Notice Inviting Tender Annexure -3 PRE-QUALIFICATION CRITERIA - Technical Clause B.2.2 :	Bidder should have executed minimum Structural Steel Fabrication and Erection of 9600 MT each within a period of twelve consecutive months in one or cumulative of two concurrent contracts in Power / Industrial projects.	Execution of structural steel fabrication 9600 MT in one project and erection of 9600 in another project which are running concurrently in the same financial year shall be eligible against criteria. Please clarify.	PQR is self-explanatory.
46)	Notice Inviting Tender Annexure -3 PRE-QUALIFICATION CRITERIA - Technical Clause B.2.2 :	Bidder should have executed minimum Structural Steel Fabrication and Erection of 9600 MT each within a period of twelve consecutive months in one or cumulative of two concurrent contracts in Power / Industrial projects.	We request your kindself to consider three concurrent contracts in Power/Industrial Projects towards the eligibility of contractors for the execution of fabrication and erection of 9600 MT each within a period of twelve consecutive months	PQR given in tender prevails

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
47)	Technical Conditions of Contract (TCC) Volume IA, Part-I Chapter - II SCOPE OF WORKS	Fly Ash Silo	Please provide us the tender drawings for Fly Ash Silos. Otherwise, please indicate the following:- * Elevation of Ring beams * Silo RCC shell thickness * Height of RCC shell of Silo * Total height of Silo etc. to analyse the involvement of staging materials and its subsequent cost part to be considered in items.	Approx dimensions of the silo are: 1: Height of the silo = 29m 2. Shell height : 17.5m 3. Dia of the shell: 12m Actual dimensions/details shall be provided during execution stage to the successful bidder.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
48)	TCC Volume IA, Part-I Chapter - II SCOPE OF WORKS	Various Structures with curved shaped	As per Scope of Work mentioned in TCC there are various structures involving curved shaped surfaces (which does not involve slip form type form work). We propose to include in the price schedule following two items for more specifice and reasonable rate quoting for the work:- * Item-1 : Fair face formwork with good quality water proof plywood of required thickness and smooth surface below finish ground floor level for curved surfaces of foundations, columns, beams, lintels etc.....with unit in 'Sqm'. * Item-2 : Fair face form work with good quality water proof plywood of required thickness and smooth surface above finish ground floor level for curved surfaces of columns, beams, slabs, lintels etc.....with unit in 'Sqm'.	No change in the items. All the curved surface shuttering shall be considered in the items 301, 302. Requirement of slip form for curved structures shall be as per drawings & direction of BHEL Engineer-in-charge at site and shall be paid as per item ISG 303.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
49)	TCC Volume IA, Part-I Chapter - II SCOPE OF WORKS Clause 1.2.2	List of Major Structures & Buildings. BA Overflow Tank, Fly Ash Silo, Clarifier, Seal Water Tank & Ash Conditioner Water Tank	Kindly provide the details of BA Overflow Tank, Fly Ash Silo, Clarifier, Seal Water Tank and Ash Conditioner Water Tank along with scope of work. Kindly clarify whether the Fabrication of Raw Steel for the mentioned items is under bidder's scope or whether it is to be supplied as a composite unit to erect in situ. We request you to kindly include a separate SOR Item for the execution of the above mentioned works if fabrication is in the scope of bidder.	Supply of composite units are not envisaged in this tender. All structural fabrication work shall be done at site as per the drawings & BOQ.
50)	TCC Volume IA, Part-I Chapter –II Clause 1.2.2 (48)	Lighting Mast- One lot	Please specify the scope of works for Lighting Mast.	Please refer scope work, Vol-1A, Part-1, Chapter-II and BOQ.
51)	TCC Volume IA, Part-I Chapter - II Clause 1.2.4	The area of work shall be cleared of all vegetation, rubbish and other objectionable matter and materials removed …… ……. …….. ……. included in the unit rates rendered for the different items under bill of quantities.	We request you to kindly provide the levelled ground with free of vegetation, rubbish and other objectionable matter.	Tender conditions prevail.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
52)		Tender Drawings	Request to kindly provide tender drawings for structures to be executed under contract	Tender drawings for some of the structures of CHP & AHP are attached. These are meant for tender purpose only. However, actual drawings shall be provided to bidder during execution.
53)		Earthwork in excavation work	For excavation upto any depth, if any existing running service lines / any hindrances (over or under ground) encountered, it will be taken care (relocating / removal) by Owner /BHEL with no extra cost to bidder / Contractor. - Please confirm.	Rerouting of overhead line if any is in BHEL/TSGENCO scope. Rerouting of underground line if any will be by the bidder and payment for the same will be in line with the BOQ.
54)	TCC Volume IA, Part-I Chapter - III Clause 1.3.4	Construction Power will be provided at a single point	We request you to provide us Power at least three points (One at Batching Plant & Two at Construction site) as well as for our temporary facilities (like Site office, store, steel yard etc.)	Tender conditions prevail
55)	TCC Volume IA, Part-I Chapter - III Clause 1.3.4	Electricity: The construction power will be provided at a single point for construction purpose only at free of any charges.	We request you to kindly provide atleast 3 points, apart from a single point, along the conveyor length of 800 mtrs.	Tender conditions prevail
			It is requested to provided construction power at 2 points free of cost at 415 V.	Tender conditions prevail.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
56)	TCC Volume IA, Part-I Chapter - III Clause 1.3.4 and 1.3.5	Electricity & Water	One extra point of Electricity & Water each near Batching Plant area may please be given at free of cost. - Please confirm.	Tender conditions prevail
57)	TCC Volume IA, Part-I Chapter - III Clause 1.3.5	Construction Water will be provided at single point within the plant area	We request you to provide us Water at least two points (Each at batching Plant & Construction site) as well as for our temporary facilities at laydown area.	Tender conditions prevail
58)	TCC Volume IA, Part-I Chapter - III Clause 1.3.6	Material Supply	We presume that BHEL will issue Structural Steel, Reinforcement Steel & Earthing rod at free of cost. Please confirm. And also provide us the distance between BHEL stote to site & Laydown area.	Material supply in line with TCC Clause 1.3.6. BHEL Site store is at a maximum distance of 2 km from plant.
59)	TCC Volume IA, Part-I Chapter –IV Clause 1.4.2.1 (8) & (13)	Batching Plant 30 cum (2 nos) & concrete weigh Batcher (2 nos)	As the concrete quantity is @ 100000 cum only Please allow us to deploy B.P. 30 cum/hr 2 nos. only instead of concrete weigh Batcher (2 nos)	As per minimum requirement mentioned.
60)	TCC Volume IA, Part-I Chapter –IV Clause 1.4.2.1 (10)	Concrete Pump	Please specify the capacity of concrete pump	Concrete pump deployed by the bidder shall have minimum capacity of 30cum/hr and pump shall be able to feed the concrete upto 80m height.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
61)	TCC Volume IA, Part-I Chapter –IV Clause 1.4.2.1 (11)	Boom Placer	Please allow to deploy the Boom Placer whenever it is required for site execution instead of deploying the same for total contract period.	Please refer to explanatory notes under chapter IV for T&P
62)	TCC Volume IA, Part-I Chapter –IV Clause 1.4.2.1 (51) & (52)	Minimum requirement of T&P for Civil works: Portable insulated metal site office (cabin) of minimum size …… …….. ……. …… ……. fittings etc.	Please clarify the following: (a) By whom these 4 nos. Porta cabin will be used? (b) Is each of the porta cabin will be equipped with A1 size plotter, fax, telephone facilities? (c) We request you to please clarify, by whom these porta cabins will be used (by client / contractor)	Clause 1.4.2.1 (51) & (52) stands deleted. However, Vendor to have their own site office with all the minimum facilities.
			Please Clarify, we have to provide office for BHEL 1 no or 4 no.	Clause 1.4.2.1 (51) & (52) stands deleted. However, Vendor to have their own site office with all the minimum facilities.
63)	TCC Volume IA, Part-I Chapter –IV clause 1.4.2.2	Minimum requirement of equipments to be deployed by the bidder	The quantum of lifting equipments (Cranes) provided in the referred item is on the higher side. We apprehend that actual deployment of T&P will be commensurate as per availability of the work front from Client.	Minimum requirement of T & P's specified shall be deployed at site by the bidder. However, deployment plan shall be finalised in consultation with BHEL site-in-charge.

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
64)	TCC Volume IA, Part-I Chapter –IV clause 1.4.2.2 (23)	TCC Chapter IV : T&P Sr. no. 23 for Structure Jeep-Car	Please clarify whether it is to provided for BHEL the no. required.	Clause 1.4.2.2 (23) stands deleted.
65)	TCC Volume IA, Part-I Chapter –IV clause 1.4.2.2 (52)	for Structure: Portable Fire Extinguishers	Please clarify total no. of Portable Fire Extinguishers to be deployed for civil & structural portion.	TCC is clear. Bidder to quote accordingly.
66)	TCC Volume IA, Part-I Chapter –IV clause 1.4.2.2 (58)	Minimum requirement of equipments to be deployed by the bidder Local Stress Relieving Equipment	Kindly provide the specification & quantum of Local Stress Relieving works to be carried out. We request you to kindly include a separate SOR item for the execution of SR works.	Separate SOR is not required. However the process is inclusive in the respective work.
67)	TCC Volume IA, Part-I Chapter –IV T& Ps AND MMEs		In T&P schedule for some T&P 's it is specified that we have to deploy the same as per requirement but if those T& P which is not required for the construction purpose the bidder has to deploy it as per the schedule. Please clarify	It is already mentioned that it is to be deployed as per requirement. Requirement shall be accessed during execution in consultation with site-in-charge.
68)	TCC Volume IA, Part-I Chapter –VII clause 1.7.1	Secured Advance	We request you to incorporate Sand, Cladding sheet, Grating or any other BOI/ high value items for eligible to get secured advance.	Tender conditions prevail

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
69)	TCC Volume IA, Part-I Chapter –VII clause 1.7.1	Secured Advance	Interest free Secured Advance upto max. of 75% of the value of materials (landing cost at site) may also please be allowed for various Vendor based architectural items like doors, windows, metal decking & cladding work, false ceiling works, water proofing work, rain water pipes etc. required for incorporation in permanent works. - Please confirm.	Tender conditions prevail
70)	TCC Volume IA, Part-I Chapter –VII clause 1.7.2	Advance for Mobilisation	We request you to release the mobilisation advance as Interest free. If not, please provide us the present rate of interest for Mobilisation Advance. We request you amend the value as 10% of the contract value and recovery of the same should start after 4th Running Bill.	Tender conditions prevail
			We request you to provide interest free mobilization advance of 10% of Contract value. The said advance shall be recovered on pro rata basis commencing after first ten percent (10%) of the gross value of the work is executed and paid and entire advance is recovered by the time 80% of the gross value of the contract is executed and paid	Tender conditions prevail

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
71)	TCC Volume IA, Part-I Chapter –VII clause 1.7.3	Interim Payment	We request you to release interim payments upto 100% of the item rate upon submission of the quality check formats/ documents as per the quality plan for the quantum of work billed and duly certified by engineer.	Tender conditions prevail
			We need more elaboration in release of Interim payment.	Tender conditions prevail
72)	TCC Volume IA, Part-I Chapter –VII clause 1.7.4	Final Bill & Retention Amount (Retention Money)	We request you to accept for Bank Guarantee @2.5% of the item rate in lieu of cash retention from RA Bills which is valid until final bill/ virtual completion of the project.	Tender conditions prevail
73)	TCC Volume IA, Part-I Chapter –VII clause 1.7.4.1	The Balance 5% of the item rate shall be released as under after completion of all works & on completion of material reconciliation and certified by BHEL Engineer.	We earnestly request you to allow us to submit Retention-Cum-Performance Guarantee for the job of 5% of the contract value in the form of Bank Guarantee valid till Guarantee Period during the execution period and hence no cash deduction shall be made from our monthly R.A. Bills on this account.	Tender conditions prevail
74)	TCC Volume IA, Part-I Chapter –VIII clause 1.8.4	Any other taxes and duties (except VAT & Service Tax) . …….. …….. ……. …… …… ….. ……. deemed fit.	We request you to kindly reimburse the difference in case of any variation for all other taxes and duties (including VAT & Service Tax) at actual on submission of documentary proof of payment during the tenure of contract. Please confirm.	Tender conditions prevail

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
75)	TCC Volume IA, Part-I Chapter –VIII clause 1.8.7	Taxes & other Duties	Please clarify the Format (Bidder to submit in their letter head) Certificate on VAT Compliance)	The given format is self-explanatory
76)	TCC Volume IA, Part-I Chapter –XIV	Issue & Reconciliation of Steel	We request you to consider rolling margin in your account as the supply of steel is in your scope. Please confirm.	Tender conditions prevail
77)	TCC Volume IA, Part-II Chapter –1 Sl.No.1	Additional Security Deposit	We request to provide the estimated value for this package.	In the clause it is already mentioned that the BHEL's estimated value shall be disclosed to successful bidder (on request) in case 'Additional Security Deposit' is applicable.
78)	TCC Volume IA, Part-II Chapter –1 Sl. No.3	PRICE VARIATION COMPENSATION for CEMENT, LABOUR, HIGH SPEED DIESEL OIL, and MATERIALS	We request you to pay PVC for CEMENT, LABOUR, HIGH SPEED DIESEL OIL, and MATERIALS for the entire original contract period and extended period if any. Also request you to release PVC as ceiling free.	Tender conditions prevail
79)	TCC Volume IA, Part-II Chapter –1 Sl. No.3 2.17- A2, 2.17.5	Explanatory statement: Price variation compensation	Please Clarify, PVC is applicable for entire contract period and extended period.	Tender is clear

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
80)	General conditions of Contract / Page No. 7 of 32/ Clause 1.9.1 (iv)	Earnest Money Deposit	We understand that One Time EMD with PSSR is acceptable for this tender package. Please confirm.	Yes.
81)	General conditions of Contract / Page No. 8 of 32 / Clause. 1.10	Security Deposit	Please clarify this clause is applicable for this tender package.	Yes.
82)	General conditions of Contract / Page No. 18 of 32 / Clause 2.7.9	BHEL shall have the right to impose Liquidated Damage / Penalty at the rate of 0. 5% of the contract value, per week of delay or part thereof subject to a maximum of 10% of the contract value	We request you to amend the maximum limit to 5% of the contract value for the project, as most of the PSUs are considering the ceiling limit as 5%.	Tender conditions prevail
83)		Vendor List for brought out items	It is requested to provide vendor list of APGENCO for brought out items.	Successful bidder to propose the vendor during execution for approval of BHEL / TSGENCO.
84)		Geotechnical / soil investigation report	Please furnish the detailed Soil Investigation Report together with laboratory test results thereof together with the bore hole location plan, indicating thereon the bore hole numbers vis-à-vis the location of the proposed structures.	Attached

No	Reference clause	Existing provision	Bidder's query	BHEL's clarification
85)		Geotechnical / soil investigation report	Please provide us the Detailed Soil investigation Report / Bore Log details indicating the details of sub soil strata at various depths, depth of water table and required depths of excavation etc.	Preliminary Report is attached for reference.
86)			Please confirm the area available for laydown within plant boundary. Also request you to provide us the key plan indicating the distances of various locations (viz. Steel yard & site, Site and laydown area / Batching Plant etc.)	Please refer TCC Volume IA, Part-I Chapter –III Clause 1.3.3
87)			Please confirm the works / facilities to be provided to client/ BHEL during period of execution.	No facilities are envisaged for BHEL separately. However, Vendor to have their own site office with all the minimum facilities for smooth completion of project.

C) The documents mentioned in the following table are in next 111 pages as below:

Description of Documents	No of pages
Geotechnical / soil investigation report - Preliminary	94
Coal Handling Plant preliminary drawings for tender purpose	17

All other conditions of the tender specification remain unchanged.
Bidders are requested to consider this corrigendum as part of tender specification and quote accordingly.

-Sd-
Manager / Subcontracts

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. CETEST

Job No : 3472 | Created by : Chandrani | Created on : 22/04/2015 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IBH-54

Co-ordinates E=467066.000 N=1947282.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	20	Undisturbed (UDS)	1
Cone (Pc)		Penetrometer (SPT)	20
Vane (V)		Disturbed (DS)	1
		Water Sample (WS)	0

Commencement Date : 14/03/15
Completion Date : 17/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 109.50 m.
Water Struck At :
Standing Water Level : 4.10 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm.)	SAMPLES Ref. No	SAMPLES Depth (m)
10.50m.				10.75
		50 Refusal 3.0 cm Pentn.	*SPT-14	10.75-10.78
			R12	CR=NIL RQD=NIL
		50 Refusal 4.0 cm Pentn.	*SPT-15	11.50-11.54
			R13	CR=NIL RQD=NIL
		51 Refusal 3.0 cm Pentn.	*SPT-16	12.25-12.28
			R14	CR=NIL RQD=NIL
		50 Refusal 5.0 cm Pentn.	*SPT-17	13.00-13.05
Completely weathered, light grey, medium grained, decomposed & disintegrated rock particle collected as sludge & containts highly fractured rock fragments & R14.			R15	CR=20% RQD=NIL
				13.75
			R16	CR=14% RQD=NIL
		50 Refusal 5.0 cm Pentn.	*SPT-18	14.50-14.55
			R17	CR=16% RQD=NIL
		51 Refusal 3.0 cm Pentn.	*SPT-19	15.25-15.28
			R18	CR=17% RQD=NIL
		50 Refusal 4.0 cm Pentn.	*SPT-20	16.00-16.04
			R19	CR=23% RQD=NIL
				16.70
			R20	CR=25% RQD=NIL
17.50m.				17.50
			R21	CR=26% RQD=NIL
				18.25
Highly weathered, light grey, medium grained, highly fractured rock.			R22	CR=25% RQD=NIL
				19.00
			R23	CR=27% RQD=NIL
20.00m.				20.00

N.B. - '*' means sample could not be recovered.

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. CETEST

Job No : 3472 | Created by : Chandrani | Created on : 22/04/2015 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IBH-55

Co-ordinates E=467751.000 N=1947245.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	11	Undisturbed (UDS)	1
Cone (Pc)		Penetrometer (SPT)	11
Vane (V)		Disturbed (DS)	1
		Water Sample (WS)	0

Commencement Date : 26/02/15
Completion Date : 28/02/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 101.777 m.
Water Struck At :
Standing Water Level : 2.60 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm.)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m				
Very stiff, deep grey, silty clay / clayey silt. Obs. gravels.		1 2 3 4 19/5 7	DS-1	0.50
			SPT-1	1.00-1.45
1.60m				
Very dense, brownish grey, silty sand with decomposed rock & boulder.			*UDS-1	2.00-2.17
		12 19 30 39 >100/31	*SPT-2	3.00-3.35
		5.0 cm Pentn. Refusal		
3.60m		50	*SPT-3	3.60-3.65 3.60
		5.0 cm Pentn. Refusal	R1	CR=NIL RQD=NIL
		50	*SPT-4	4.25-4.30 4.25
		5.0 cm Pentn. Refusal	R2	CR=NIL RQD=NIL
		50	*SPT-5	5.00-5.04 5.00
		4.0 cm Pentn. Refusal	R3	CR=NIL RQD=NIL
		50	*SPT-6	5.75-5.79 5.75
Completely weathered, deep brown to brownish grey, medium grained, decomposed & disintegrated rock particle collected as sludge.		4.0 cm Pentn. Refusal	R4	CR=NIL RQD=NIL
		50	*SPT-7	6.50-6.53 6.50
		3.0 cm Pentn. Refusal	R5	CR=NIL RQD=NIL
		50	*SPT-8	7.25-7.28 7.25
		3.0 cm Pentn. Refusal	R6	CR=NIL RQD=NIL
		50	*SPT-9	8.00-8.03 8.00
		3.0 cm Pentn. Refusal	R7	CR=NIL RQD=NIL
		50	*SPT-10	8.75-8.78 8.75
		3.0 cm Pentn. Refusal	R8	CR=NIL RQD=NIL
9.50m		50	*SPT-11	9.50-9.52 9.50
Highly weathered, light whitish brown, medium grained, highly fractured rock.		2.0 cm Pentn.	R9	CR=27% RQD=NIL 10.25
10.25m			R10	CR=29% RQD=NIL 11.00
Highly to moderately weathered, light blackish grey, fine grained, moderately fractured rock.		NX rotary drilling from 3.60m to 15.00m	R11	CR=44% RQD=NIL 11.75
11.00m			R12	CR=64% RQD=32% 12.50
			R13	CR=82% RQD=59% 13.25
Moderately to slightly weathered / fresh, light blackish grey, fine grained, slightly fractured rock.			R14	CR=86% RQD=70% 14.00
			R15	CR=89% RQD=78% 15.00
15.00m				

N.B. - '*' means sample could not be recovered.

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. CETEST

Job No : 3472 | Created by : Chandrani | Created on : 22/04/2015 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IBH-56

Co-ordinates E=467192.000 N=1947319.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	18	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	18
Vane (V)		Disturbed (DS)	1
		Water Sample (WS)	0

Commencement Date : 28/03/15
Completion Date : 28/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 104.935 m.
Water Struck At :
Standing Water Level : 4.30 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm.)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m. Top soil consists of whitish grey, silty clay. Obs. calcareous nodules & moorum.			DS-1	0.50
1.00m. Very dense, light grey with sand mixture.		>100 (15 20 35 50) 2.5 cm Pentn.	SPT-1	1.00-1.25
1.50m.		58 Refusal 5.0 cm Pentn.	*SPT-2 R1	1.50-1.55 CR=NIL/RQD=NIL 1.50
		50 Refusal 5.0 cm Pentn.	*SPT-3 R2	2.00-2.05 CR=NIL RQD=NIL 2.00
		50 Refusal 5.0 cm Pentn.	*SPT-4 R3	2.75-2.80 CR=NIL RQD=NIL 2.75
		52 Refusal 3.0 cm Pentn.	*SPT-5 R4	3.50-3.53 CR=NIL RQD=NIL 3.50
		51 Refusal 3.0 cm Pentn.	*SPT-6 R5	4.25-4.28 CR=NIL RQD=NIL 4.25
		50 Refusal 3.0 cm Pentn.	*SPT-7 R6	5.00-5.03 CR=NIL RQD=NIL 5.00
Completely weathered, light grey, medium grained, decomposed & disintegrated rock particle collected as sludge.		51 Refusal 2.0 cm Pentn.	*SPT-8 R7	5.75-5.77 CR=NIL RQD=NIL 5.75
		50 Refusal 4.0 cm Pentn.	*SPT-9 R8	6.59-6.63 CR=13% RQD=NIL 6.50
		52 Refusal 5.0 cm Pentn.	*SPT-10 R9	7.25-7.30 CR=NIL RQD=NIL 7.25
		51 Refusal 4.0 cm Pentn.	*SPT-11 R10	8.00-8.04 CR=NIL RQD=NIL 8.00
		50 Refusal 3.0 cm Pentn.	*SPT-12 R11	8.75-8.78 CR=NIL RQD=NIL 8.75
		50 Refusal 4.0 cm Pentn.	*SPT-13 R12	9.50-9.54 CR=NIL RQD=NIL 9.50
		52 Refusal 3.0 cm Pentn.	*SPT-14 R13	10.25-10.28 CR=NIL RQD=NIL 10.25
		50 Refusal 5.0 cm Pentn.	*SPT-15 R14	11.00-11.05 CR=NIL RQD=NIL 11.00
		51 Refusal 3.0 cm Pentn.	*SPT-16 R15	11.75-11.78 CR=NIL RQD=NIL 11.75
		50 Refusal 5.0 cm Pentn.	*SPT-17 R16	12.50-12.55 CR=NIL RQD=NIL 12.50
13.25m. Highly weathered, light grey, medium grained, highly fractured rock.		52 Refusal 3.0 cm Pentn. NX rotary drilling from 1.50m to 15.00m	*SPT-18 R17 R18	13.25-13.28 CR=20% RQD=NIL 13.25 14.00 CR=25% RQD=NIL 15.00
15.00m. N.B. - '*' means sample could not be recovered.				

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana.			CETEST
Job No : 3472	Created by : Chandrani	Created on : 22/04/2015	Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IBH-57 | Co-ordinates E=467113.000 N=1947315.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	13	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	13
Vane (V)		Disturbed (DS)	2
		Water Sample (WS)	0

Commencement Date : 25/03/15
Completion Date : 30/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 104.858 m.
Water Struck At :
Standing Water Level : 4.80 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm.)	SAMPLES Ref. No	Depth (m)
0.00m				
Hard, whitish grey, silty clay with calcareous nodules.			DS-1	0.50
0.50m				
Very dense, light grey, silty sand with decomposed rock.		>100 8 8 9 20 40 50 — 2.5 cm Pentn. Refusal	SPT-1	1.00-1.40
1.60m		50 — 4.0 cm Pentn. Refusal	*SPT-2 / R1	1.60-1.64 CR=NIL/RQD=NIL 1.60
		50 — 5.0 cm Pentn. Refusal	*SPT-3 / R2	2.00-2.05 CR=NIL RQD=NIL 2.00
		52 — 4.0 cm Pentn. Refusal	*SPT-4 / R3	2.75-2.79 CR=NIL RQD=NIL 2.75
		50 — 3.0 cm Pentn. Refusal	*SPT-5 / R4	3.50-3.53 CR=NIL RQD=NIL 3.50
Completely weathered, light grey, medium grained, decomposed & disintegrated rock particle collected as sludge.		50 — 3.0 cm Pentn. Refusal	*SPT-6 / R5	4.25-4.28 CR=NIL RQD=NIL 4.25
		50 — 2.0 cm Pentn. Refusal	*SPT-7 / R6	5.00-5.02 CR=NIL RQD=NIL 5.00
		50 — 2.0 cm Pentn. Refusal	*SPT-8 / R7	5.75-5.77 CR=NIL RQD=NIL 5.75
		50 — 2.0 cm Pentn. Refusal	*SPT-9 / R8	6.50-6.52 CR=NIL RQD=NIL 6.50
		50 — 2.0 cm Pentn. Refusal	*SPT-10 / R9	7.25-7.27 CR=NIL RQD=NIL 7.25
8.00m		50 — 2.0 cm Pentn. Refusal	*SPT-11 / R10	8.00-8.02 CR=17% RQD=NIL 8.00
		51 — 4.0 cm Pentn. Refusal	*SPT-12 / R11	8.75-8.79 CR=21% RQD=NIL 9.50
Completely to highly weathered, light grey, medium grained, highly fractured rock. Obs. decomposed & disintegrated rock particle collected as sludge.		NX rotary drilling from 1.60m to 30.00m	R12	CR=20% RQD=NIL 10.25
			R13	CR=24% RQD=NIL 11.00
			R14	CR=NIL RQD=NIL
		50 — 5.0 cm Pentn. Refusal	*SPT-13 / R15	11.75-11.80 CR=25% RQD=NIL 11.75
			R16	CR=24% RQD=NIL 12.50
13.25m			R17	CR=27% RQD=NIL 13.25
Highy weathered, light grey, medium grained, moderately fractured rock.			R18	CR=33% RQD=NIL 14.00
			R19	CR=27% RQD=NIL 14.75
15.50m				15.50

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. CETEST

Job No : 3472 | Created by : Chandrani | Created on : 22/04/2015 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IBH-57

Co-ordinates E=467113.000 N=1947315.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	13	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	13
Vane (V)		Disturbed (DS)	2
		Water Sample (WS)	0

Commencement Date : 25/03/15
Completion Date : 30/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 104.858 m.
Water Struck At :
Standing Water Level : 4.80 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm.)	SAMPLES Ref. No	SAMPLES Depth (m)
15.50m.				
			R20	CR=32% RQD=NIL
				16.25
			R21	CR=32% RQD=NIL
				17.00
			R22	CR=26% RQD=NIL
				17.75
			R23	CR=20% RQD=NIL
				18.50
			R24	CR=22% RQD=NIL
				19.25
Highy weathered, light grey, medium grained, moderately fractured rock.			R25	CR=32% RQD=NIL
				20.00
			R26	CR=34% RQD=NIL
				20.75
			R27	CR=32% RQD=NIL
				21.50
			R28	CR=31% RQD=NIL
				22.25
			R29	CR=38% RQD=NIL
				23.00
			R30	CR=48% RQD=NIL
23.75m.				23.75
			R31	CR=52% RQD=NIL
				24.50
			R32	CR=54% RQD=NIL
				25.25
			R33	CR=51% RQD=NIL
				26.00
Moderately weathered, light grey, medium grained, moderately fractured rock.			R34	CR=56% RQD=NIL
				26.75
			R35	CR=52% RQD=NIL
				27.50
			R36	CR=53% RQD=NIL
				28.25
			R37	CR=56% RQD=NIL
				29.00
			R38	CR=58% RQD=NIL
30.00m.				30.00

N.B. – '*' means sample could not be recovered.

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. CETEST

Job No : 3472 | Created by : S.NATH | Created on : 05/05/2015 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. ICST1 | Co-ordinates E= 467126.000 N= 1947299.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	11	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	11
Vane (V)		Disturbed (DS)	3
		Water Sample (WS)	0

Commencement Date : 18/03/15
Completion Date : 24/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 99.332 m.
Water Struck At :
Standing Water Level : 3.00 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m. Deep blackish grey, silty clay / clayey silt with sand mixture.			DS-1	0.50
1.00m. Brownish grey, silty sand with decomposed rock.			DS-2	1.00
1.50m.		Refusal 50 4.0 cm Pentn.	*SPT-1	1.30-1.34
		Refusal 50 3.0 cm Pentn.	*SPT-2	1.50-1.53 1.50
		NX rotary drilling from 1.50m to 21.00m	R1	CR=NIL RQD=NIL
		Refusal 50 1.0 cm Pentn.	*SPT-3	2.50-2.51 2.50
			R2	CR=NIL RQD=NIL
		Refusal 50 2.0 cm Pentn.	*SPT-4	3.50-3.52 3.50
			R3	CR=NIL RQD=NIL
Completely weathered, yellowish brown, medium grained, highly fractured rock.		Refusal 50 1.0 cm Pentn.	*SPT-5	4.50-4.51 4.50
			R4	CR=12% RQD=NIL
		Refusal 50 2.0 cm Pentn.	*SPT-6	5.50-5.52 5.50
			R5	CR=NIL RQD=NIL
		Refusal 50 2.0 cm Pentn.	*SPT-7	6.50-6.52 6.50
			R6	CR=NIL RQD=NIL
		Refusal 50 2.0 cm Pentn.	*SPT-8	7.50-7.52 7.50
			R7	CR=NIL RQD=NIL
8.50m.		Refusal 50 2.0 cm Pentn.	*SPT-9	8.50-8.52 8.50
			R8	CR=10% RQD=NIL
Completely weathered, yellowish brown, medium grained, highly fractured rock.		Refusal 50 1.0 cm Pentn.	*SPT-10	9.50-9.51 9.50
			R9	CR=14% RQD=NIL
11.00m.		Refusal 50 2.0 cm Pentn.	*SPT-11	10.50-10.52 10.50

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana.			CETEST
Job No : 3472	Created by : S.NATH	Created on : 05/05/2015	Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. ICST1

Co-ordinates E= 467126.000 N= 1947299.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	11	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	11
Vane (V)		Disturbed (DS)	3
		Water Sample (WS)	0

Commencement Date : 18/03/15
Completion Date : 24/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 99.332 m.
Water Struck At :
Standing Water Level : 3.00 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm)	SAMPLES Ref. No	SAMPLES Depth (m)
11.00m.			R10	CR=16% RQD=NIL
				11.50
Completely weathered, yellowish brown, medium grained, highly fractured rock.			R11	CR=22% RQD=NIL
				12.50
			R12	CR=20% RQD=NIL
13.50m.				13.50
			R13	CR=26% RQD=NIL
				14.50
			R14	CR=34% RQD=NIL
				15.50
			R15	CR=40% RQD=NIL
				16.50
Highly weathered, light grey, medium grained, moderately fractured rock.			R16	CR=42% RQD=NIL
				17.50
			R17	CR=38% RQD=NIL
				18.50
			R18	CR=37% RQD=NIL
				19.50
			R19	CR=40% RQD=NIL
				20.50
			R20	CR=33% RQD=NIL
21.00m.				21.00

N.B. – '*' means sample could not be recovered.

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana.			CETEST
Job No : 3472	Created by : S.NATH	Created on : 05/05/2015	Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IPMT 1

Co-ordinates E= 467989.000 N= 1947200.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	0	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	0
Vane (V)		Disturbed (DS)	2
		Water Sample (WS)	0

Commencement Date : 16/03/15
Completion Date : 18/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 98.492 m.
Water Struck At :
Standing Water Level : 3.50 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m. Top soil consists of silty clay / clayey silt with sand mixture, kankars, stone chips etc.			DS-1	0.50
1.00m.		NX rotary drilling from 1.00m to 21.00m	DS-2	1.00
			R1	CR=10% RQD=NIL
Completely weathered, whitish grey, fine grained, highly fractured rock.			R2	CR=08% RQD=NIL
3.00m.			R3	CR=NIL RQD=NIL
Completely weathered, fully decomposed, disintegrated rock.			R4	CR=NIL RQD=NIL
5.00m.			R5	CR=07% RQD=NIL
Completely weathered, whitish grey, medium grained, highly fractured rock.			R6	CR=NIL RQD=NIL
6.00m. Whitish grey, disintegrated, fully decomposed rock.			R7	CR=08% RQD=NIL
7.00m. Completely weathered, whitish grey, medium grained, highly fractured rock.			R8	CR=11% RQD=NIL
9.00m. Completely to highly weathered, deep grey to light grey, fine grained, highly fractured rock.			R9	CR=10% RQD=NIL
			R10	CR=12% RQD=NIL
11.00m.				

1.00 2.00 3.00 4.00 5.00 6.00 7.00 8.00 9.00 10.00 11.00

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. CETEST

Job No : 3472 | Created by : S.NATH | Created on : 05/05/2015 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IPMT 1 | Co-ordinates E= 467989.000 N= 1947200.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	0	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	0
Vane (V)		Disturbed (DS)	2
		Water Sample (WS)	0

Commencement Date : 16/03/15
Completion Date : 18/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 98.492 m.
Water Struck At :
Standing Water Level : 3.50 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm)	SAMPLES Ref. No	SAMPLES Depth (m)
11.00m.				11.00
			R11	CR=09% RQD=NIL
				12.00
			R12	CR=11% RQD=NIL
				13.00
			R13	CR=27% RQD=NIL
				14.00
			R14	CR=35% RQD=12%
				15.00
			R15	CR=22% RQD=NIL
Completely to highly weathered, deep grey to light grey, fine grained, highly fractured rock.				16.00
			R16	CR=12% RQD=NIL
				17.00
			R17	CR=18% RQD=NIL
				18.00
			R18	CR=13% RQD=NIL
				19.00
			R19	CR=15% RQD=NIL
				20.00
			R20	CR=17% RQD=NIL
21.00m.				21.00

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. CETEST

Job No : 3472 | Created by : S.NATH | Created on : 05/05/2015 | Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IPMT2

Co-ordinates E= 467185.000 N= 1947257.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	0	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	0
Vane (V)		Disturbed (DS)	3
		Water Sample (WS)	0

Commencement Date : 20/03/15
Completion Date : 23/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 97.738 m.
Water Struck At :
Standing Water Level : 3.50 m.

DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm)	SAMPLES Ref. No	SAMPLES Depth (m)
0.00m Deep grey, silty clay with calcareous nodules.			DS-1	0.50
1.00m Yellowish brown, silty sand with decomposed rock.			DS-2	1.00
1.50m		NX rotary drilling from 1.50m to 21.00m	DS-3	1.50
			R1	CR=NIL RQD=NIL
			R2	CR=NIL RQD=NIL
Completely weathered, yellowish brown, medium grained, decomposed & disintegrated rock particles.			R3	CR=NIL RQD=NIL
			R4	CR=NIL RQD=NIL
5.50m			R5	CR=15% RQD=NIL
Completely weathered, whitish grey to light grey, medium grained, highly fractured rock.			R6	CR=18% RQD=NIL
			R7	CR=22% RQD=NIL
			R8	CR=24% RQD=NIL
9.50m			R9	CR=26% RQD=NIL
Highly weathered, light grey, medium grained, moderately fractured rock.				
11.00m				

1.50 2.50 3.50 4.50 5.50 6.50 7.50 8.50 9.50 10.50

Project : Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana.			CETEST
Job No : 3472	Created by : S.NATH	Created on : 05/05/2015	Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. IPMT2

Co-ordinates E= 467185.000 N= 1947257.000

Field Test	Nos	Samples	Nos
Penetrometer (SPT)	0	Undisturbed (UDS)	0
Cone (Pc)		Penetrometer (SPT)	0
Vane (V)		Disturbed (DS)	3
		Water Sample (WS)	0

Commencement Date : 20/03/15
Completion Date : 23/03/15
Bore Hole Diameter : 150 mm. / NX.
Level Of Ground : 97.738 m.
Water Struck At :
Standing Water Level : 3.50 m.

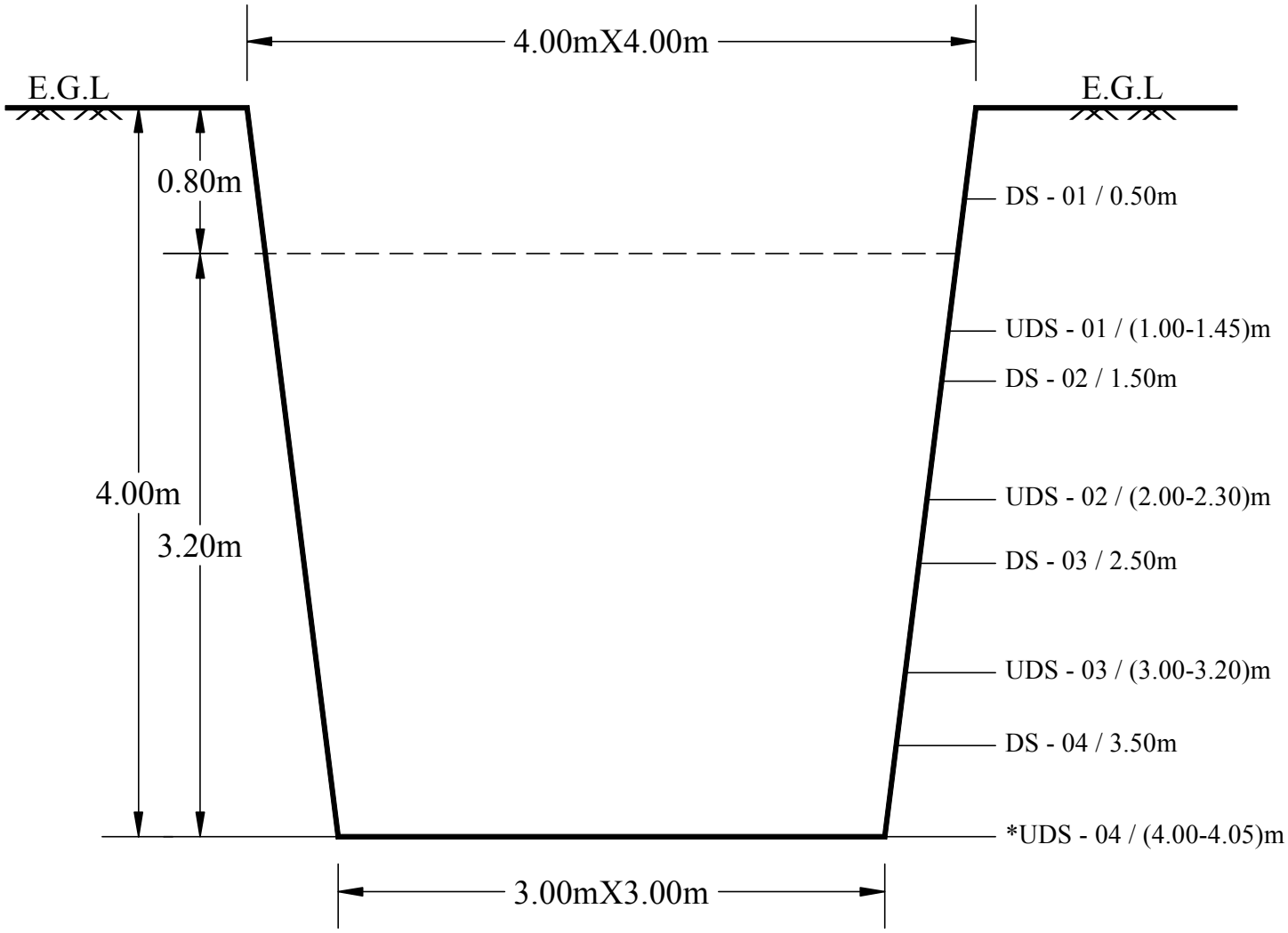
DESCRIPTION	SYMBOL	N-VALUE (EACH DIVN. = 7.5cm)	SAMPLES Ref. No	SAMPLES Depth (m)
11.00m.			R10	CR=27% RQD=NIL
				11.50
			R11	CR=29% RQD=NIL
				12.50
			R12	CR=27% RQD=NIL
				13.50
			R13	CR=30% RQD=NIL
				14.50
			R14	CR=34% RQD=NIL
				15.50
Highly weathered, light grey, medium grained, moderately fractured rock.			R15	CR=49% RQD=NIL
				16.50
			R16	CR=44% RQD=NIL
				17.50
			R17	CR=40% RQD=NIL
				18.50
			R18	CR=48% RQD=NIL
				19.50
			R19	CR=48% RQD=NIL
21.00m.				21.00

-:List of Co-ordinates & RL:-

Commenced on	28/03/2015
Completed on	28/03/2015

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467300.000	1947326.000	104.086

S.W.L.=Not Found.



Description Of Soil:-

EGL-0.80m :- Brownish grey to light grey, sandy silt with calcareous nodules.

0.80m-4.00m :- Brownish grey clayey silt with brownish patches and rock pcs.

PIT LOG FOR ITP-01

Note :-

DS means Disturbed Sample
UDS means Undisturbed Sample

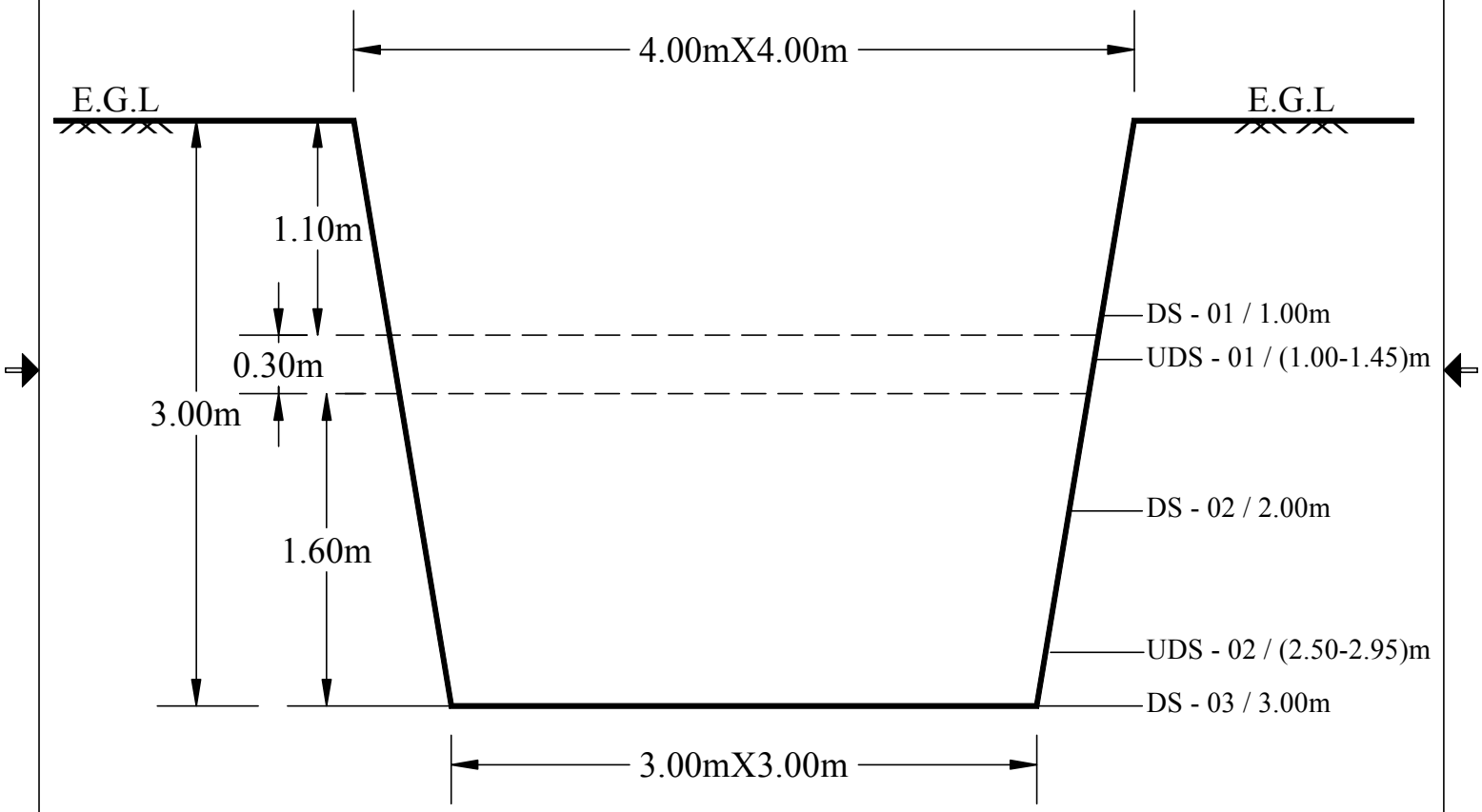
Note :-'*' means sample could not be recovered.

-:List of Co-ordinates & RL:-

Commenced on	14/04/2015
Completed on	15/04/2015

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467300.000	1947219.000	105.767

S.W.L.=Not Found.



Description Of Soil:-

EGL-1.10m :- Deep grey, silty clay. Obs. calcareous.

1.10m-1.40m :- Yellowish brown, silty moorum.

1.40m-3.00m :- Greyish brown to whitish brown, silty sand with decomposed rock.

PIT LOG FOR IPLT-01

Note :-

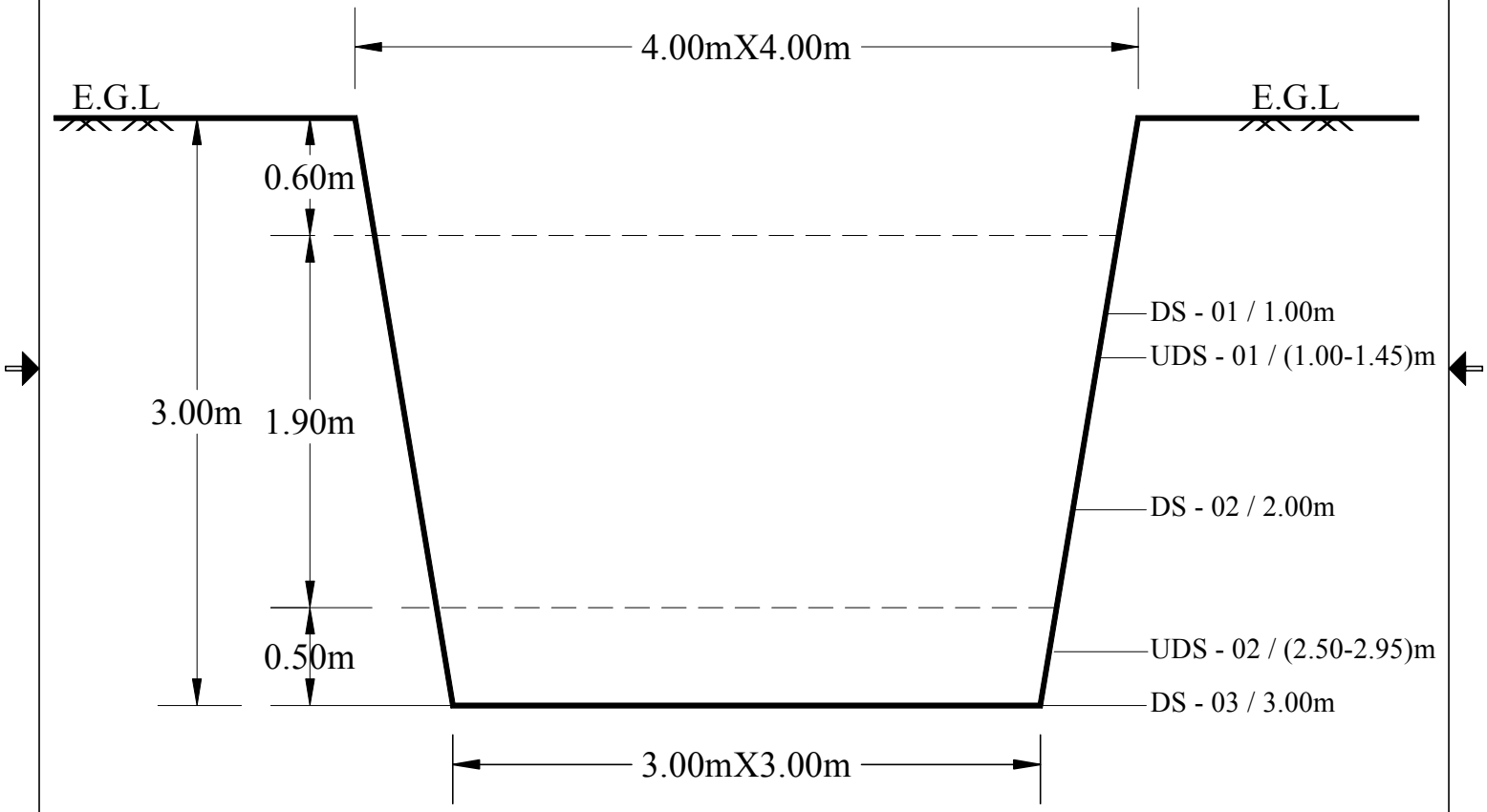
DS means Disturbed Sample
UDS means Undisturbed Sample

-:List of Co-ordinates & RL:-

Commenced on	28/03/2015
Completed on	29/03/2015

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467837.000	1947199.000	100.873

S.W.L.=2.75 m.



Description Of Soil:-

EGL-0.60m :- Deep grey, silty clay with sand mixture. Obs. calcareous nodules.

0.60m-2.50m :- Yellowish brown, clayey silty moorum. Obs. calcareous nodules.

2.50m-3.00m :- Greyish brown to whitish grey, clayey silty sand with decomposed rock.

PIT LOG FOR IPLT-02

Note :-

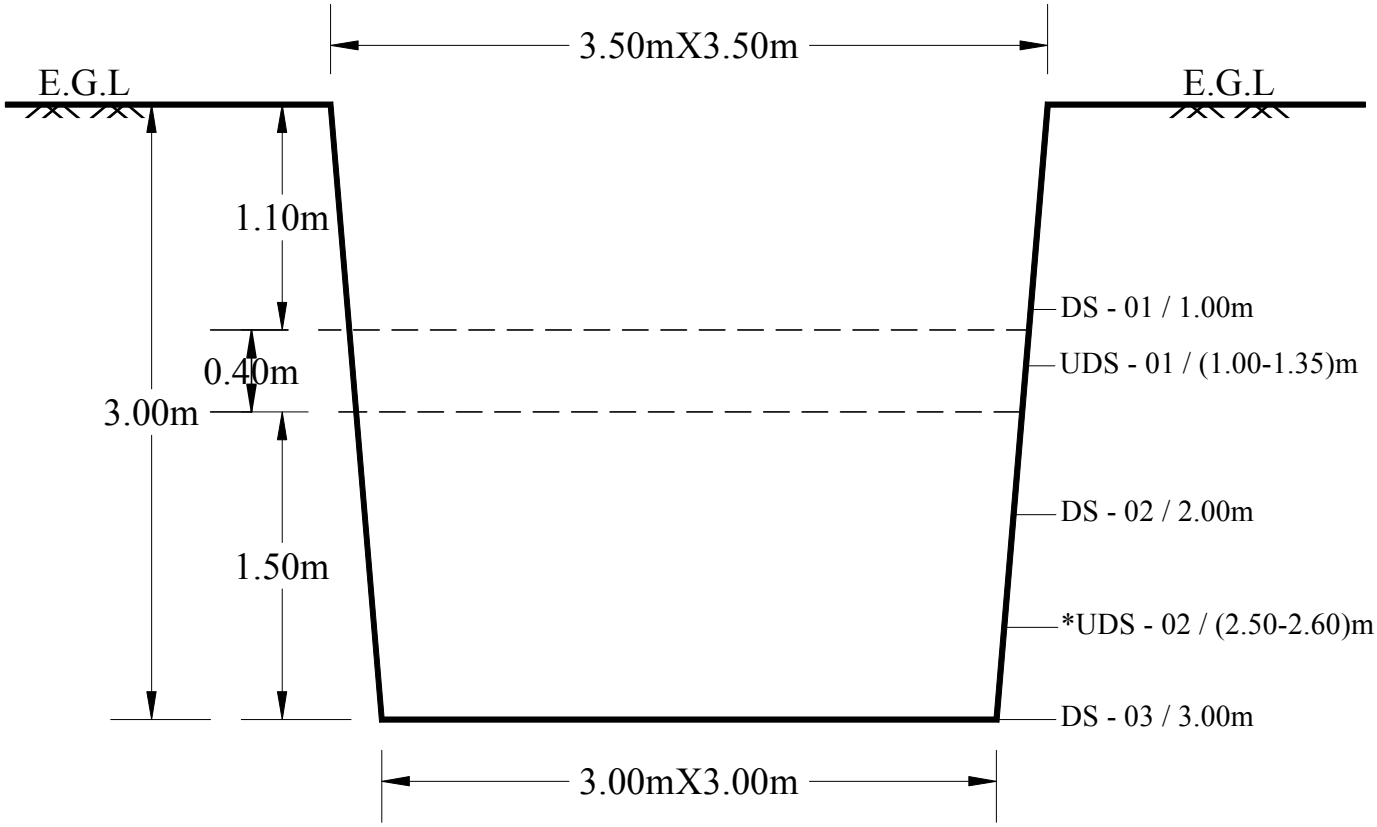
DS means Disturbed Sample
UDS means Undisturbed Sample

-:List of Co-ordinates & RL:-

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467359.000	1947072.000	103.964

Commenced on	23/04/2015
Completed on	24/04/2015

S.W.L.=Not Found



Description Of Soil:-

EGL-1.10m :- Brownish grey, clayey silt/silty clay with sand mixture.

1.10m-1.50m :- Reddish brown, silty moorum. Obs. calcareous nodules.

1.50m-3.00m :- Light grey, decomposed rock with boulder.

PIT LOG FOR IPLT-03

Note :-

DS means Disturbed Sample
UDS means Undisturbed Sample

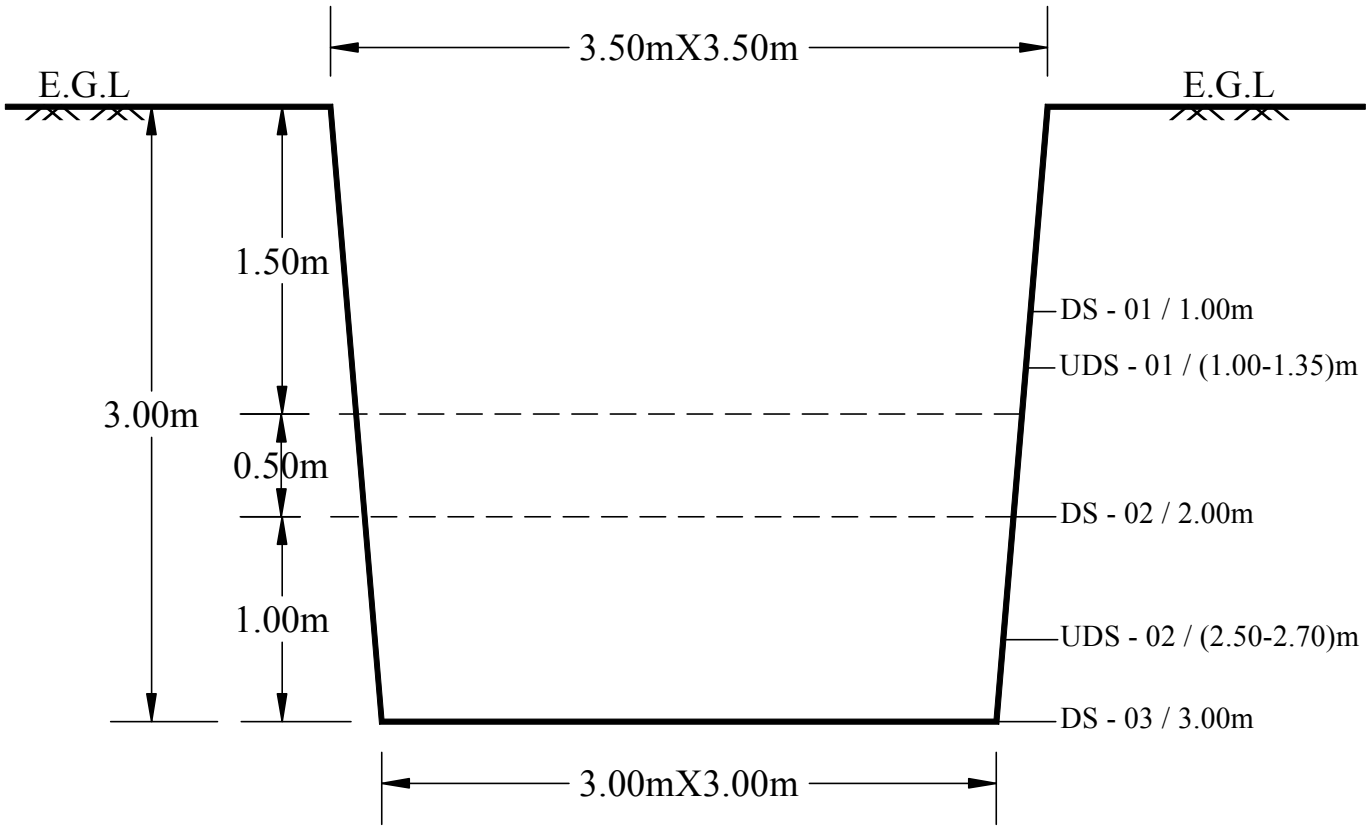
Note :-'*' means sample could not be recovered.

-:List of Co-ordinates & RL:-

Commenced on	27/04/2015
Completed on	28/04/2015

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467597.000	1947021.000	101.205

S.W.L.=Not Found



Description Of Soil:-

EGL-1.50m :- Deep grey, clayey silt with gravels.

1.50m-2.00m :- Brownish grey, silty moorum with clay binders. Obs. boulder.

2.00m-3.00m :- Light grey, decomposed rock.

PIT LOG FOR IPLT-04

Note :-

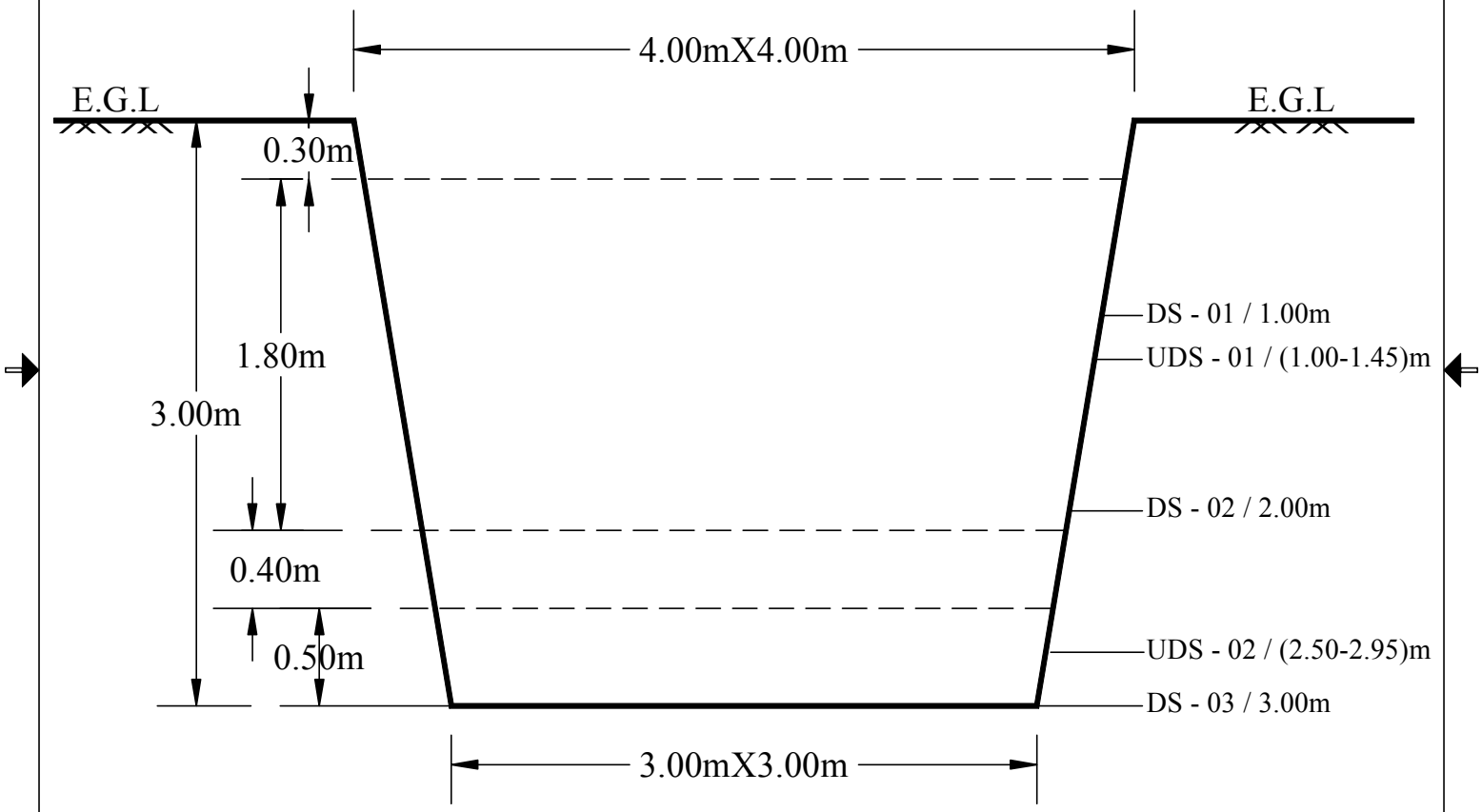
DS means Disturbed Sample
UDS means Undisturbed Sample

-:List of Co-ordinates & RL:-

Commenced on	10/04/2015
Completed on	11/04/2015

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467073.000	1947216.000	108.319

S.W.L.= Not Found



Description Of Soil:-

EGL-0.30m :- Filled up soil consists of brownish grey, clayey silty sand with rock pcs.

0.30m-2.10m :- Blackish grey / deep grey, silty clay with calcareous nodules.

2.10m-2.50m :- Yellowish brown, silty moorum.

2.50m-3.00m :- Whitish brown to light brown, decomposed rock.

Note :-

DS means Disturbed Sample
UDS means Undisturbed Sample

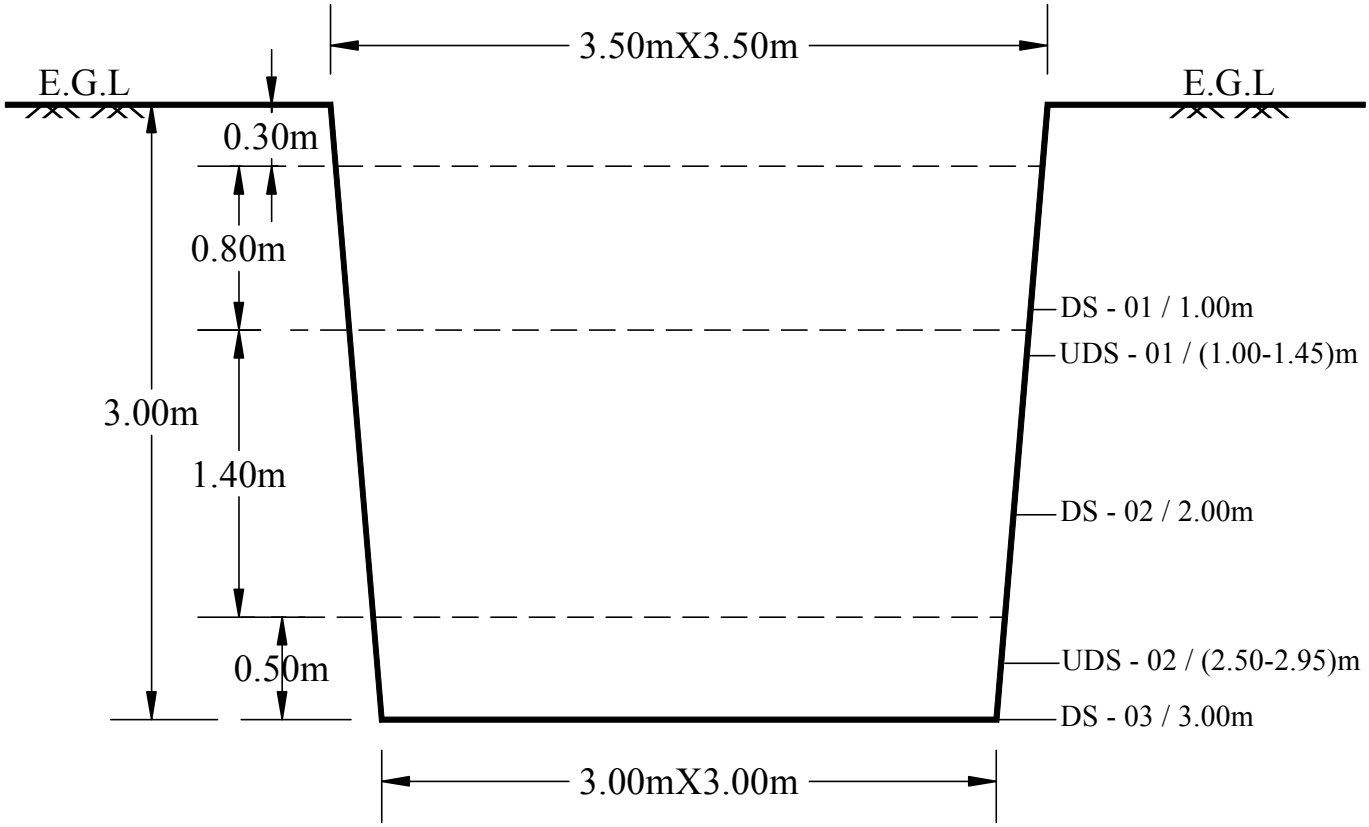
PIT LOG FOR IPLT-05

-:List of Co-ordinates & RL:-

Commenced on	11/04/2015
Completed on	12/04/2015

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467970.000	1947203.000	98.402

S.W.L.=2.80 m.



Description Of Soil:-

EGL-0.30m :- Filled up soil, silty clay

0.30m-1.10m :- Top portion consists of deep grey, clayey silt. Obs. kankars.

1.10m-2.50m :- Whitish grey, sandy silty moorum with calcareous nodules.

2.50m-3.00m :- Light grey, decomposed rock.

Note :-

DS means Disturbed Sample
UDS means Undisturbed Sample

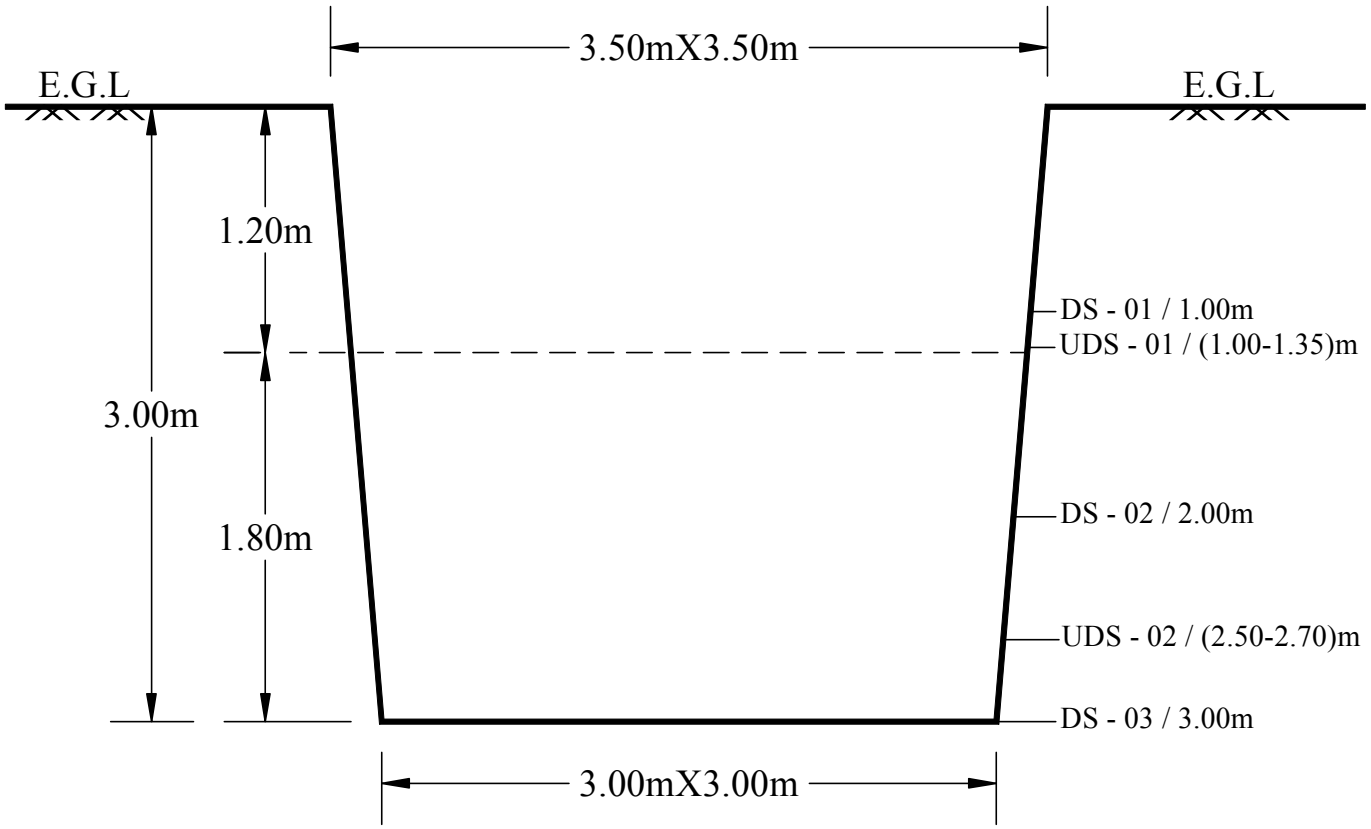
PIT LOG FOR IPLT-06

-:List of Co-ordinates & RL:-

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467697.000	1947094.000	99.512

Commenced on	26/04/2015
Completed on	27/04/2015

S.W.L.=Not Found



Description Of Soil:-

EGL-1.20m :- Deep grey, clayey silt with gravels.

1.20m-3.00m :- Pinkish grey, decomposed rock with quartzite.

PIT LOG FOR IPLT-07

Note :-

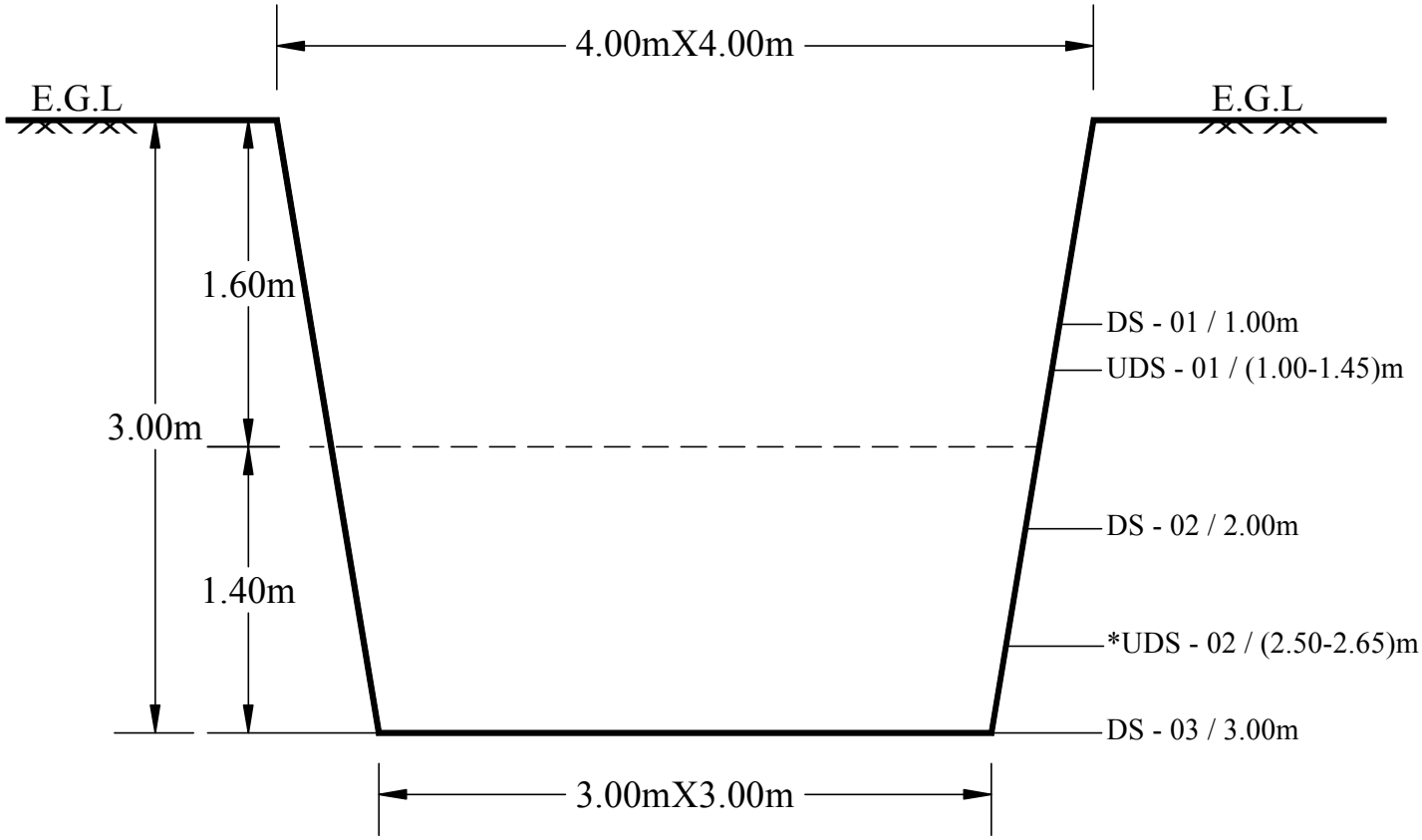
DS means Disturbed Sample
UDS means Undisturbed Sample

-:List of Co-ordinates & RL:-

Commenced on	07/04/2015
Completed on	08/04/2015

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467161.000	1947297.000	108.390

S.W.L.=Not Found.



Description Of Soil:-

EGL-1.60m :- Deep grey, silty clay with sand mixture. Obs. calcareous nodules.

1.60m-3.00m :- Brownish grey to whitish grey, clayey silty sand with decomposed rock.

PIT LOG FOR ICPLT-01

Note :-

DS means Disturbed Sample
UDS means Undisturbed Sample

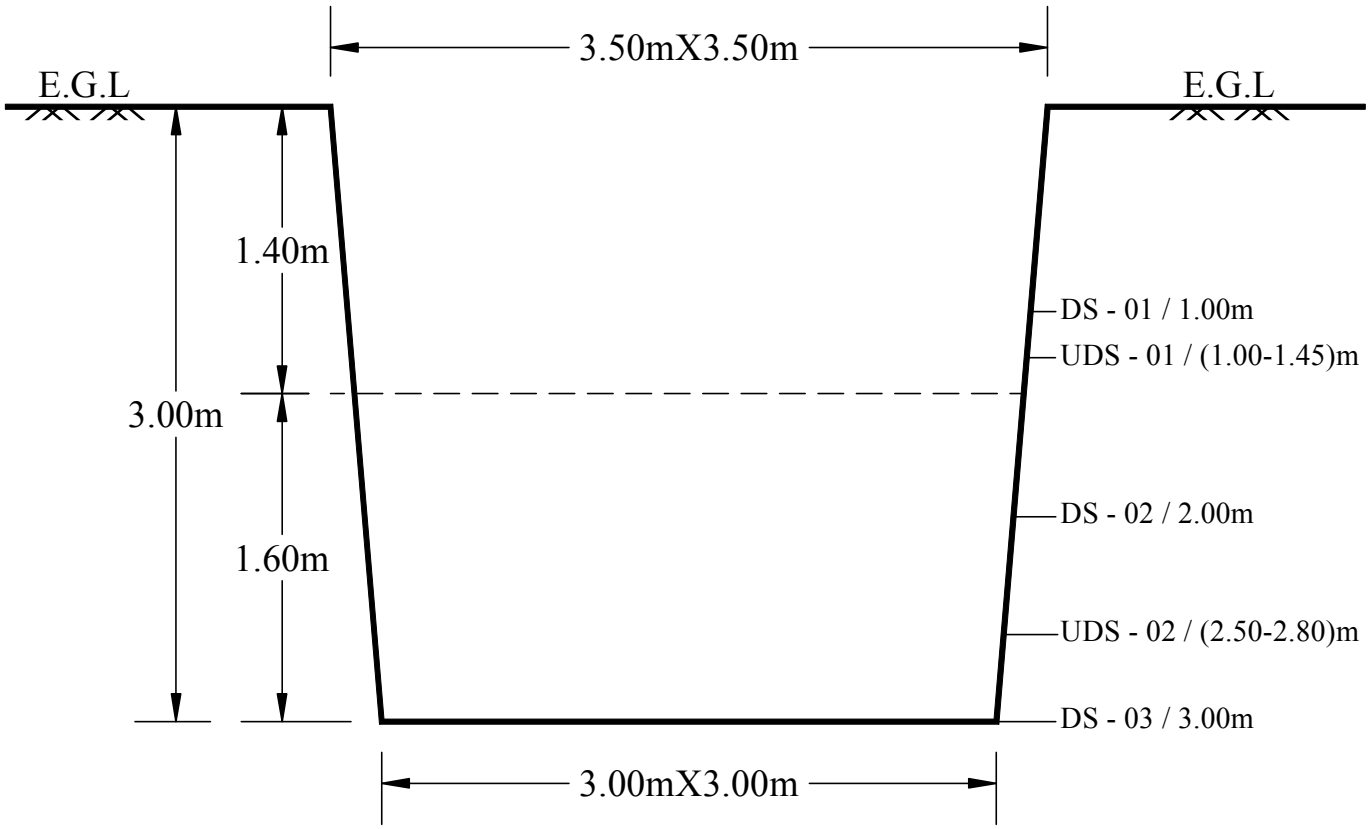
Note :-'*' means sample could not be recovered.

-:List of Co-ordinates & RL:-

Commenced on	09/04/2015
Completed on	10/04/2015

Co-ordinates (M)		R.L. (M)
Easting	Northing	
467968.000	1947242.000	99.206

S.W.L.=2.40 m.



Description Of Soil:-

EGL-1.40m :- Top soil consists of brownish grey, silty clay with rock pieces.

1.40m-3.00m :- Whitish grey, clayey sandy silt with calcareous nodules & decomposed rock.

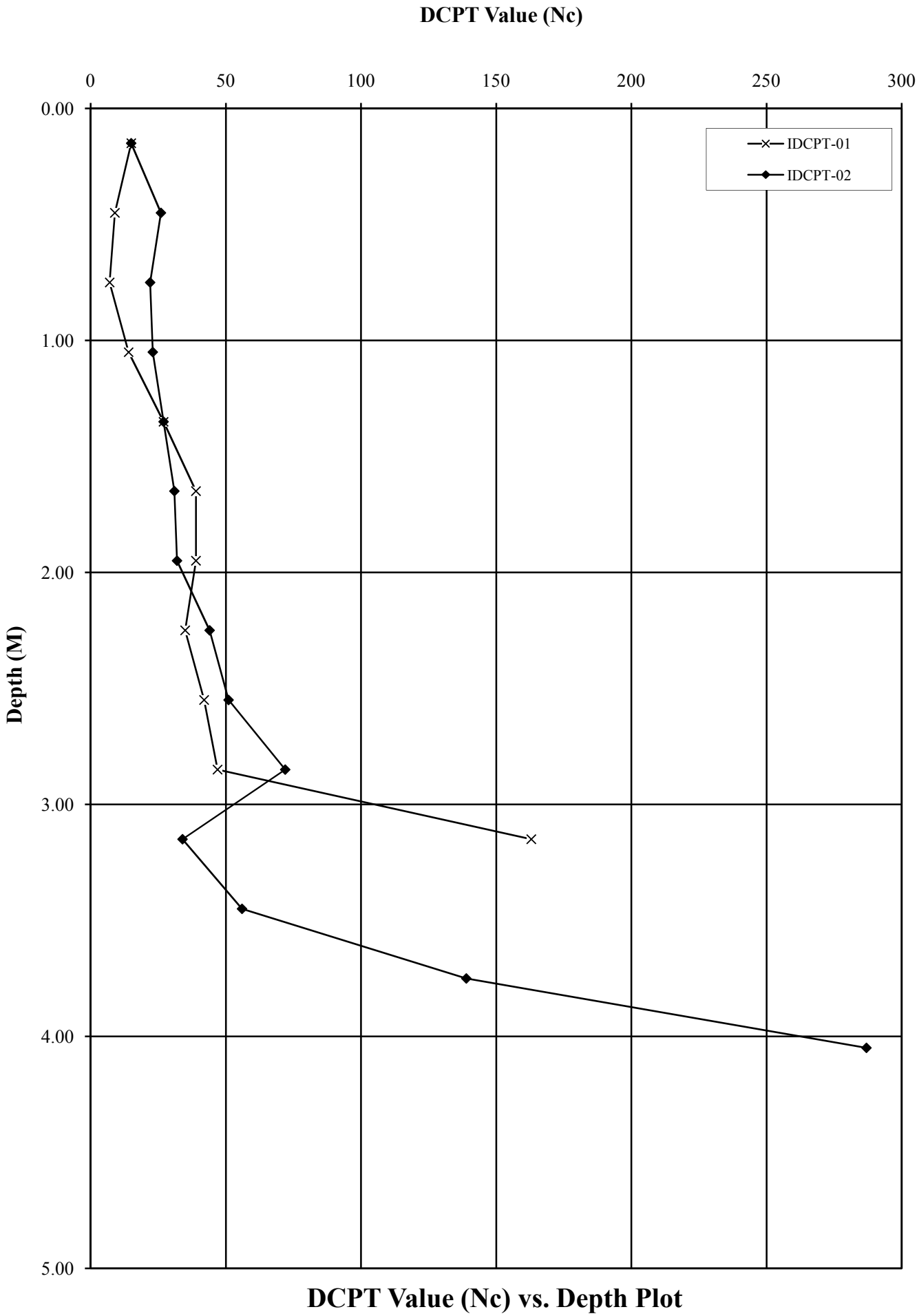
PIT LOG FOR ICPLT-02

Note :-

DS means Disturbed Sample
UDS means Undisturbed Sample

DYNAMIC CONE PENETRATION TEST RESULTS

DCPT No.	Co-Ordinates		R.L. of Ground (M)	Starting Depth (M)	Ending Depth (M)	Average Depth (M)	Nc Value
	Easting	Northinng					
IDCPT-01	467674.000	1947078.000	98.960	0.00	0.30	0.15	15
				0.30	0.60	0.45	9
				0.60	0.90	0.75	7
				0.90	1.20	1.05	14
				1.20	1.50	1.35	27
				1.50	1.80	1.65	39
				1.80	2.10	1.95	39
				2.10	2.40	2.25	35
				2.40	2.70	2.55	42
				2.70	3.00	2.85	47
				3.00	3.30	3.15	163
IDCPT-02	467271.000	1947040.000	104.740	0.00	0.30	0.15	15
				0.30	0.60	0.45	26
				0.60	0.90	0.75	22
				0.90	1.20	1.05	23
				1.20	1.50	1.35	27
				1.50	1.80	1.65	31
				1.80	2.10	1.95	32
				2.10	2.40	2.25	44
				2.40	2.70	2.55	51
				2.70	3.00	2.85	72
				3.00	3.30	3.15	34
				3.30	3.60	3.45	56
				3.60	3.90	3.75	139
				3.90	4.20	4.05	287
							Extrapolated value



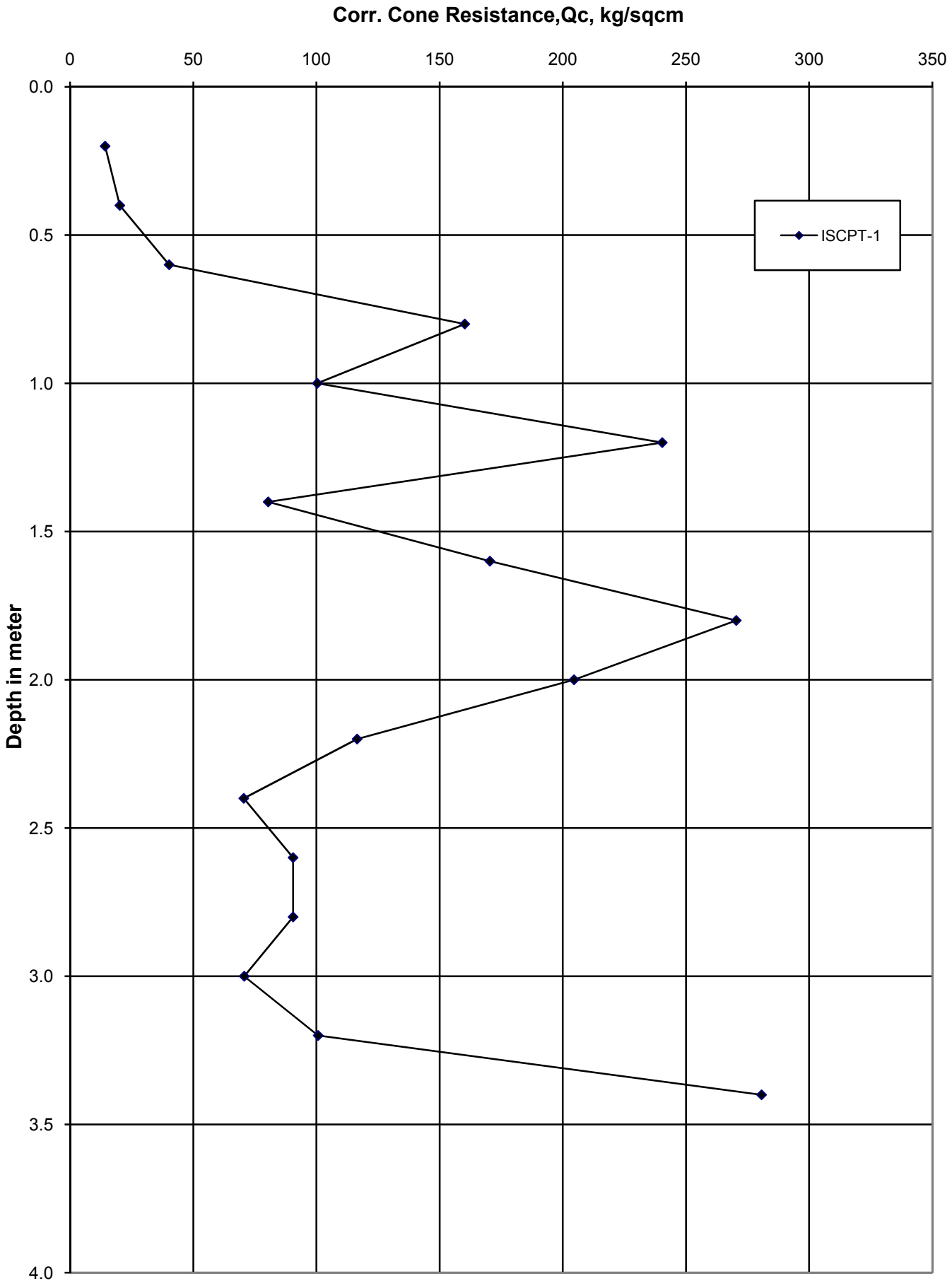
DCPT Value (Nc) vs. Depth Plot

ISCPT NO. - 1

Mass of cone(kg), m =	1.029	Area of friction jacket (sqcm), a =	100.57
Area of Cone (sqcm), b =	10	Mass of each rod (kg), m =	1.529
Plunger Area (sqcm), ap =	20	Ratio of plunger area to cone area =	2
		Mass of friction jacket(kg), mf =	1.111

Depth	Cone Resistance, Gauge Reading, kg/sqcm	Total Resistance, Gauge Reading, kg/sqcm	Corr. Cone Resistance, Qc, kg/sqcm	Corr. Friction Resistance, fs, kg/sqcm	Friction Ratio	No of bars
(1)	(2)	(3)	(4)	(5)	(6)	(7)
0.2	7.0	10.0	14	0.31	2.2	1
0.4	10.0	15.0	20	0.51	2.5	1
0.6	20.0	24.0	40	0.41	1.0	1
0.8	80.0	84.0	160	0.41	0.3	1
1.0	50.0	70.0	100	2.00	2.0	2
1.2	120.0	125.0	240	0.51	0.2	2
1.4	40.0	65.0	80	2.50	3.1	2
1.6	85.0	100.0	170	1.50	0.9	2
1.8	135.0	135.0	270	0.01	0.0	2
2.0	102.0	104.0	205	0.21	0.1	3
2.2	58.0	63.0	117	0.51	0.4	3
2.4	35.0	45.0	71	1.01	1.4	3
2.6	45.0	70.0	91	2.50	2.8	3
2.8	45.0	60.0	91	1.50	1.7	3
3.0	35.0	45.0	71	1.01	1.4	4
3.2	50.0	62.0	101	1.20	1.2	4
3.4	140.0	160.0	281	2.00	0.7	4

Layer No	Depth From (M)	Depth To (M)	Average Friction Ratio	Type of Soil	Average Qc kg/sqcm	Strength Parameters (c / ϕ)
II	0	0.6	1.9	Clayey silt / Silty Clay	24.92	0.92kg/sqcm
V	0.6	3.40	1.15	Sand	146.23	45°



Corr. Cone Resistance vs depth plot

FIELD PERMEABILITY TEST RESULTS:

12Nos. Field permeability test was conducted at different depths in three bore holes by falling head method and the test results are presented below

Test Locations	Depth of Test (M)	Permeability (cm/sec)
IBH-16	1.20-2.00	1.780×10^{-5}
	2.70-3.50	8.899×10^{-6}
	4.20-5.00	8.439×10^{-6}
	5.70-6.50	3.576×10^{-5}
IBH-21	1.20 – 2.00	4.536×10^{-6}
	2.70 – 3.50	3.797×10^{-6}
	4.20 – 5.00	3.777×10^{-6}
	5.70 – 6.50	4.388×10^{-6}
IBH-29	1.20-2.00	2.472×10^{-6}
	2.70-3.50	1.606×10^{-6}
	4.20-5.00	1.120×10^{-4}
	5.70-6.50	3.077×10^{-5}

PERCOLATION TEST RESULTS:

1Nos. percolation test was conducted by falling head method and the test results are presented below.

Percolation No.	Depth (M)	Permeability (cm/sec)
ITP-1	4.00	4.00×10^{-7}

PART II: LABORATORY TEST RESULTS

Format No: CET/FM/42

TEST REPORT

TEST REPORT NO : 3472 DATE: 12/05/15

Name and Address of Customer: Bharat Heavy Electricals Limited,
Power Sector Southern Region,
690, Annasalai, Nandanam, Chennai - 600035

Customer Reference No : 88/14/0077/ANA/3472

Customer Reference Date : 09/03/2015

Date of Sample Received at Lab : 11/03/2015

Date of Starting of Test : 19/03/2015

Date of Completion of Test : 11/05/2015

Sample ID Nos : 3472/IBH01/SPT01 to 3472/ICPLT02/DS01

Please refer the page nos. 128 of 193 to 141 of 193 of the Report for the following:

1. Sample Description
2. Test methods used
3. Test results

Further to note that the test parameters are mentioned at the header of test result table.

* The report related to the particular sample(s) tested under stated condition.
* All tests are based as per IS specifications.
* Any discrepancy in this report should be brought to the notice within 15 (fifteen) days from the date of certificate.
* Full/Partial use of this test results could not be done without the written permission of authorized signatory.

Bore Hole	Sample Number	Depth M	Sample Description	Bulk Dens. gms/cc	Dry Dens. gms/cc	Spec. Grav.	Nat. Mois. %	Void Ratio	Strength Test Results Pc/Pn kg/sqcm	Shear kg/sqcm	Cohesn kg/sqcm	Frictn Deg.	Atter. Limits LL %	PL %	SL %	IS Classification	Grain Size Gravl %	Sand %	Silt %	Clay %	Test Method
IBH01	SPT01	1.00	Brownish grey, clayey silty sand.													SM		83	17 (Silt+Clay)		***See the Note
IBH02	UDS01	2.00	Brownish grey, silty clay with calcareous nodules.	1.72	1.45	2.57	22 S	0.583	TRSH-UU		0.53	0	51	20	15	CH		34	48	18	Do
							19 T		3.0	0.573											
							22 C		2.0	0.507											
									1.0	0.495											
									UNCONFD		0.43	0									
									0.0	0.450											
									0.0	0.432											
									0.0	0.416											
									REMOULD		0.33	0									
									0.0	0.339											
									0.0	0.326											
									0.0	0.309											
IBH02	SPT02	3.00	Brownish grey, silty sand with traces of mica & boulder.													SM	38	47	15 (Silt+Clay)		Do
IBH03	SPT01	1.00	Brownish grey silty clay / clayey silt with traces of kankars.										53	20		CH					Do
IBH04	UDS01	2.00	Brownish grey, silty clay with calcareous nodules, rock pcs.	2.07	1.87	2.66	10 S		TRSH-UU		0.25	13	45	17		SC	48	31	19	2	Do
							10 T		3.0	1.301											
									2.0	0.918											
									1.0	0.674											
IBH05	UDS01	2.00	Brownish grey, silty clay with kankars & traces of calcareous nodules.	1.97	1.58	2.61	26 S	0.587	TRSH-UU		0.86	4	50	20	14	CH		30	58	12	Do
							25 T		3.0	1.164											
							23 C		2.0	1.047											
									1.0	0.968											
									UNCONFD		0.75	0									
									0.0	0.752											
									0.0	0.748											
									0.0	0.751											
									REMOULD		0.58	0									
									0.0	0.597											
									0.0	0.574											
									0.0	0.570											

Bore	Sample	Depth	Sample Description	Bulk	Dry	Spec.	Nat.	Void	Strength Test Results				Atter. Limits			IS	Grain Size				Test
Hole	Number	M		Dens.	Dens.	Grav.	Mois.	Ratio	Pc/Pn	Shear	Cohesn	Frictn	LL	PL	SL	Classi	Gravl	Sand	Silt	Clay	
				gms/cc	gms/cc		%		kg/sqcm	kg/sqcm	kg/sqcm	Deg.	%	%	%	ficatio	%	%	%	%	Method
IBH06	SPT02	2.20	Brownish grey, silty sand with calcareous nodules & decomposed rock pcs.													SM	42	52	06 (Silt+Clay)		Do
IBH07	UDS01	2.00	Brownish grey, silty clay with kankars & traces of calcareous nodules.	1.87	1.41	2.62	31 S	0.593	TRSH-UU		0.57	5	52	18		CH		17	62	21	Do
							32 T		3.0	0.915											
							23C		2.0	0.802											
									1.0	0.711											
									UNCONFD		0.55	0									
									0.0	0.564											
									0.0	0.549											
									0.0	0.537											
									REMOULD		0.47	0									
									0.0	0.478											
									0.0	0.459											
									0.0	0.473											
IBH08	UDS01	2.00	Brownish grey, silty clay with calcareous nodules.	1.90	1.70	2.65	10 S	0.419	TRSH-UU		0.55	0	48	18		SC	32	35	24	9	Do
							11 T		3.0	0.634											
							14 C		2.0	0.555											
									1.0	0.475											
IBH09	SPT01	1.00	Brownish grey, silty sand with traces of rock pieces and clay binder.													SM	10	58	32 (Silt+Clay)		Do
IBH09	UDS02	4.00	Deep grey, silty clay with traces of calcareous nodules & sand mixture.	1.92	1.51	2.67	24 S	0.638	TRSH-UU		0.38	10	62	24	18	CH		38	40	22	Do
							27 T		3.0	1.098											
							21 C		2.0	0.788											
									1.0	0.703											
IBH12	SPT01	1.00	Brownish grey, clayey silty sand with decomposed rock pieces .													SM*		49	51 (Silt+Clay)		Do
IBH15	SPT01	1.00	Deep grey, silty clay / clayey silt with kankars & boulders.													CH*	12	28	60 (Silt+Clay)		Do

Bore	Sample	Depth	Sample Description	Bulk	Dry	Spec.	Nat.	Void	Strength Test Results				Atter. Limits			IS	Grain Size				Test
Hole	Number	M		Dens.	Dens.	Grav.	Mois.	Ratio	Pc/Pn	Shear	Cohesn	Frictn	LL	PL	SL	Classi ficatio	Gravl	Sand	Silt	Clay	
				gms/cc	gms/cc		%		kg/sqcm	kg/sqcm	kg/sqcm	Deg.	%	%	%		%	%	%	%	Method
IBH16	SPT01	1.00	Brownish grey silty clay with decomposed rock pieces.										51	18		SC	13	51**	29	7	Do
IBH16	SPT02	2.40	Brownish grey, clayey silty sand.			2.59										SM		57	35	8	Do
IBH17	SPT01	1.00	Greyish brown silty clay with traces of calcarious nodules.										54	21		CH					Do
IBH17	SPT02	2.50	Brownish grey, clayey silty sand with calcarious nodules.			2.62										SM		68	22	10	Do
IBH18	SPT01	1.00	Greyish brown, silty clay with calcarious nodules.			2.61							38	17		CI		28	48	24	Do
IBH19	SPT01	1.00	Greish brown silty clay with traces of decomposed rock pieces.			2.61							54	22		CH		23	46	31	Do
IBH20	SPT01	1.00	Deep yellowish brown, silty sand with boulder & gravel.													SM	13	79	08 (Silt+Clay)		Do
IBH22	SPT01	1.00	Brownish grey silty clay with rock pieces and calcareous nodules.										37	14		SC	13	57**	30 (Silt+Clay)		Do
IBH23	SPT01	1.00	Brownish grey silty clay with rock pieces and calcareous nodules.										41	18		SC	19	40	41 (Silt+Clay)		Do
IBH24	SPT01	1.00	Brownish grey,silty clay with sand mixture.			2.67							51	19		SC		53**	40	7	Do
IBH24	SPT02	2.30	Deep grey, silty sand traces of rock pieces.			2.62										SM		59	24	17	Do

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CETEST

Bore Hole	Sample Number	Depth M	Sample Description	Bulk Dens. gms/cc	Dry Dens. gms/cc	Spec. Grav.	Nat. Mois. %	Void Ratio	Strength Test Results Pc/Pn kg/sqcm	Shear kg/sqcm	Cohesn kg/sqcm	Frictn Deg.	Atter. Limits LL %	PL %	SL %	IS Classification	Grain Size Gravl %	Sand %	Silt %	Clay %	Test Method
IBH25	SPT01	1.00	Yellowish grey, silty clay with clacarious nodules.													CH*	4	43	53 (Silt+Clay)		Do
IBH26	SPT01	1.00	Brownish grey silty sand with rock pieces and rock pieces.													SM	48	34	18 (Silt+Clay)		Do
IBH27	SPT01	1.00	Deep blackish grey, silty clay with sand mixture.													CI*		36	64 (Silt+Clay)		Do
IBH28	SPT01	1.00	Dark grey, silty clay. Obs. kankars.			2.62							56	21		CH		28	56	16	Do
IBH30	SPT02	3.00	Yellowish grey, silty sand with calcarious nodules & traces of clay binders.													SM	27	48	25 (Silt+Clay)		Do
IBH31	UDS01	2.00	Dark grey, silty clay. Obs. calcareous nodules.			2.64			TRSH-UU		0.66	5	49	18		CI	16	22	39	23	Do
									3.0	1.080											
									2.0	0.880											
									1.0	0.822											
									UNCONFD		0.73	0									
									0.0	0.783											
									0.0	0.725											
									0.0	0.698											
									REMOULD		0.60	0									
									0.0	0.625											
									0.0	0.608											
									0.0	0.589											

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CETEST

Bore	Sample	Depth	Sample Description	Bulk	Dry	Spec.	Nat.	Void	Strength Test Results				Atter. Limits			IS	Grain Size				Test
Hole	Number	M		Dens.	Dens.	Grav.	Mois.	Ratio	Pc/Pn	Shear	Cohesn	Frictn	LL	PL	SL	Classi	Gravl	Sand	Silt	Clay	
				gms/cc	gms/cc		%		kg/sqcm	kg/sqcm	kg/sqcm	Deg.	%	%	%	ficatio	%	%	%	%	Method
IBH33	UDS01	2.00	Brownish grey, silty clay with calcareous nodules,rock pcs.	2.14	1.89	2.69	10 S	0.378	TRSH-UU		1.89	18	58	17		SC	22	29	37	12	Do
							13 T		3.0	3.906											
							12 C		2.0	3.471											
									1.0	3.087											
									UNCONFD		3.49	0									
									0.0	3.520											
									0.0	3.479											
									0.0	3.479											
									REMOULD		2.79	0									
									0.0	2.883											
									0.0	2.741											
									0.0	2.741											
IBH34	SPT01	1.00	Brownish grey, silty clay with sand mixture and traces of rock pieces.													CH*	6	32	62 (Silt+Clay)		Do
IBH35	SPT01	1.00	Brownish grey, silty sand with rock piecs and rock pieces.													SM	20	74	6 (Silt+Clay)		Do
IBH36	SPT01	1.00	Brownish grey, silty sand with decomposed rock pieces and traces of kankars													SM	15	55	30 (Silt+Clay)		Do
IBH37	SPT01	1.00	Deep grey silty clay with sand mixture.			2.58										CH*		27	58	15	Do
IBH38	SPT01	1.00	Bronish grey, silty sand with rock pieces and rock pieces.													SM		92	8 (Silt+Clay)		Do
IBH39	SPT01	1.00	Brownish grey, silty sand. Obs. calcareous nodules & decomposed rock.													SM		84	16 (Silt+Clay)		Do

Bore Hole	Sample Number	Depth M	Sample Description	Bulk Dens. gms/cc	Dry Dens. gms/cc	Spec. Grav.	Nat. Mois. %	Void Ratio	Strength Test Results Pc/Pn kg/sqcm	Shear kg/sqcm	Cohesn kg/sqcm	Frictn Deg.	Atter. Limits LL %	PL %	SL %	IS Classification	Grain Size Gravl %	Sand %	Silt %	Clay %	Test Method
IBH40	UDS01	2.00	Dark grey, silty clay. Obs. calcareous nodules.			2.62			TRSH-UU		0.70	6				CH*		32	38	30	Do
									3.0	1.151											
									2.0	0.992											
									1.0	0.924											
									UNCONFD		0.65	0									
									0.0	0.685											
									0.0	0.648											
									0.0	0.625											
									REMOULD		0.45	0									
									0.0	0.468											
									0.0	0.439											
									0.0	0.446											
IBH41	SPT01	1.00	Blackish grey, silty clay / clayey silt with sand mixture & gravels.													CI*	18	26	56 (Silt+Clay)		Do
IBH42	SPT01	1.00	Deep brownish grey clayey silt with sand mixture and calcarious nodules.			2.58										SM	37	22	37	4	Do
IBH43	SPT01	1.00	Brownish grey, silty clay with traces of gravel pieces and sand mixture.										47	19		SC	13	47**	40 (Silt+Clay)		Do
IBH44	SPT01	1.00	Brownish grey silty sand with traces of mica.													SM		85	15 (Silt+Clay)		Do
IBH45	SPT01	1.00	Whitish brown, silty sand. Obs. decomposed rock.													SM		90	10 (Silt+Clay)		Do
IBH46	SPT01	1.00	Brownish grey, silty clay with sand mixture.			2.49										CI*		36	50	14	Do
IBH46	SPT02	3.00	Yellowish grey silty sand with clay binder.													SM		71	29 (Silt+Clay)		Do

Bore Hole	Sample Number	Depth M	Sample Description	Bulk Dens. gms/cc	Dry Dens. gms/cc	Spec. Grav.	Nat. Mois. %	Void Ratio	Strength Test Results Pc/Pn kg/sqcm	Shear kg/sqcm	Cohesn kg/sqcm	Frictn Deg.	Atter. Limits LL %	PL %	SL %	IS Classification	Grain Size Gravl %	Sand %	Silt %	Clay %	Test Method
IBH47	SPT02	3.00	Brownish grey, silty sand with traces of mica.													SM		90	10 (Silt+Clay)		Do
IBH48	SPT02	3.00	Whitish grey silty sand with decomposed rock pieces and rock pieces.													SM	17	47	36 (Silt+Clay)		Do
IBH49	UDS01	2.00	Brownish grey, silty clay with kankars & rock pieces.	2.07	1.74	2.62	19 S	0.366	TRSH-UU		0.87	6	40	15		SC	22	40	25	13	Do
							19 T		3.0	1.324											
							12 C		2.0	1.182											
									1.0	1.005											
									UNCONFD		0.92	0									
									0.0	0.935											
									0.0	0.928											
									0.0	0.898											
									REMOULD		0.77	0									
									0.0	0.778											
									0.0	0.756											
									0.0	0.776											
IBH50	SPT01	1.00	Brownish grey, silty clay with traces of calcareous nodules.													CH*		24	64	12	Do
IBH51	SPT01	1.00	Brownish grey, silty clay with sand mixture. Obs. calcareous nodules			2.68							38	16		SC		55**	41	4	Do
IBH52	SPT01	1.00	Brownish grey, silty clay with sand mixture with calcarious nodules.			2.63							42	17		SC	7	50**	43 (Silt+Clay)		Do
IBH54	SPT01	1.00	Brownish grey, silty clay with traces of calcarious noodules.			2.62							57	21		CH		35	37	28	Do
IBH55	SPT01	1.00	Brownish grey silty clay with sand mixture.			2.52							52	19		CH		47	36	17	Do

Bore Hole	Sample Number	Depth M	Sample Description	Bulk Dens. gms/cc	Dry Dens. gms/cc	Spec. Grav.	Nat. Mois. %	Void Ratio	Strength Test Results Pc/Pn kg/sqcm	Shear kg/sqcm	Cohesn kg/sqcm	Frictn Deg.	Atter. Limits LL %	PL %	SL %	IS Classification	Grain Size Gravl %	Sand %	Silt %	Clay %	Test Method
IBH56	DS01	0.50	Brownish grey silty sand with calcarious nodules and traces of clay binders.													SM	31	30	39 (Silt+Clay)		Do
IBH57	SPT01	1.00	Light grey, silty sand with decomposed rock.													SM		90	10 (Silt+Clay)		Do
* - Classification is based on average subsoil properties.																					
** - The apparent high percentage of sand content is presence of calcareous nodules & rock pieces.																					

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Sheet No.

CETEST

LABORATORY ROCK TEST RESULTS

BH No.	Run No.	Depth (M)	Description	Density (gm/cc)		Water Content	Porosity □	Specific Gravity	Crushing Strength/ Unconfined Compressive strength (kg/sqcm)		Coefficient of softening	Point Load Strength Index (kg/sqcm)	Slake Durability Index (%)	Hardness (based on Mohs' Scale)	Soundness (% loss)	E (kg/sqcm)	Test Method
				Bulk	Dry	(%)			Dry	Saturated							
IBH-01	10	10.75-11.50	Moderately weathered, whitish brown, highly fractured rock.	2.842	2.838	0.14	0.3900	2.850	--	--	--	14.98	--	Moderately Hard	--	--	***See the Note
IBH-01	24	20.50-21.25	Slightly weathered, light grey, medium grained, highly fractured rock.	2.758	2.754	0.12	0.3305	2.763	--	--	--	30.76	--	--	11.26	--	Do
IBH-01	26	22.75-23.50	Slightly weathered, light grey, medium grained, highly fractured rock.	2.751	2.747	0.13	0.3589	2.757	--	530	--	--	--	--	0.5	20011	Do
IBH-01	28	24.25-25.00	Slightly weathered, light grey, medium grained, highly fractured rock.	2.896	2.865	1.07	3.0799	2.956	--	--	--	36.33	--	Hard	--	--	Do
IBH-02	12	12.25-13.00	Highly weathered, light grey, medium grained, highly fractured rock.	2.524	2.520	0.17	0.4214	2.531	--	--	--	--	--	--	--	--	Do
IBH-02	30	25.75-26.50	Moderately weathered, light grey, medium grained, highly fractured rock.	2.753	2.751	0.06	0.1763	2.756	334	251	0.753	--	99.23	Hard	3.52	15719	Do
IBH-03	23	19.75-20.50	Highly weathered, light grey, medium grained, highly fractured rock.	2.740	2.738	0.06	0.1763	2.743	--	--	--	78.88	99.08	--	--	--	Do
IBH-06	19	15.75-16.50	Highly weathered, light grey, medium grained, moderately fractured rock.	2.725	2.720	0.20	0.5348	2.734	--	--	--	12.91	--	Hard	--	--	Do
IBH-07	13	12.25-13.00	Highly weathered, light grey to blackish grey, fine grained, highly to moderately fractured rock.	2.681	2.676	0.17	0.4624	2.688	--	--	--	35.15	--	--	4.6	--	Do
IBH-07	18	16.00-17.00	Moderately weathered, light grey to blackish grey, fine grained, highly to moderately fractured rock.	2.737	2.733	0.13	0.3648	2.743	--	351	--	--	--	Medium Hard	--	3107	Do
IBH-08	15	14.55-15.30	Slightly weathered, dark grey, medium grained, highly fractured rock.	2.999	2.949	1.67	4.9321	3.102	--	--	--	--	--	--	--	--	Do
IBH10	2	1.75-2.50	Highly weathered, grey, medium grained, highly fractured rock.	2.818	2.769	1.78	4.9143	2.912	--	--	--	--	--	--	--	--	Do
IBH11	18	13.75-14.50	Highly weathered, light grey, medium grained, moderately fractured rock.	3.006	2.999	0.24	0.7059	3.021	--	--	--	27.33	97.10	--	--	--	Do
IBH12	2	2.00-2.75	Completely weathered, light grey, medium grained, highly fractured rock.	2.766	2.749	0.60	1.6471	2.795	--	--	--	--	--	Moderately Hard	--	--	Do
IBH13	9	7.00-7.75	Highly weathered, blackish grey, fine grained, highly fractured rock.	2.840	2.826	0.51	1.4500	2.867	--	--	--	15.58	--	--	--	--	Do
IBH13	20	15.75-16.00	Moderately weathered, deep grey, fine grained, medium fractured rock.	3.088	3.082	0.19	0.6000	3.101	--	187	--	--	96.59	--	3.8	--	Do

BH No.	Run No.	Depth (M)	Description	Density (gm/cc)		Water Content	Porosity %	Specific Gravity	Crushing Strength/ Unconfined Compressive strength (kg/sqcm)		Coefficient of softening	Point Load Strength Index (kg/sqcm)	Slake Durability Index (%)	Hardness (based on Mohs' Scale)	Soundness (% loss)	E (kg/sqcm)	Test Method
				Bulk	Dry	(%)			Dry	Saturated							
IBH14	9	7.25-8.00	Highly weathered, yellowish brown, medium grained, medium fractured rock.	2.840	2.836	0.13	0.3581	2.846	--	--	--	--	--	Moderately Hard	--	--	Do
IBH15	8	8.00-8.75	Completely weathered, whitish grey, medium grained, highly fractured rock.	2.745	2.741	0.13	0.3462	2.751	--	--	--	11.52	--	--	--	--	Do
IBH17	19	16.25-17.00	Highly weathered, light grey, medium grained, highly fractured rock.	2.854	2.851	0.13	0.3600	2.861	--	--	--	7.91	--	Medium Hard	--	--	Do
IBH-18	32	26.00-26.75	Highly weathered, light grey, medium grained, highly fractured rock.	3.056	3.054	0.04	0.1279	3.058	--	--	--	85.28	99.20	--	3.56	--	Do
IBH-20	15	11.75-12.50	Moderately weathered, light whitish grey, fine grained, highly to moderately fractured rock.	2.524	2.513	0.44	1.0979	2.541	--	13	--	--	70.46	Hard	--	1900	Do
IBH-20	38	29.00-30.00	Moderately weathered, light grey, fine grained, medium fractured rock.	2.768	2.766	0.07	0.1987	2.772	--	483	--	--	99.50	Hard	0.84	34015	Do
IBH21	21	16.50-17.75	Completely weathered, light grey, medium grained, highly fractured rock.	2.702	2.698	0.15	0.4045	2.709	--	--	--	--	--	--	--	--	Do
IBH-23	20	16.50-17.25	Highly weathered, light grey, medium grained, highly fractured rock.	3.049	3.040	0.30	0.9231	3.068	--	--	--	5.89	--	--	--	--	Do
IBH-24	15	13.50-14.75	Moderately weathered, light grey, medium grained, highly fractured rock.	2.614	2.610	0.15	0.3786	2.620	--	--	--	--	--	--	--	--	Do
IBH-26	23	17.75-18.50	Moderately weathered, light grey to yellowish brown, medium grained, moderately fractured rock.	3.132	3.127	0.15	0.4718	3.142	--	224	--	--	98.17	Hard	1.78	8009	Do
IBH-28	19	17.00-17.75	Highly weathered, light blackish grey, fine grained, highly fractured rock.	2.855	2.846	0.30	0.8458	2.870	--	--	--	6.66	--	--	--	--	Do
IBH-30	35	29.50-30.00	Moderately weathered, light grey, medium grained, moderately fractured rock.	2.739	2.737	0.07	0.1862	2.742	--	407	--	--	99.03	Hard	0.62	26406	Do
IBH33	23	20.50-21.25	Slightly to fresh, light blackish grey, moderately fractured rock.	2.701	2.696	0.19	0.5188	2.710	--	302	--	--	99.23	--	--	--	Do
IBH-34	3	3.75-4.50	Highly weathered, light grey with yellowish brown, fine to medium grained, highly fractured rock.	3.136	3.135	0.01	0.0282	3.136	--	190	--	--	99.52	--	--	1931	Do
IBH-34	21	17.25-18.00	Slightly weathered, light grey, fine grained, moderately to slightly fractured rock.	3.204	3.203	0.03	0.0828	3.206	600	186	0.310	--	99.61	Hard	0.5	2209	Do
IBH-35	15	12.50-13.25	Highly weathered, light grey, medium grained, moderately fractured rock.	2.593	2.584	0.35	0.8957	2.607	--	--	--	--	96.21	Medium Hard	--	--	Do

BH No.	Run No.	Depth (M)	Description	Density (gm/cc)		Water Content	Porosity %	Specific Gravity	Crushing Strength/ Unconfined Compressive strength (kg/sqcm)		Coefficient of softening	Point Load Strength Index (kg/sqcm)	Slake Durability Index (%)	Hardness (based on Mohs' Scale)	Soundness (% loss)	E (kg/sqcm)	Test Method
				Bulk	Dry	(%)			Dry	Saturated							
IBH-36	8	8.75-9.50	Moderately weathered, dark grey to light grey, medium grained, moderately fractured rock.	2.718	2.716	0.08	0.2092	2.721	--	--	--	54.87	--	--	--	--	Do
IBH-36	16	14.50-15.00	Slightly weathered, dark grey to light grey, medium grained, moderately fractured rock.	2.760	2.758	0.09	0.2364	2.764	514	463	0.901	--	99.03	--	0.55	18661	Do
IBH-37	16	14.25-15.00	Completely weathered, whitish brown to brownish grey, medium to fine grained, decomposed and disintegrated rock.	2.807	2.788	0.67	1.8750	2.842	--	--	--	--	--	Moderately Hard	--	--	Do
IBH-38	16	12.75-13.50	Completely weathered, light brownish grey to light blackish grey, medium to fine grained, highly fractured decomposed and disintegrated rock.	3.327	3.312	0.47	1.5500	3.364	--	--	--	--	--	--	--	--	Do
IBH-39	4	4.75-5.50	Highly weathered, light grey, medium grained, highly fractured rock.	2.936	2.934	0.08	0.2285	2.941	--	--	--	2.46	--	Hard	--	--	Do
IBH-41	13	11.00-11.75	Highly weathered, brownish grey, fine grained, highly fractured rock.	2.986	2.984	0.05	0.1503	2.989	--	--	--	14.88	--	Medium Hard	16.53		Do
IBH-42	11	9.50-10.00	Completely weathered, brownish grey, medium to fine grained, decomposed and disintegrated rock.	2.950	2.947	0.12	0.3466	2.957	--	--	--	--	--	--	--	--	Do
IBH-44	7	6.50-7.25	Completely weathered, whitish brown, medium to fine grained, decomposed and disintegrated rock.	3.025	3.024	0.02	0.0750	3.026	--	--	--	--	--	Moderately Hard	--	--	
IBH-46	9	10.25-11.00	Highly weathered, light grey, medium grained, highly to moderately fractured rock.	2.683	2.677	0.24	0.6313	2.694	--	--	--	8.61	--	--	--	--	Do
IBH-46	28	24.50-25.25	Moderately weathered, light grey to whitish grey, medium grained, moderately fractured rock.	2.664	2.655	0.33	0.8854	2.679	167	99	0.595	--	93.66	Hard	0.88	6803	Do
IBH-47	15	15.00-15.75	Moderately weathered, light grey, medium grained, highly fractured rock.	2.719	2.715	0.14	0.3819	2.725	--	--	--	72.17	--	--	--	--	Do
IBH-47	23	21.00-21.75	Moderately weathered, light grey, medium grained, highly fractured rock.	2.752	2.749	0.11	0.3116	2.758	--	--	--	50.60	--	--	--	--	Do
IBH-48	20	18.25-19.00	Highly weathered, light grey, medium grained, highly to moderately fractured rock.	2.528	2.505	0.91	2.2833	2.563	--	--	--	--	95.19	Medium Hard	11.36		Do
IBH-50	6	7.15-7.90	Slightly to fresh, deep greyish brown, medium grained, moderately fractured rock.	2.744	2.699	1.70	4.5834	2.828	--	--	--	--	--	--	--	--	Do

BH No.	Run No.	Depth (M)	Description	Density (gm/cc)		Water Content	Porosity %	Specific Gravity	Crushing Strength/ Unconfined Compressive strength (kg/sqcm)		Coefficient of softening	Point Load Strength Index (kg/sqcm)	Slake Durability Index (%)	Hardness (based on Mohs' Scale)	Soundness (% loss)	E (kg/sqcm)	Test Method
				Bulk	Dry	(%)			Dry	Saturated							
IBH-50	12	11.65-12.40	Highly weathered, light greyish brown, medium grained, moderately fractured rock.	2.966	2.938	0.95	2.7802	3.022	--	--	--	--	--	Medium Hard	--	--	Do
IBH-50	19	16.90-17.65	Highly weathered, whitish grey, medium grained, moderately fractured rock.	2.693	2.689	0.14	0.3809	2.699	--	--	--	69.25	--	--	6.8		Do
IBH-51	23	19.00-20.00	Slightly weathered, light grey, medium grained, highly fractured rock.	2.651	2.640	0.41	1.0833	2.669	--	--	--	--	--	Medium Hard	--	--	Do
IBH-52	14	13.55-14.30	Slightly weathered, light grey, medium grained, highly fractured rock.	2.749	2.746	0.10	0.2804	2.754	--	--	--	47.13	--	--	--	--	Do
IBH-54	15	13.00-13.75	Completely weathered, light grey, medium grained, highly fractured rock.	2.750	2.748	0.09	0.2351	2.754	--	--	--	34.86	--	Hard	--	--	Do
IBH-55	12	11.75-12.50	Slightly weathered, light blackish grey, fine grained, slightly fractured rock.	2.720	2.718	0.07	0.1945	2.723	--	178	--	--	98.84	Hard	1.86	8704	Do
IBH56	8	6.50-7.25	Completely weathered, light grey, medium grained, decomposed and disintegrated rock.	2.627	2.621	0.22	0.5778	2.637	--	--	--	--	--	--	--	--	Do
IBH57	37	25.25-29.00	Moderately weathered, light grey, medium grained, moderately fractured rock.	2.903	2.899	0.15	0.4489	2.912	--	--	--	57.24	97.40	--	3.56	--	Do

SWELLING TEST RESULTS

Borehole No.	Sample No.	Depth (M)	Description	Free Swell Index, (%)	Swelling Pressure (kg/cm^2)	Plasticity Index (%)	Test Method
IBH-02	UDS-01	2.00	Brownish grey, clayey silt with calcareous nodules.	47.50	0.70	31	***See the Note
IBH-09	UDS-02	4.00	Deep grey, silty clay with traces of calcareous nodules & sand mixture.	45.00	0.88	38	Do
IBH-16	SPT-02	2.40	Brownish grey, silty sand with traces of clay binders.	7.89	0.00	NON-PLASTIC	Do
IBH-19	SPT-01	1.00	Greyish brown silty clay with traces of decomposed rock pieces.	50.00	0.59	32	Do
IBH-33	UDS-01	2.00	Brownish grey, silty clay with calcareous nodules &rock pcs.	30.00	0.73	41	Do
IBH-46	SPT-01	1.00	Brownish grey, clayey silt with sand mixture.	66.67	0.49	--	Do
IBH-51	SPT-01	1.00	Brownish grey, clayey silt with sand mixture & decomposed rock.	23.16	0.26	22	Do
IBH-55	SPT-01	1.00	Brownish grey clayey silt with sand mixture.	44.74	0.42	33	Do
IBH-56	DS-01	0.50	Brownish grey silty sand with calcarious nodules and trces of clay binders.	22.86	0.00	NON-PLASTIC	Do

SUMMARISED COMPACTION & CBR TEST RESULTS

Sl. No.	Test No.	Sample No.	Depth (M)	Description	Standard Proctor Compaction Test		CBR (%) Soaked Condition		Recommended Soaked CBR (%)	Test Method
					OMC (%)	MDD (gm/cc)	2.50mm Penetration	5.00mm Penetration		
1	ITP01	DS02	1.50	Brownish grey clayey silt with sand mixture and rock pieces.	11.15	2.066	7.57	6.49	7.00	***See the Note
2	ICBR01	DS01	0.50	Deep grey clayey silt/silty clay with decomposed rock pieces.	16.64	1.703	--	--	--	Do
3	ICBR02	DS01	0.50	Brownish grey, silty clay with calcareous nodules and rock pieces.	17.73	1.668	9.56	7.83	9.00	Do
4	ICBR03	DS01	0.50	Brownish grey, silty clay with decomposed rock pieces.	13.27	1.881	9.94	8.49	9.00	Do
5	IPLT01	DS02	2.00	Light brownish grey, silty sand with decomposed rock pieces.	10.87	1.969	--	--	--	Do
6	IPLT02	DS01	1.00	Yellowish brown, clayey silty moorum. Obs Calcareous nodules.	10.70	1.993	21.47	19.12	21.00	Do
7	IPLT03	DS01	1.00	Brownish grey clayey silt/silty clay with sand mixture.	13.75	1.745	--	--	--	Do
8	ICPLT01	DS02	2.00	Brownish grey clayey silty sand with decomposed rock pieces .	9.59	2.052	13.22	11.03	13.00	Do
9	ICPLT02	DS01	1.00	Brownish grey, silty clay with rock pieces.	20.00	1.585	--	--	--	Do

****Note: Test Methods**

Bulk Density & Dry Density: Ref. CET/SOP/01, Issue No. 01-(Page 27 & 39 of 40)
Natural Moisture Content: IS 2720 (Part 2)
Specific Gravity: IS 2720 (Part 3).
Grain size analysis: IS 2720 (Part 4)
Liquid Limit & Plastic Limit: IS 2720 (Part 5)
Shrinkage Limit: IS 2720 (Part 6)
Standard Proctor Compaction Test (Light Compaction): IS 2720 (Part 7)
Unconfined Compressive Strength Test: IS 2720 (Part 10)
Triaxial Test (TRSH-UU): IS 2720 (Part 11)

Consolidation Properties (Void Ratio): IS 2720 (Part 15)
California
Free Swell Index: IS 2720 (Part 40)
Swelling Pressure: IS 2720 (Part 41)
Laboratory
Point Load Index: IS 8764.
Water Content, Bulk & Dry Density and Porosity: IS 13030
Specific Gravity: IS 2720 (Part 3).
Slake Durability Index : IS 10050.
Unconfined Compressive Strength of rock: IS 9143.

Rock Hardness, Soundness : Out of NABL scop

C.E.Testing Company Pvt. Ltd.

Prepared By

Nilgam Parasad Gorai

(N.P.Gorai)
Geotech Engineer

Checked & Approved By

Sudip Nath

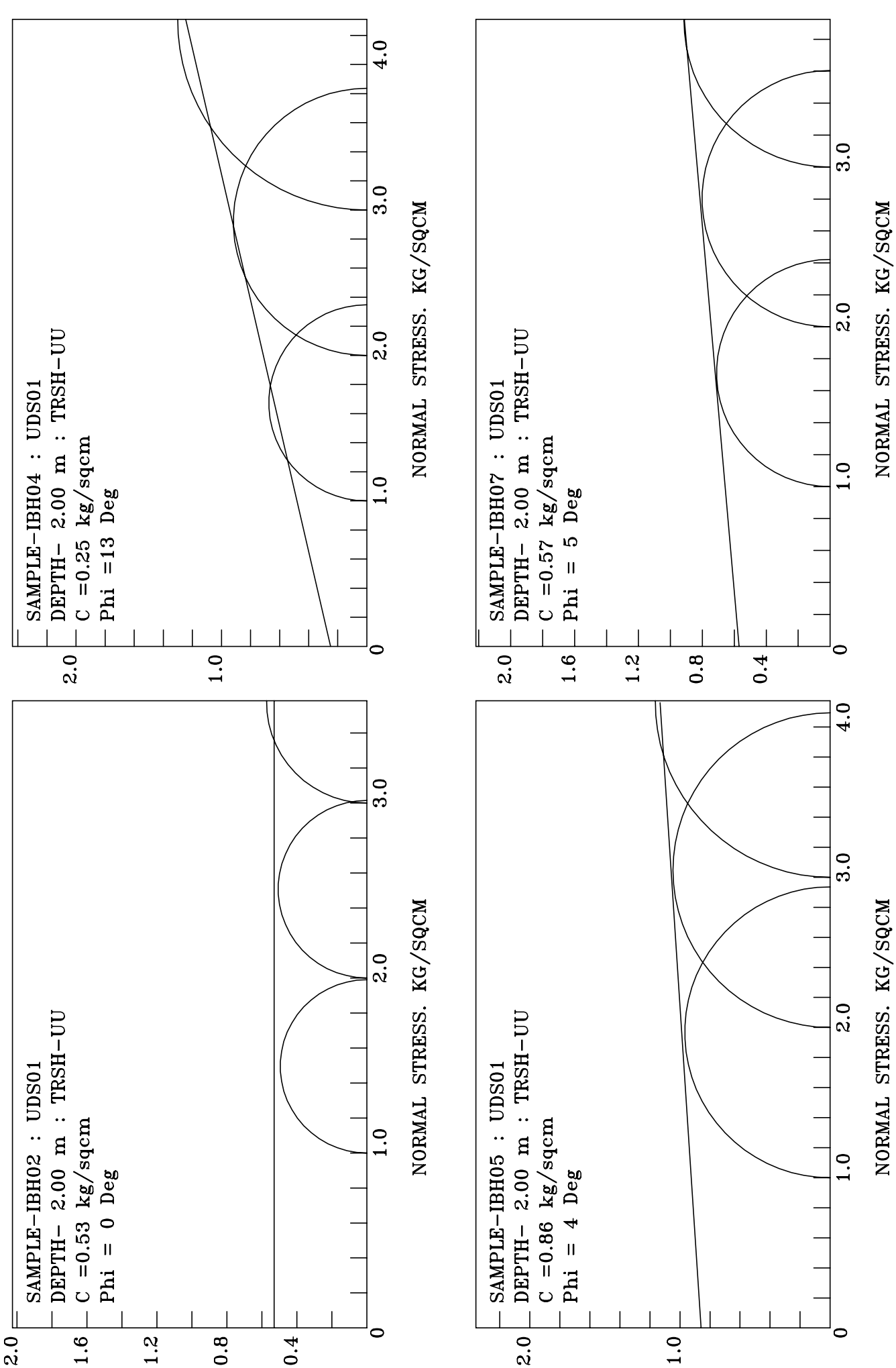
Sudip Nath
Technical Manager

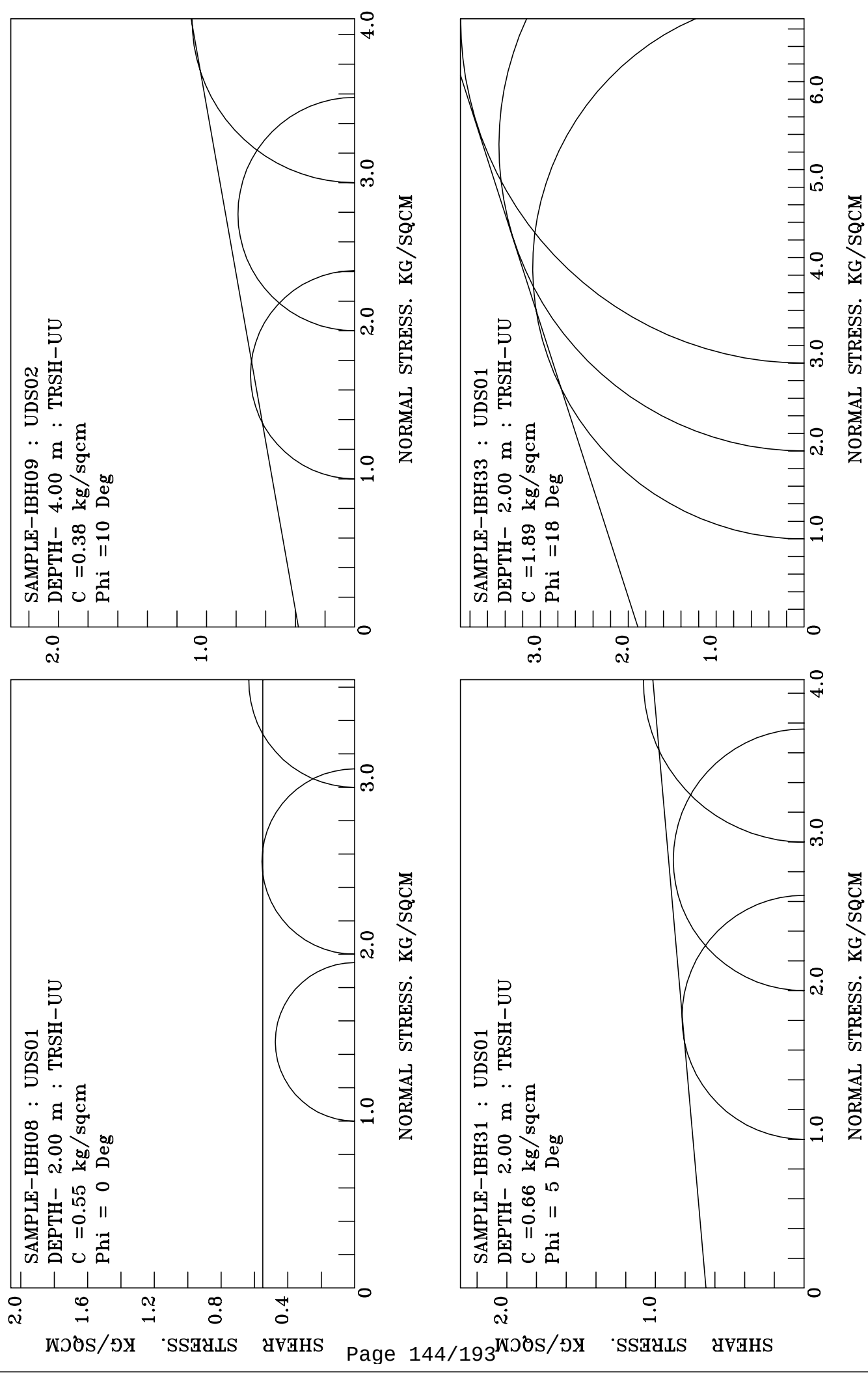
****End of Report****

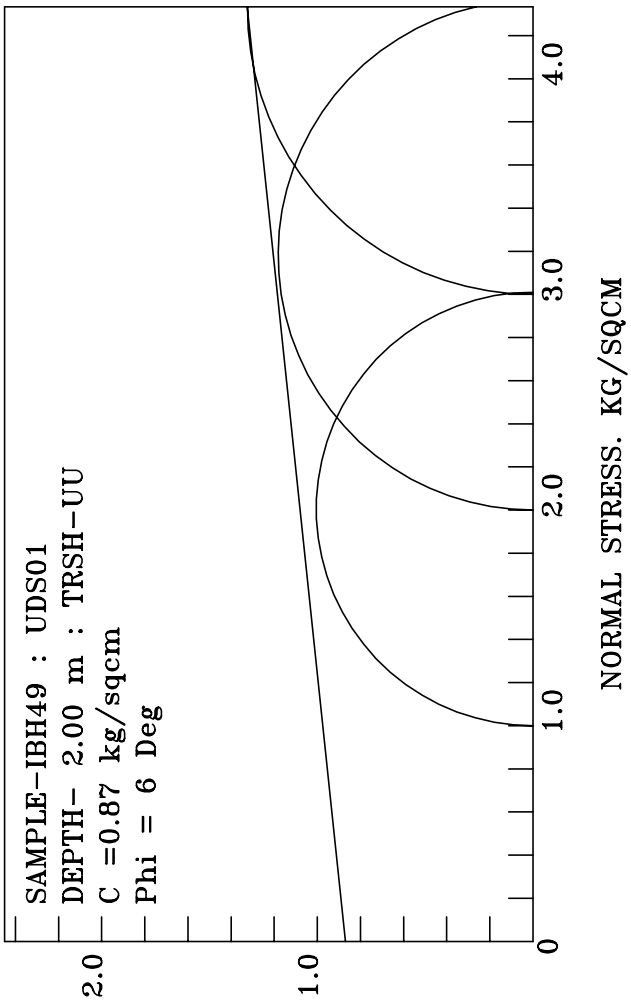
Project: Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana.
Job No. : 3472
Sheet No.

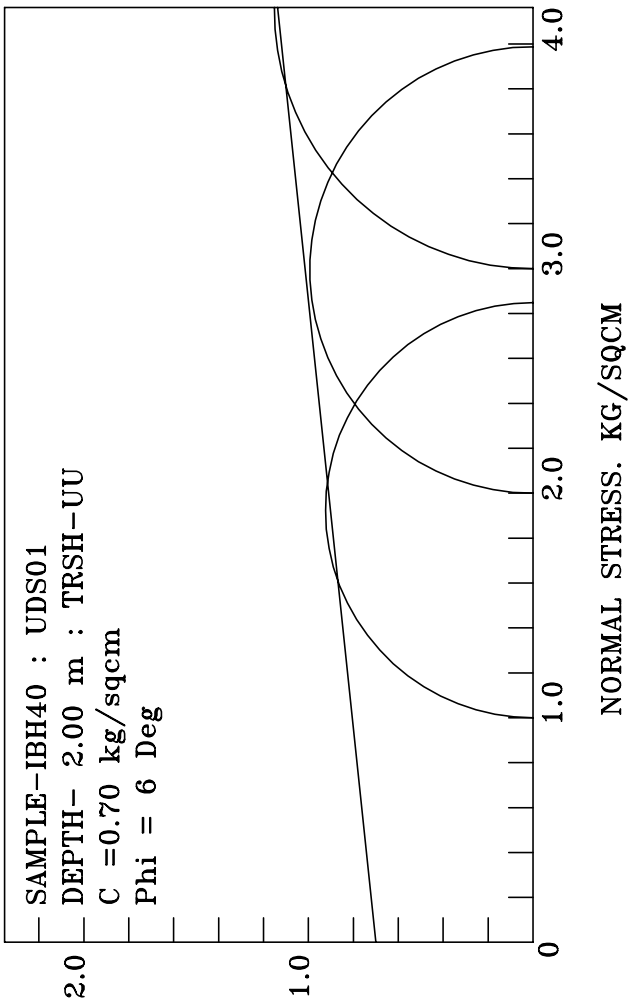
CETEST

PART III: CHARTS & GRAPHS


SAMPLE-IBH04 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =0.25 kg/sqcm
Phi =13 Deg
NORMAL STRESS. KG/SQCM
SAMPLE-IBH07 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =0.57 kg/sqcm
Phi = 5 Deg
NORMAL STRESS. KG/SQCM
SAMPLE-IBH02 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =0.53 kg/sqcm
Phi = 0 Deg
SHEAR STRESS. KG/SQCM
NORMAL STRESS. KG/SQCM
SAMPLE-IBH05 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =0.86 kg/sqcm
Phi = 4 Deg
SHEAR STRESS. KG/SQCM
NORMAL STRESS. KG/SQCM


SAMPLE-IBH09 : UDS02
DEPTH- 4.00 m : TRSH-UU
C =0.38 kg/sqcm
Phi =10 Deg
SHEAR STRESS. KG/SQCM
NORMAL STRESS. KG/SQCM
SAMPLE-IBH33 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =1.89 kg/sqcm
Phi =18 Deg
SHEAR STRESS. KG/SQCM
NORMAL STRESS. KG/SQCM
SAMPLE-IBH08 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =0.55 kg/sqcm
Phi = 0 Deg
SHEAR STRESS. KG/SQCM
NORMAL STRESS. KG/SQCM
SAMPLE-IBH31 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =0.66 kg/sqcm
Phi = 5 Deg
SHEAR STRESS. KG/SQCM
NORMAL STRESS. KG/SQCM


SAMPLE-IBH49 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =0.87 kg/sqcm
Phi = 6 Deg
2.0
1.0
0
1.0
2.0
3.0
4.0
NORMAL STRESS. KG/SQCM


SAMPLE-IBH40 : UDS01
DEPTH- 2.00 m : TRSH-UU
C =0.70 kg/sqcm
Phi = 6 Deg
2.0
1.0
0
1.0
2.0
3.0
4.0
NORMAL STRESS. KG/SQCM
SHEAR STRESS. KG/SQCM

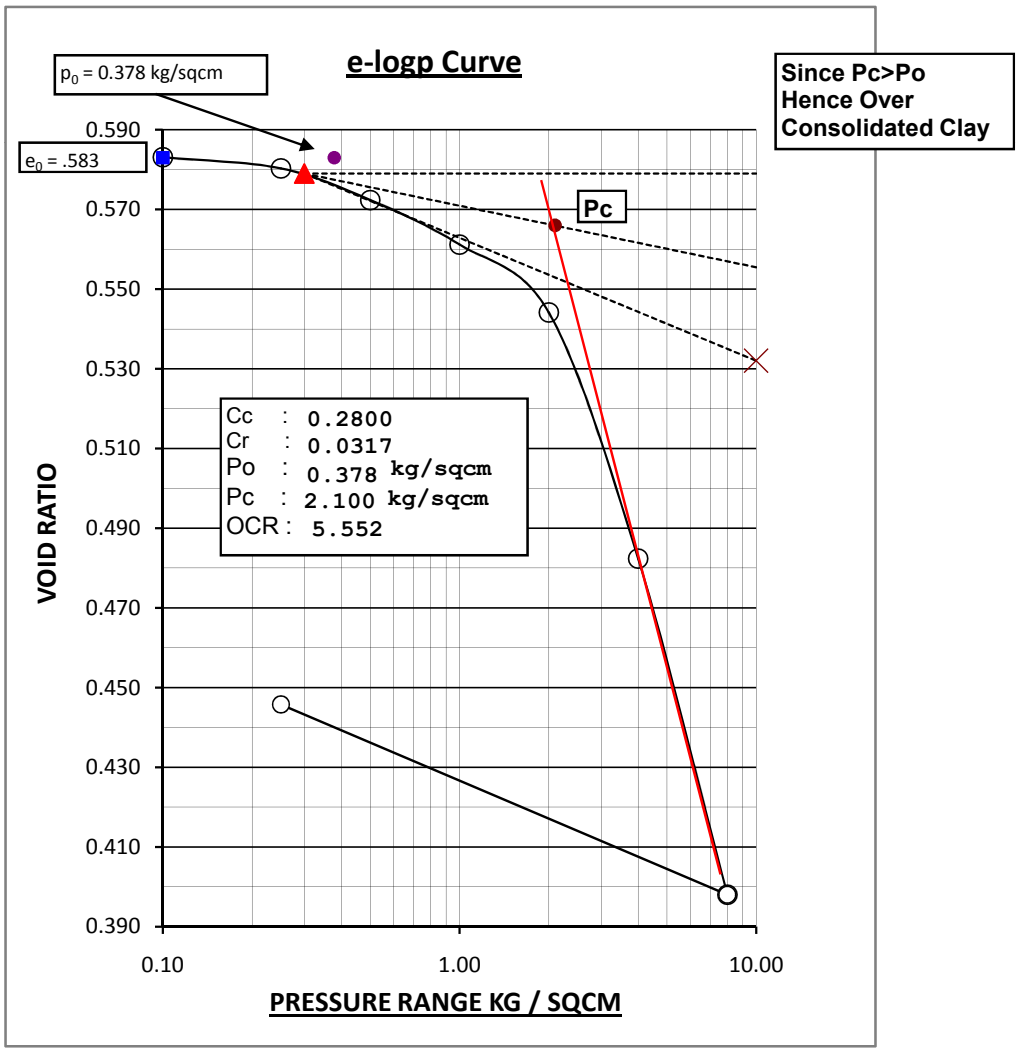
CONSOLIDATION TEST RESULTS

Sample Number:IBH02/UDS-01 Depth :2-2.45 meters

Description :Brownish grey silty clay with traces of kankars.

Water content:Initial=21.8% Final =20% Initial Void Ratio =0.583

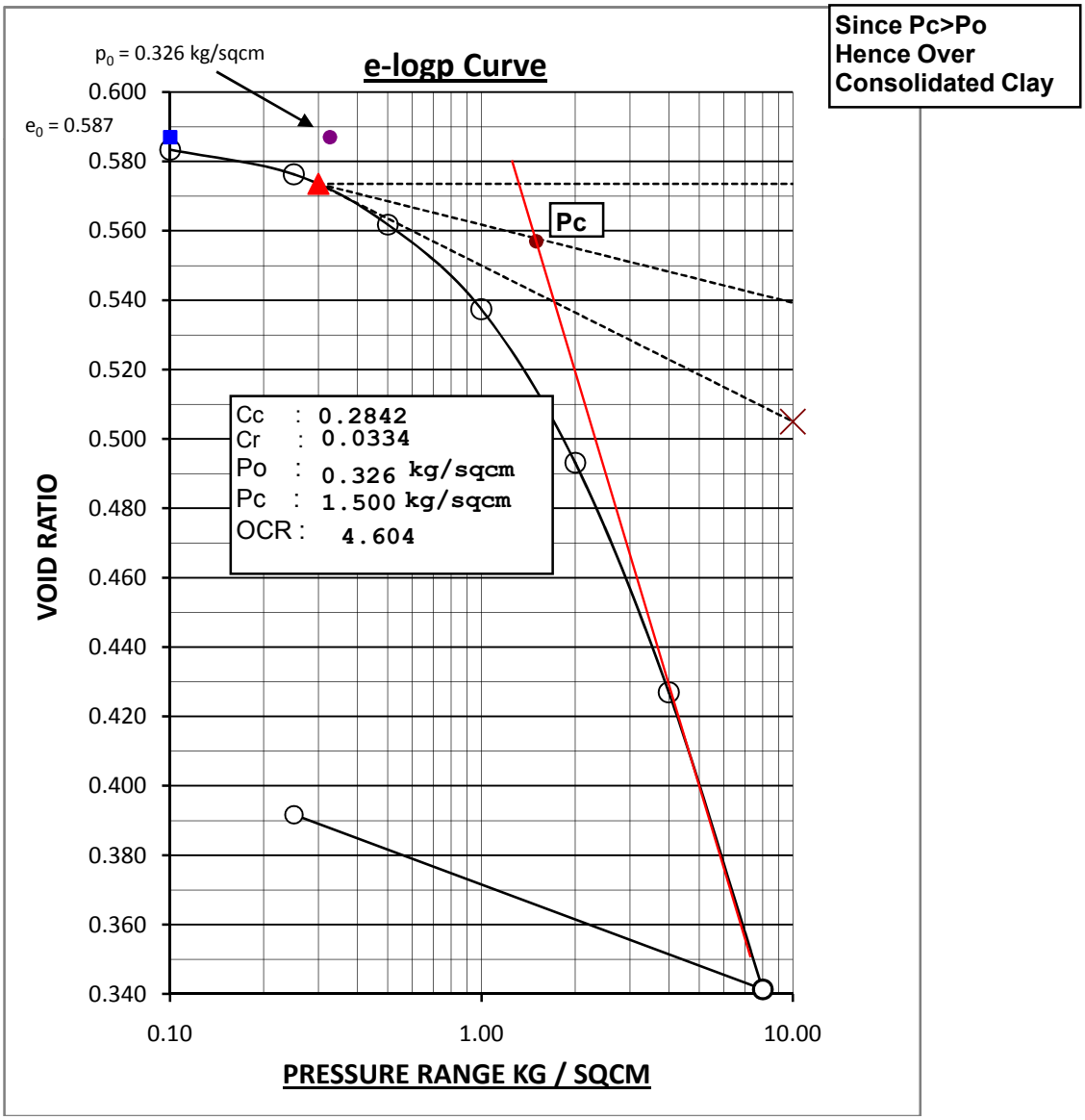
P1-P2 Kg/Sqcm	Dial Change	Void Ratio	Mv Sqcm/kg	Comprn %	Mvc sqcm/kg	T90 Sec	1000.Cv sqcm/sec
0.00 - 0.10	2	0.583	0.0021				
0.10 - 0.25	17	0.580	0.0118	66.67	0.0039	231.7	3.359
0.25 - 0.50	48	0.572	0.0200	50.00	0.0100	265.3	2.893
0.50 - 1.00	68	0.561	0.0143	35.29	0.0092	303.6	2.467
1.00 - 2.00	103	0.544	0.0109	46.60	0.0058	218.9	3.298
2.00 - 4.00	375	0.482	0.0200	41.33	0.0117	161.4	4.022
4.00 - 8.00	511	0.398	0.0142	26.42	0.0105	242.4	2.163
8.00 - 0.25	289	0.446	0.0044				



CONSOLIDATION TEST RESULTS

Sample Number:IBH-05/UDS-01 Depth :2-2.45 meters
Description :Brownish grey silty clay with traces of sand mixture.
Water content:Initial=23.2% Final =16.5% Initial Void Ratio =0.587

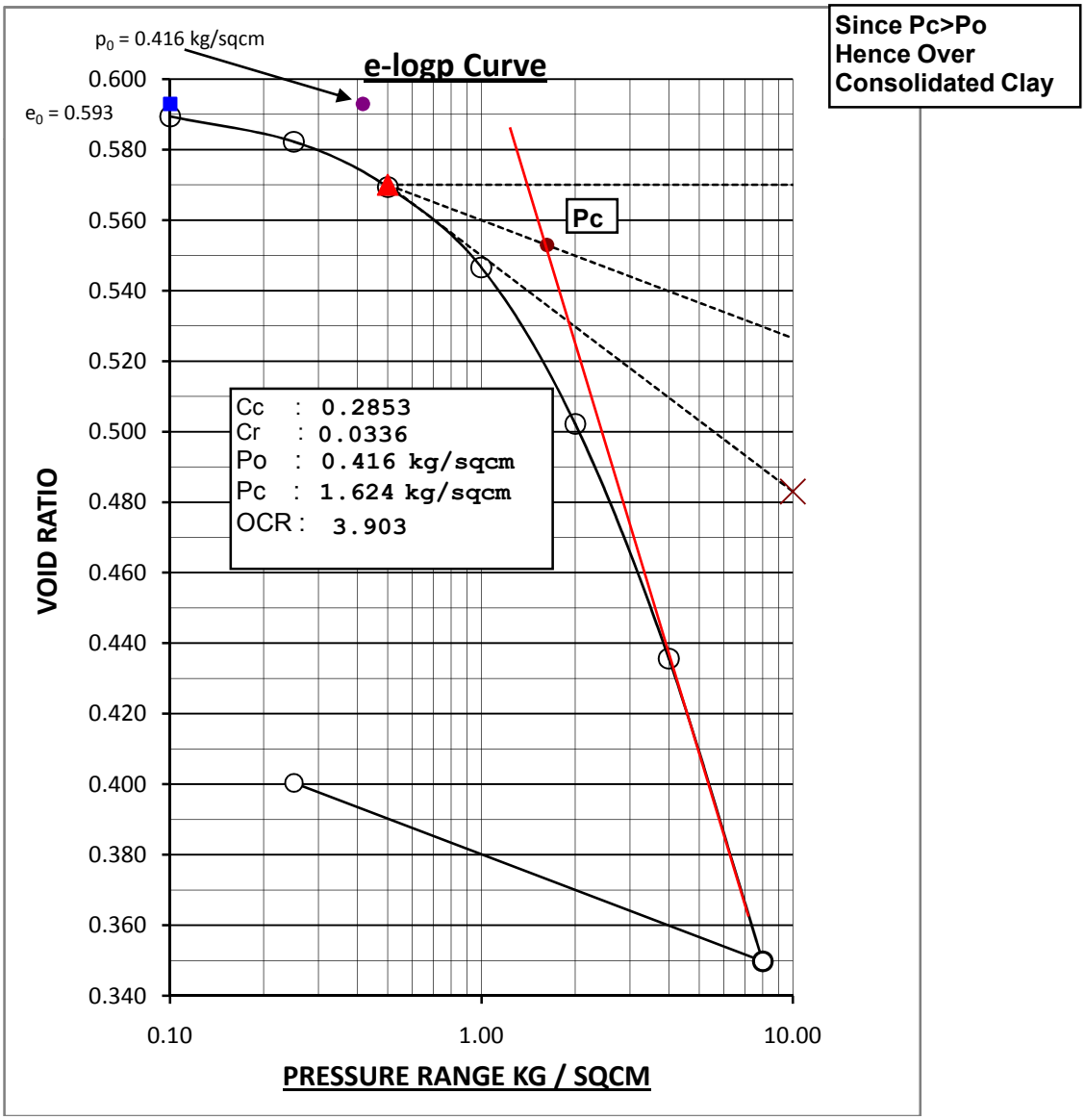
P1-P2 Kg/Sqcm	Dial Change	Void Ratio	Mv Sqcm/kg	Comprn %	Mvc sqcm/kg	T90 Sec	1000.Cv sqcm/sec
0.00 - 0.10	19	0.583	0.0199				
0.10 - 0.25	43	0.576	0.0301	34.88	0.0196	195.3	3.893
0.25 - 0.50	87	0.562	0.0367	18.18	0.0300	115.9	6.380
0.50 - 1.00	147	0.537	0.0313	14.97	0.0266	225.8	3.113
1.00 - 2.00	266	0.493	0.0287	15.79	0.0242	164.6	3.892
2.00 - 4.00	399	0.427	0.0222	10.78	0.0198	104.5	5.229
4.00 - 8.00	515	0.341	0.0150	9.32	0.0136	99.5	4.312
8.00 - 0.25	303	0.392	0.0048				



CONSOLIDATION TEST RESULTS

Sample Number:IBH-07/UDS-01 Depth :2-2.45 meters
Description :Brownish grey silty clay with traces of sand mixture.
Water content:Initial=23.2% Final =16.5% Initial Void Ratio =0.593

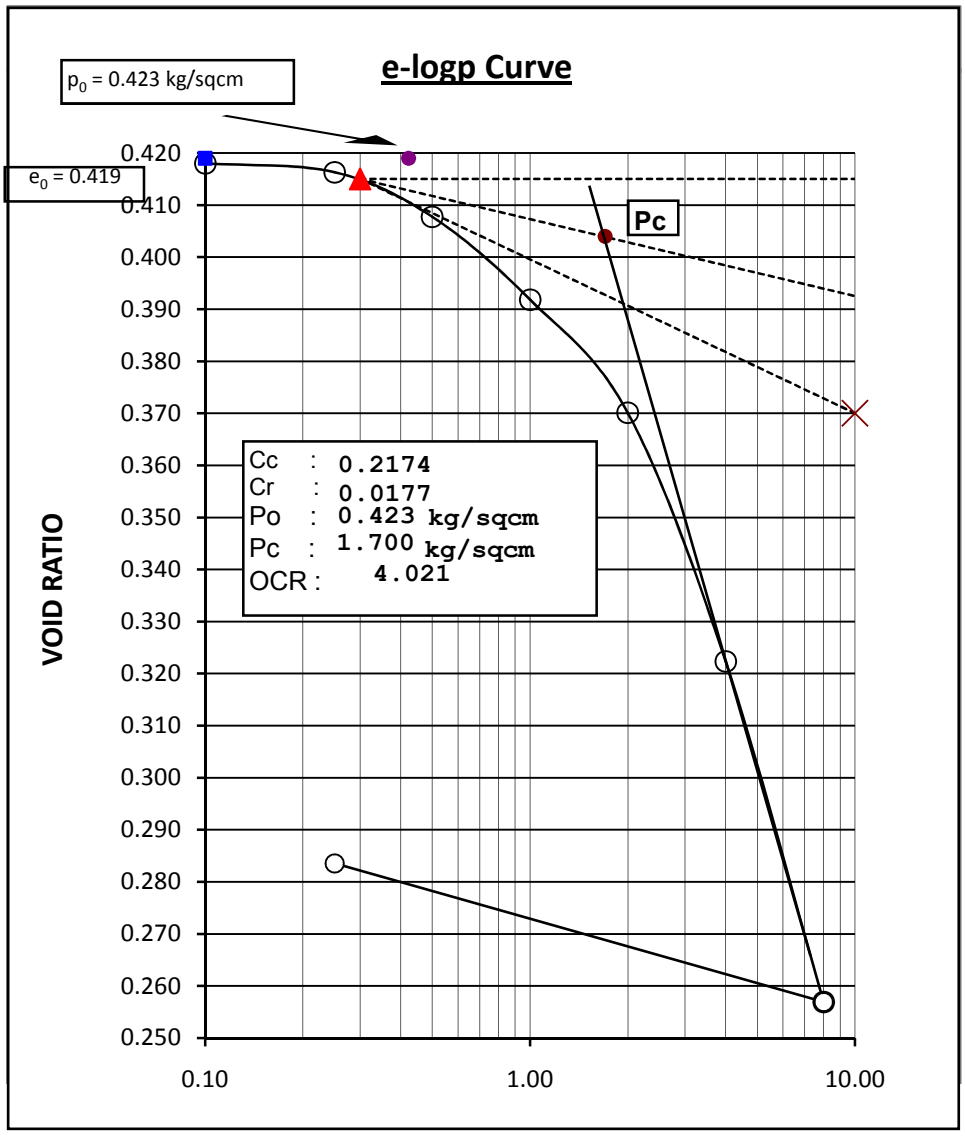
P1-P2 Kg/Sqcm	Dial Change	Void Ratio	Mv Sqcm/kg	Comprn %	Mvc sqcm/kg	T90 Sec	1000.Cv sqcm/sec
0.00 - 0.10	19	0.589	0.0199				
0.10 - 0.25	43	0.582	0.0301	34.88	0.0196	179.5	4.236
0.25 - 0.50	77	0.569	0.0325	18.18	0.0266	115.9	6.394
0.50 - 1.00	137	0.547	0.0291	14.97	0.0248	125.6	5.634
1.00 - 2.00	266	0.502	0.0287	15.79	0.0242	90.0	7.184
2.00 - 4.00	399	0.436	0.0221	10.78	0.0198	68.0	8.115
4.00 - 8.00	515	0.350	0.0150	9.32	0.0136	60.0	7.231
8.00 - 0.25	303	0.400	0.0048				



CONSOLIDATION TEST RESULTS

Sample Number:IBH08/UDS-01 Depth :2-2.45 meters
Description :Brownish grey silty clay with calcareous nodules and rock pcs.
Water content:Initial=13.7% Final =12.2% Initial Void Ratio =0.419

P1-P2 Kg/Sqcm	Dial Change	Void Ratio	Mv Sqcm/kg	Comprn %	Mvc sqcm/kg	T90 Sec	1000.Cv sqcm/sec
0.00 - 0.10	4	0.418	0.0041				
0.10 - 0.25	12	0.416	0.0082	16.67	0.0068	72.6	11.172
0.25 - 0.50	59	0.408	0.0241	15.25	0.0204	216.6	3.691
0.50 - 1.00	110	0.392	0.0226	24.55	0.0171	98.3	7.851
1.00 - 2.00	150	0.370	0.0156	24.00	0.0119	140.5	5.199
2.00 - 4.00	330	0.322	0.0174	50.30	0.0087	119.3	5.505
4.00 - 8.00	452	0.257	0.0124	36.95	0.0078	348.5	1.564
8.00 - 0.25	184	0.284	0.0027				

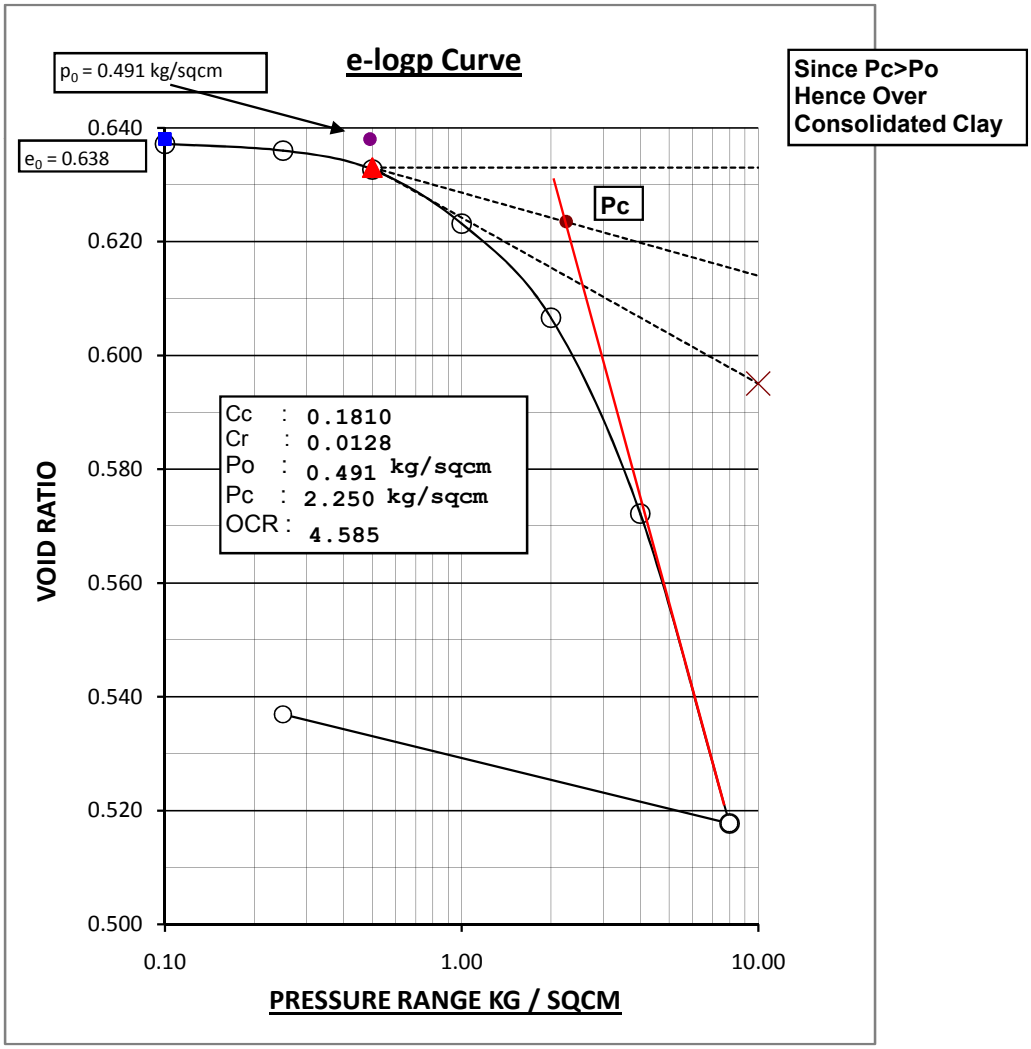


Since Pc>Po
Hence Over
Consolidated Clay

CONSOLIDATION TEST RESULTS

Sample Number:IBH09/UDS-02 Depth :4-4.45 meters
Description :Brownish grey silty clay with traces of kankars.
Water content:Initial=21.2% Final =19.3% Initial Void Ratio =0.638

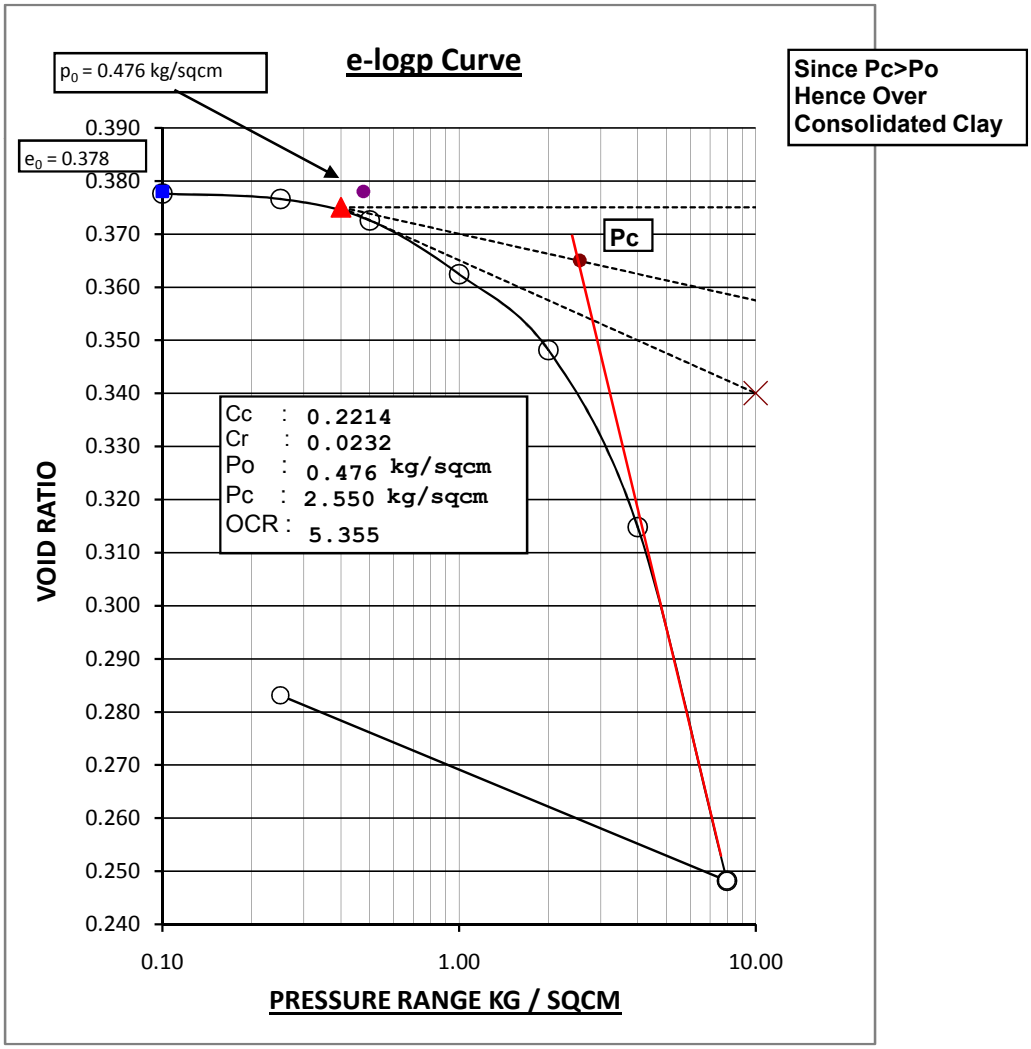
P1-P2 Kg/Sqcm	Dial Change	Void Ratio	Mv Sqcm/kg	Comprn %	Mvc sqcm/kg	T90 Sec	1000.Cv sqcm/sec
0.00 - 0.10	2	0.637	0.0020				
0.10 - 0.25	7	0.636	0.0048	28.57	0.0034	98.3	8.266
0.25 - 0.50	20	0.633	0.0082	30.00	0.0097	82.1	9.839
0.50 - 1.00	57	0.623	0.0117	28.07	0.0084	104.6	7.604
1.00 - 2.00	99	0.607	0.0102	37.37	0.0064	89.0	8.652
2.00 - 4.00	206	0.572	0.0107	29.61	0.0075	115.6	6.241
4.00 - 8.00	326	0.518	0.0087	24.20	0.0066	85.0	7.540
8.00 - 0.25	115	0.537	0.0016				



CONSOLIDATION TEST RESULTS

Sample Number:BH-33/UDS-01 Depth :2-2.45 meters
Description :Brownish grey silty clay with calc.nodules.
Water content:Initial=12.3% Final =15.6% Initial Void Ratio =0.378

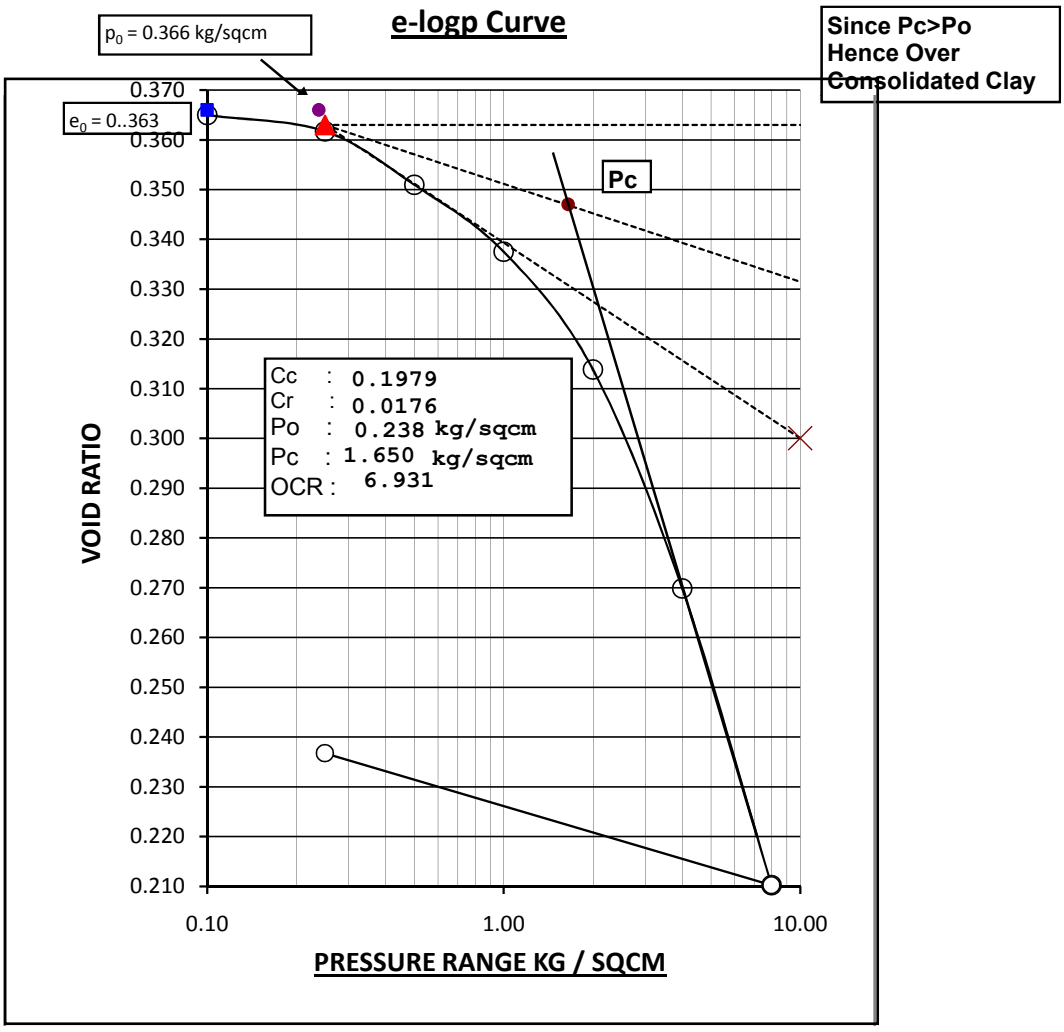
P1-P2 Kg/Sqcm	Dial Change	Void Ratio	Mv Sqcm/kg	Comprn %	Mvc sqcm/kg	T90 Sec	1000.Cv sqcm/sec
0.00 - 0.10	2	0.378	0.0021				
0.10 - 0.25	7	0.377	0.0049	28.57	0.0035	279.4	2.762
0.25 - 0.50	28	0.373	0.0117	11.11	0.0104	440.6	1.738
0.50 - 1.00	70	0.362	0.0147	51.43	0.0071	235.2	3.190
1.00 - 2.00	99	0.348	0.0105	31.31	0.0072	223.5	3.237
2.00 - 4.00	231	0.315	0.0124	44.16	0.0069	140.5	4.790
4.00 - 8.00	462	0.248	0.0127	35.93	0.0081	205.4	2.786
8.00 - 0.25	242	0.283	0.0036				



CONSOLIDATION TEST RESULTS

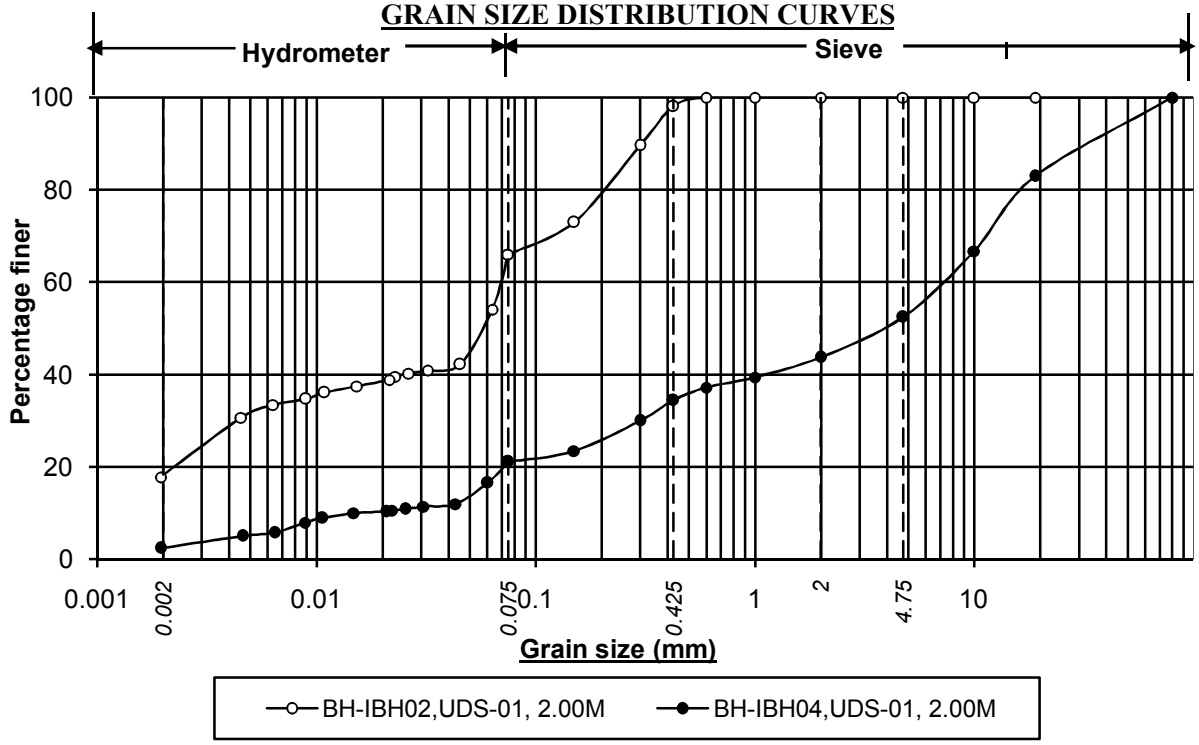
Sample Number:IBH49/UDS-01 Depth :2-2.45 meters
Description :Brownish grey silty clay with rock pcs. And traces of kankars.
Water content:Initial=12% Final =12.7% Initial Void Ratio =0.366

P1-P2 Kg/Sqcm	Dial Change	Void Ratio	Mv Sqcm/kg	Comprn %	Mvc sqcm/kg	T90 Sec	1000.Cv sqcm/sec
0.00 - 0.10	5	0.365	0.0052				
0.10 - 0.25	23	0.362	0.0159	52.17	0.0076	266.3	2.945
0.25 - 0.50	76	0.351	0.0316	34.78	0.0206	176.3	4.357
0.50 - 1.00	95	0.337	0.0199	16.47	0.0166	111.0	6.676
1.00 - 2.00	167	0.314	0.0177	29.34	0.0125	207.8	3.368
2.00 - 4.00	311	0.270	0.0167	37.94	0.0104	127.9	4.912
4.00 - 8.00	421	0.210	0.0117	29.45	0.0083	210.9	2.494
8.00 - 0.25	187	0.237	0.0028				

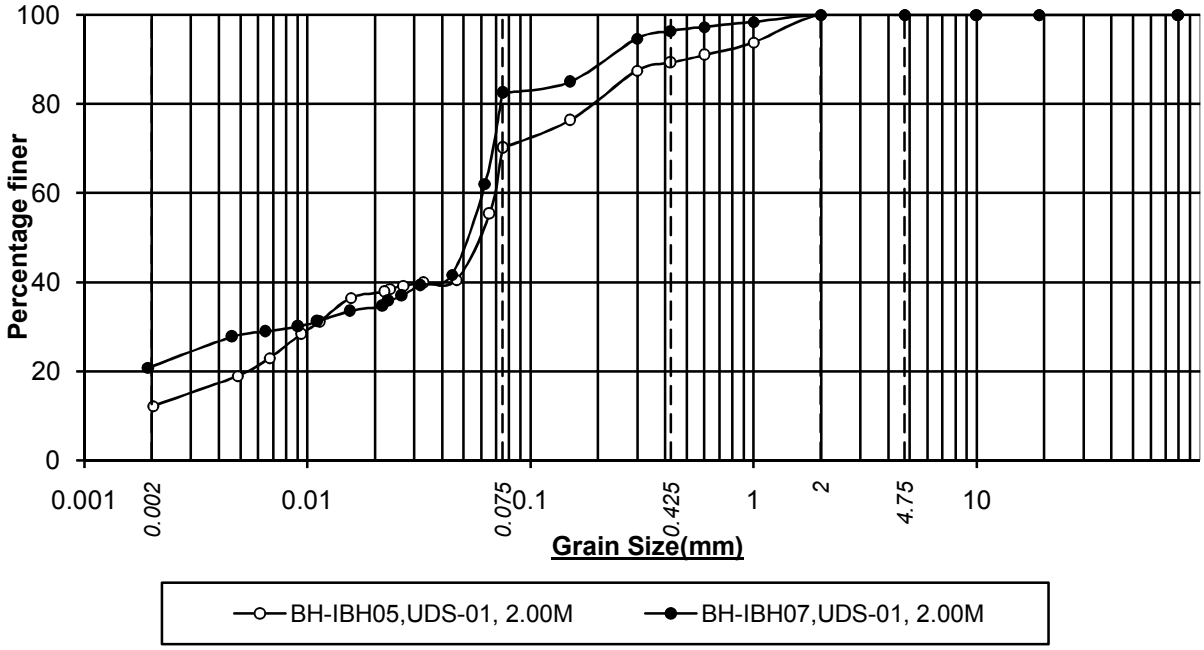


C. E. Testing Company Pvt. Ltd.

GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH02,UDS-01, 2.00M	18.1	47.9	32.2	1.8	0.0	34.0		0.0
IBH04,UDS-01, 2.00M	2.5	18.7	13.2	9.3	8.8	31.3		47.5

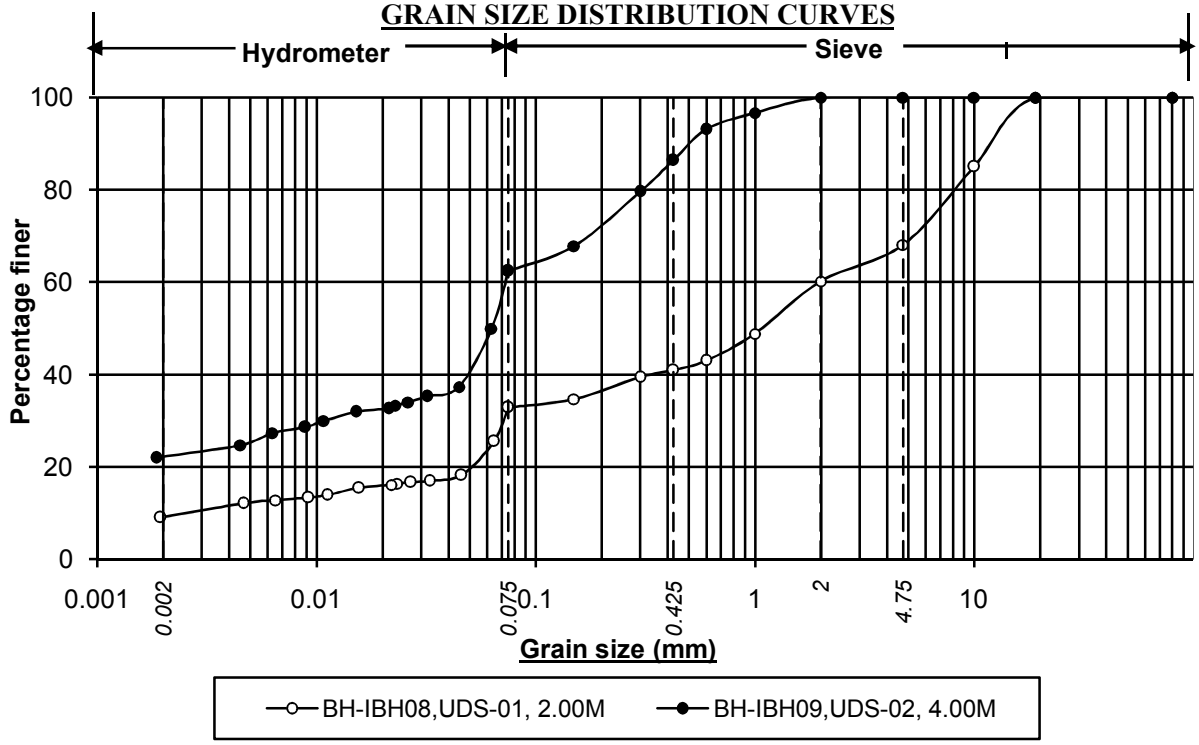


Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH05,UDS-01, 2.00M	12.0	58.1	19.2	10.7	0.0	29.9		0.0
IBH07,UDS-01, 2.00M	21.0	61.5	13.9	3.6	0.0	17.5		0.0

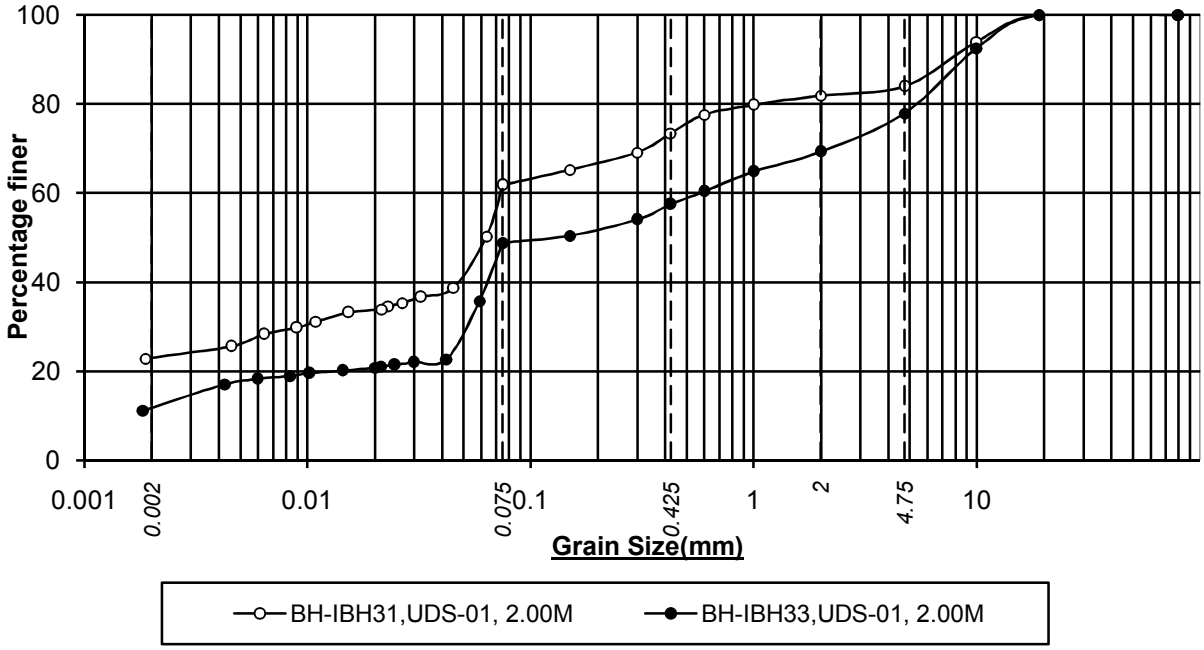
Project:- Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. **Job No. 3472**

C. E. Testing Company Pvt. Ltd.

GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH08,UDS-01, 2.00M	9.2	23.7	8.1	19.2	7.9	35.2		31.9
IBH09,UDS-02, 4.00M	22.2	40.3	24.0	13.5	0.0	37.5		0.0



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH31,UDS-01, 2.00M	23.0	38.8	11.6	8.5	2.1	22.2		16.0
IBH33,UDS-01, 2.00M	11.8	37.1	8.6	11.8	8.6	29.0		22.1

Project:- Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. **Job No. 3472**

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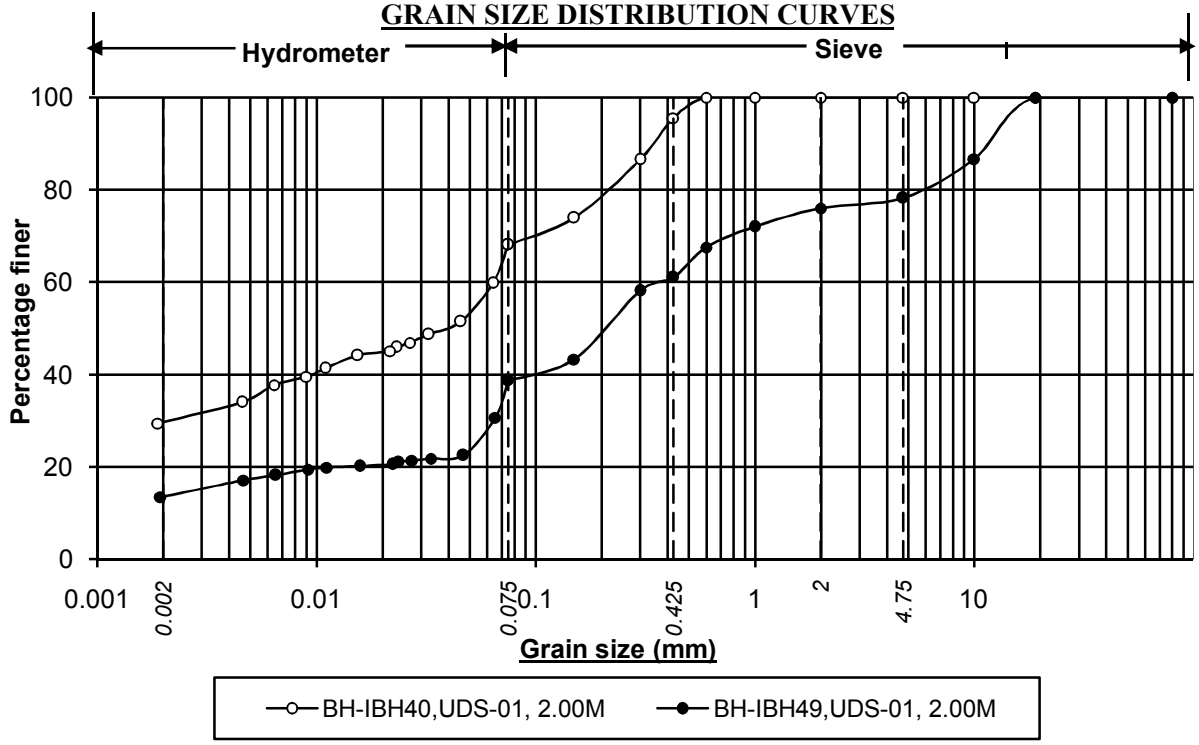
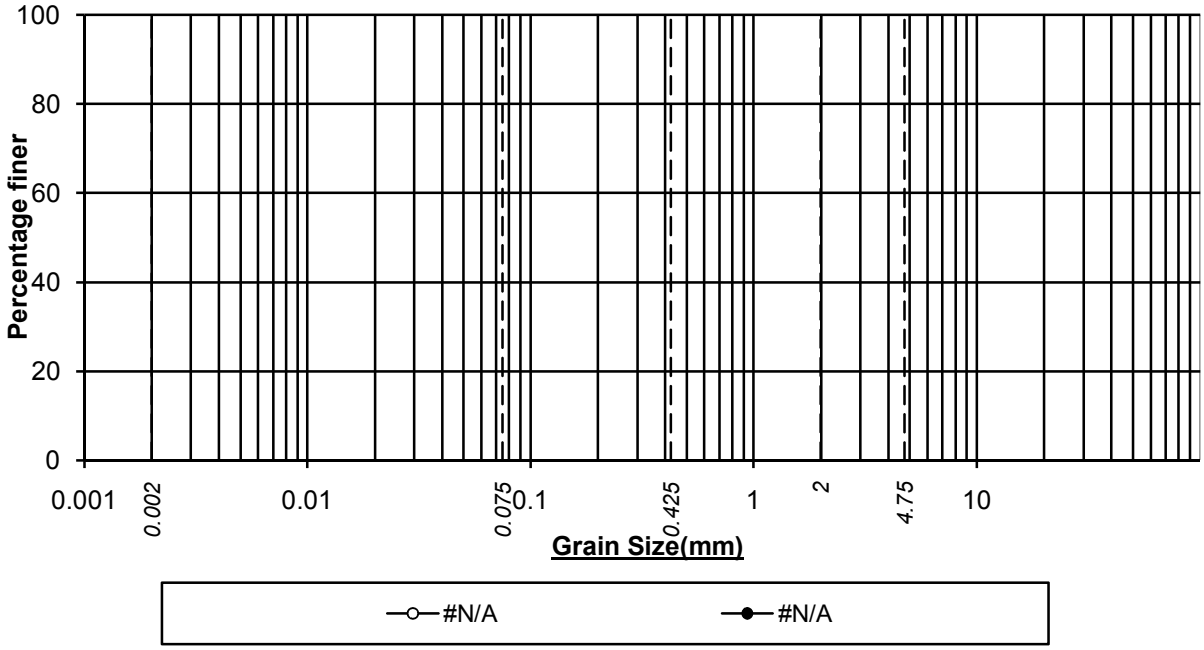
Sheet No.:

GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH40,UDS-01, 2.00M	29.7	38.5	27.4	4.4	0.0	31.8		0.0
IBH49,UDS-01, 2.00M	13.6	25.2	22.2	14.9	2.4	39.5		21.7

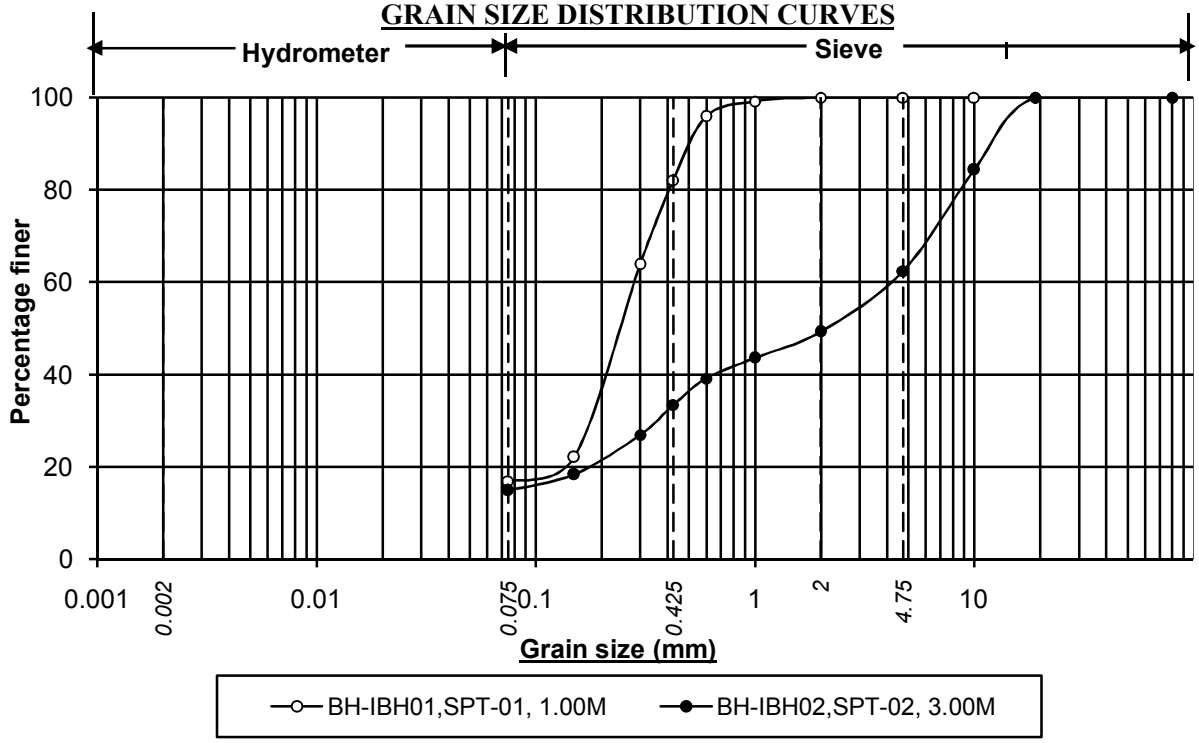


Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**

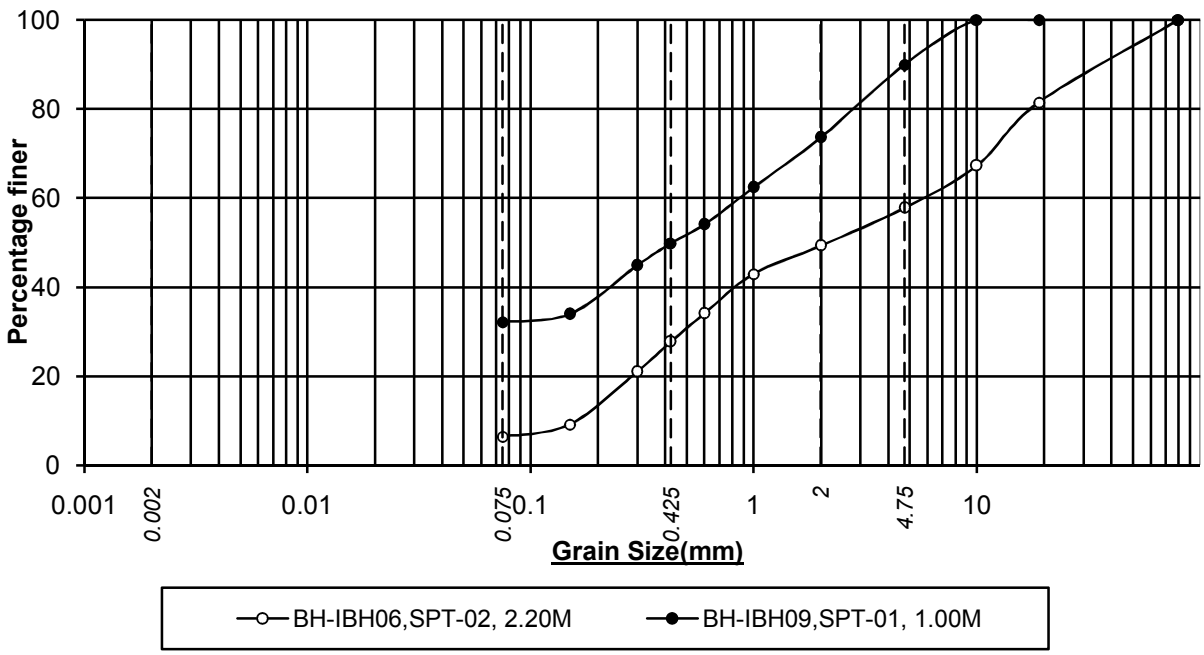
Project:- Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. **Job No. 3472**

C. E. Testing Company Pvt. Ltd.

GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	Total sand	Weighted mean dia (mm)	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH01,SPT-01, 1.00M		17.0	65.1	17.9	0.0	83.0		0.0
IBH02,SPT-02, 3.00M		14.9	18.5	15.9	13.1	47.5		37.6



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	Total sand	Weighted mean dia (mm)	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH06,SPT-02, 2.20M		6.4	21.3	21.6	8.5	51.4		42.2
IBH09,SPT-01, 1.00M		32.2	17.6	23.9	16.3	57.8		10.0

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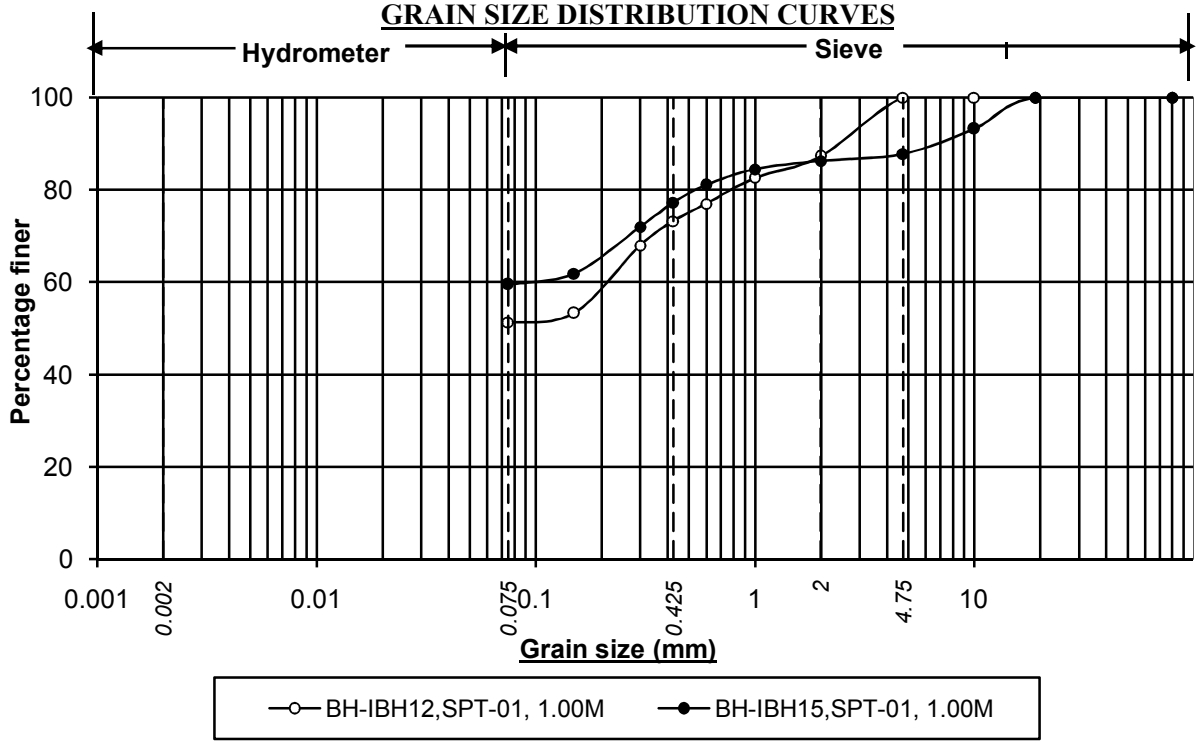
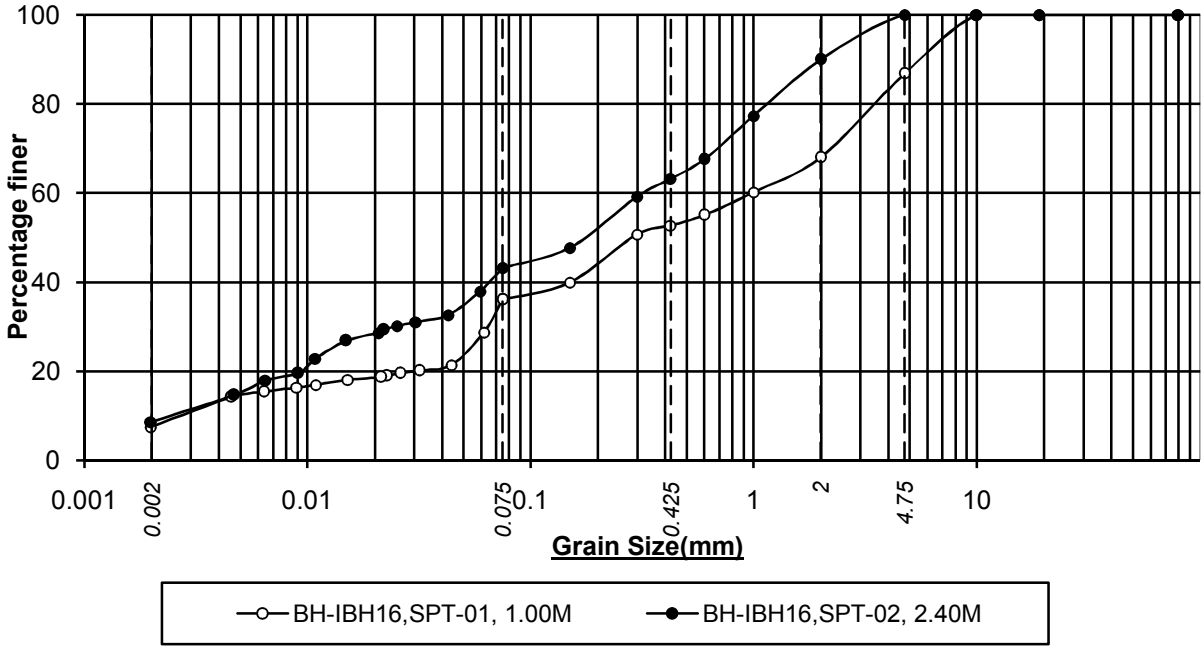
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH12,SPT-01, 1.00M		51.3	21.9	14.1	12.7	48.7		0.0
IBH15,SPT-01, 1.00M		59.6	17.7	9.0	1.5	28.2		12.2



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH16,SPT-01, 1.00M	7.5	28.6	16.6	15.3	18.8	50.7		13.2
IBH16,SPT-02, 2.40M	8.6	34.6	20.0	26.8	10.0	56.8		0.0

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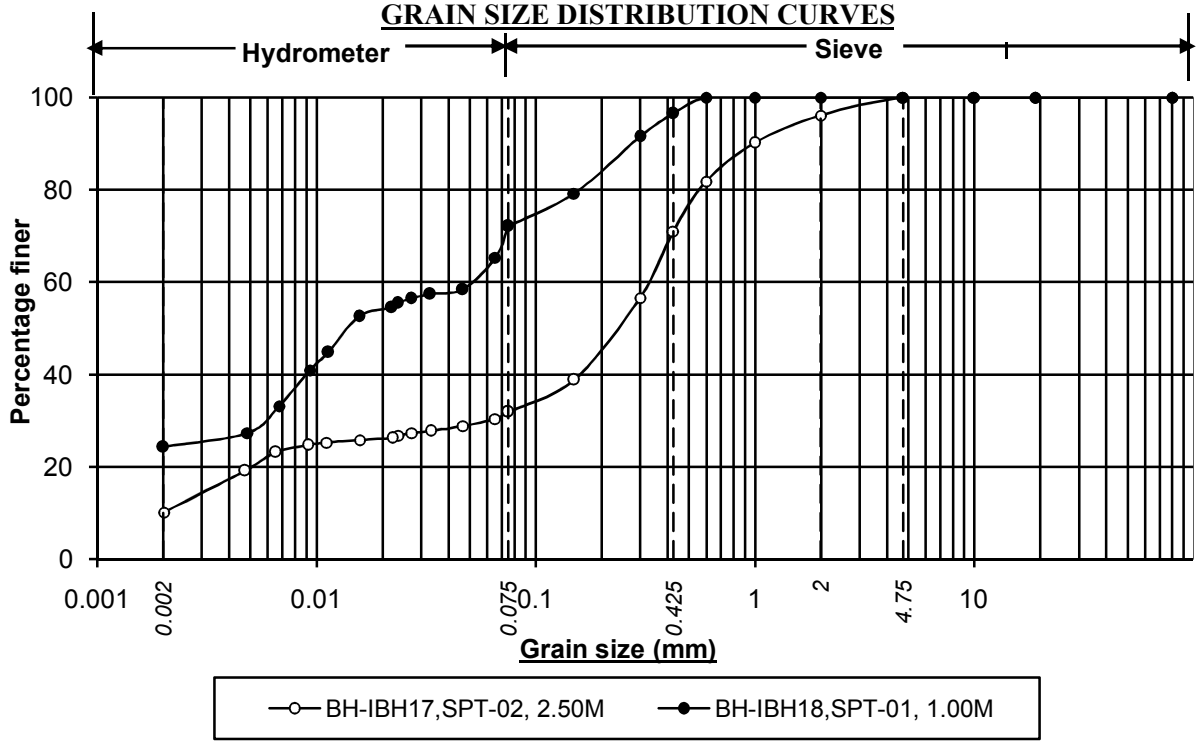
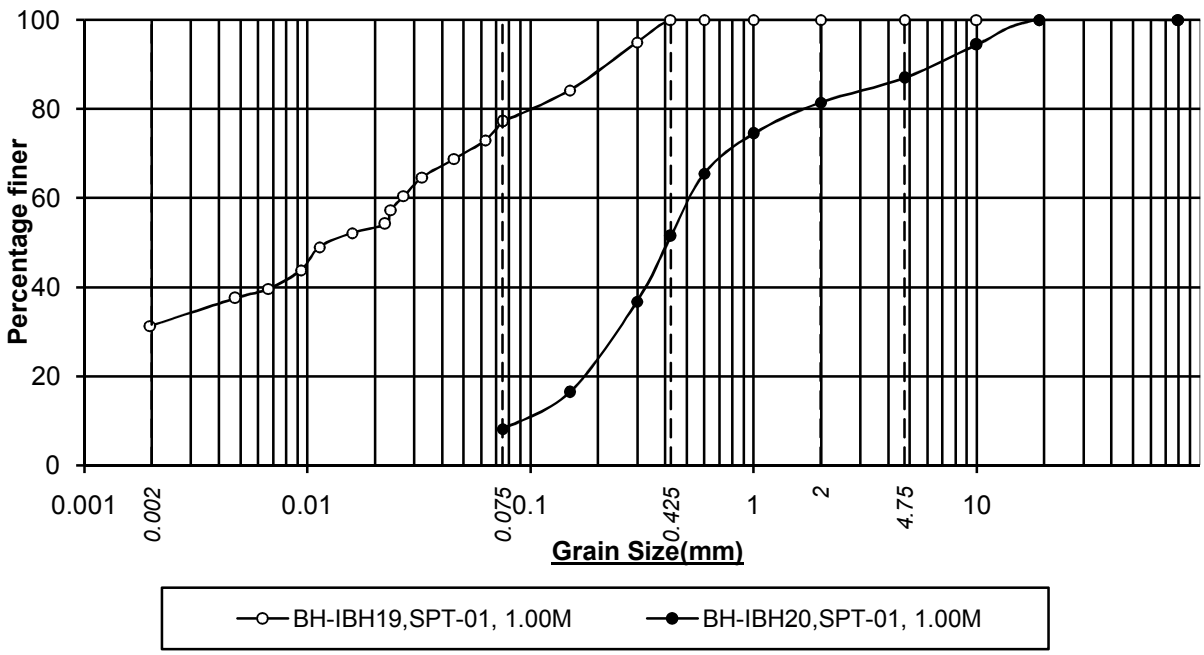
GRAIN SIZE DISTRIBUTION CURVES



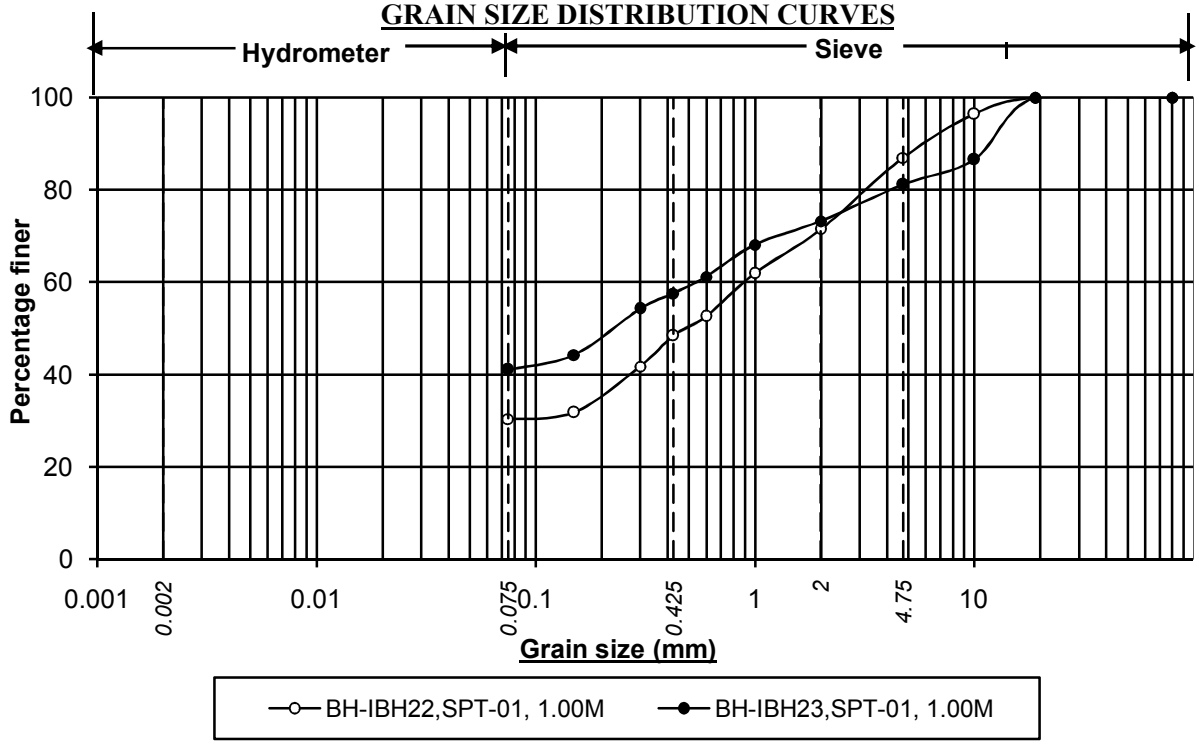
Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH17,SPT-02, 2.50M	10.0	22.0	39.0	25.1	3.9	68.0		0.0
IBH18,SPT-01, 1.00M	24.4	47.8	24.4	3.4	0.0	27.8		0.0



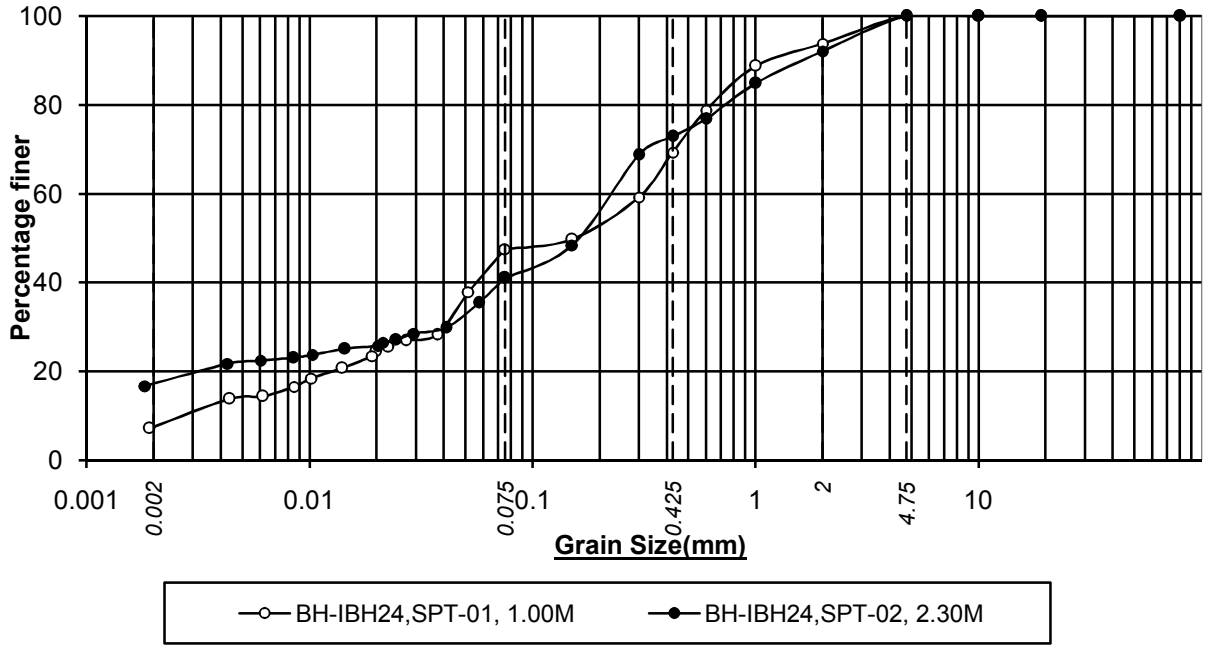
Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH19,SPT-01, 1.00M	31.4	45.8	22.8	0.0	0.0	22.8		0.0
IBH20,SPT-01, 1.00M		8.2	43.3	30.0	5.5	78.8		13.0

Project:- Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. **Job No. 3472**

GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH22,SPT-01, 1.00M		30.4	18.1	23.0	15.5	56.6		13.0
IBH23,SPT-01, 1.00M		41.1	16.4	15.7	8.0	40.1		18.8



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH24,SPT-01, 1.00M	7.6	39.9	21.7	24.5	6.3	52.5		0.0
IBH24,SPT-02, 2.30M	17.2	23.9	31.8	19.1	8.0	58.9		0.0

Project:- Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. **Job No. 3472**

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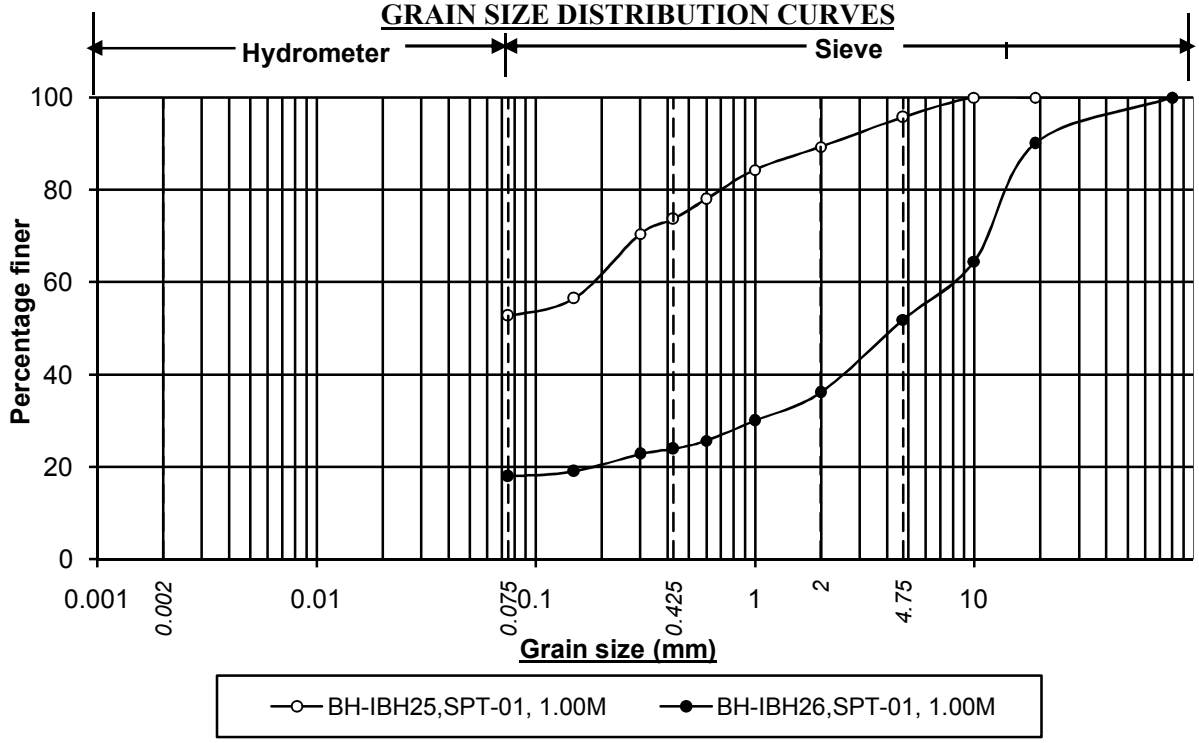
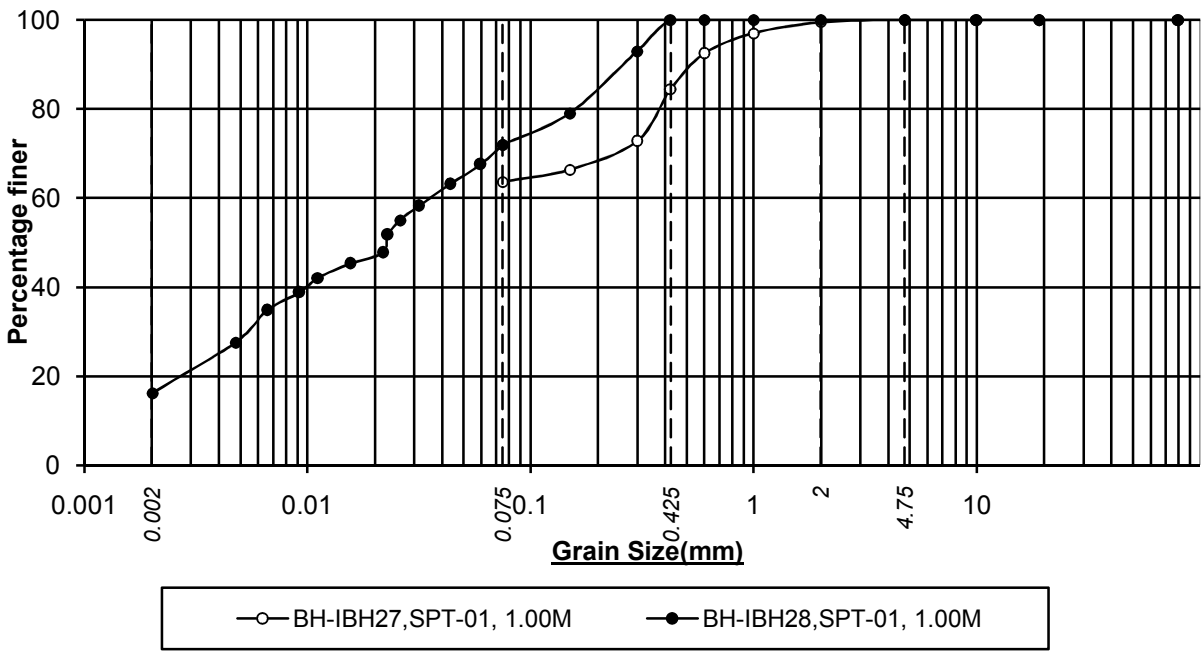
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH25,SPT-01, 1.00M		52.8	20.9	15.7	6.4	43.0		4.2
IBH26,SPT-01, 1.00M		18.0	5.9	12.2	15.8	33.9		48.1



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH27,SPT-01, 1.00M		63.7	20.8	15.0	0.5	36.3		0.0
IBH28,SPT-01, 1.00M	16.1	55.9	28.0	0.0	0.0	28.0		0.0

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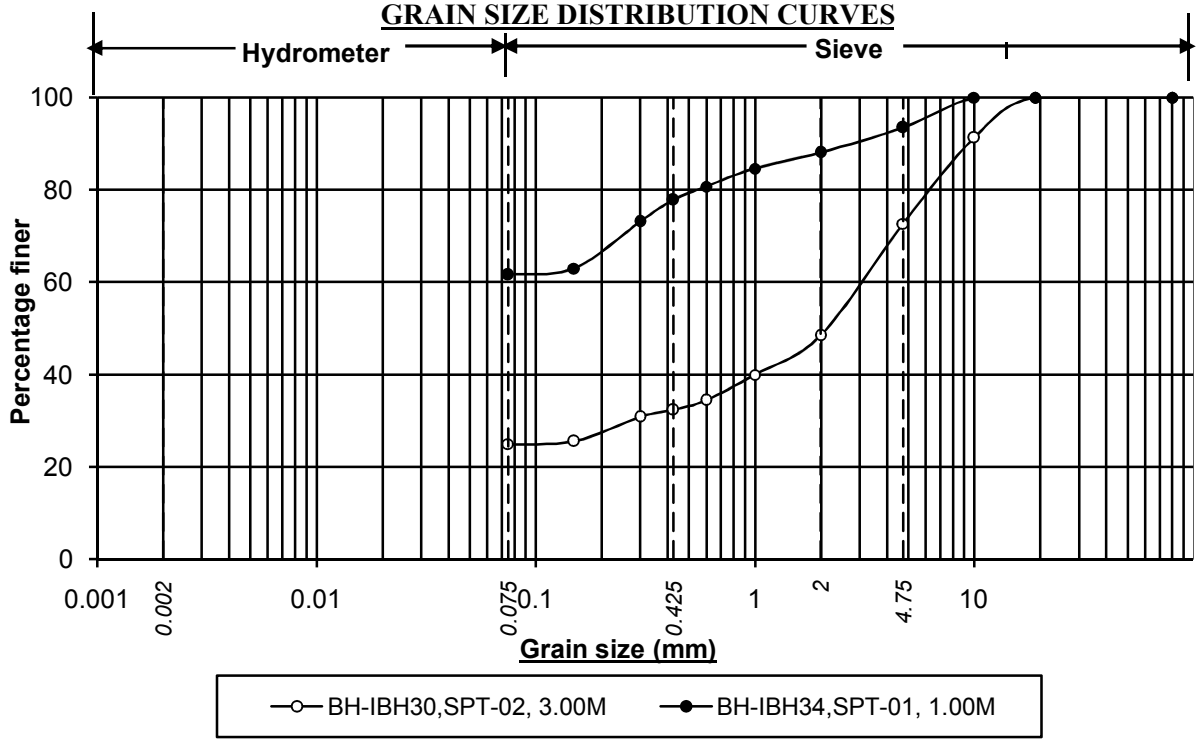
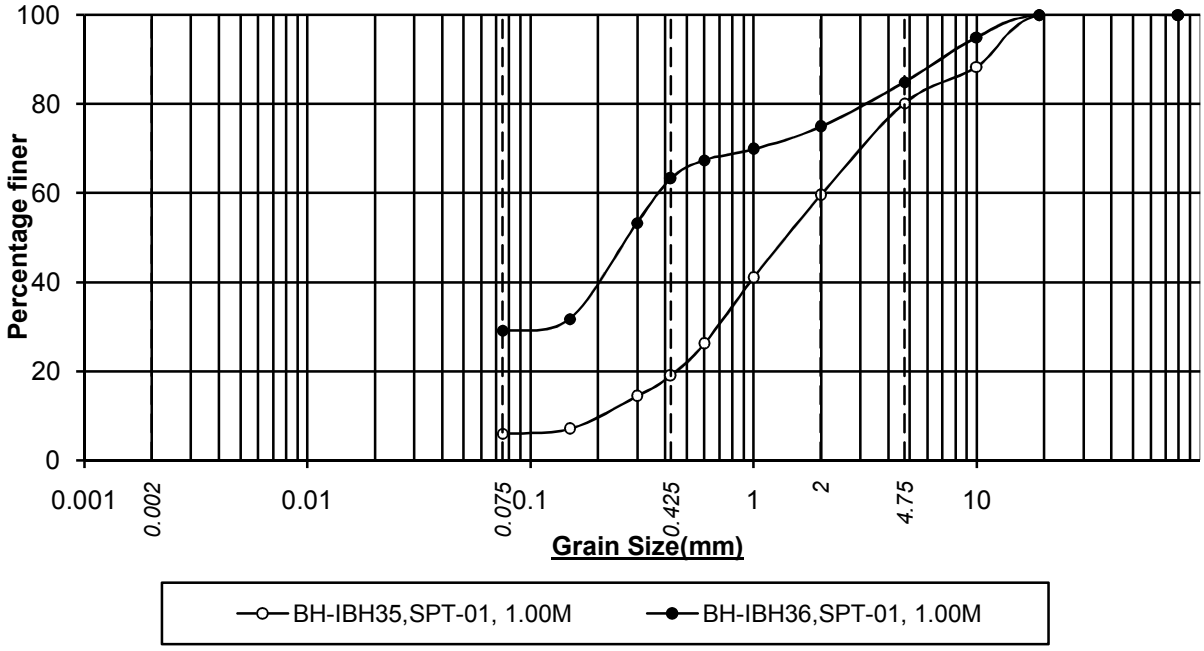


Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH30,SPT-02, 3.00M		25.0	7.4	16.1	24.2	47.7		27.3
IBH34,SPT-01, 1.00M		61.7	16.2	10.3	5.4	31.9		6.4



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH35,SPT-01, 1.00M		6.0	12.9	40.5	20.7	74.1		19.9
IBH36,SPT-01, 1.00M		29.8	33.5	11.6	10.0	55.1		15.1

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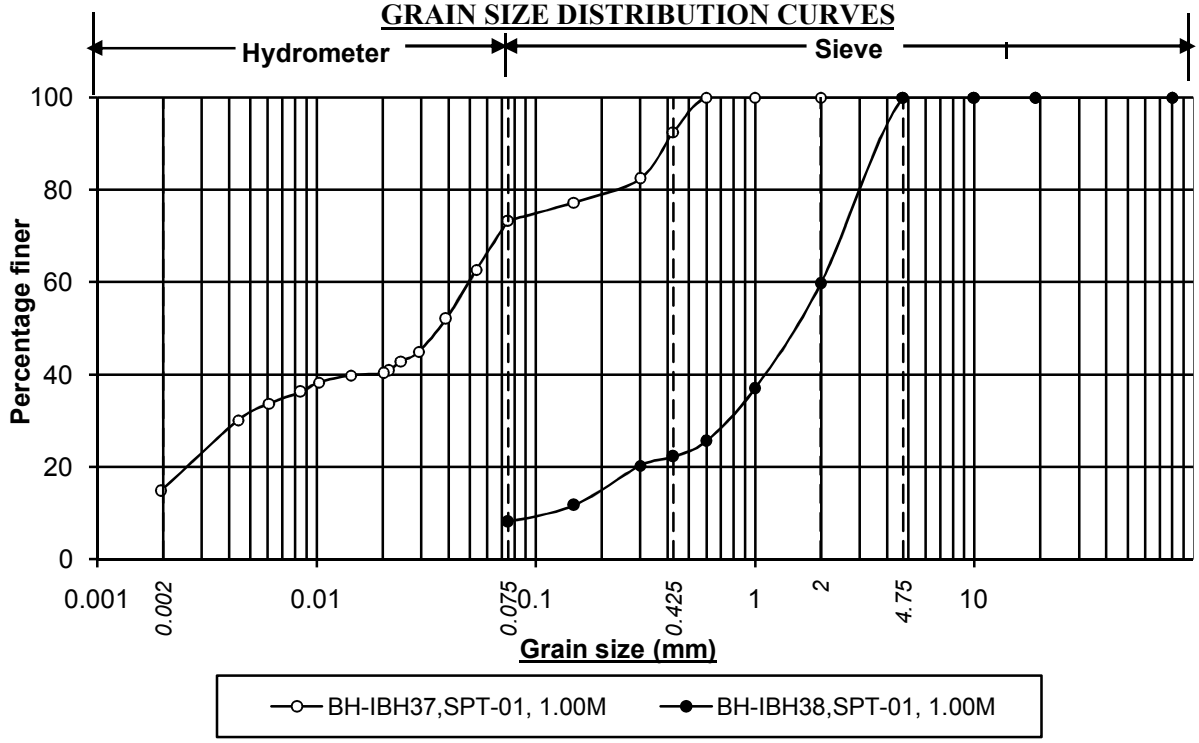
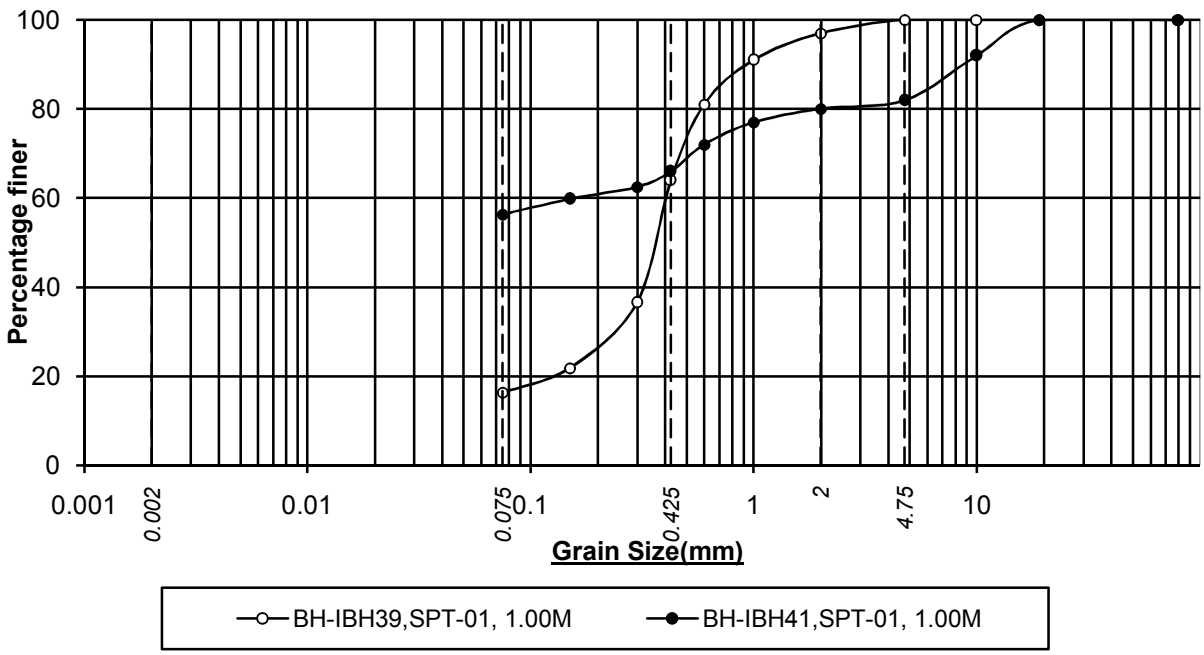
GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.00	2.0-4.75	Total sand	Weighted mean dia (mm)	>4.75
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH37,SPT-01, 1.00M	15.2	58.1	19.2	7.5	0.0	26.7		0.0
IBH38,SPT-01, 1.00M		8.1	14.2	37.4	40.3	91.9		0.0



Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.00	2.0-4.75	Total sand	Weighted mean dia (mm)	>4.75
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH39,SPT-01, 1.00M		16.3	47.7	33.0	3.0	83.7		0.0
IBH41,SPT-01, 1.00M		56.3	9.7	14.0	2.0	25.7		18.0

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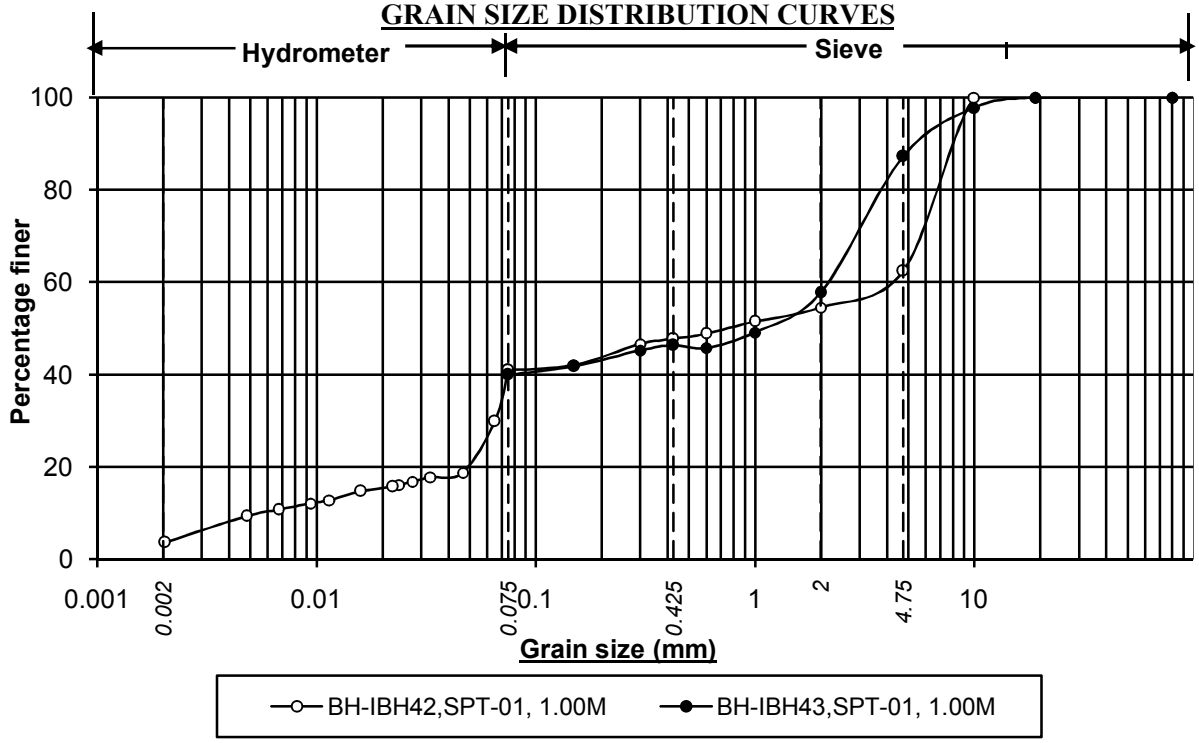
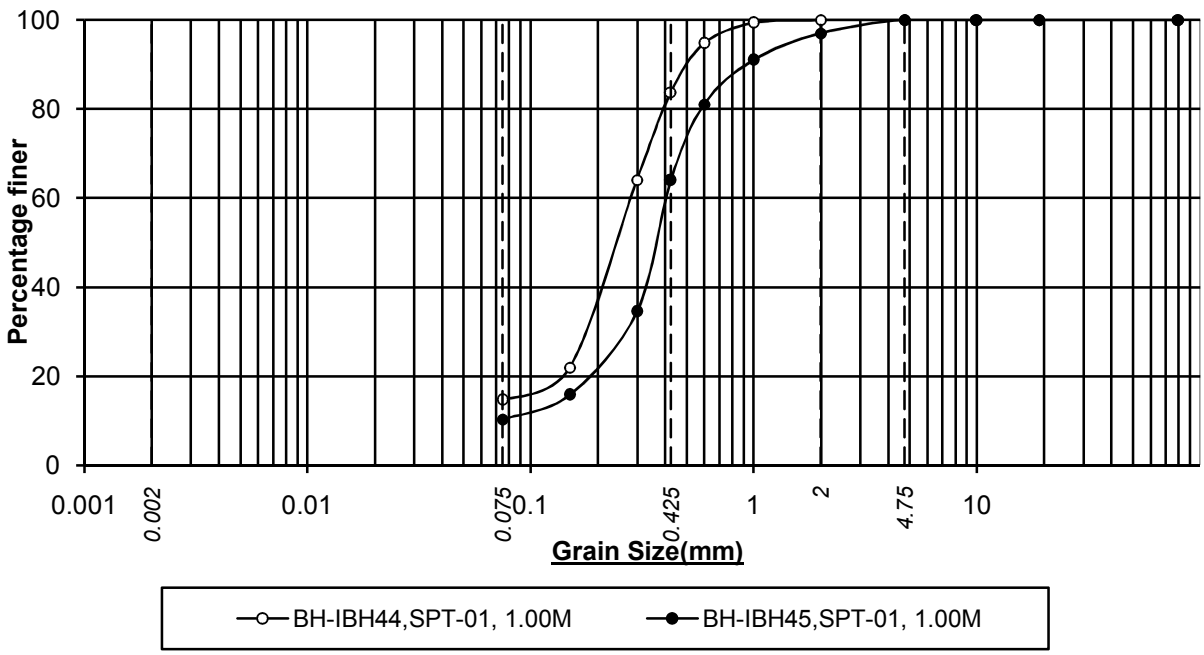


Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH42,SPT-01, 1.00M	3.5	37.4	6.9	6.7	8.0	21.6		37.5
IBH43,SPT-01, 1.00M		40.1	6.3	11.4	29.5	47.2		12.7



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH44,SPT-01, 1.00M		14.6	69.2	16.2	0.0	85.4		0.0
IBH45,SPT-01, 1.00M		10.3	53.7	33.0	3.0	89.7		0.0

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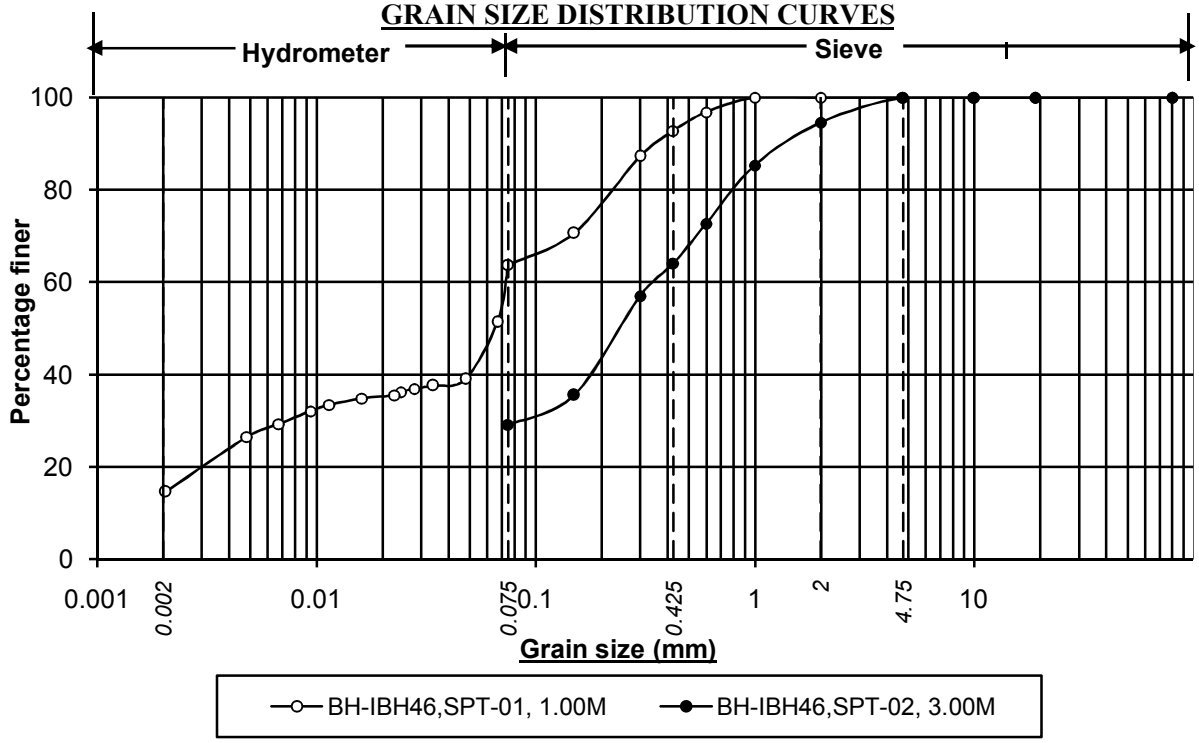
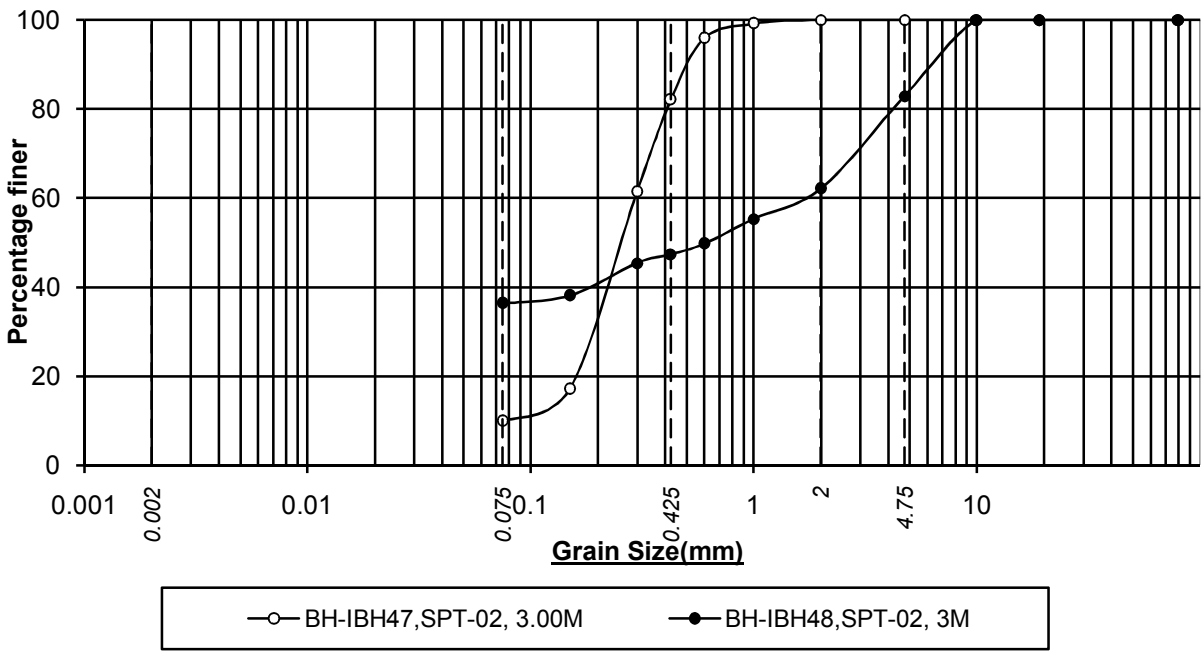


Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.00	2.0-4.75	Total sand	Weighted mean dia (mm)	>4.75
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH46,SPT-01, 1.00M	14.3	49.6	28.9	7.2	0.0	36.1		0.0
IBH46,SPT-02, 3.00M		29.1	35.0	30.5	5.4	70.9		0.0



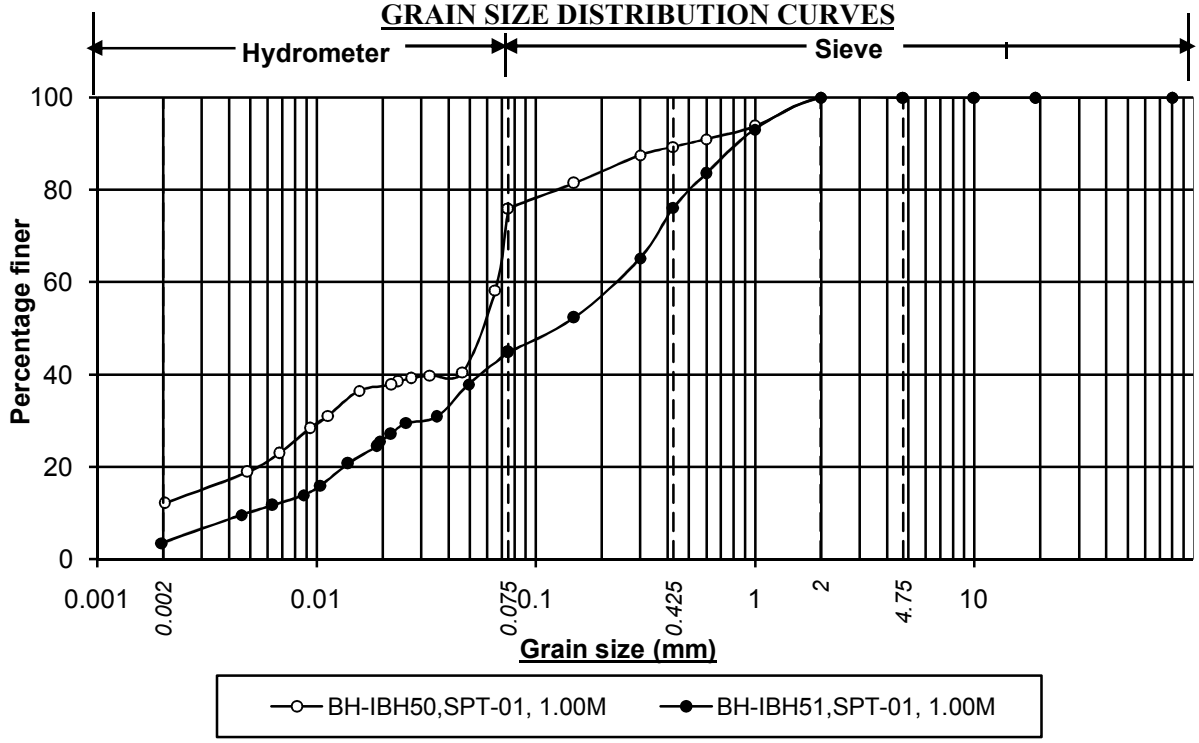
Grain size (mm)	<0.002	0.002-0.075	0.075-0.425	0.425-2.00	2.0-4.75	Total sand	Weighted mean dia (mm)	>4.75
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH47,SPT-02, 3.00M		9.9	72.2	17.9	0.0	90.1		0.0
IBH48,SPT-02, 3.00M		36.3	11.0	14.8	20.8	46.6		17.1

Project:- Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. **Job No. 3472**

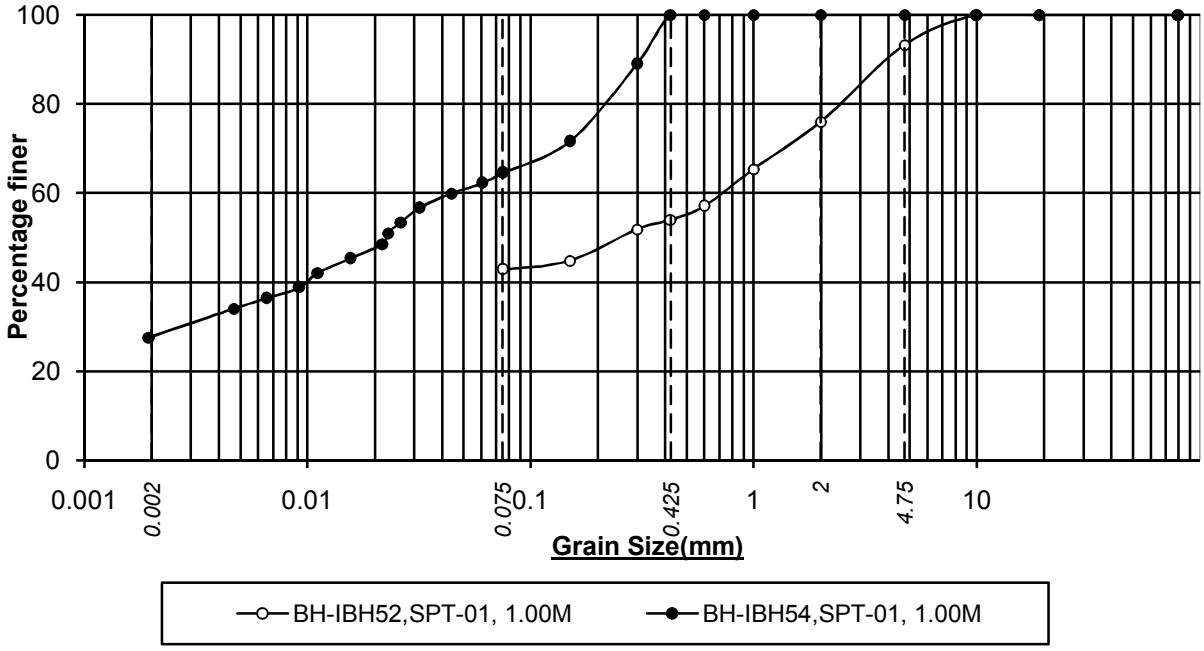
C. E. Testing Company Pvt. Ltd.

Sheet No.:

GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH50,SPT-01, 1.00M	12.0	64.0	13.3	10.7	0.0	24.0		0.0
IBH51,SPT-01, 1.00M	3.6	41.3	31.2	23.9	0.0	55.1		0.0



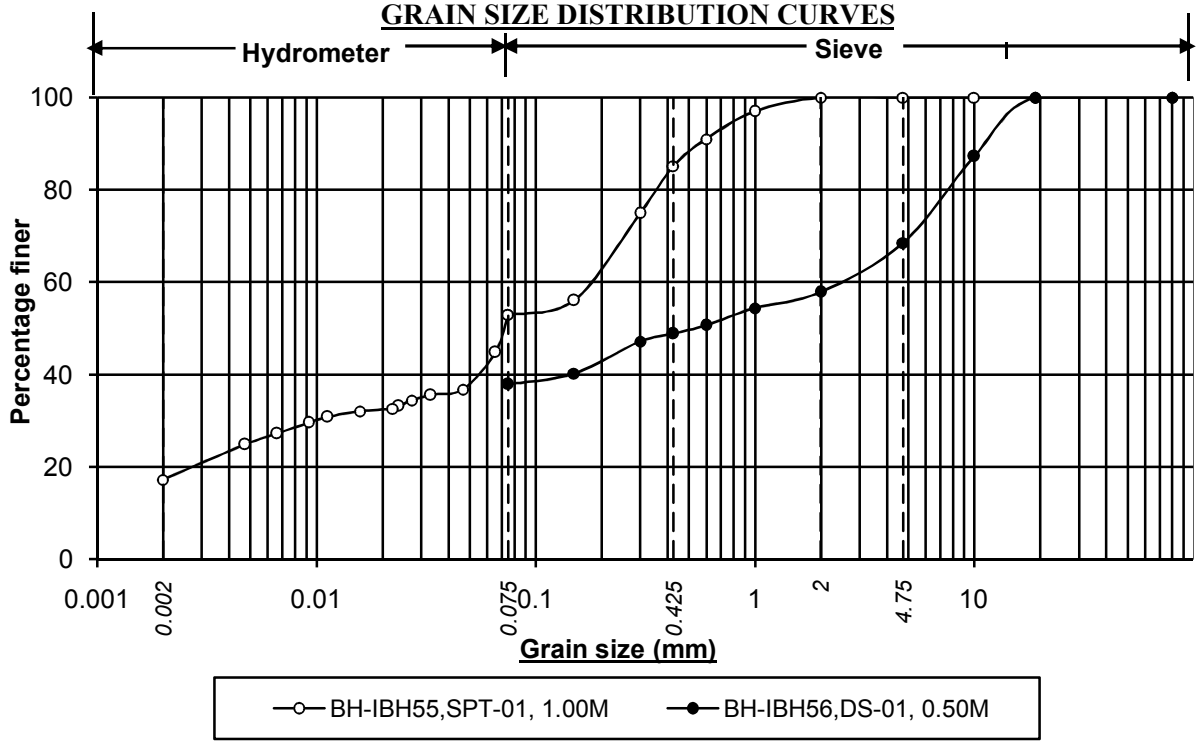
Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH52,SPT-01, 1.00M		42.8	11.1	22.0	17.3	50.4		6.8
IBH54,SPT-01, 1.00M	27.7	36.9	35.4	0.0	0.0	35.4		0.0

Project:- Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. **Job No. 3472**

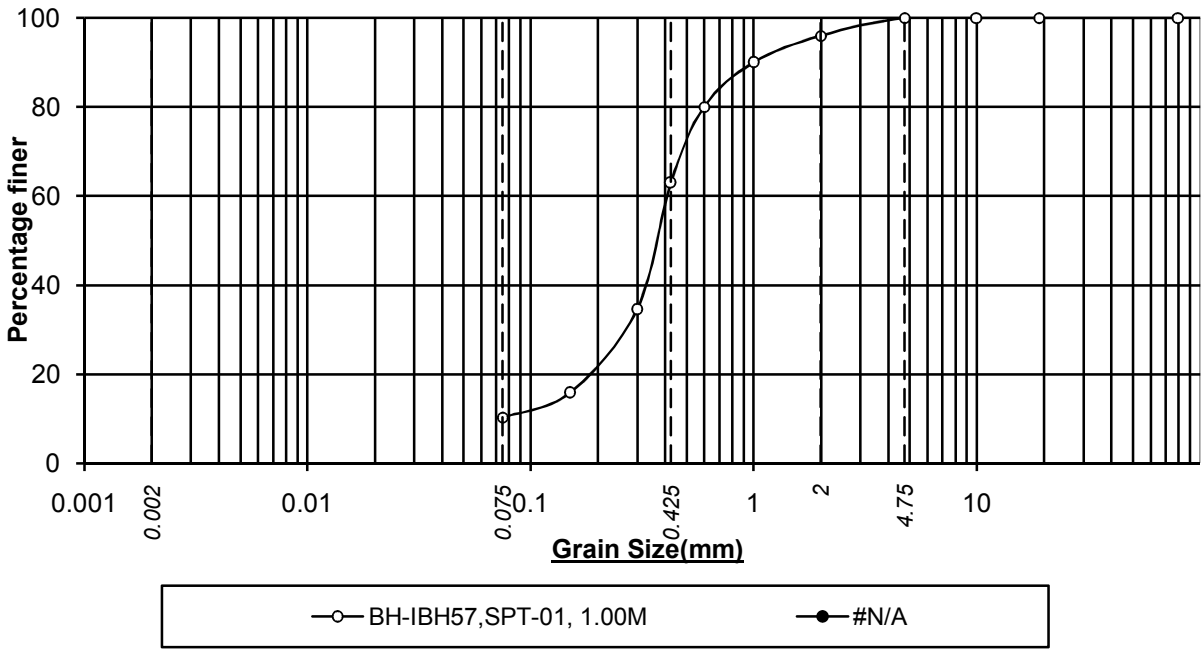
C. E. Testing Company Pvt. Ltd.

Sheet No.:

GRAIN SIZE DISTRIBUTION CURVES



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH55,SPT-01, 1.00M	17.2	35.8	32.1	14.9	0.0	47.0		0.0
IBH56,DS-01, 0.50M		39.0	10.3	9.0	10.7	30.0		31.0



Grain size (mm)	*<0.002*	*0.002-0.075*	*0.075-0.425*	*0.425-2.00*	*2.0-4.75*	**Total sand**	**Weighted mean dia (mm)**	*>4.75*
Sample No.	**Clay (%)**	**Silt (%)**	**Fine sand (%)**	**Medium sand (%)**	**Coarse sand (%)**			**Gravel (%)**
IBH57,SPT-01, 1.00M		10.3	52.7	33.0	4.0	89.7		0.0

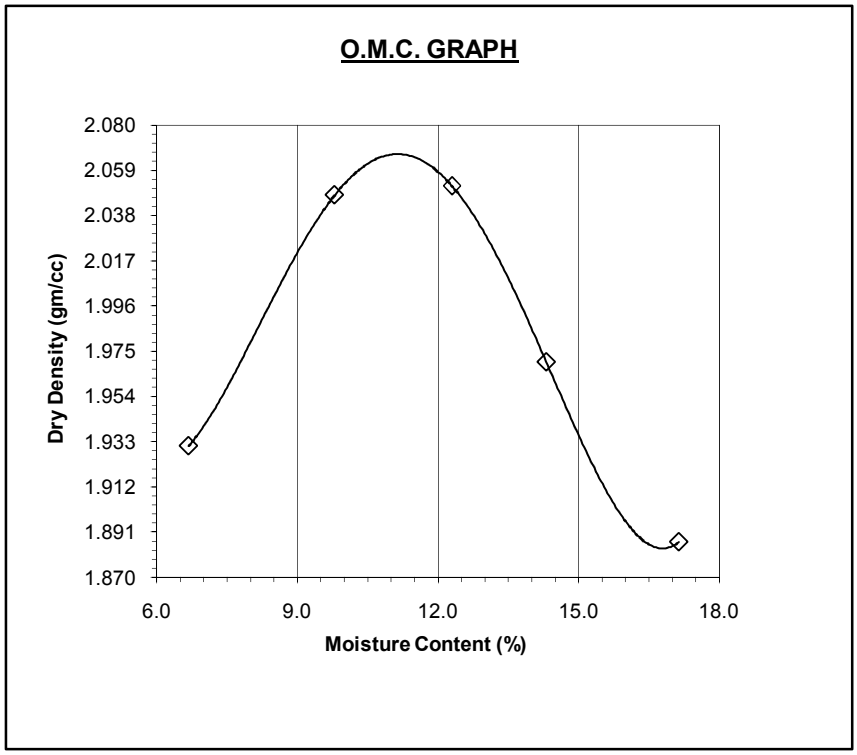
Project:- Geotech. Inv. Work for 1x800MW KTPS at Khammam Dist. Telangana. **Job No. 3472**

C.B.R. & PROCTOR TEST RESULTS.

ITP01 / DS02

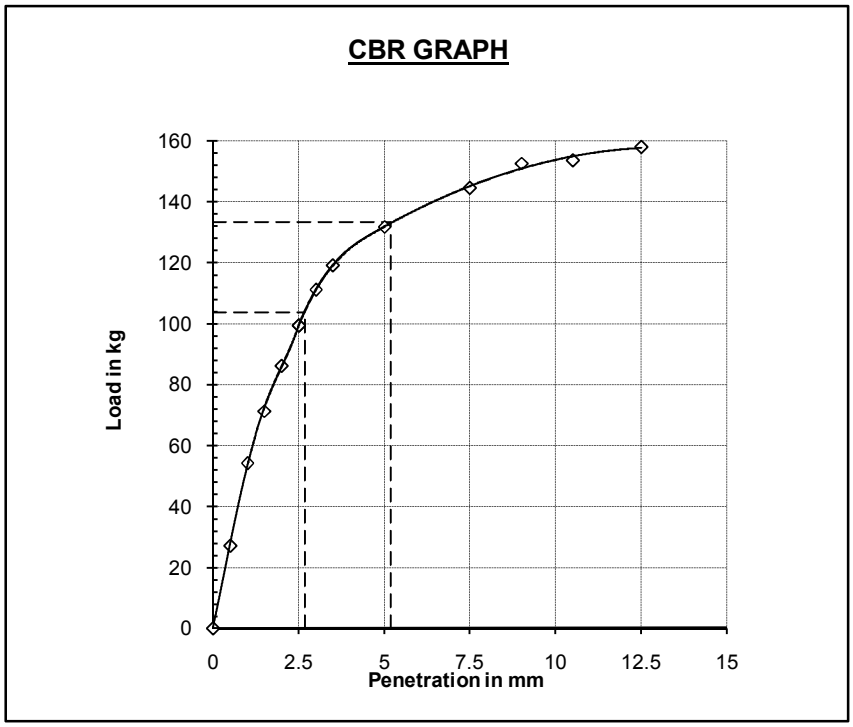
Depth = 1.50m

Maximum Dry Density : 2.066 gm/cc
Optimum Moisture Content: 11.15 %



TYPE :- SOAKED

Penetration (mm)	CBR (%)
2.5	7.57
5.0	6.49

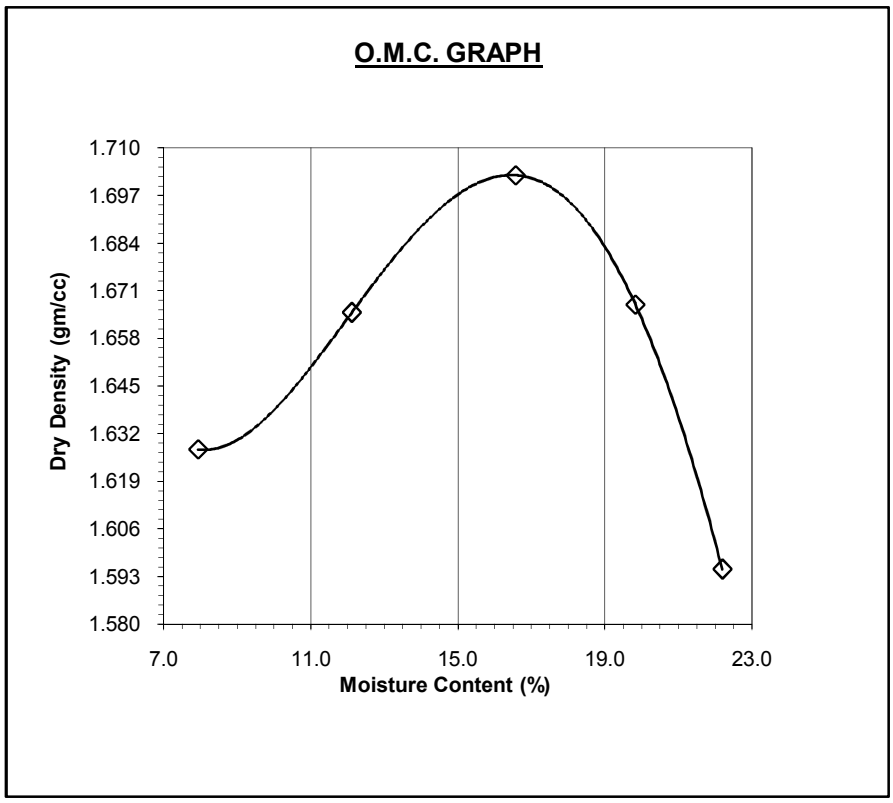


C.B.R. & PROCTOR TEST RESULTS.

ICBR01 / DS01

Depth = 0.50m

Maximum Dry Density : 1.703 gm/cc
Optimum Moisture Content: 16.64 %

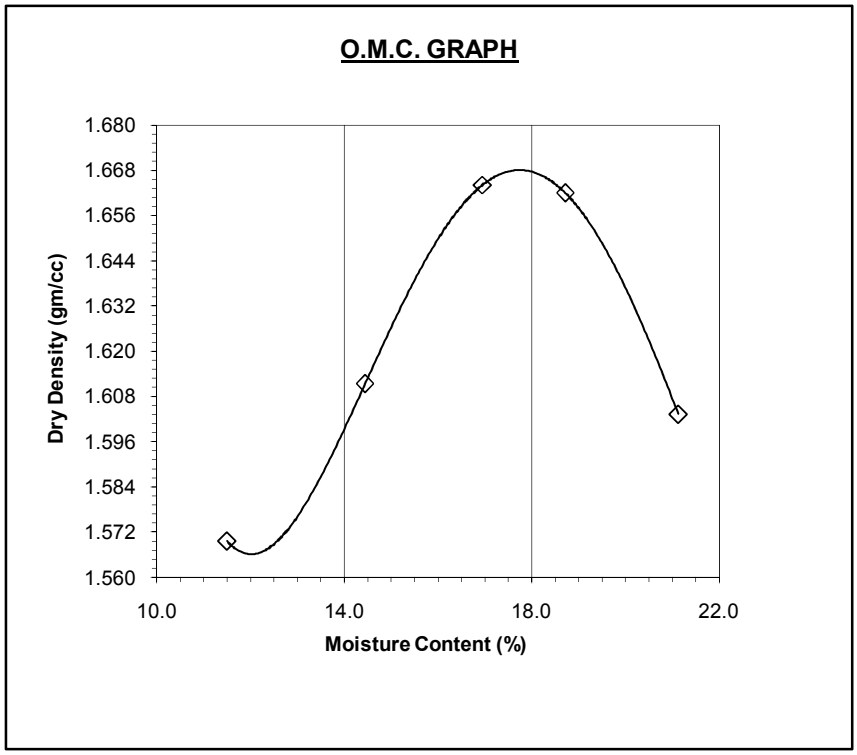


C.B.R. & PROCTOR TEST RESULTS.

ICBR02 / DS01

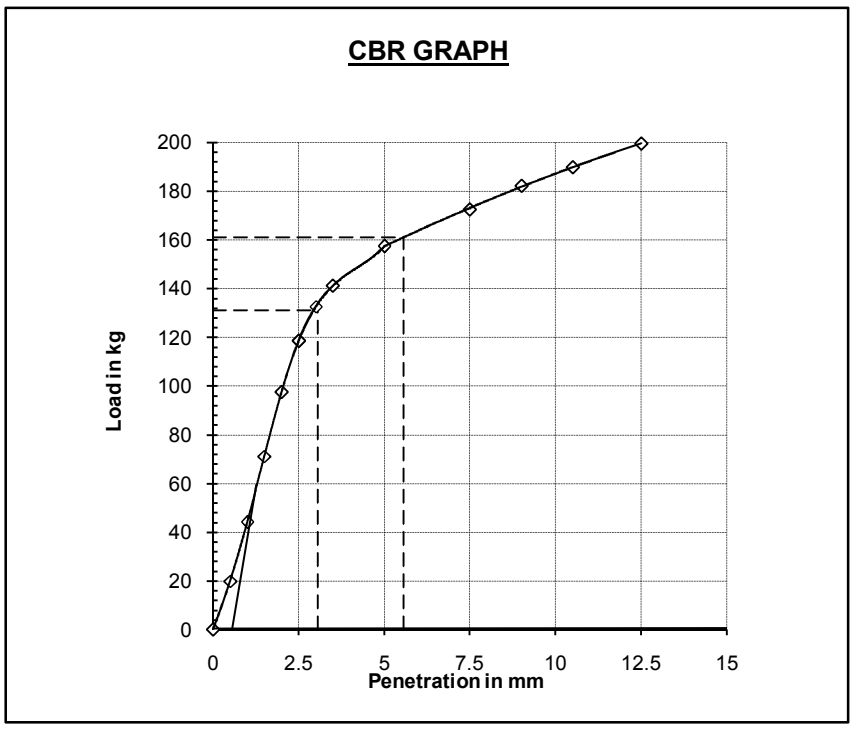
Depth = 0.50m

Maximum Dry Density : 1.668 gm/cc
Optimum Moisture Content: 17.73 %



TYPE :- SOAKED

Penetration (mm)	CBR (%)
2.5	9.56
5.0	7.83

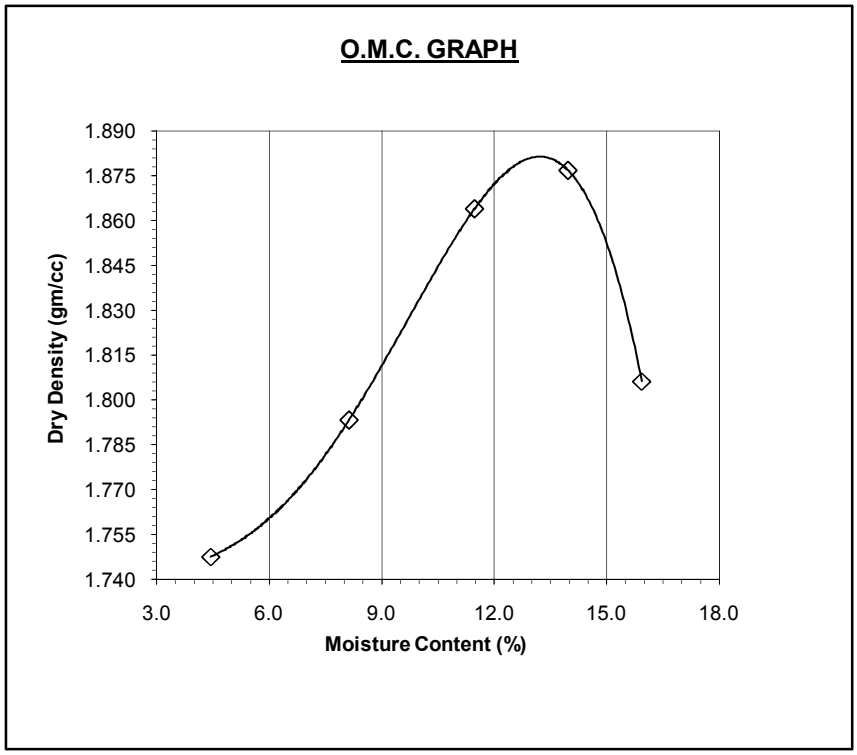


C.B.R. & PROCTOR TEST RESULTS.

ICBR03 / DS01

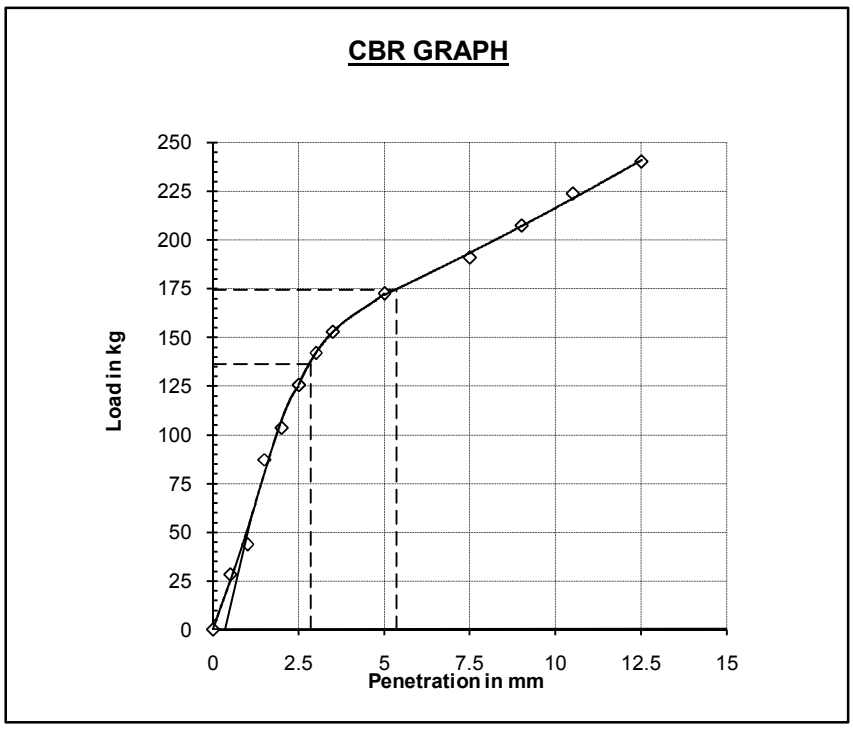
Depth = 0.50m

Maximum Dry Density : 1.881 gm/cc
Optimum Moisture Content: 13.27 %



TYPE :- SOAKED

Penetration (mm)	CBR (%)
2.5	9.94
5.0	8.49

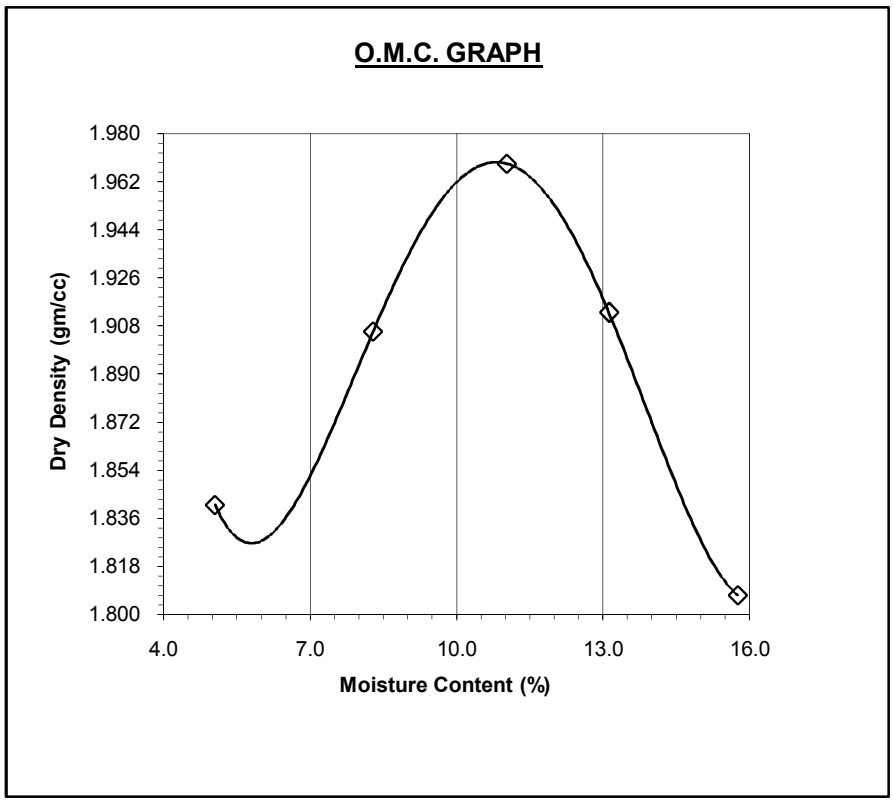


C.B.R. & PROCTOR TEST RESULTS.

IPLT01 / DS02

Depth = 2.00m

Maximum Dry Density : 1.969 gm/cc
Optimum Moisture Content: 10.87 %

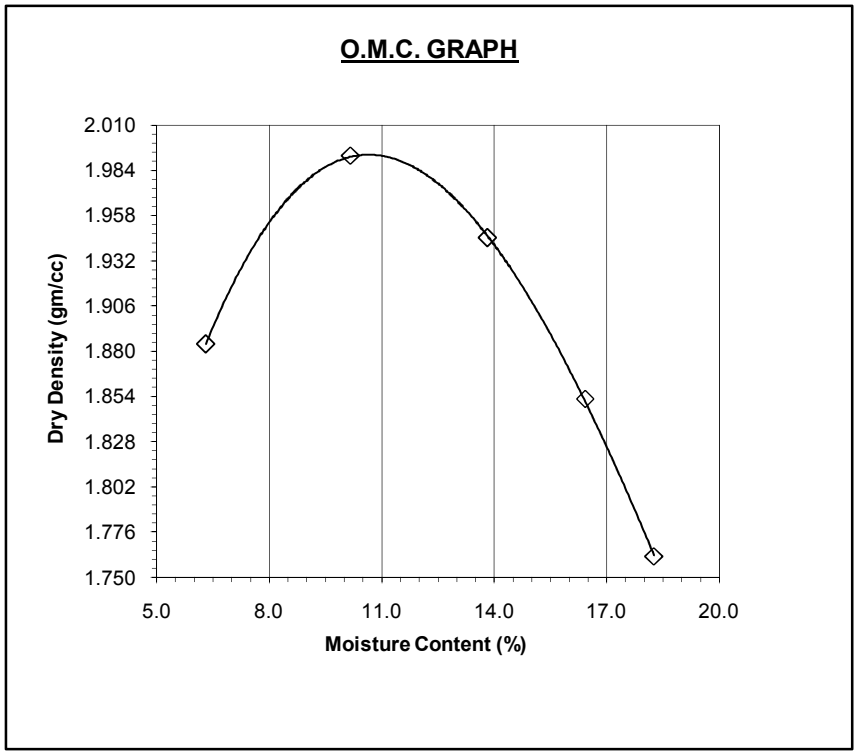


C.B.R. & PROCTOR TEST RESULTS.

IPLT02 / DS01

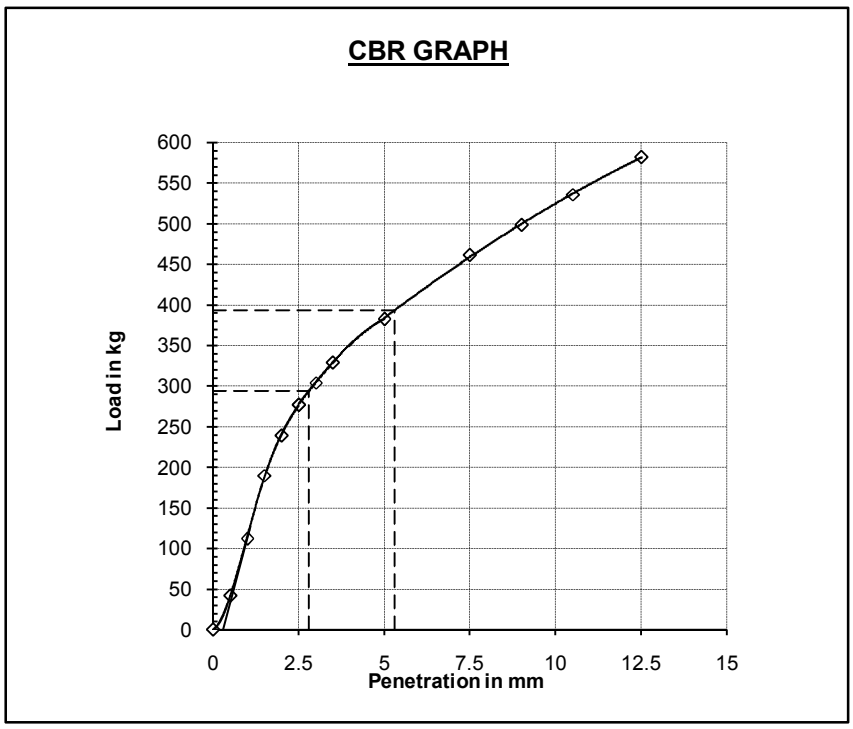
Depth = 1.00m

Maximum Dry Density : 1.993 gm/cc
Optimum Moisture Content: 10.70 %



TYPE :- SOAKED

Penetration (mm)	CBR (%)
2.5	21.47
5.0	19.12

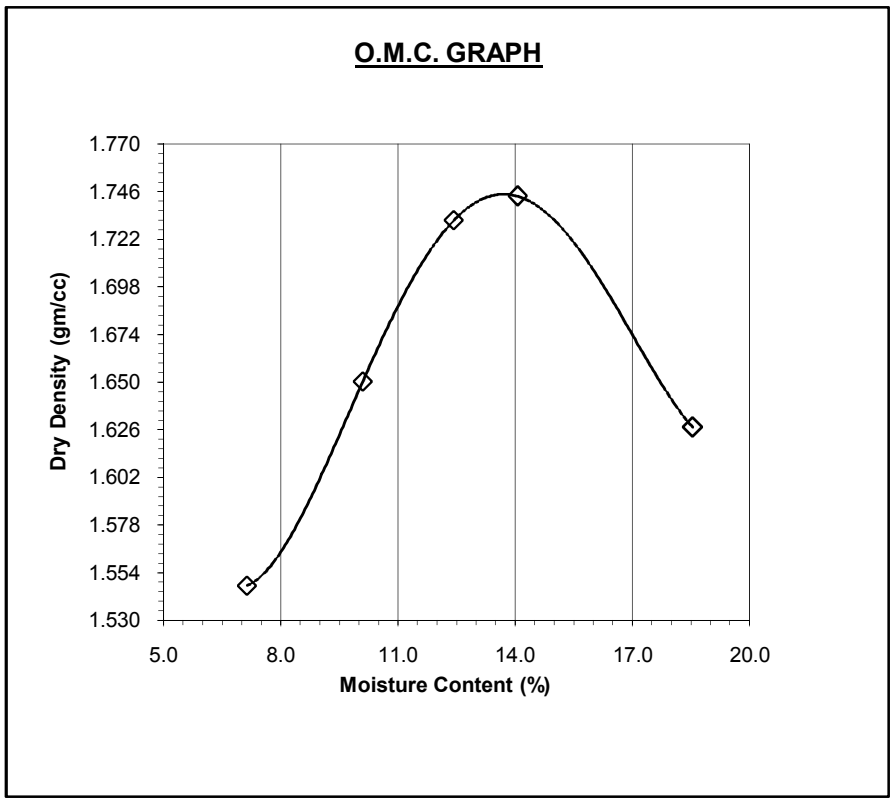


C.B.R. & PROCTOR TEST RESULTS.

IPLT03 / DS01

Depth = 1.00m

Maximum Dry Density : 1.745 gm/cc
Optimum Moisture Content: 13.75 %

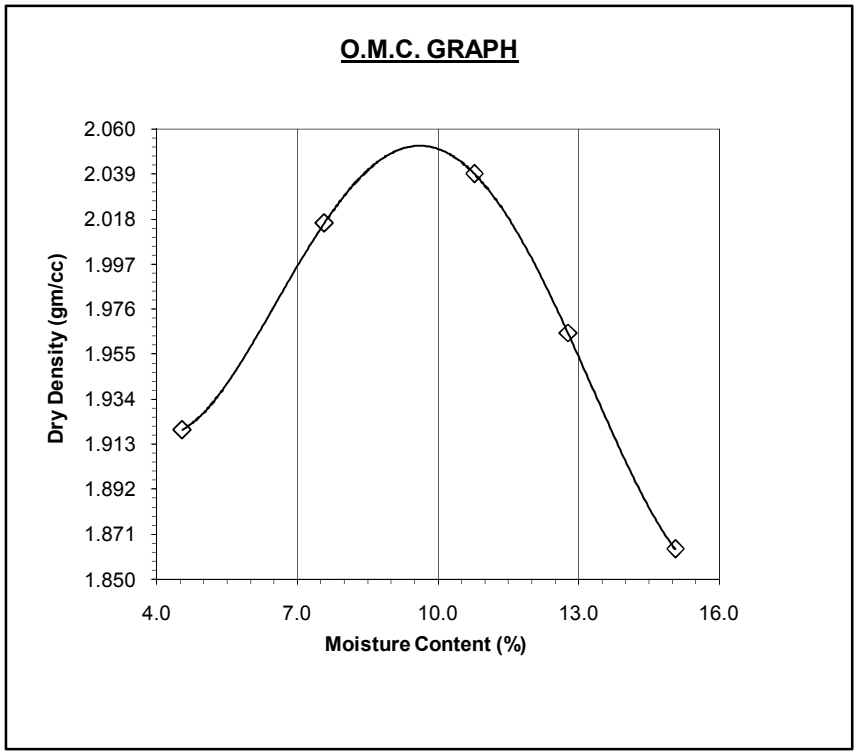


C.B.R. & PROCTOR TEST RESULTS.

ICPLT01 / DS02

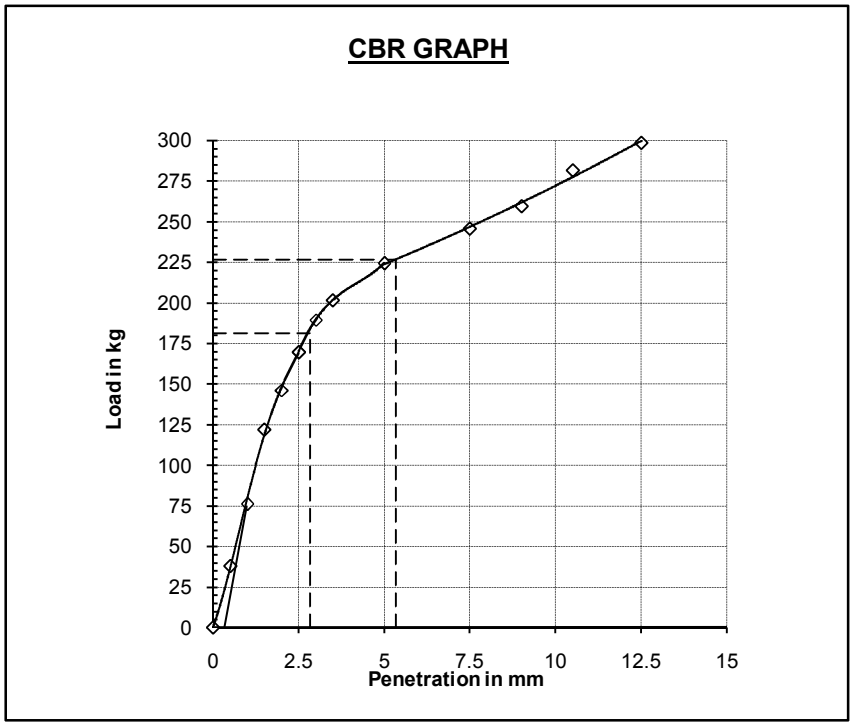
Depth = 2.00m

Maximum Dry Density : 2.052 gm/cc
Optimum Moisture Content: 9.59 %



TYPE :- SOAKED

Penetration (mm)	CBR (%)
2.5	13.22
5.0	11.03

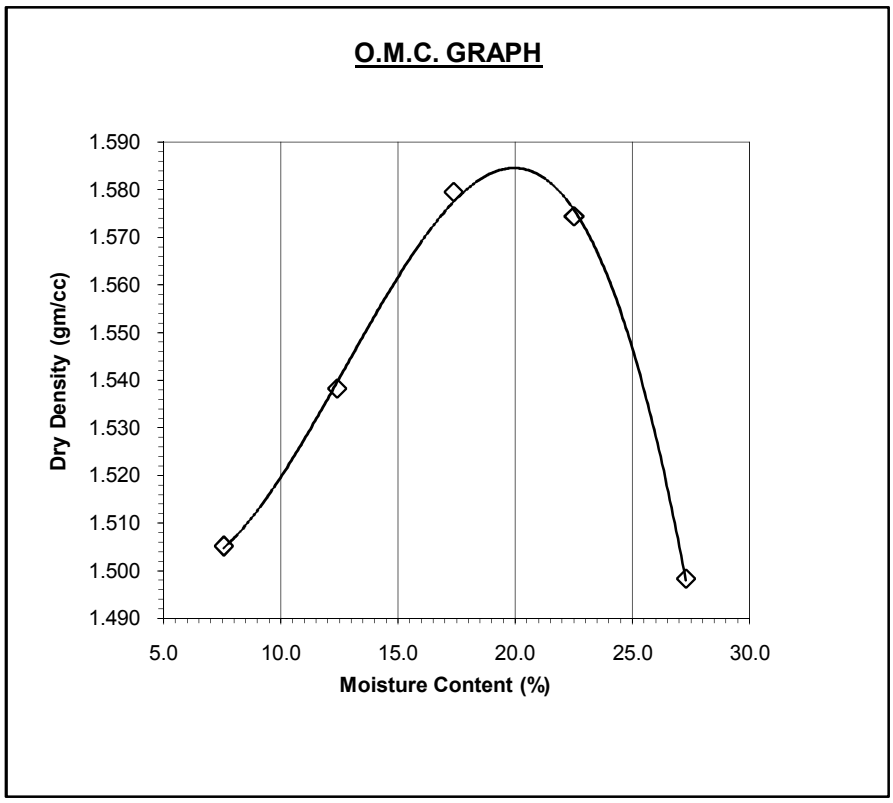


C.B.R. & PROCTOR TEST RESULTS.

ICPLT02 / DS01

Depth = 1.00m

Maximum Dry Density : 1.585 gm/cc
Optimum Moisture Content: 20.00 %



PART IV: SAMPLE CALCULATION

Foundation around TP-7 Area, Depth of foundation = 1.50m below FGL (FGL=104.00M)

The suggested founding level falls inside weathered rock layer. This is a weathered rock layer with low to moderate CR value and nil RQD. Now from literature we know that the c and φ values of a rock specimen is in the range of c = 35 to 175 kg/sqcm and Φ is seldom less than 40 degree [Bowles, J. E., Foundation Analysis and Design, pp-278, 5th Edition]. Neglecting the cohesion value, use Φ = 35° for bearing capacity calculation.

The Net Ultimate Bearing Capacity is given as:

$$q_{nu} = C.N_c.S_c.D_c + q.N_q.S_q.D_q + 0.5\gamma.B.N_\gamma.S_\gamma.D_\gamma - q$$

Where,

N_c, N_q and N_γ are bearing capacity factors,
S_c, S_q and S_γ are shape factors,
D_c, D_q and D_γ are depth factors,

And

C = Cohesion
q = Overburden pressure,
B = Width of foundation,
γ = Effective density below foundation.

For 4m x 6m

Cohesion, C = 0.00 t/sqm
Using ϕ = 35 degree, the bearing capacity factors are:
Nc = 46.12
Nq = 33.30
Nγ = 48.03
Use,
Depth of Foundation = Df = 1.5 M (below FGL)
Width of Foundation = B = 4 M
Length of Foundation = L = 6 M
Overburden Pressure = q =1.500 (Depth) x 0.90 (Submerged density) = 1.35 t/sqm (assuming the ground water table is flushing with the ground level)
The Shape factors are [IS:6403 - 1981]
Sc = 1.13 Sq = 1.13 Sγ = 0.73
The Depth factors are [IS:6403 - 1981]
Dc = 1.14 Dq = 1.07 Dγ = 1.07
Computed Net Ultimate Bearing Capacity = 121.23 t/sqm
Using a factor of safety of 2.5, Net Safe Bearing Capacity = 48.49 t/sqm

For 10m x 15m

Computed Net Ultimate Bearing Capacity = 214.12 t/sqm
Using a factor of safety of 2.5, Net Safe Bearing Capacity = 85.65 t/sqm

The above bearing capacity should be checked against settlement criteria. This is shown below.

Deformation parameters

Use young's modulus for layer VI & VII = 1000 kg/sqcm & 2000 kg/sqcm respectively.

SETTLEMENT CALCULATION

Settlement Analysis for 4m x 6m foundation

A) General Data:

Width of foundation =	4.0	m
Length of foundation =	6.0	m
Depth of foundation =	1.5	m
Net Base Pressure =	4.5	kg/sqcm

B) Subsoil Properties:

Layer - VI

Young's Modulus =	1000	kg/sqcm
Poisson Ratio, μ =	0.25	
Top of Stratum =	1.50	m
End of Stratum =	3.77	m
Geological factor, G =	1.00	
m_{vc} =	0.0000	sqcm/kg

Layer - VII

Young's Modulus =	2000	kg/sqcm
Poisson Ratio, μ =	0.25	
Top of Stratum =	3.77	m
End of Stratum =	9.50	m
Geological factor, G =	1.00	
m_{vc} =	0.0000	sqcm/kg

C) Calculation of Immediate Settlement:

Settlement at center

M = L' / B' =	1.500	
N = H / B' =	1.133	
I_1 =	0.157	
I_2 =	0.100	
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.223	
Immediate settlement S_i = $[q_o \times B' \times (1-\mu^2) \times m \times I_s] / E_s$	0.754	cm

Settlement at center

M = L' / B' =	1.319	
N = H / B' =	1.830	
I_1 =	0.270	
I_2 =	0.083	
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.326	
Immediate settlement S_i = $[q_o \times B' \times (1-\mu^2) \times m \times I_s] / E_s$	0.399	cm

Settlement at corner

M = L' / B' =	1.50	
N = H / B' =	0.567	
I_1 =	0.053280	
I_2 =	0.085739	
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.110	
Immediate settlement S_i =	0.186	cm

Settlement at corner

M = L' / B' =	1.32	
N = H / B' =	0.915	
I_1 =	0.119	
I_2 =	0.095	
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.182	
Immediate settlement S_i =	0.112	cm

Average S_i for Stratum I= 4.70 mm

Total immediate settlement = 7.26 mm

Average S_i for Stratum II= 2.55 mm

(for both the layer)

So, total settlement = 7.26mm

Foxe's Depth correction Factor = 0.92

Corrected Total Settlement = 6.68 mm <12mm

Settlement Analysis for 10m x 15m foundation

A) General Data:

Width of foundation =	10.0	m
Length of foundation =	15.0	m
Depth of foundation =	1.5	m
Net Base Pressure =	4.5	kg/sqcm

B) Subsoil Properties:

Layer - VI

Young's Modulus =	1000	kg/sqcm
Poisson Ratio, μ =	0.25	
Top of Stratum =	1.50	m
End of Stratum =	3.77	m
Geological factor, G =	1.00	
m_{vc} =	0.0000	sqcm/kg

Layer - VII

Young's Modulus =	2000	kg/sqcm
Poisson Ratio, μ =	0.25	
Top of Stratum =	3.77	m
End of Stratum =	21.50	m
Geological factor, G =	1.00	
m_{vc} =	0.0000	sqcm/kg

C) Calculation of Immediate Settlement:

Settlement at center

M = L' / B' =	1.500	
N = H / B' =	0.453	
I_1 =	0.036	
I_2 =	0.076	
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.087	
Immediate settlement S_i = $[q_o \times B' \times (1-\mu^2) \times m \times I_s] / E_s$	0.731	cm

Settlement at center

M = L' / B' =	1.408	
N = H / B' =	2.892	
I_1 =	0.381	
I_2 =	0.066	
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.425	
Immediate settlement S_i = $[q_o \times B' \times (1-\mu^2) \times m \times I_s] / E_s$	1.558	cm

Settlement at corner

M = L' / B' =	1.50	
N = H / B' =	0.227	
I_1 =	0.009582	
I_2 =	0.046989	
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.041	
Immediate settlement S_i =	0.173	cm

Settlement at corner

M = L' / B' =	1.41	
N = H / B' =	1.446	
I_1 =	0.213	
I_2 =	0.094	
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.275	
Immediate settlement S_i =	0.504	cm

Average S_i for Stratum I=	4.52	mm	
Total immediate settlement =	14.83	mm	
Average S_i for Stratum II=	10.31	mm	(for both the layer)

So, total settlement = 14.83mm
Foxe's Depth correction Factor = 0.97
Rigidity correction Factor= 0.80
Corrected Total Settlement = 11.51 mm <12mm
So, use a net allowable bearing capacity of 45t/sqm for depth of foundation of 1.50m below FGL.

Foundation at Crushed Coal Pile Area around IBH-44 & 45, Depth of foundation = 2.50m below FGL (FGL=104.00M)

The founding level falls inside medium dense sand layer
i.e layer IV. Design corrected N = 19
Use C = 0 kg/sqcm & Φ = 30°
Assume size of foundation = 4m x 6m

Considering General Shear Failure

Computed Net Ultimate Bearing Capacity = 82.52 t/sqm
Using a factor of safety of 2.5, Net Safe Bearing Capacity = 33.01 t/sqm

Considering Local Shear Failure

Φ = 30°, Φ' = $\tan^{-1}$ (2/3 x tan 30°) = 21°
Computed Net Ultimate Bearing Capacity = 26.35 t/sqm
Using a factor of safety of 2.5, Net Safe Bearing Capacity = 10.54 t/sqm

Therefore, interpolated SBC = [10.54 + {(30-28) / (36-28)} x (33.01-10.54)] = 16.16 t/sqm

The above bearing capacity should be checked against settlement criteria. This is shown below.

Deformation Parameters

Layer IV

Design corrected N = 19
Treating the sand to be normally consolidated sand, E_S = 5(N+15) = 170kg/sqcm
Treating the sand to be silty sand, E_S = 3(N+6) = 75kg/sqcm
However, use the E_S value to 120 kg/sqcm

Layer V

Design corrected N = 66
Treating the sand to be over consolidated sand, E_S = 400 + 10.5N = 1093 kg/sqcm
However, let us restrict the E_S value to 750 kg/sqcm

LayerVI

Use Young's modulus for layer VI = 1000 kg/sqcm.

SETTLEMENT CALCULATION

Settlement Analysis for 4m x 6m foundation

A) General Data:

Width of foundation =	4.0	m
Length of foundation =	6.0	m
Depth of foundation =	2.5	m
Net Base Pressure =	1.5	kg/sqcm

B) Subsoil Properties:

Layer - IV			Layer - V			Layer -VI		
Young's Modulus =	120	kg/sqcm	Young's Modulus =	750	kg/sqcm	Young's Modulus =	1000	kg/sqcm
Poisson Ratio, μ =	0.25		Poisson Ratio, μ =	0.25		Poisson Ratio, μ =	0.25	
Top of Stratum =	2.50	m	Top of Stratum =	4.65	m	Top of Stratum =	5.652	m
End of Stratum =	4.65	m	End of Stratum =	5.65	m	End of Stratum =	10.5	m
Geological factor, G =	1.00		Geological factor, G =	1.00		Geological factor, G =	1	
m_{vc} =	0.0000	sqcm/kg	m_{vc} =	0.0000	sqcm/kg	m_{vc} =	0.0000	sqcm/kg

C) Calculation of Immediate Settlement:

Settlement at center		*Settlement at center*		*Settlement at center*	
M = L' / B' =	1.500	M = L' / B' =	1.325	M = L' / B' =	1.280
N = H / B' =	1.076	N = H / B' =	0.325	N = H / B' =	1.356
I_1 =	0.146	I_1 =	0.020	I_1 =	0.200
I_2 =	0.100	I_2 =	0.061	I_2 =	0.091
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.213	$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.061	$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.260
Immediate settlement S_i =	1.997 cm	Immediate settlement S_i =	0.067 cm	Immediate settlement S_i =	0.192 cm
$[q_o \times B \times (1-\mu^2) \times m \times I_s] / E_s$		$[q_o \times B \times (1-\mu^2) \times m \times I_s] / E_s$		$[q_o \times B \times (1-\mu^2) \times m \times I_s] / E_s$	

Settlement at corner		*Settlement at corner*		*Settlement at corner*	
M = L' / B' =	1.50	M = L' / B' =	1.33	M = L' / B' =	1.280
N = H / B' =	0.538	N = H / B' =	0.163	N = H / B' =	0.678
I_1 =	0.048666	I_1 =	0.005	I_1 =	0.075
I_2 =	0.083673	I_2 =	0.035	I_2 =	0.089
$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.104	$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.029	$I_s = I_1 + \{(1-2\mu) / (1-\mu)\} I_2$ =	0.134
Immediate settlement S_i =	0.490 cm	Immediate settlement S_i =	0.016 cm	Immediate settlement S_i =	0.050 cm

Average S_i for Stratum I=	12.43 mm	Average S_i for Stratum II=	0.41 mm	Average S_i for Stratum III=	1.21 mm
Total immediate settlement =	14.05 mm	(for all the three layers)			

So, total settlement = 14.05mm
Foxe's Depth correction Factor = 0.85
Corrected Total Settlement = 11.94 mm < 25mm
So, use a net allowable bearing capacity of 15t/sqm for depth of foundation of 2.50m below FGL.

IN-SITU PERMEABILITY TEST IN OVERBURDEN (FALLING HEAD METHOD)

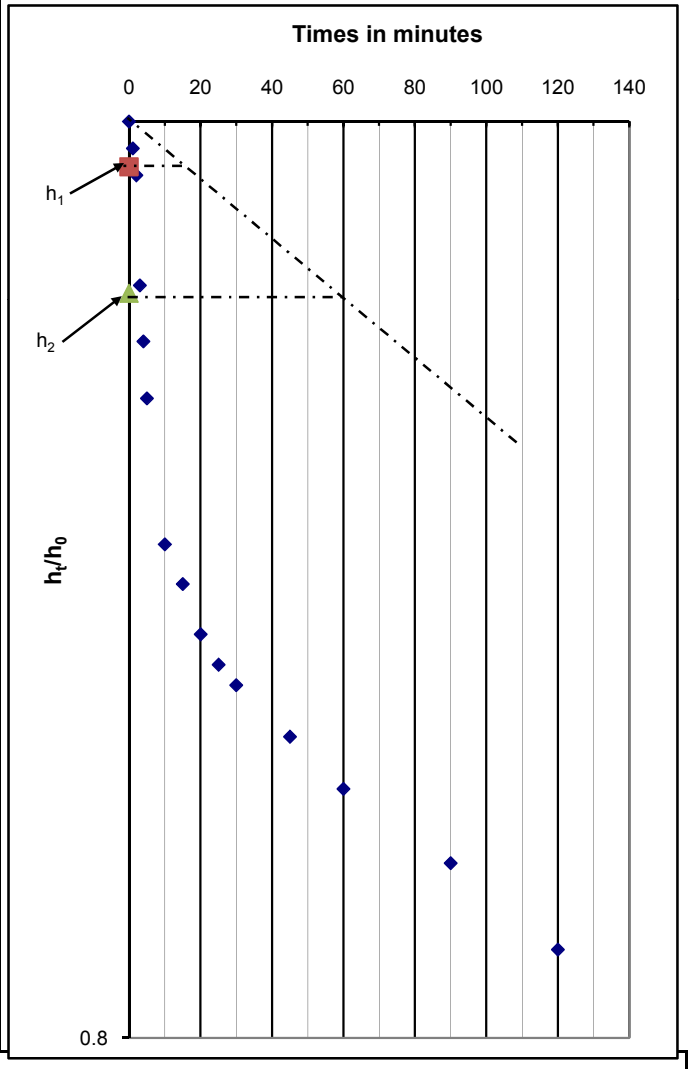
Test location	IBH-16		
Ground elevation	104.703M	Static water level	4.30m below G.L.
Diameter of hole (2R)	174.0mm	Ht. of casing from GL	0.30m
Inner diameter of casing/ intake pipe (d)	150.0mm		
Depth tested	2.70m-3.50m		
Length of test section (L)	0.80m		

Data sheet

Time interval (minute)	Water level in intake pipe (cm)	h_t (cm)	h_t/h_0
0	0.00	460.000	1.0000
1	3.00	457.000	0.9935
2	6.00	454.000	0.9870
3	18.00	442.000	0.9609
4	24.00	436.000	0.9478
5	30.00	430.000	0.9348
10	45.00	415.000	0.9022
15	49.00	411.000	0.8935
20	54.00	406.000	0.8826
25	57.00	403.000	0.8761
30	59.00	401.000	0.8717
45	64.00	396.000	0.8609
60	69.00	391.000	0.8500
90	76.00	384.000	0.8348
120	84.00	376.000	0.8174
From the above Graph, We have			
h1 ↳	0.989	t1 ↳	15 min
h2 ↳	0.959	t2 ↳	60 min

$$K = \frac{d^2}{8L}\log_e \frac{L}{R}\frac{\log_e(h_1/h_2)}{t_2 - t_1}$$ ↳ 8.899E-06cm/sec

Time vs. h_t/h_0 plot



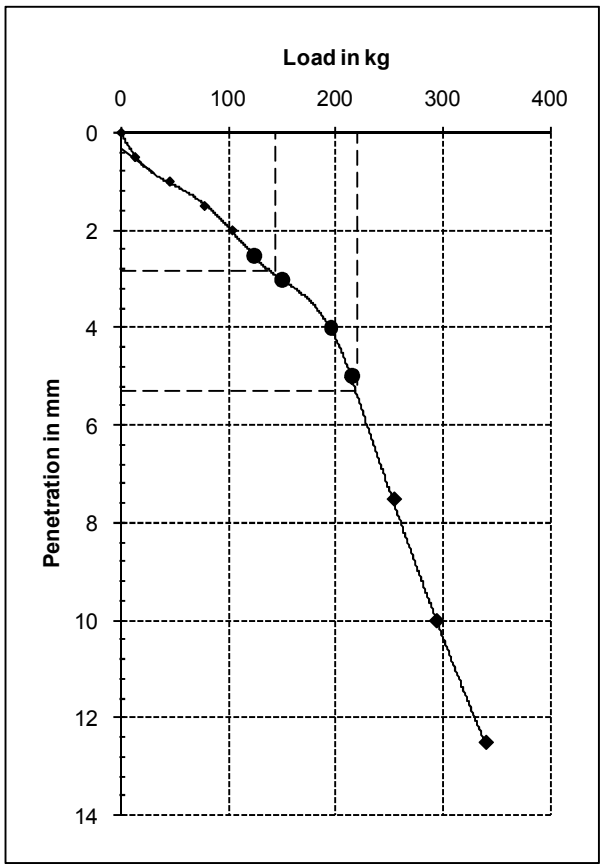
Legend: h_1 = head of water in the intake pipe at time t_1 above static water level,
h_2 = head of water in the intake pipe at time t_2 above static water level;
h_0 = depth of static water level at time t_0,
h_t = head of water in the intake pipe at any time t

SAMPLE FIELD CBR CALCULATION

Test No. ICBR-3
Depth: 0.50m
Description: Light brownish grey, moorum with sand mixture.

Field CBR Test Results

CBR Type: Unsoaked		
Weight of Surcharge = 10 kg		
Proving Ring Constant = 6.537 kg/division		
Penetration (mm)	Proving Ring Reading	Load (in kg)
0.00	0.00	0.00
0.50	2.0	13.1
1.00	7.0	45.8
1.50	12.0	78.4
2.00	16.0	104.6
2.50	19.0	124.2
3.00	23.0	150.4
4.00	30.0	196.1
5.00	33.0	215.7
7.50	39.0	254.9
10.00	45.0	294.2
12.50	52.0	339.9



From graph,

Load for 2.50mm penetration = 145 kg
Hence CBR for 2.50mm penetration = (145 / 1370) x 100 = 10.58%

Load for 5.00mm penetration = 220.5 kg
Hence CBR for 5.00mm penetration = (220.5 / 2055) x 100 = 10.73%

PART V: PHOTOGRAPHS

Borehole

Borehole

Borehole

Borehole

Rock Core

Rock Core

Rock Core

Rock Core

Trial Pit

IFPT

ICBR

IDCPT

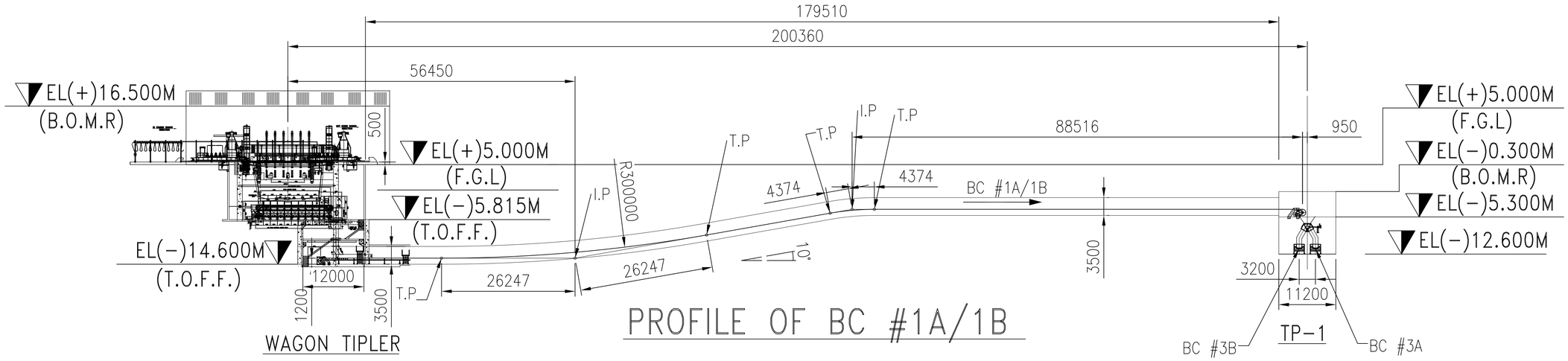
ISCPT

IPLT

ICPLT

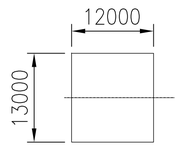
ICST

IPMT

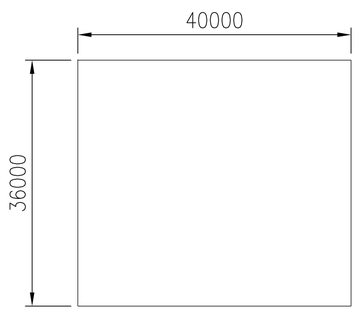


PROFILE OF BC #1A/1B

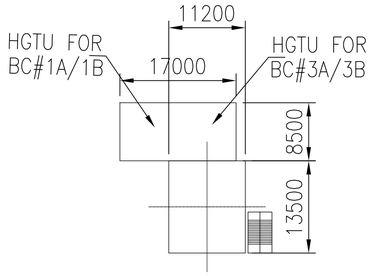
PLAN AT EL(−)5.815M



PLAN AT EL(−)14.600M



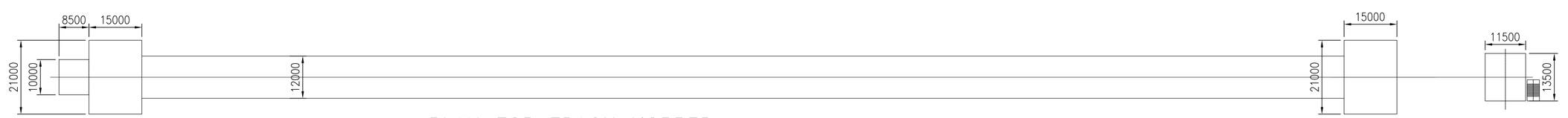
PLAN FOR SHED



PLAN FOR TP−1

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

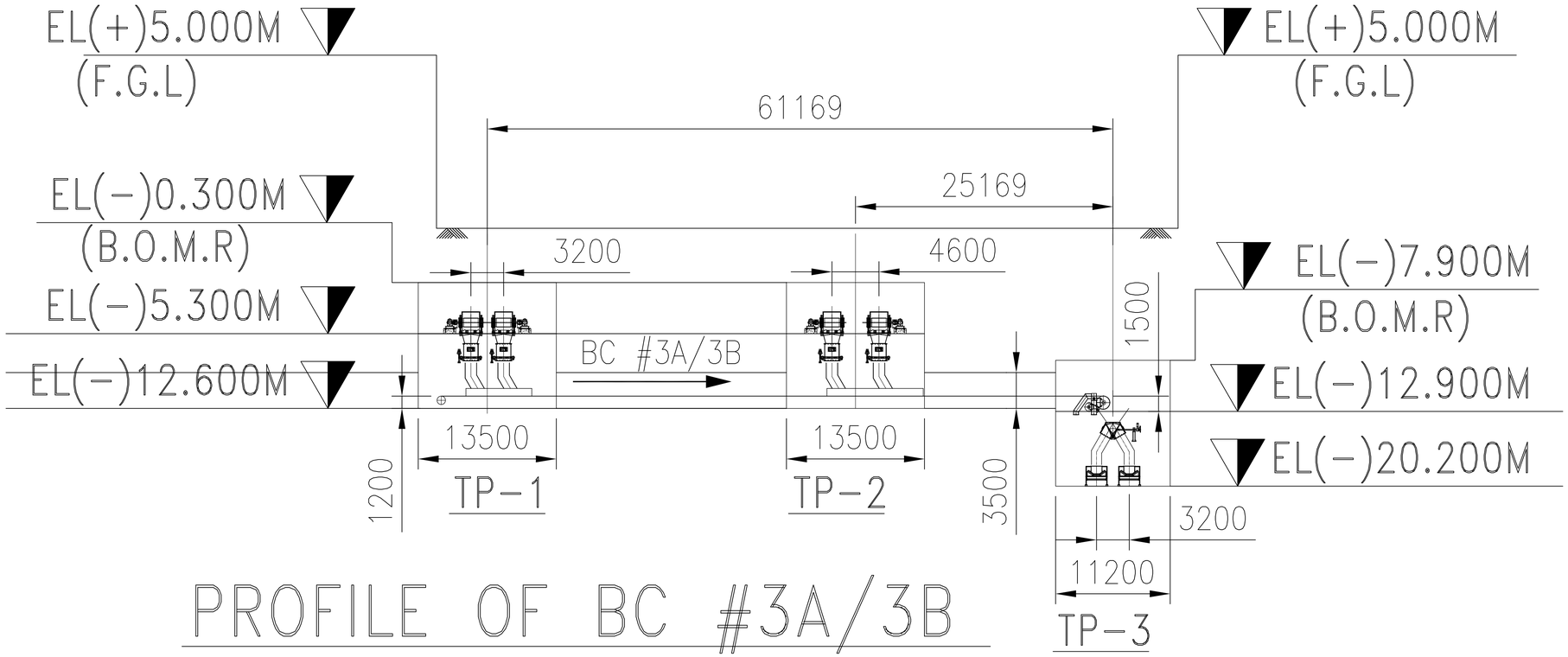
PROFILE OF BC #2A/2B



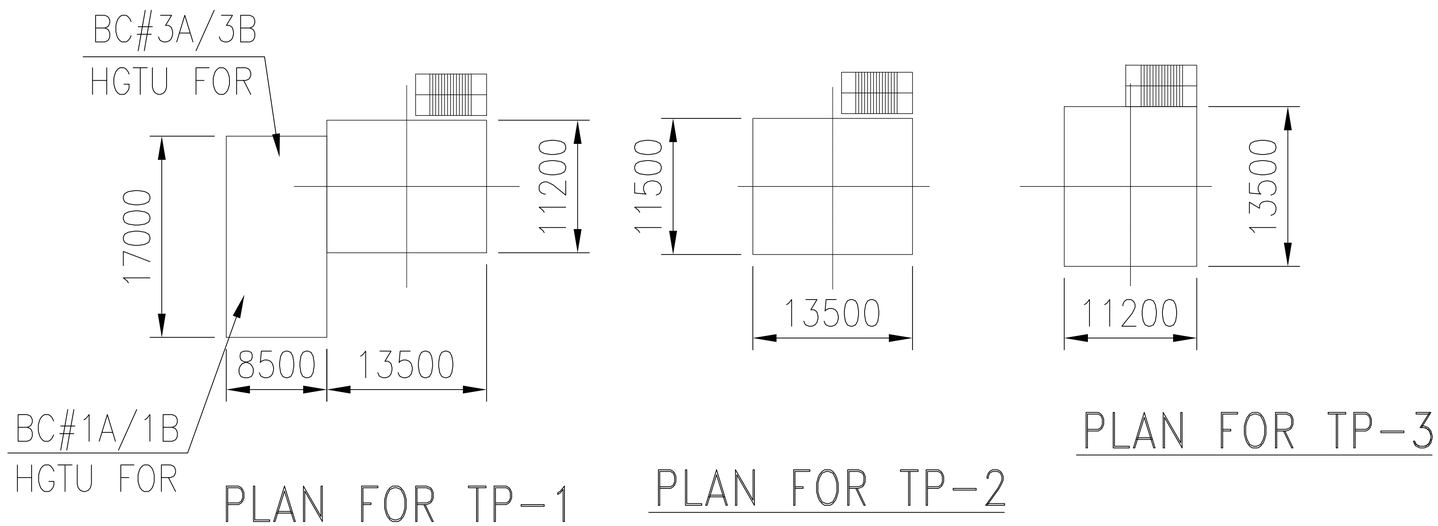
PLAN AT EL(-)15.000M

PLAN FOR TRACK HOPPER

PLAN FOR TP-2



PROFILE OF BC #3A/3B

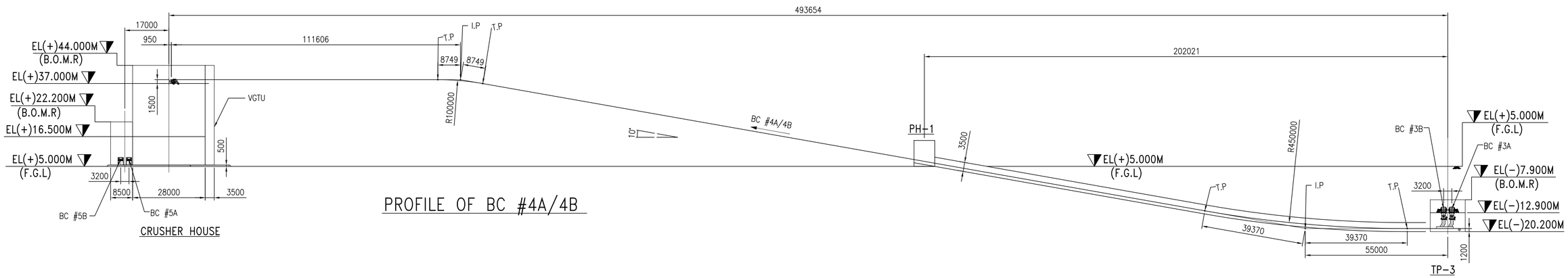


PLAN FOR TP−1

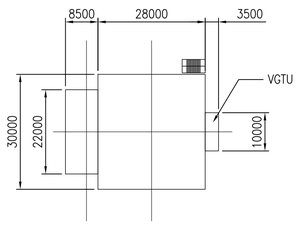
PLAN FOR TP−2

PLAN FOR TP−3

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

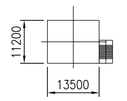


PROFILE OF BC #4A/4B

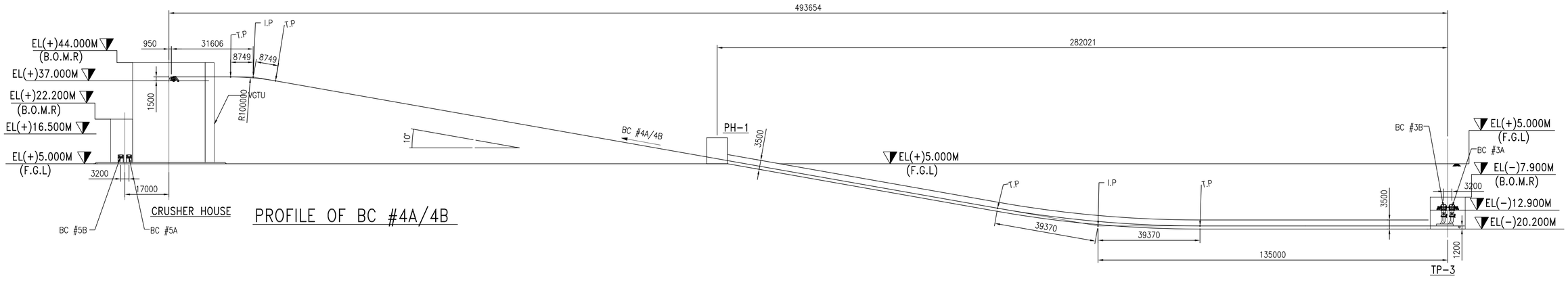


PLAN FOR CRUSHER HOUSE

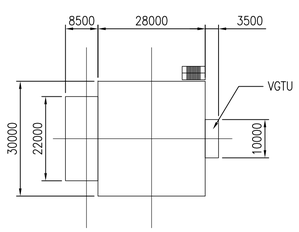
OPTION-1



PLAN FOR TP-3

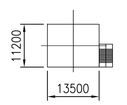


PROFILE OF BC #4A/4B

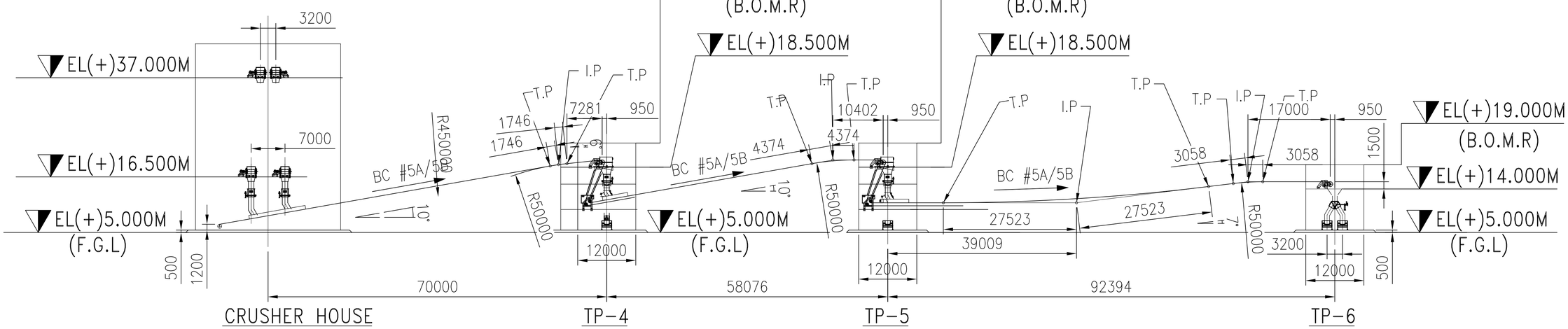


PLAN FOR CRUSHER HOUSE

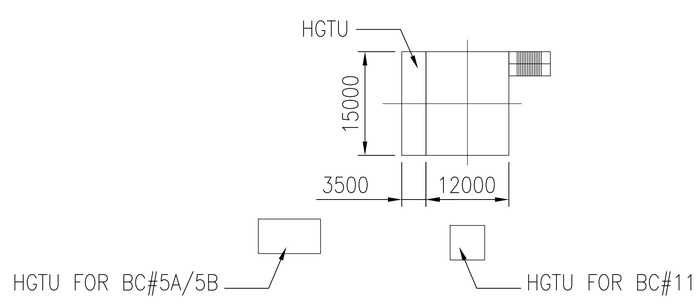
OPTION-2



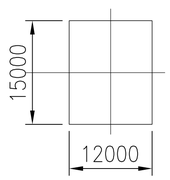
PLAN FOR TP-3



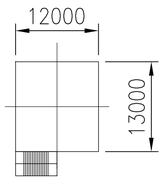
PROFILE OF BC #5A/5B



PLAN FOR TP-4



PLAN FOR TP-5



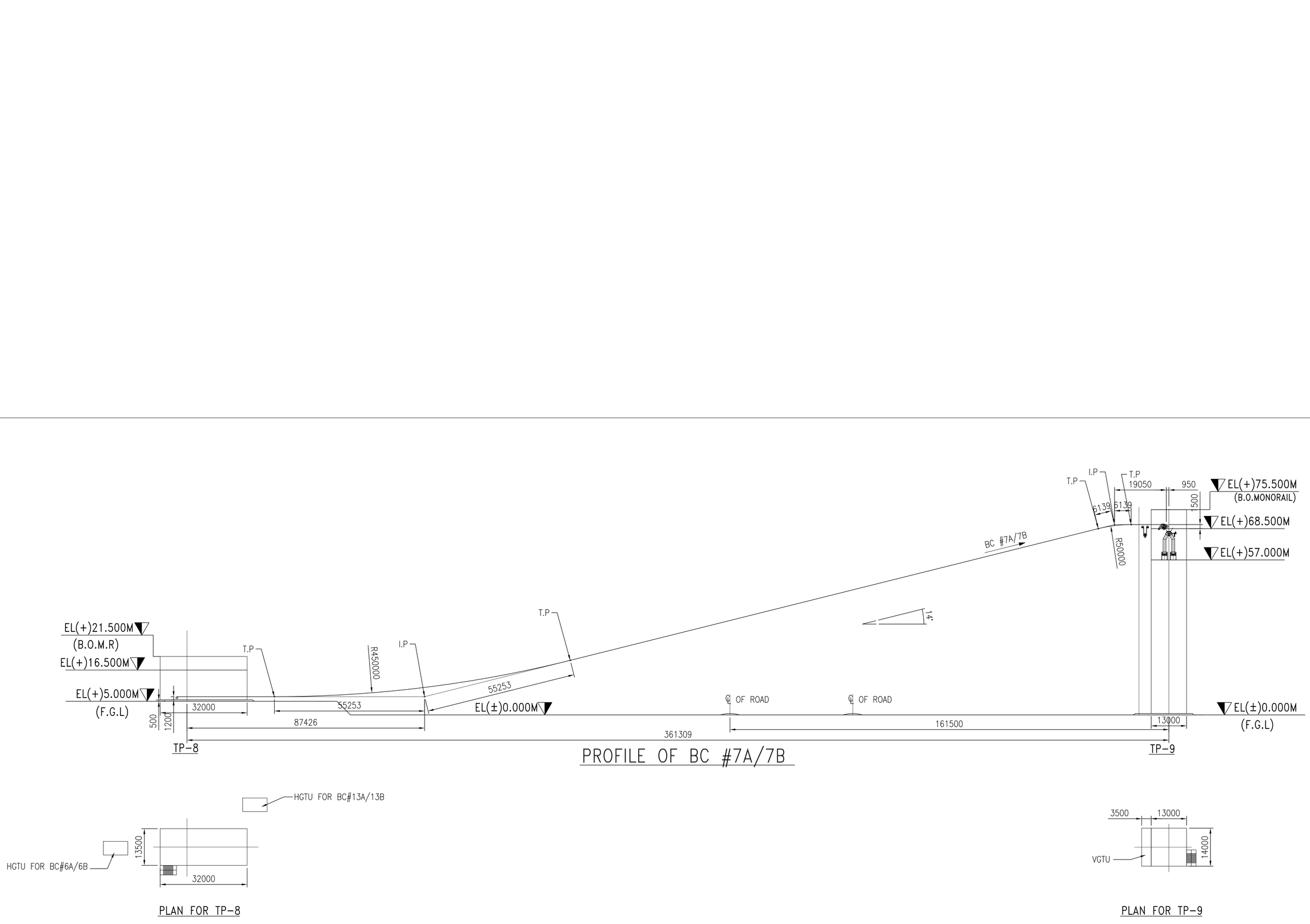
PLAN FOR TP-6

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

PROFILE OF BC #6A/6B

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT



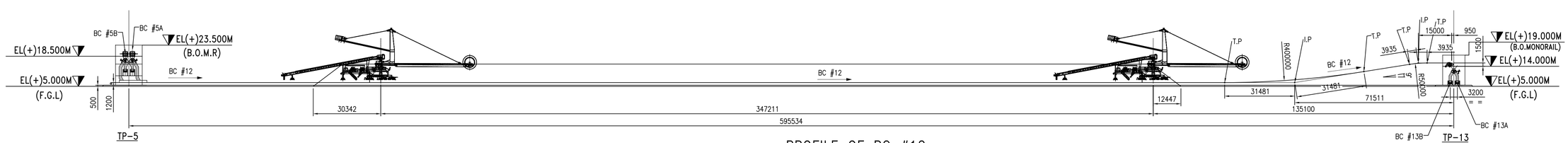
PROFILE OF BC #7A/7B

PLAN FOR TP-8

PLAN FOR TP-9

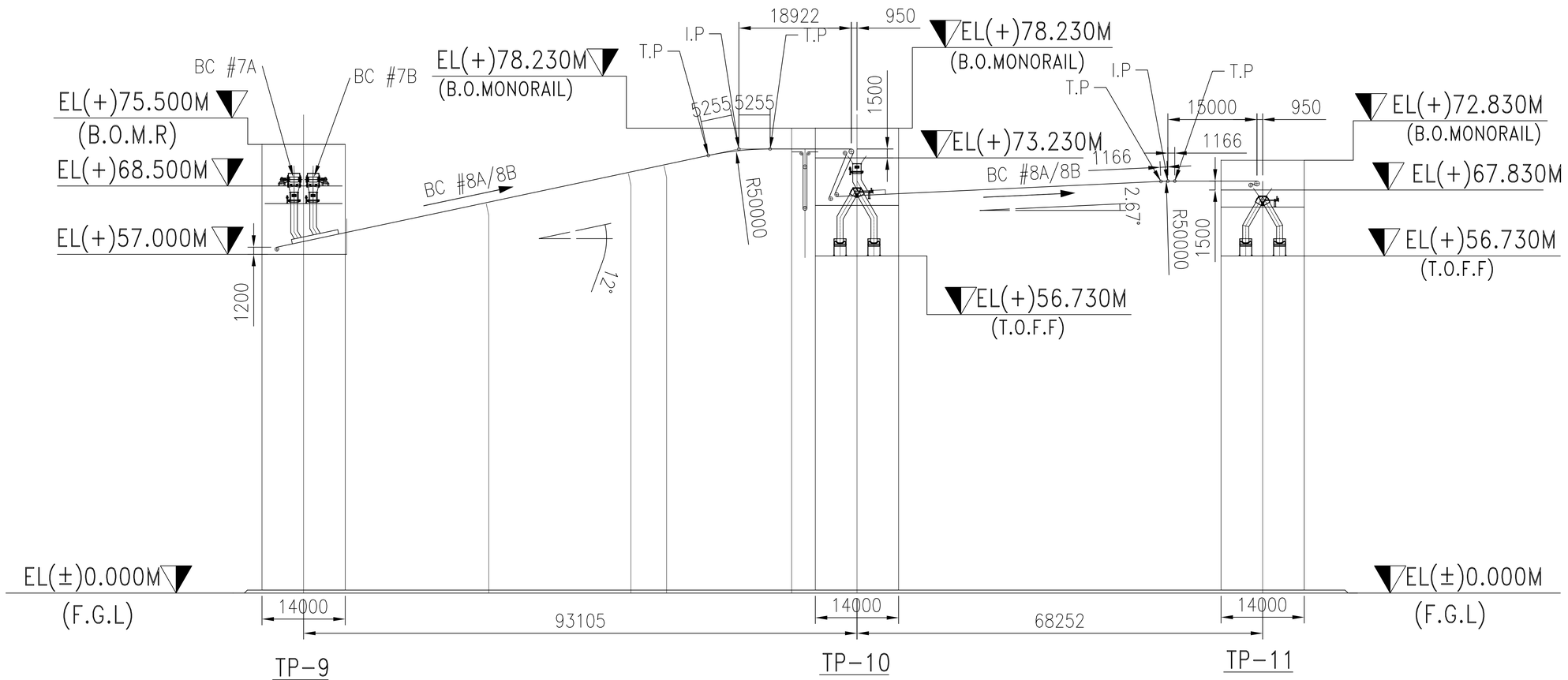
PROFILE OF BC #11

PLAN FOR TP-12

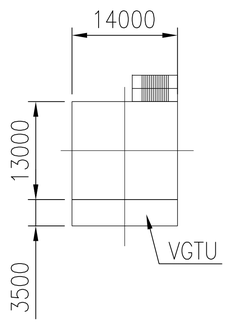


PROFILE OF BC #12

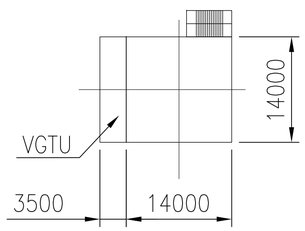
PLAN FOR TP-13



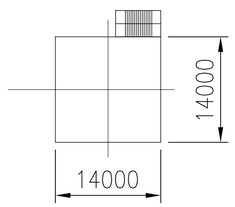
PROFILE OF BC #8A/8B



PLAN FOR TP-9

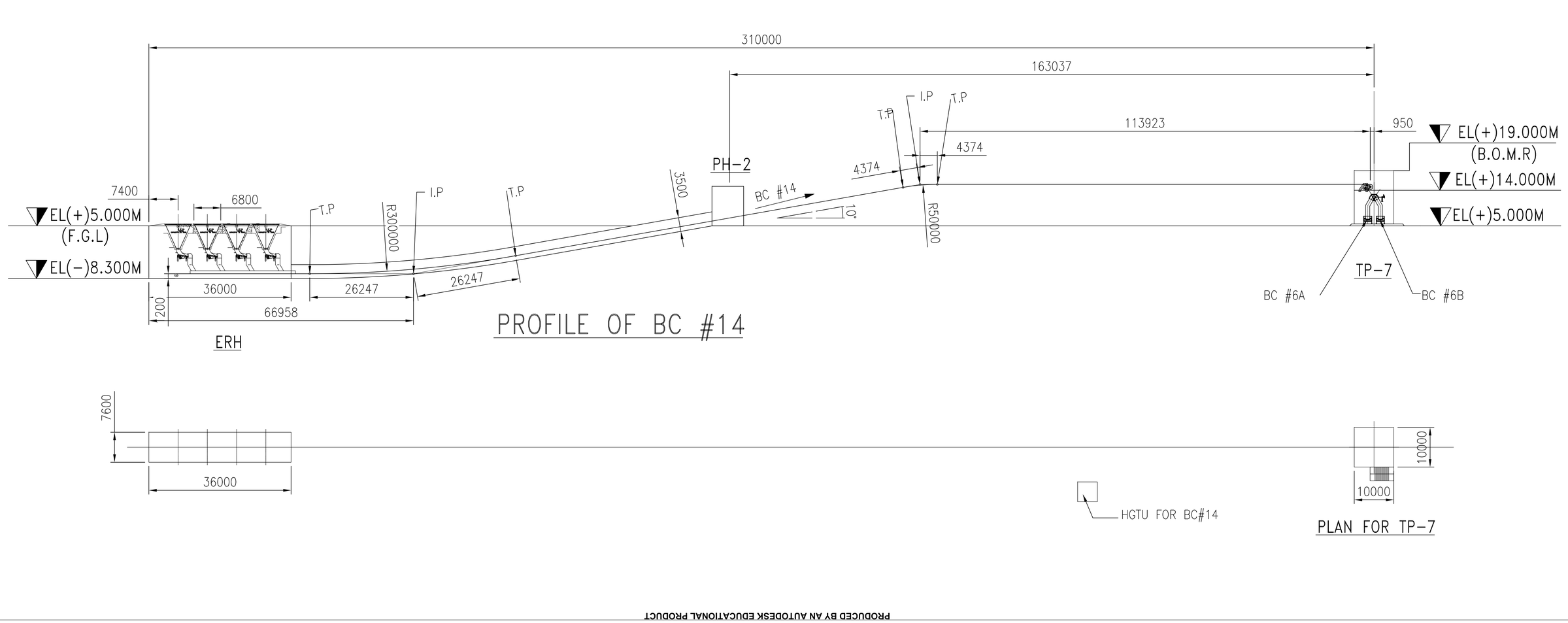


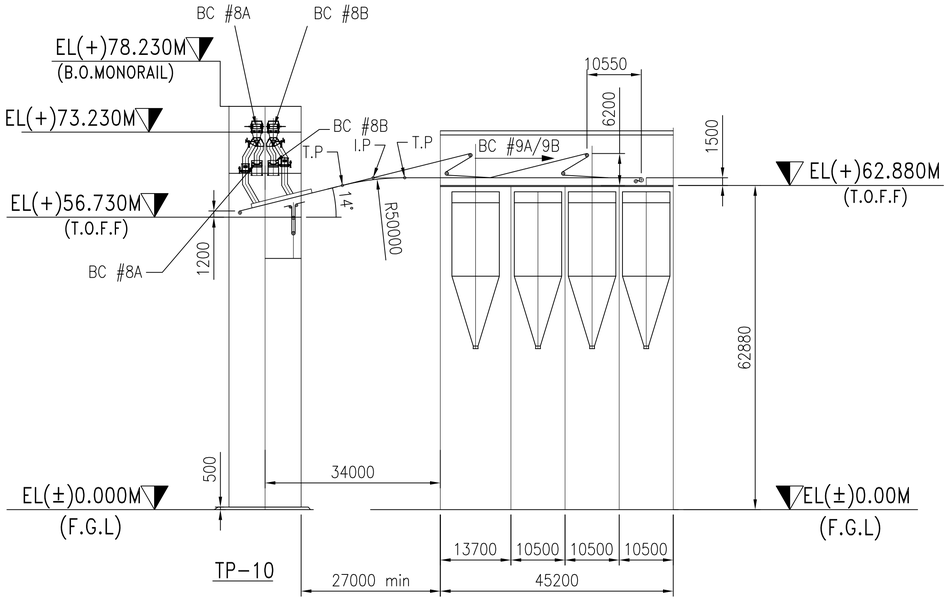
PLAN FOR TP-10



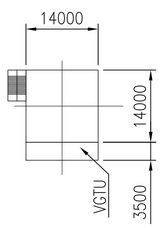
PLAN FOR TP-11

PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT
PRODUCED BY AN AUTODESK EDUCATIONAL PRODUCT

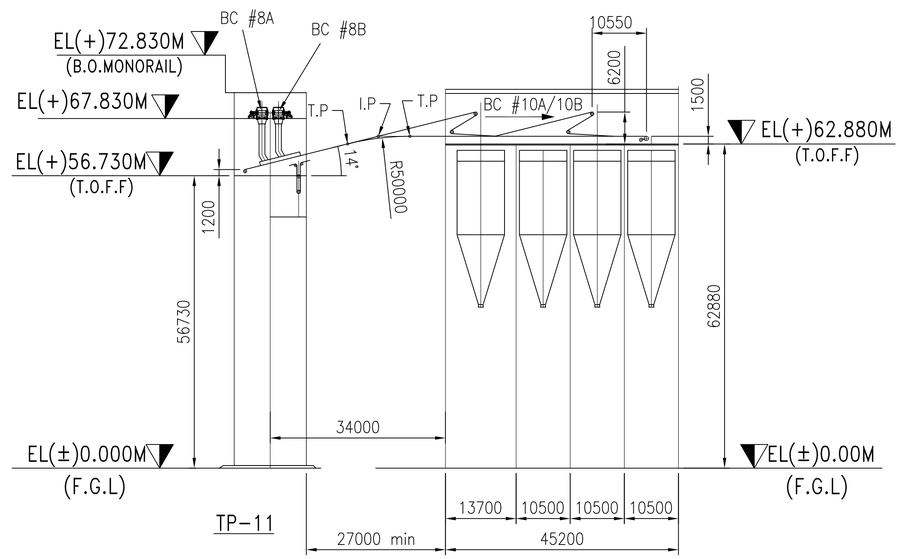




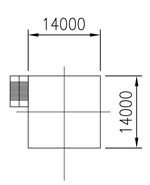
PROFILE OF BC #9A/9B



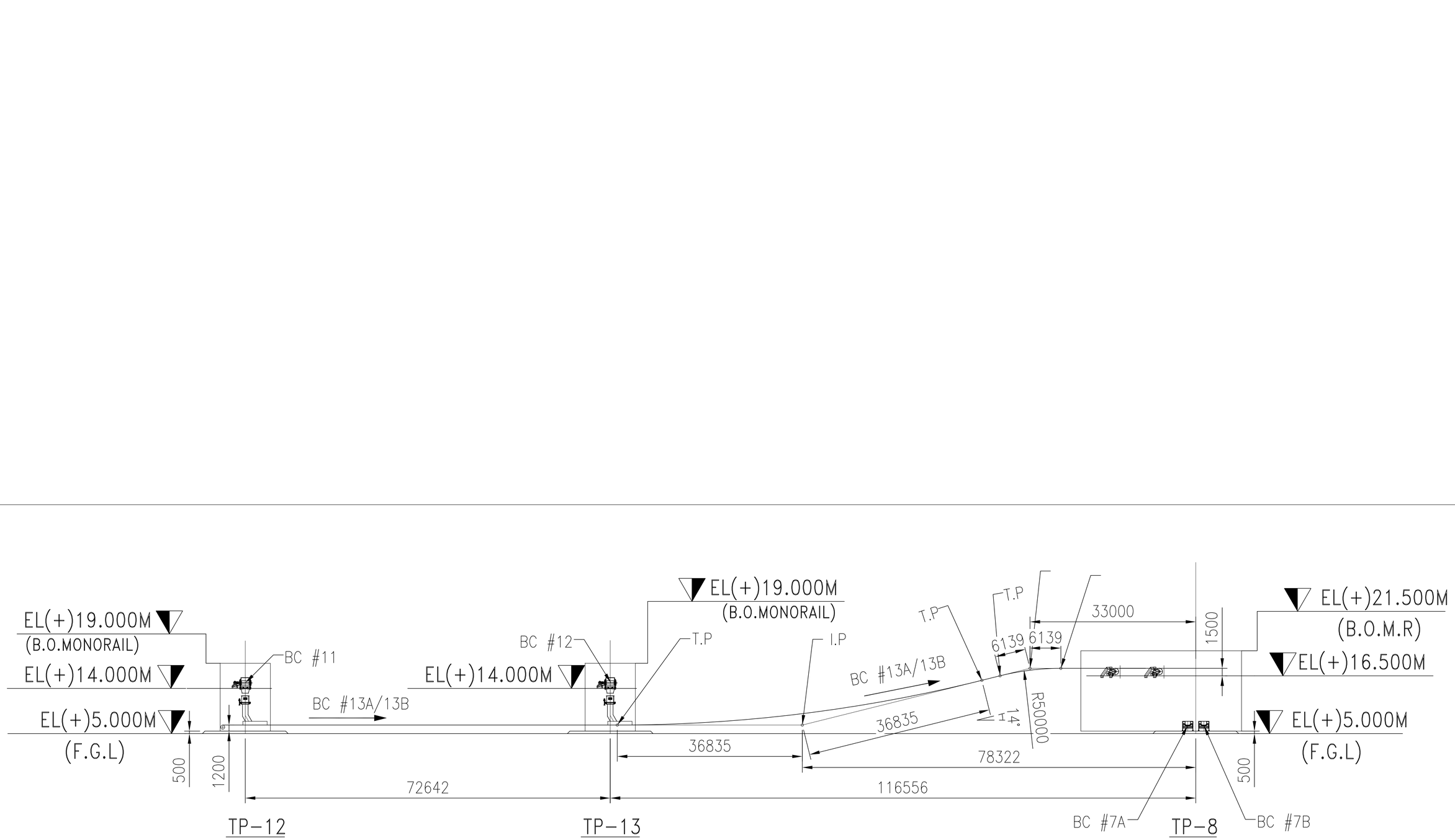
PLAN FOR TP-10



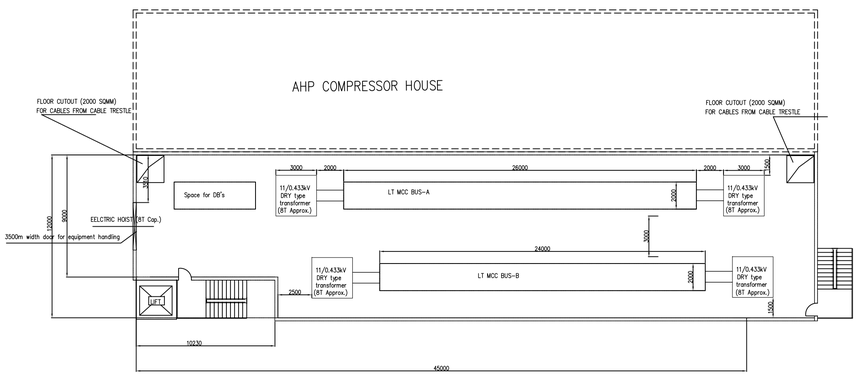
PROFILE OF BC #10A/10B



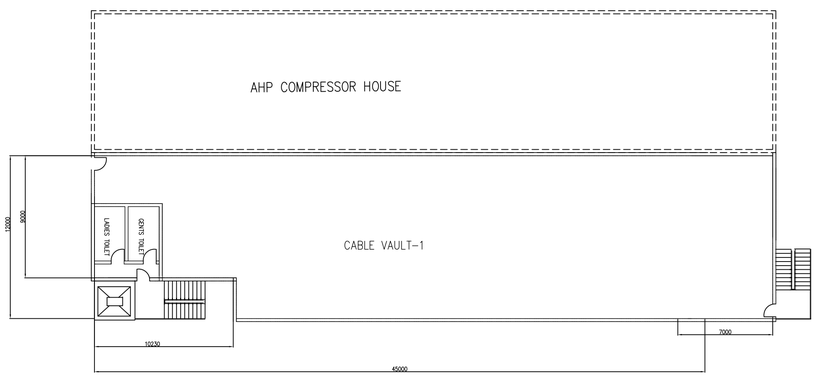
PLAN FOR TP-11



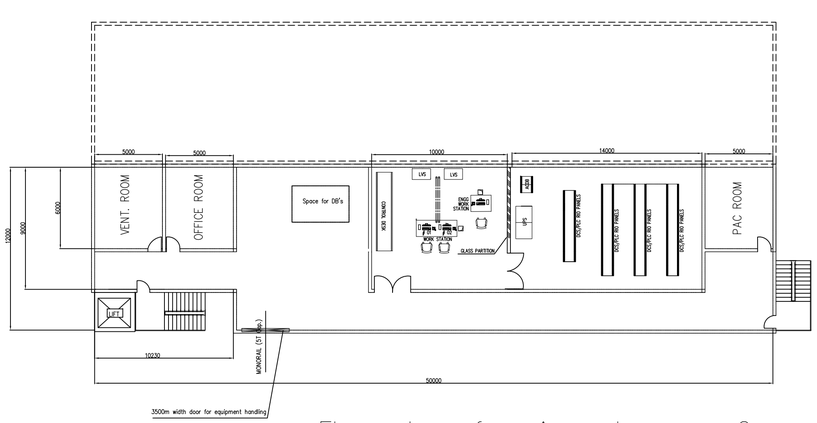
PROFILE OF BC #13A/13B



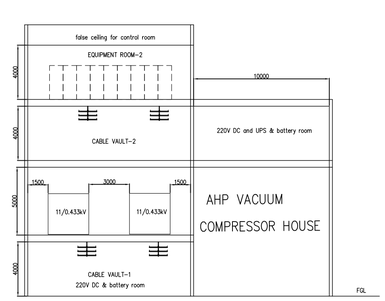
floor plan of Equipment room-1



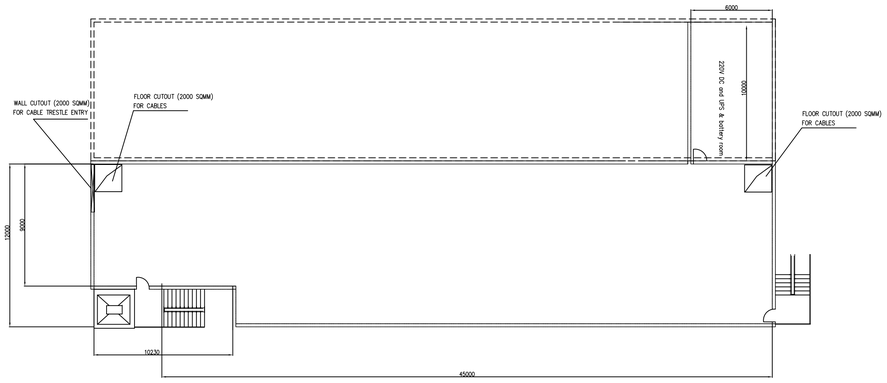
FLOOR PLAN of CABLE VAULT -1



Floor plan of equipment room -2



ELEVATION VIEW



FLOOR PLAN of CABLE VAULT -2

NOTES:

1. DIMENSIONS ARE SUBJECTED TO CHANGE BASED ON ISG/PEM INPUTS
2. FALSE CEILING AS PER TSGENCO SPEC TO BE CONSIDERED IN AIR CONDITIONED ROOMS.
3. CLEAR HEIGHT SHALL BE PROVIDED CONSIDERING BOTTOM OF THE DEEPEST BEAM.
4. STAIRCASE, DOORS , LIFT,CUTOUTS SHOWN IS INDICATIVE ONLY. CIVIL SHALL INFORM COMMENTS IF ANY.
5. COORDINATES SHALL BE GIVEN AFTER PLOT PLAN FINALIZATION.
6. ROAD/CABLE TRESTLE/BUSDUCT SUPPORT DETAILS SHALL BE INTIMATED LATER.
7. DIMENSIONS INDICATED ARE IN mm UNLESS NOTED.

R.No.	DATE	DESCRIPTION	BY	CHKD.	APPD.

REVISIONS

THIS DRG. HAS BEEN APPROVED BY CONSULTANTS/PURCHASERS LETTER NO. DT.

FOR OWNER'S COMMENTS: CIVIL/STR. / MECH. / ELECT.

JOB No. IS-1-14-2006

RELEASE STATUS

PURPOSE	DATE	SIGNATURE
FOR APPROVAL		
FOR TENDER ONLY		

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA
1x800 MW KOTHAGUDAM TPS STAGE-VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
INDUSTRIAL SYSTEMS GROUP
BANGALORE

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	DES'N			
	CHD			
	APPD			

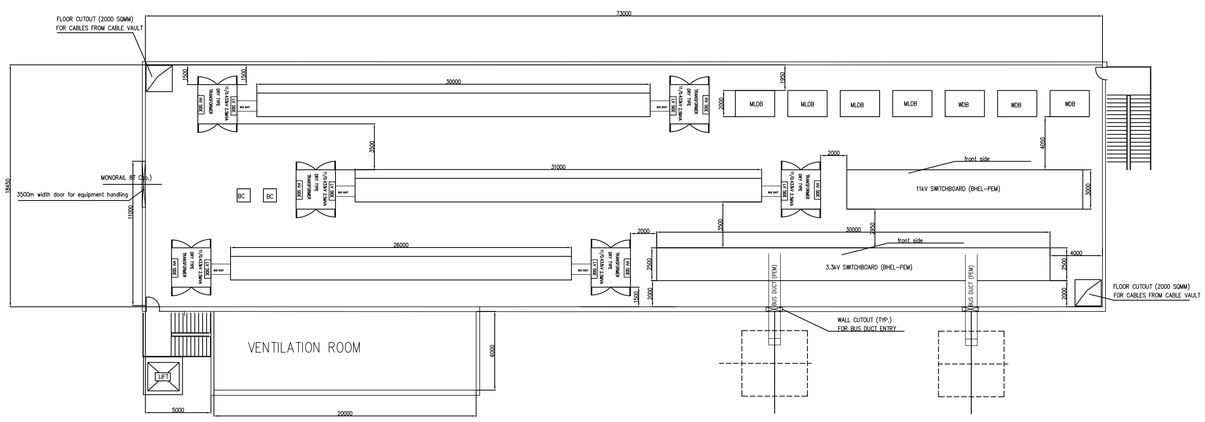
TITLE: **ELECTRICAL EQUIPMENT LAYOUT FOR AHP CONTROL CUM SWICTHGE**

DEPT. / SIGN / SCALE

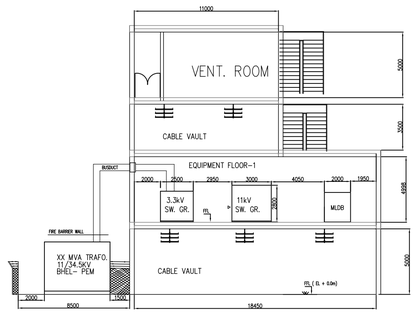
DRAWING NO. **IS-1-EE-690-121-E001**

SHEET 01 OF 01 REV. 00

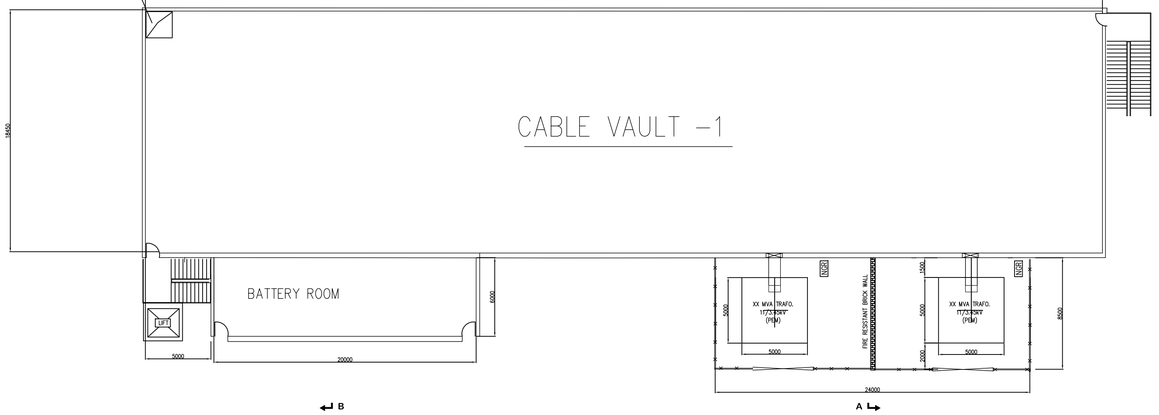
SIZE-A1



B Equiment floor -1 A



SECTION A - A



B A

NOTES:

1. DIMENSIONS ARE SUBJECTED TO CHANGE BASED ON ISG/PEM INPUTS
2. FALSE CEILING AS PER TSGENCO SPEC TO BE CONSIDERED IN AIR CONDITIONED ROOMS.
3. CLEAR HEIGHT SHALL BE PROVIDED CONSIDERING BOTTOM OF THE DEEPEST BEAM.
4. STAIRCASE, DOORS , LIFT,CUTOUTS SHOWN IS INDICATIVE ONLY. CIVIL SHALL INFORM COMMENTS IF ANY.
5. COORDINATES SHALL BE GIVEN AFTER PLOT PLAN FINALIZATION.
6. ROAD/CABLE TRESTLE/BUSDUCT SUPPORT DETAILS SHALL BE INTIMATED LATER.
7. DIMENSIONS INDICATED ARE IN mm UNLESS NOTED.

R.No.	DATE	DESCRIPTION	BY	CHKD.	APPD.

REVISIONS

JOB No: IS-1-14-2006

RELEASE STATUS

PURPOSE	DATE	SIGNATURE
FOR APPROVAL		
FOR TENDER ONLY		
FOR CONST. PURPOSE: CIVIL/STR.		
FOR CONST. PURPOSE: MECH.		
FOR CONST. PURPOSE: ELECT.		

THIS DRG. HAS BEEN APPROVED BY CONSULTANTS/ PURCHASERS LETTER NO., DT.

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA
1x800 MW KOTHAGUDAM TPS STAGE-VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
INDUSTRIAL SYSTEMS GROUP
BANGALORE

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	DES'N			
	CHD			
	APPD			

TITLE

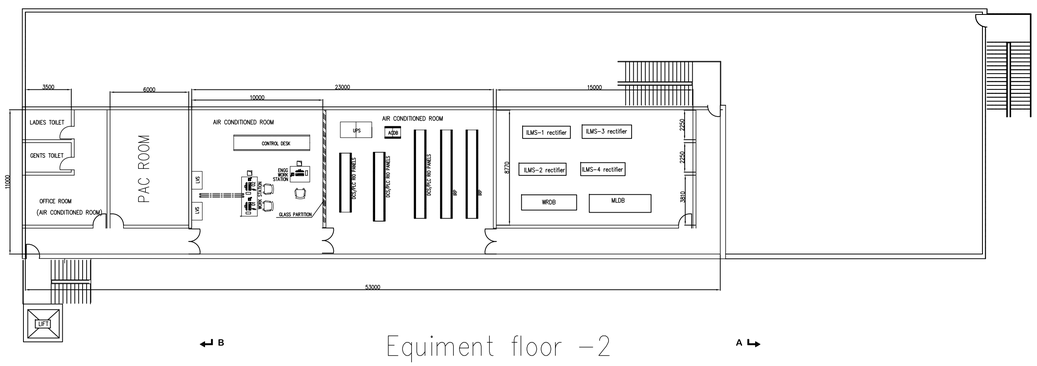
ELECTRICAL EQUIPMENT LAYOUT FOR CHP CONTROL CUM SWITCHGE

DEPT. | SCALE | SIGN

DRAWING NO. **IS-1-EE-690-121-E001**

SHEET 01 OF 02 REV. 00

SIZE-A1



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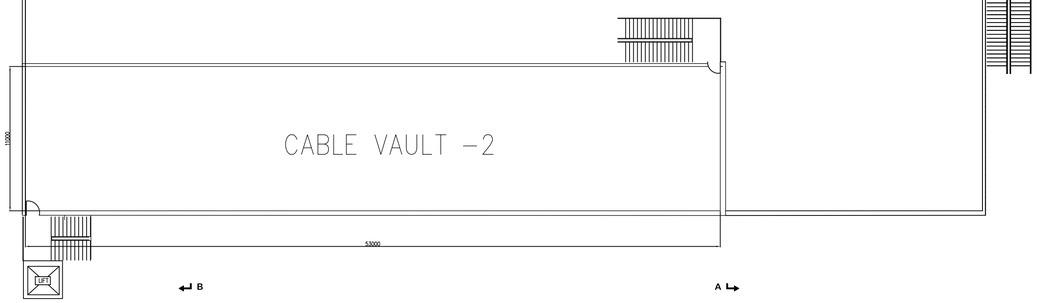

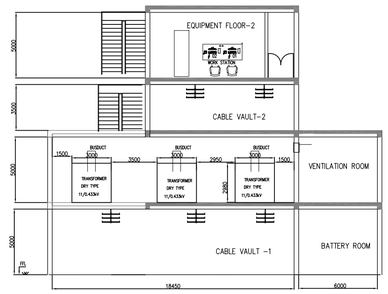

SECTION **B - B**

R.No.	DATE	DESCRIPTION	BY	CHKD.	APPD.

REVISIONS

JOB No. IS-1-14-2006

RELEASE STATUS

PURPOSE	DATE	SIGNATURE
FOR APPROVAL		
FOR TENDER ONLY		
FOR CONST PURPOSE: CIVIL/STR.		
FOR CONST PURPOSE: MECH.		
FOR CONST PURPOSE: ELECT.		

THIS DRG. HAS BEEN APPROVED BY CONSULTANTS/ PURCHASERS LETTER NO., DT.,

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA
1x800 MW KOTHAGUDAM TPS STAGE-VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
INDUSTRIAL SYSTEMS GROUP
BANGALORE

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	DES'N			
	CHD			
	APPD			

TITLE

ELECTRICAL EQUIPMENT LAYOUT FOR CHP CONTROL CUM SWITCHGE

DEPT. | SCALE | SIGN

DRAWING NO. **IS-1-EE-690-121-E001**

SHEET 02 OF 02 REV. 00

SIZE-A1

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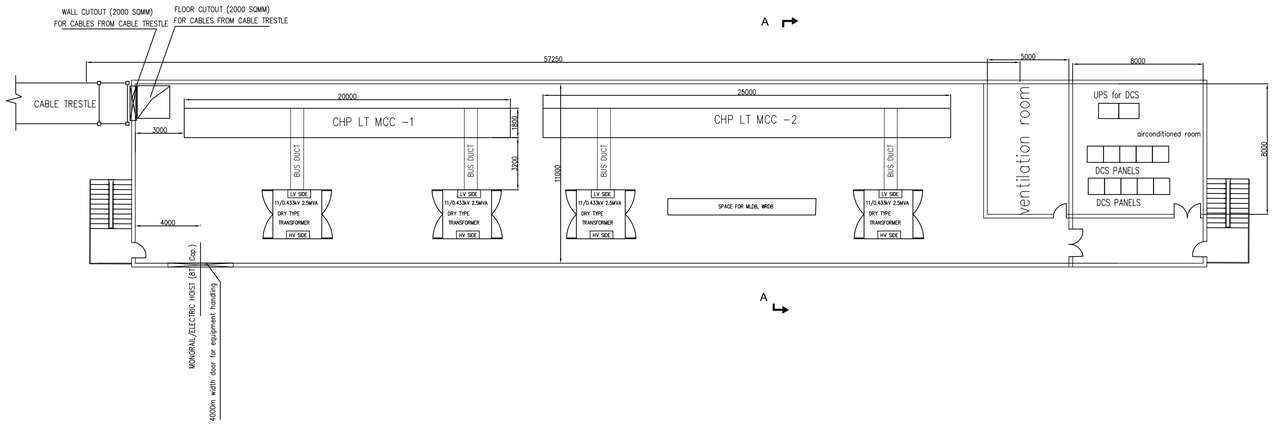
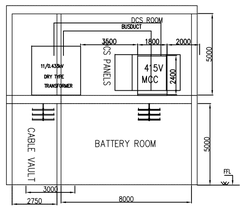
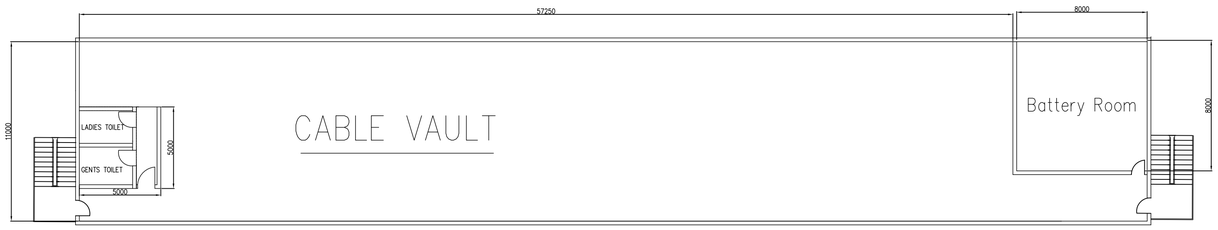




SECTION A-A



NOTES:

1. DIMENSIONS ARE SUBJECTED TO CHANGE BASED ON ISG/PEM INPUTS
2. FALSE CEILING AS PER TSGENCO SPEC TO BE CONSIDERED IN AIR CONDITIONED ROOMS.
3. CLEAR HEIGHT SHALL BE PROVIDED CONSIDERING BOTTOM OF THE DEEPEST BEAM.
4. STAIRCASE, DOORS , LIFT,CUTOUTS SHOWN IS INDICATIVE ONLY. CIVIL SHALL INFORM COMMENTS IF ANY.
5. COORDINATES SHALL BE GIVEN AFTER PLOT PLAN FINALIZATION.
6. ROAD/CABLE TRESTLE/BUSDUCT SUPPORT DETAILS SHALL BE INTIMATED LATER.
7. DIMENSIONS INDICATED ARE IN mm UNLESS NOTED.

CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA
1x800 MW KOTHAGUDAM TPS STAGE-VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

(JOINT VENTURE WITH) Mahindra Company
BHARAT HEAVY ELECTRICALS LTD
INDUSTRIAL SYSTEMS GROUP
BANGALORE

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	DES'N			
	CHD			
	APPD			

JOB No. IS-1-14-2006

RELEASE STATUS

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FOR APPROVAL		
FOR TENDER ONLY		
FOR FIRM CONST	CIVIL/STR.	
	MECH.	
	ELECT.	

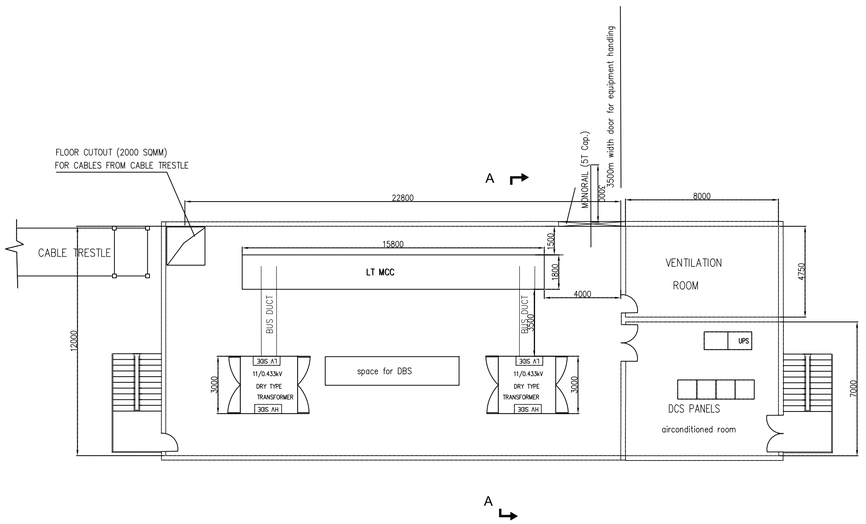
THIS DRG. HAS BEEN APPROVED BY CONSULTANTS/ PURCHASERS LETTER NO. DT.

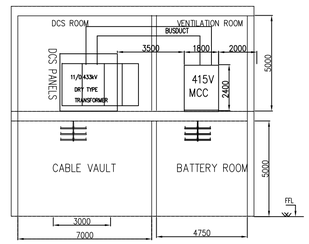
TITLE
ELECTRICAL EQUIPMENT LAYOUT FOR CHP MCC NEAR TP-1

DEPT. SCALE DRAWING NO. **IS-1-EE-690-121-E001**
SIGN
SHEET 01 OF 01 REV. 00
SIZE-A1

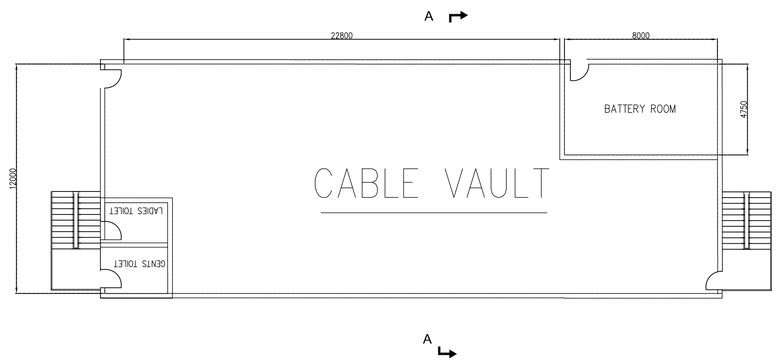
R.No.	DATE	DESCRIPTION	BY	CHKD.	APPD.

REVISIONS





SECTION A–A



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REVISIONS

JOB No. IS-1-14-2006

RELEASE STATUS

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FOR TENDER ONLY		
FOR CONST. PURPOSE: CIVIL/STR.		
MECH.		
ELECT.		

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CUSTOMER: TELANGANA STATE POWER GENERATION CORPORATION LTD
TELANGANA STATE, INDIA
1x800 MW KOTHAGUDAM TPS STAGE–VII UNIT#12, PALONCHA

OWNER'S CONSULTANT: DEVELOPMENT CONSULTANTS PVT. LTD.
CONSULTING ENGINEERS
KOLKATA MUMBAI CHENNAI NEW DELHI

BHARAT HEAVY ELECTRICALS LTD
INDUSTRIAL SYSTEMS GROUP
BANGALORE

DEPT CODE		NAME	SIGN	DATE
M	DRN			
	DESN			
	CHD			
	APPD			

TITLE

ELECTRICAL EQUIPMENT LAYOUT FOR SILO MCC

DEPT. | SCALE | DRAWING NO.
SIGN

SHEET 01 OF 01 REV. 00

SIZE-A1

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