



BHEL-ISG

TECHNICAL SPECIFICATIONS FOR DESIGN, SUPPLY AND
SUPERVISION FOR GEOCELL GROUND IMPROVEMENT
WORKS FOR COAL STOCKPILE

TAMIL NADU GENERATION AND
DISTRIBUTION CORPORATION LIMITED
2x660 MW ENNORE SEZ STPP
COAL HANDLING PLANT

**BHARAT HEAVY ELECTRICALS LIMITED
INDUSTRIAL SYSTEMS GROUP, BANGALORE**

JOB NO: IS – 1 – 14 – 2004\054

**TECHNICAL SPECIFICATIONS
FOR
DESIGN, SUPPLY AND SUPERVISION FOR GEOCELL GROUND
IMPROVEMENT WORKS FOR COAL STOCKPILE**

**TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LIMITED
2X660 MW ENNORE SEZ SUPER CRITICAL THERMAL POWER PROJECT
CHENNAI, TAMIL NADU**

S.VIKRAM Dy. Manager/ PE (Civil)	UTTAM SINGH GAHARWAR Sr. Manager/ PE (Civil)	HEMANT MALHOTRA AGM & Head/ PE (Civil)
Prepared	Checked	Approved



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PREQUALIFICATION CRITERIA



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DESIGN, SUPPLY & SUPERVISION FOR GEOCELL GROUND IMPROVEMENT WORKS

Technical Criteria:

- 1) The Geocell Ground Improvement works under the scope of this contract shall be carried out by a bidder who should have successfully completed works pertaining the design, supply and supervision of Geocell Ground Improvement system for any one of the following within the preceding seven (7) years, as on the date one month prior to Part-1 bid opening.
 - a) Three (3) completed works each costing not less than Rs. 340 Lakhs in a single order
 - b) Two (2) completed works each costing not less than Rs. 425 Lakhs in a single order
 - c) One (1) completed works each costing not less than Rs. 680 Lakhs in a single order
- 2) Computed settlement from the analysis submitted shall be within the limits stipulated in Cl. 4.1 of Technical Specification.

Financial Criteria:

The average annual turnover of the bidder in the preceding three (3) financial years as on 31.03.20 shall not be less than Rs. 255 Lakhs.

Selection Criteria:

The bidders meeting the above Technical & Financial criteria and Technical & Commercial Terms & Conditions of the enquiry, shall be offered to do a Test Patch of 50m x 50m for validation of the Ground Improvement designs submitted. The bidders qualifying the Test patch criteria as detailed in Cl. 3(b) of Technical Specifications, shall be considered for Price bid opening.

There shall be no payment for Test patch works.

Please refer clause no. 3 of Commercial Terms & Conditions for 'Bid evaluation and Ordering Methodology'.

Documentary proof:

Bidder shall furnish following documents in proof of prequalification mentioned above.

1. Copy of Work order and completion certificates from customer in proof of the technical criteria for point 1. (Refer Note below)
2. Bidder has to submit the design of Ground Improvement system with supporting FEM analyses as per Technical Specifications.
3. Bidder to submit Annual accounts- Balance sheet and profit & loss account duly audited for the preceding three (3) financial years as on 31.03.20 in proof of Financial criteria.

NOTE:

1. Bidder shall be responsible for supply of material, however, may go for a collaboration/ agreement with any other agency/ subsidiary for supervision and testing at site. However, the sole responsibility shall lie with the bidder only and not the subsidiary/agency.



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2. In case bids are under collaboration/agreement (as mentioned in Pt. 1 above), the bidder to submit the consortium agreement. However, BHEL shall maintain transaction and correspondence only with the bidder.
3. Bids will not be considered for evaluation if Bidder is blacklisted/ banned/ hold as on date of bid opening by any PSU or Government agency in India.
4. Bidder shall submit requisite Documentary evidence such as attested copy of award letter/ contract and completion certificates/ performance certificates of previous works executed with aforesaid criteria properly indexed along with offer.
5. Bid documents are to be only in English language. The bid supporting documents other than in English language are also to be supported with translated document in English language.
6. Financial pre-qualification of the foreign bidder (other than Indian Bidders) may also be evaluated on the basis of the report from a reputed third party business rating agency like Dun & Bradstreet, Credit reform etc. The foreign bidder is to submit the report from reputed third party.
7. For evaluation of foreign bidder, exchange rate (TT selling rate of SBI) as on scheduled date of Part-1 bid opening shall be considered.
8. Bidder shall submit details of experience, i.e., jobs executed, jobs in progress in the format indicated below.

SL. NO	NAME OF PROJECT	BRIEF SCOPE OF WORK	ORDER REF. NO & DATE	DATE OF COMMISSIONING	NO. OF YEARS IN SUCCESSFUL OPERATION	PERFORMANCE CERTIFICATE ENCLOSED (Y/N)	REMARKS



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SCOPE OF WORK



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DISTRIBUTION CORPORATION LIMITED**
2x660 MW ENNORE SEZ STPP
COAL HANDLING PLANT**1. GENERAL**

BHEL is executing 2x660 MW Ennore SEZ STPS. As a part of contract, coal stockyard RCC paving with a uniform surcharge load of 15T/m² is to be designed and executed. As the site is located in Ash Pond area, there is a requirement of ground improvement **using Geocell** to support the RCC paving.

2. SITE SPECIFIC INFORMATION

- a) **Project:** 2x660 MW ENNORE SEZ STPP
- b) **Customer:** TAMIL NADU GENERATION AND DISTRIBUTION CORPORATION LIMITED
- c) **Nearest Airport:** Chennai (approx. 60 km)
- d) **Nearest Railway Station:** Athipattu Pudunagar (approx 5 kms)
- e) **Nearest Road Access:** All weather road from Pattamandri on the Thiruvottiyur-Ponneri district highway.

3. SCOPE:

- a) **Design of Ground Improvement system** using Geocell for a surcharge loading of 15 T/m² for Coal Stockpile area with the following dimensions.

S. No.	STRUCTURE	SIZE
A	COAL STOCKPILE	
1	Stock Pile 1 & 3	2x565x46m
2	Stock Pile 2	1X565X70m

(Relevant documents, drawings, geotechnical investigation report are enclosed in Annexure-1). The bidder shall be responsible for approval of Designs from Customer and may be required to participate in meetings at Customer/ Consultant's/ BHEL's office at Chennai / Delhi/ Bangalore.

- b) **Validation of design** on a test patch of 50mx50m for Technical evaluation of the submitted analysis and designs. Instrumentation and testing for validation of design calculation shall be arranged by bidder. Surcharge loading for the test patch shall be arranged by BHEL. The settlement shall be monitored for a period of 45 days from the completion of loading and submitted to BHEL and TANGEDCO for their approval.
- c) **Bidder to ensure the supply of Geocell material** to site to meet the installation plan and project schedule. Supply of the designed Geocell product to Project Site stores. The quoted



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price shall also include freight and all statutory charges and levies as applicable. Unloading shall be done by BHEL at their stores. Bidder to inform BHEL adequately in advance of planned despatches to arrange for unloading. However, BHEL shall not bear any demurrages for delays due to unforeseen circumstances. The supplied geocell material shall be suitably protected, packed, covered and despatched to prevent damage or deterioration during transit and handling. The vendor shall be responsible for any loss or damage during transportation and handling.

- d) **Supervision of installation** of the proposed geocell material for ground improvement by deputing an expert till complete installation of Geocells to the satisfaction of Customer/ BHEL.
- e) **Special Tools, facilities**, and connectors required for installation of Geocells etc. all complete.

The supply load test, and complete installation shall be completed within 6 months from the date of LOI.

Installation methodology shall take care of BHEL and other agencies working in the Coal Stockpile area and interfaces with structures / facilities / services in the Coal Stockpile area. All works to be carried out based on functional requirements and Customer / BHEL-ISG's specifications and amendments issued from time to time

4. DESIGN CRITERIA

4.1. DESIGN PHILOSOPHY

Ground Improvement System shall be designed to limit **the total settlement to 150mm and differential settlement limited to RCC paving panel rotation of 0.50 deg.**

The analysis shall be done using PLAXIS or equivalent Finite element application. Considering the nature of the system, the analysis can be done as a 2D plane strain problem. Analysis shall be done for both the stockpile widths i.e., 46m and 70m and the greater of the settlement values shall be considered as the designed settlement

The vendor may visit site and satisfy himself for the proposed solution considering the existing site condition / structures.

4.2. LOAD CASES

Following Load cases shall be considered in design of each stockpile:



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Case 1: Coal Stockpile loaded to full capacity for the entire width.

Case 2: Middle third of the Coal Stockpile along width loaded for the total intensity

Case 3: End third of the Coal Stockpile along width loaded for the total intensity

5. DOCUMENTS TO BE SUBMITTED

5.1. TO BE SUBMITTED AS A PART OF THE BID DOCUMENT

- a) Product Data sheet giving details of material, tensile capacity, dimensions and stiffness under various cases of infill material
- b) Design document with detailed analysis, reporting the total and differential settlements in compliance with Technical Specifications

5.2. TO BE SUBMITTED UPON AWARD OF WORK

- a) Coal Stockpile Ground Improvement arrangement drawings, showing plan, elevation/section as required with complete details and relevant notes shall be submitted.
- b) Installation methodology taking care of BHEL and other agencies working in the Coal Stockpile area and interfaces with structures / facilities / services in the Coal Stockpile area. Method statement with resource planning and supply schedule to meet the Time schedule (mentioned elsewhere in this document) shall form a part of the Installation methodology.
- c) Field Quality Plan shall include details of:
 - i. Frequency and Tests for Geocell giving references of applicable standards.
 - ii. Frequency and Tests for infill materials
 - iii. Methodology for Loading and Testing for the Test Patch
- d) Manufacturer Test Certificate (MTC) shall be submitted at site along with the material despatched. Further periodical testing shall be done by the vendor in accordance with the approved Field Quality Plan.



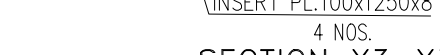
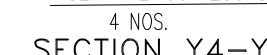
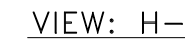
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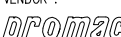
ANNEXURE-1

1.	IS-1-GA-688-108-M167	G.A. OF STOCK YARD LAYOUT OF STACKER CUM RECLAIMER
2.	IS-1-CE-688-108-C238	G.A. & R/F DETAILS OF DRAINS, RETAINING WALLS AND CULVERTS IN STOCKPILE
3.		Relevant clauses of Customer Technical Specifications
4.		Borelog and relevant Geotechnical data for the Coal Stockpile area



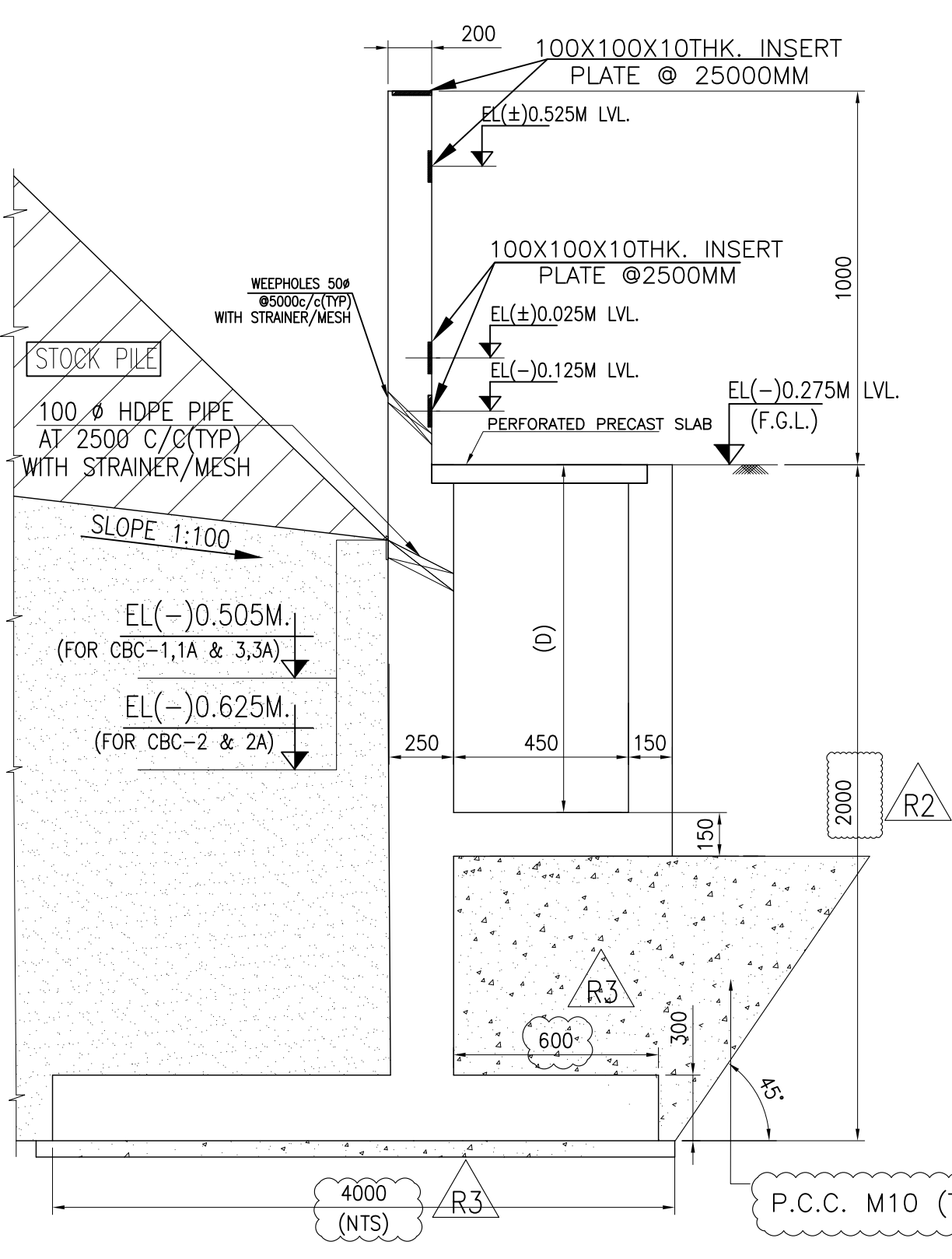
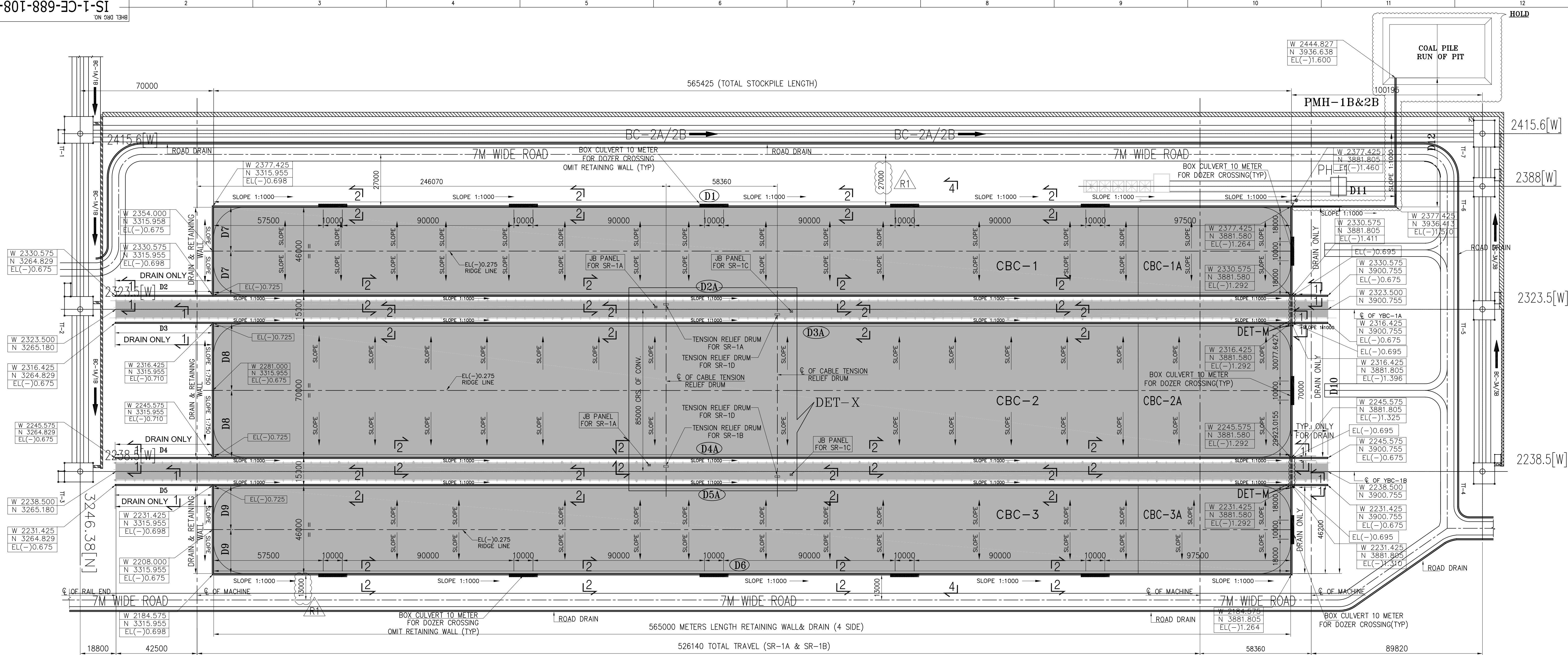
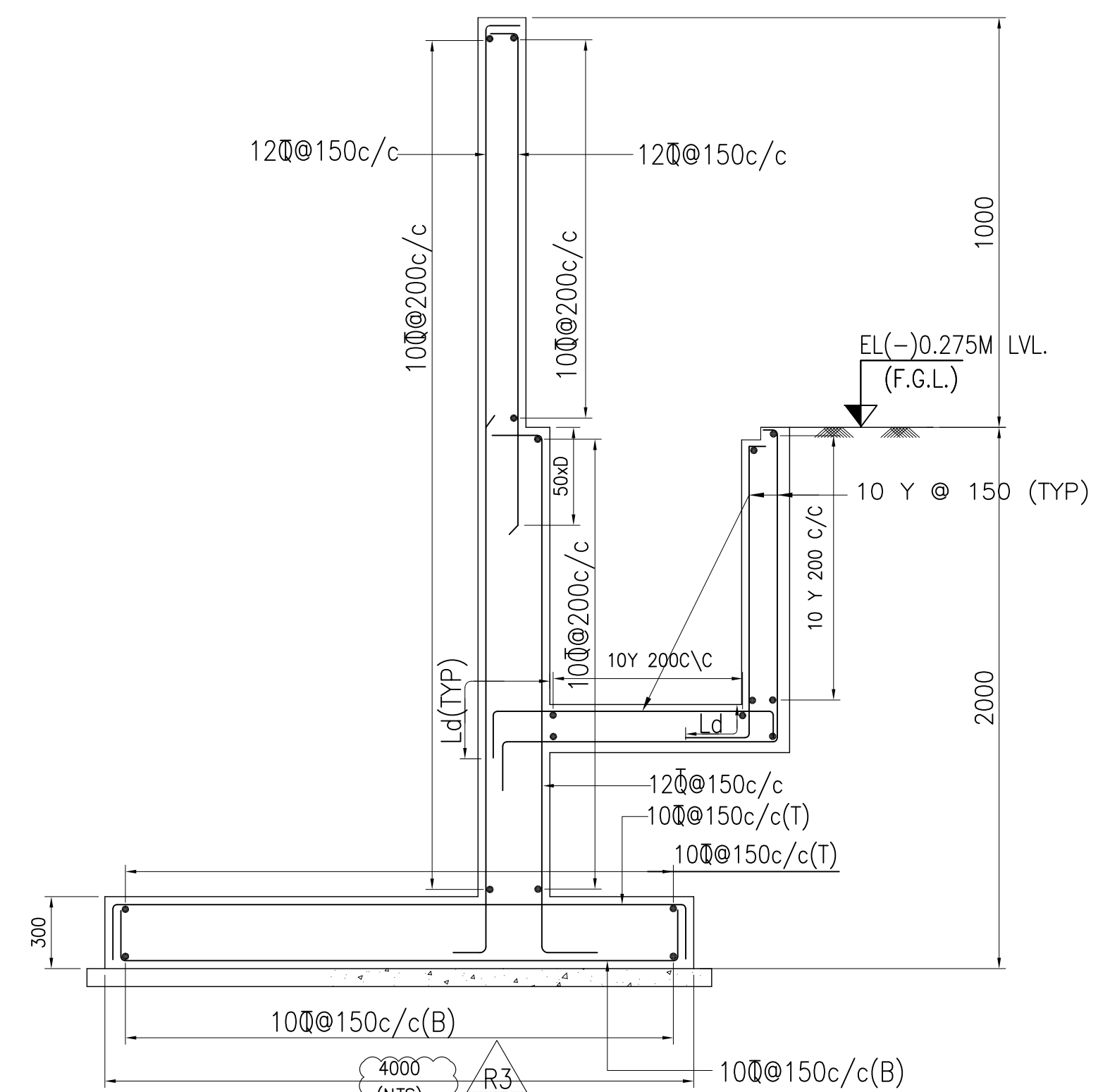
NOTES :-

1. ALL DIMENSIONS ARE MM. & LEVELS ARE IN METRE.
2. FGL OF STOCKPILE AREA IS RL (+) 9.725 M.
3. THIS DRAWING TO BE READ IN CONJUNCTION WITH
4. DRG. NO. IS-1-Ca-688-108-M164 Rev 02 G.A. OF SCR WITH TECHNICAL DATA SHEET
5. B. DRG. NO. IS-1-Ca-688-108-M168 Rev 00 WHEEL LOAD DATA OF SCR.
6. DRG. NO. IS-1-Ca-688-108-M169 Rev 02 G.A. OF RAIL TRAVEL MECHANISM FOR SCR
5. DRG. NO. IS-3-Ca-688-108-M176 Rev 00 G.A. OF HYDRAULIC BUFFER FOR SCR
6. DRG. NO. IS-3-Pi-688-108-M210 Rev 00 PID OF DUST SUPPRESSION SYSTEM FOR STACKER RECLAIMER

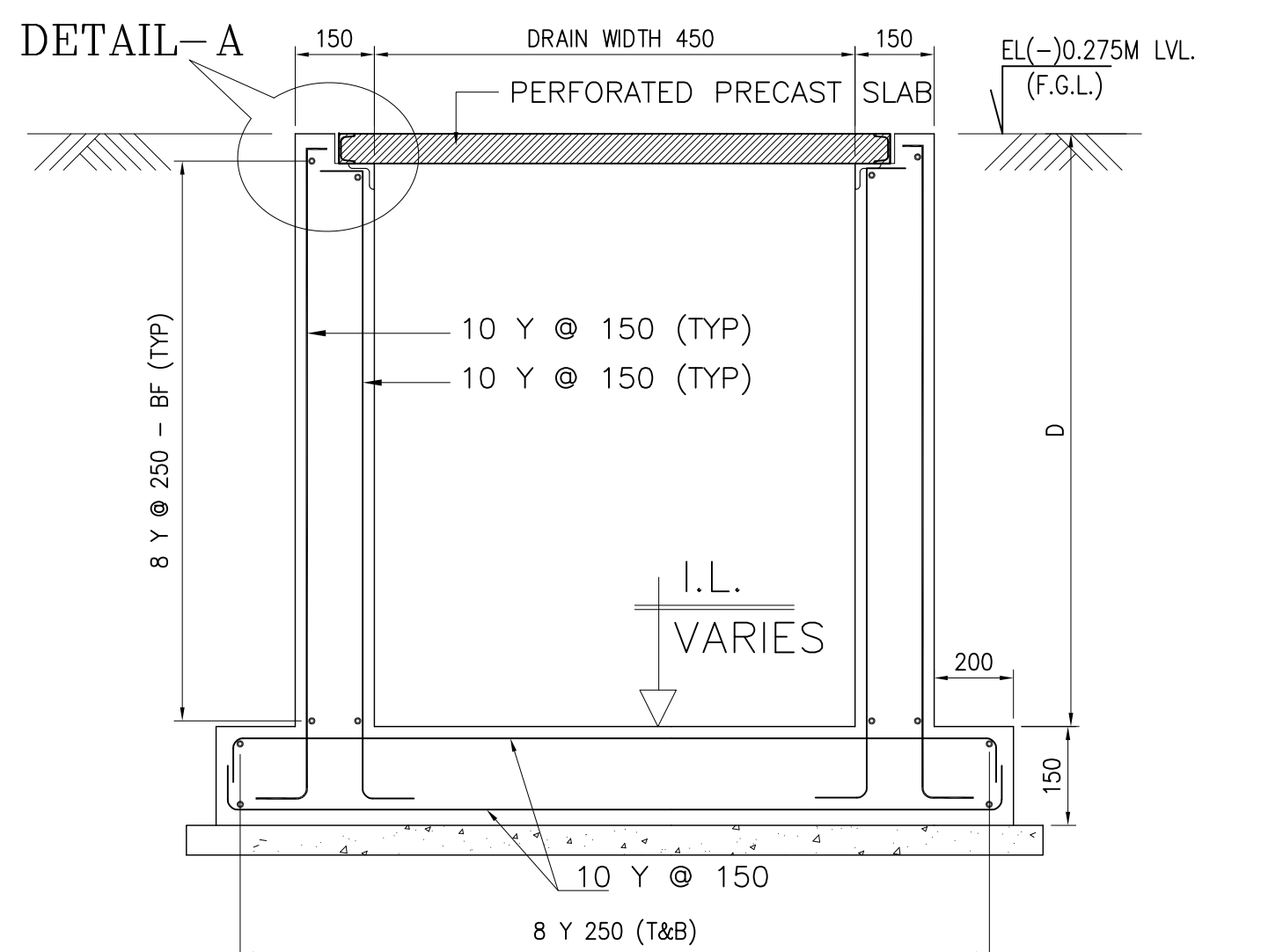
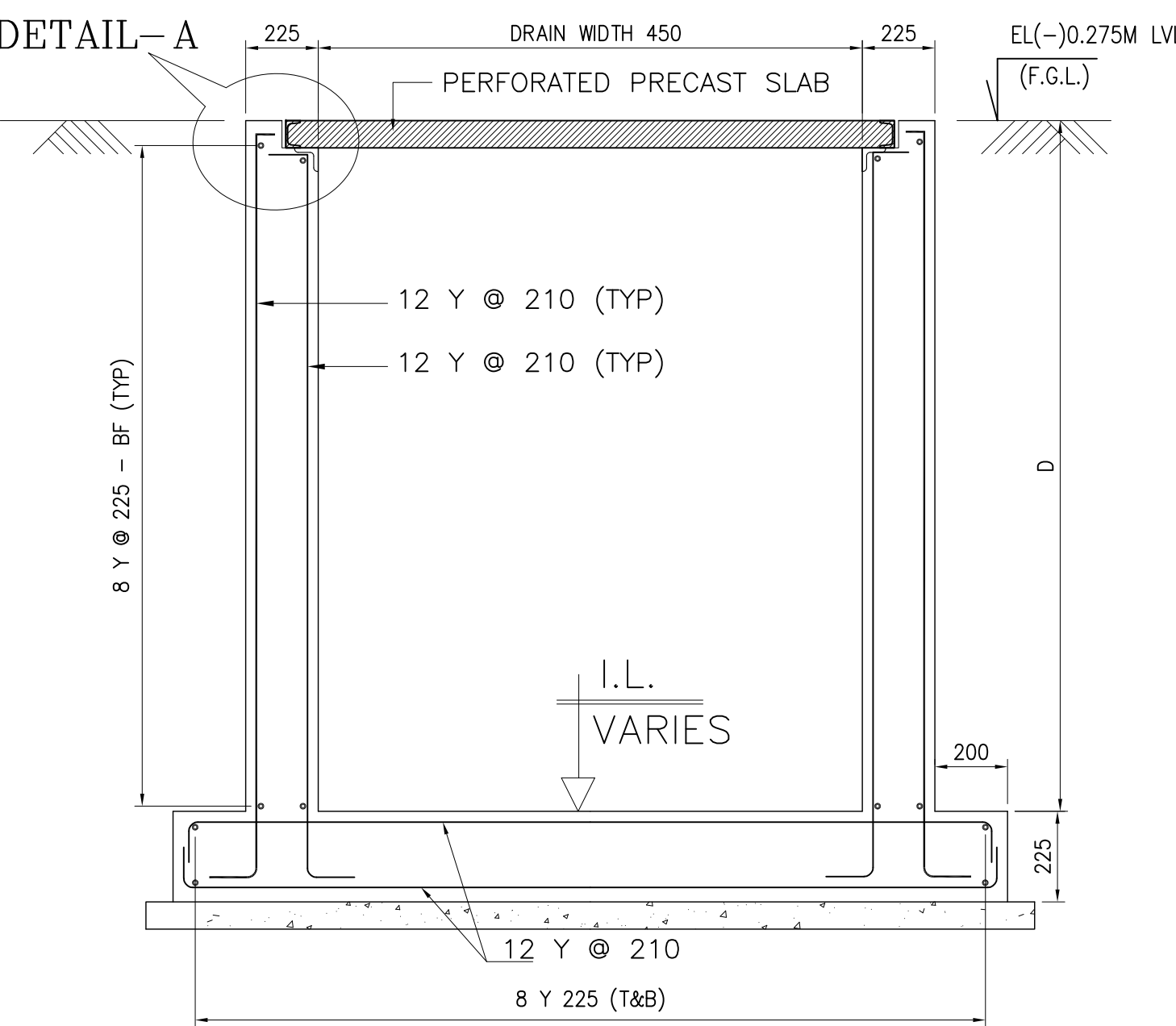
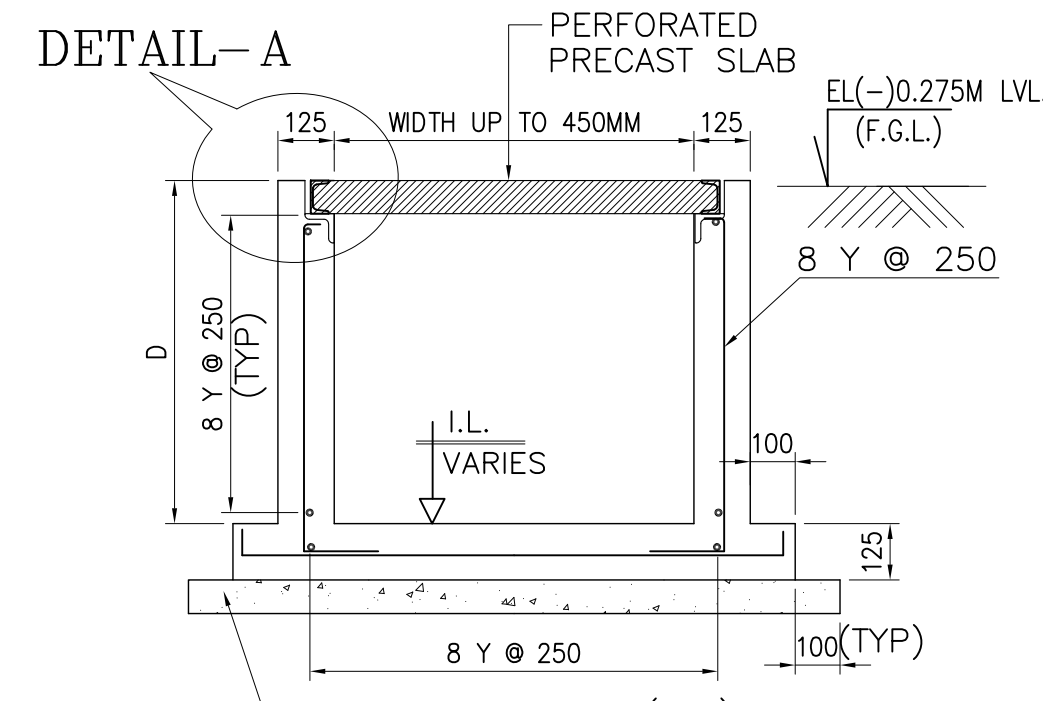
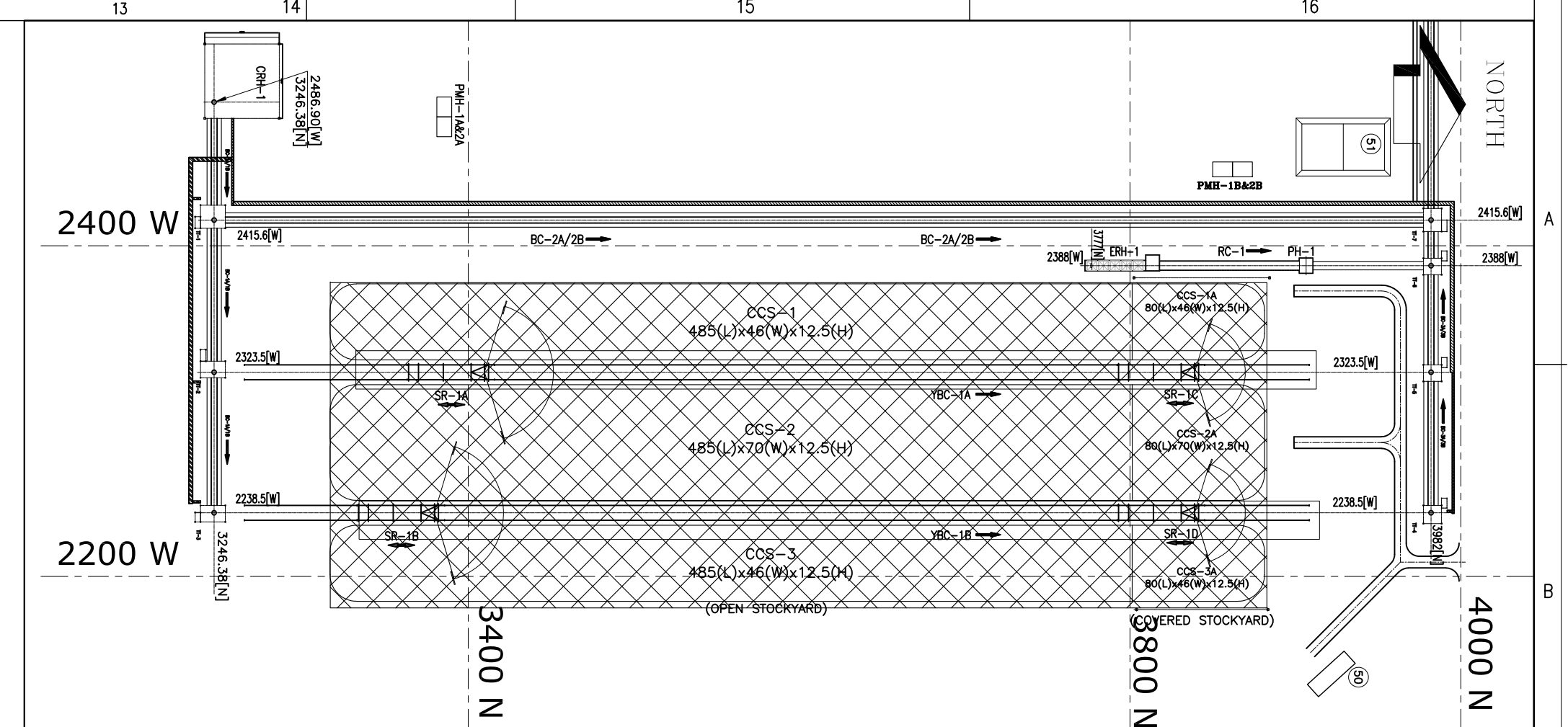
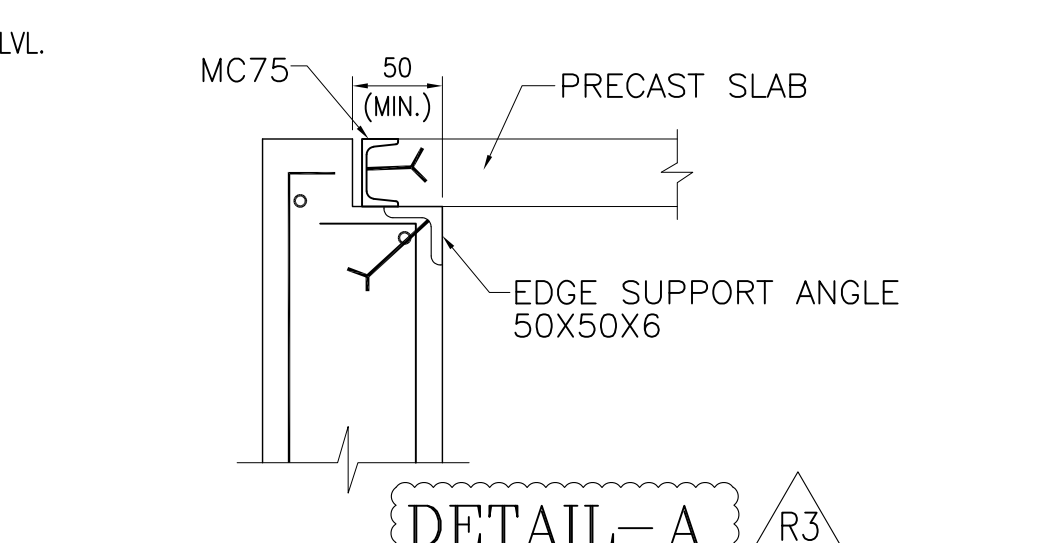
CUSTOMER :		TAMILNADU GENERATION AND DISTRIBUTION CORPORATION			
CUSTOMER CONSULTANT :		 DESEIN CONSULTING ENGINEERS NEW DELHI INDIA			
EPC CONTRACTOR :		 BHARAT HEAVY ELECTRICALS LTD. INDUSTRIAL SYSTEMS GROUP, BANGALORE			
PROJECT :		2x660 MW ENNORE SEZ SUPERCRITICAL THERMAL POWER PROJECT AT ASH DYKE OF NCTPS, CHENNAI-14			
QTY :	VENDOR :	 Promec Engineering Industries Ltd. BANGALORE - 560062, INDIA			
DATE :	DIRECTORY : AG-688	SCALE :	WEIGHT(Kg.)	REF DRG.	ITEM NO.
	FILE NO. : -	 NTS		-	
TITLE :				DRAWING NO.	
G.A. OF STOCK YARD LAYOUT OF STACKER CUM RECLAIMER				IS-1-GA-688-108-M167	
SHEET NO.		NO OF SHEETS			

DATE		NO.	REVISED AS PER COMMENTS FROM TANGSEDO ON 22-05-2018		
13.03.2019	RD	NAS, DRN			
DATE		NO.	REVISED AS PER DESIGN COMMENTS ON 08-11-2017		
13.11.2017	NLB, NAS, DRN				
DATE		NO.	REV. REVD. AS MD, JG AS PER BHEL COMMENTS DT. 08-05-2017		
26.07.2017	NLB, NAS, DRN				
DATE		DRN	CHG	APPRO	DESCRIPTION
FIRST SUBMISSION					
DRAWING NO.		K320356-00-01 R3			
DESIGN COLLABORATOR					
DRAWN		NLB	2.03.17		 FAMAU FAMAK S.A. 44-200 Kuchnia, ul. Fabryczna 5, street, Poland Phone: +48(0)77/4477000 Fax: +48(0)77/4470100 +48(0)77/4477100 www.famau.pl
CHECKED		NAS	2.03.17		
APPROVED		DB	2.03.17		
DATE		SIGNATURE			

JOB NO. : IS-1-14-2004		INDUSTRIAL SYSTEMS GROUP, BANGALORE									
STATUS OF DRAWING: FOR APPROVAL		PROJECT : 2x600 MW ENORE SEZ SUPERCRITICAL THERMAL POWER PROJECT AT ASH DYKE OF NCTPS, CHENNAI-57.									
DISTRIBUTION OF PRINTS		QTY.	SNOW	NAME		SIGN	DATE				
			<i>PRONIC Engineering Industries Ltd.</i>	DRN.	S.M.		25.02.2017				
			BANGALORE-600062, INDIA	CHD.	LD		25.02.2017				
				APPR.	GAN		25.02.2017				
DATE	REV.	NAME	SIGN	DATE	SCALE	HEIGHT (m)	REF. DRG.	ITEM NO.			
		ALTERED			DIRECTORY : AD-688						
		CHECKED			FILE NO. : -		NTS		-		
		APPROVED			TITLE	DRAWING NO.					
ZONE					G.A. OF STOCK YARD LAYOUT OF STACKER CYM REPAIR			IS-GA-688-108-M167			

SECTION-2-2
DETAIL OF RETAINING WALL

REINFORCEMENTS DETAIL OF RETAINING WALL & DRAIN

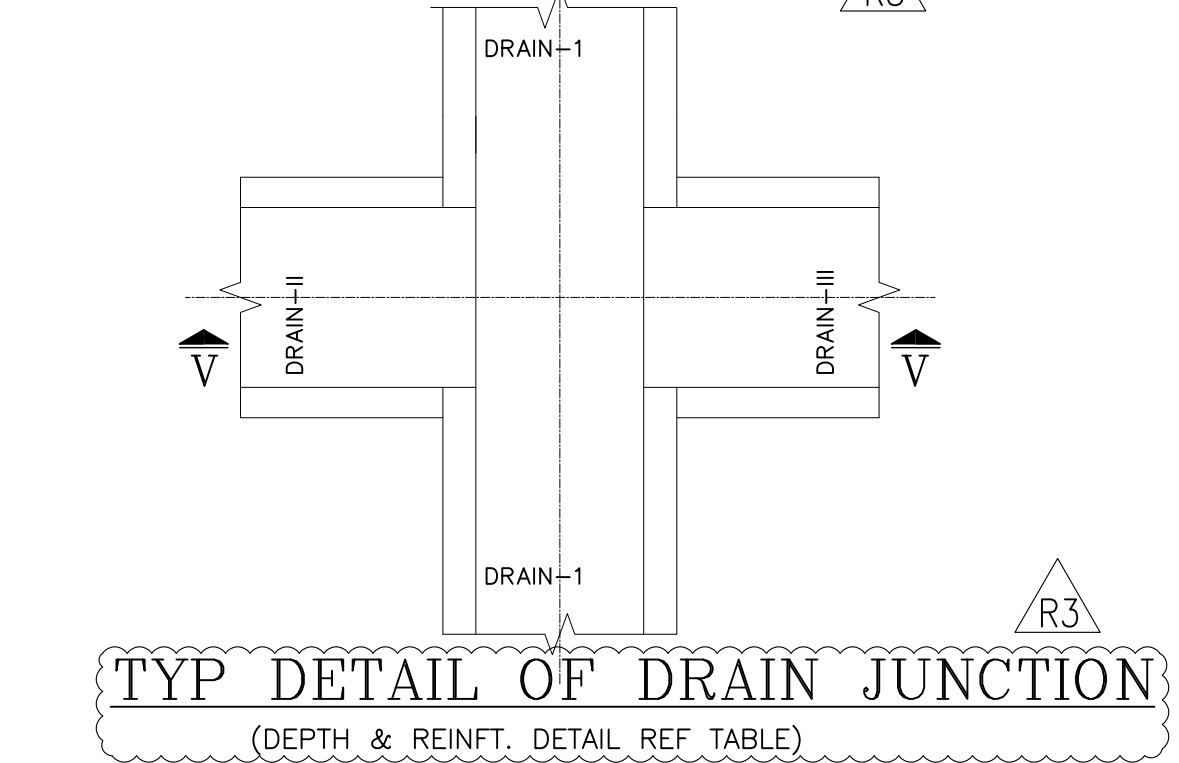
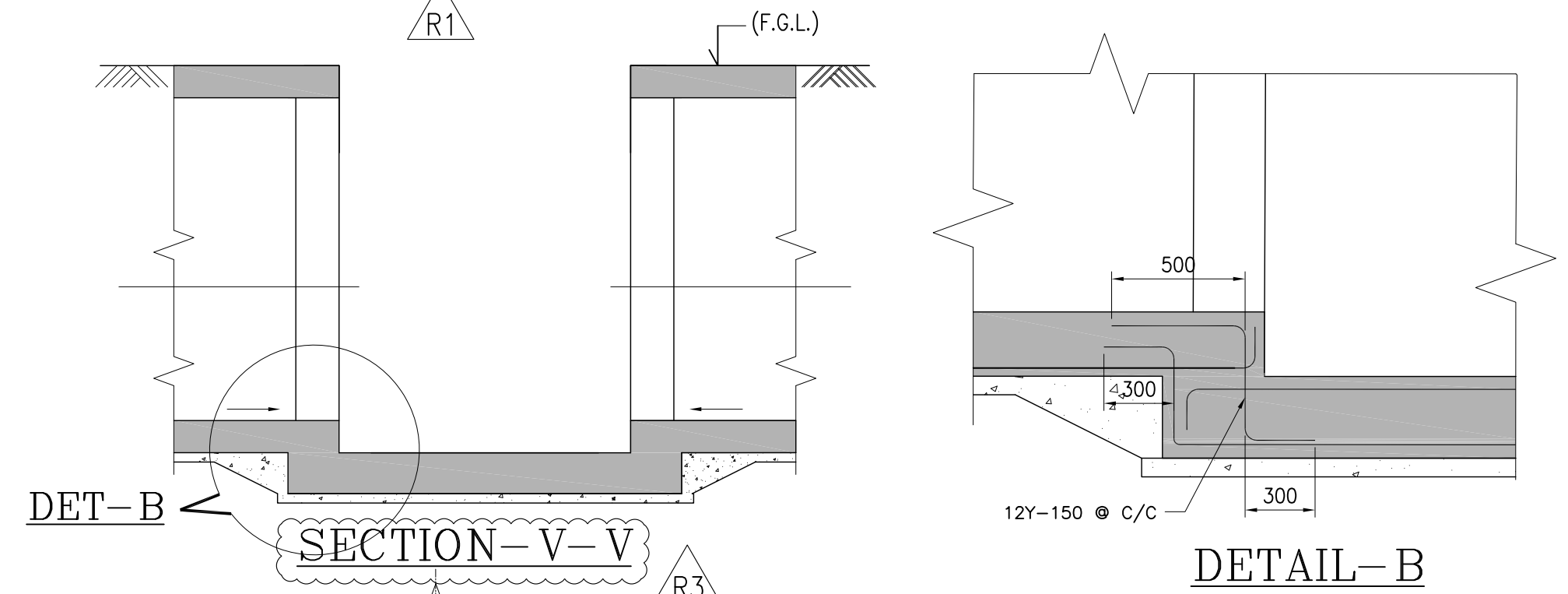
TYP. REINF. DETAIL OF DRAIN
(FOR D > 500) TO (D ≤ 1000)TYP. REINF. DETAIL OF DRAIN
(FOR D > 1000) TO (D ≤ 1500)SECTION 1-1
(FOR D ≤ 500)

KEY PLAN

* INSERT PLATE DETAIL REF: LATEST MECH. DRAWING

DETAIL OF DRAIN:-

REF.	DRAIN NO	WIDTH OF DRAIN	IL OF DRAIN AT START	IL OF DRAIN AT END	DEPTH OF DRAIN AT START(M)	DEPTH OF DRAIN AT END(M)
R1	D1	0.450	EL(-)0.698	EL(-)1.264	0.423	0.989
	D2	0.450	EL(-)0.675	EL(-)0.725	0.400	0.450
	D2A	0.450	EL(-)0.725	EL(-)1.292	0.450	1.017
	D3	0.450	EL(-)0.675	EL(-)0.725	0.400	0.450
	D3A	0.450	EL(-)0.725	EL(-)1.292	0.450	1.017
	D4	0.450	EL(-)0.675	EL(-)0.725	0.400	0.450
	D4A	0.450	EL(-)0.725	EL(-)1.292	0.450	1.017
	D5	0.450	EL(-)0.675	EL(-)0.725	0.400	0.450
	D5A	0.450	EL(-)0.725	EL(-)1.292	0.450	1.017
	D6	0.450	EL(-)0.698	EL(-)1.264	0.423	0.989
	D7	0.450	EL(-)0.675	EL(-)0.698	0.400	0.423
	D8	0.450	EL(-)0.675	EL(-)0.710	0.400	0.435
	D9	0.450	EL(-)0.675	EL(-)0.698	0.400	0.423
	D10	0.450	EL(-)1.674	EL(-)1.458	0.989	1.183
	D11	0.450	EL(-)1.458	EL(-)1.510	1.183	1.235
	D12	0.450	EL(-)1.510	EL(-)1.600	1.235	1.325



NOTES

- ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS UNLESS SPECIFIED OTHERWISE.
- EL±0.00 OF POWER HOUSE CORRESPONDS TO RL(+10.00M ABOVE MEAN SEA LEVEL.
- ALL STRUCTURE SHALL BE OF DESIGN MIX M-30 U.N.O.
- REINFORCEMENT USED SHALL BE TMT BARS OF GRADE Fe-500 CONFORMING TO IS:1786 WITH FUSION BONDED EPOXY COATING CONFORMING TO IS: 13620
- FOR BACK FILLING NON EXPANSIVE/NON SHRINKABLE SOIL ONLY SHALL BE USED.
- THIS DRAWING SHALL BE READ IN CONJUNCTION WITH THE TECHNICAL SPECIFICATION.
- LAP LENGTH SHALL BE 50 TIMES DIAMETER OF BAR. LAPS SHALL BE STAGGERED ALTERNATIVELY.
- CEMENT SHALL BE OPC WITH C₃A CONTENT FROM 5% TO 8%
- CLEAR COVER TO REINFORCEMENT IN STRUCTURAL ELEMENTS SHALL BE 30 MM.
- THE FOUNDATION & PEDESTAL WORK BELOW GROUND COMING IN CONTACT WITH SOIL, BITUMINOUS PAINTING OF GRADE 85/25 CONFORMING IS 702@1.7KG /SQM(MIN) SHALL BE PROVIDE
- NET S.B.C OF SOIL IS TAKEN AS 57/SQM. AT 2.0M BELOW FGL

REFERENCE DRGS.

- IS-1-QS-688-108-M167 R2 --- GA OF STOCK YARD LAYOUT OF STACKER CUM RECLAIMER
- IS-1-QS-688-108-C206 R3 --- RC DETAILS OF 600M JCB PILE DRIVING
- IS-1-QS-688-108-M166 R1 --- GA OF RAIL & RAIL FIXING ACCESSORIES FOR STACKER CUM RECLAIMER
- IS-1-QS-688-108-M164 R2 --- GA OF STACKER CUM RECLAIMER WITH TECHNICAL DATA SHEET
- IS-1-QS-688-108-M168 R1 --- GA OF RAIL TRAVEL MECHANISM FOR STACKER CUM RECLAIMER
- IS-1-QS-688-108-C226 R3 --- GA & R/F DETAILS OF STACKER RECLAIMER FOUNDATION SR-1A / SR-1C
- IS-1-QS-688-108-C232 R2 --- GA & R/F DETAILS OF STACKER RECLAIMER FOUNDATION SR-1B / SR-1D

CUSTOMER :

TAMILNADU GENERATION AND DISTRIBUTION CORPORATION

CUSTOMER CONSULTANT :

DESEIN CONSULTING ENGINEERS NEW DELHI INDIA

PROJECT :

2x660 MW ENNORE SEZ SUPERCRITICAL THERMAL POWER PROJECT AT ASH DYKE OF NCTPS, CHENNAI-57.

EPC CONTRACTOR :

BHARAT HEAVY ELECTRICALS LTD

INDUSTRIAL SYSTEMS GROUP

BANGALORE

NAME

SIGN

DATE

NO.OF VAR

DRN.

KOUSIK

-sd-

21.04.2018

CHD.

RANJAN

-sd-

21.04.2018

APPD.

SCC

-sd-

21.04.2018

DIRECTORY : A0-688

SCALE

NTS

WEIGHT(Kgs.)

REF DRG.

ITEM NO.

NO.OF

DRAWING NO.

IS-1-CE-688-108-C238

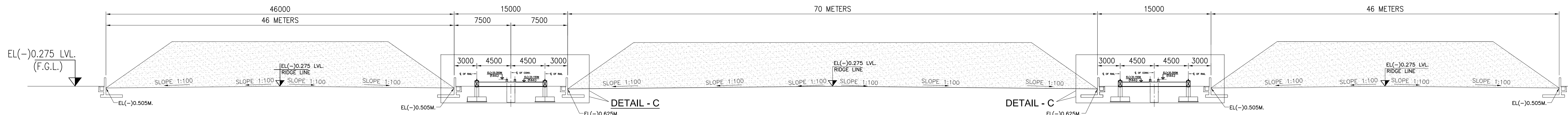
REV.

03

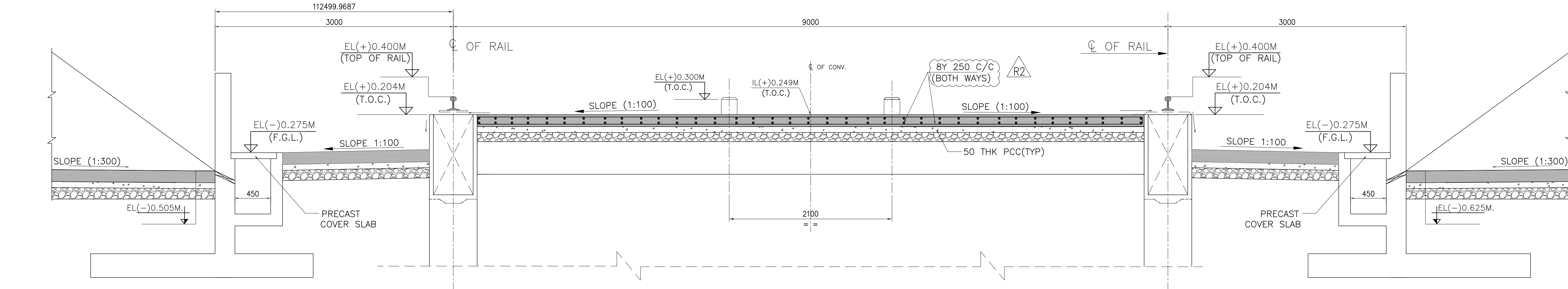
SHEET NO. 01

NO.OF SHTS. 02

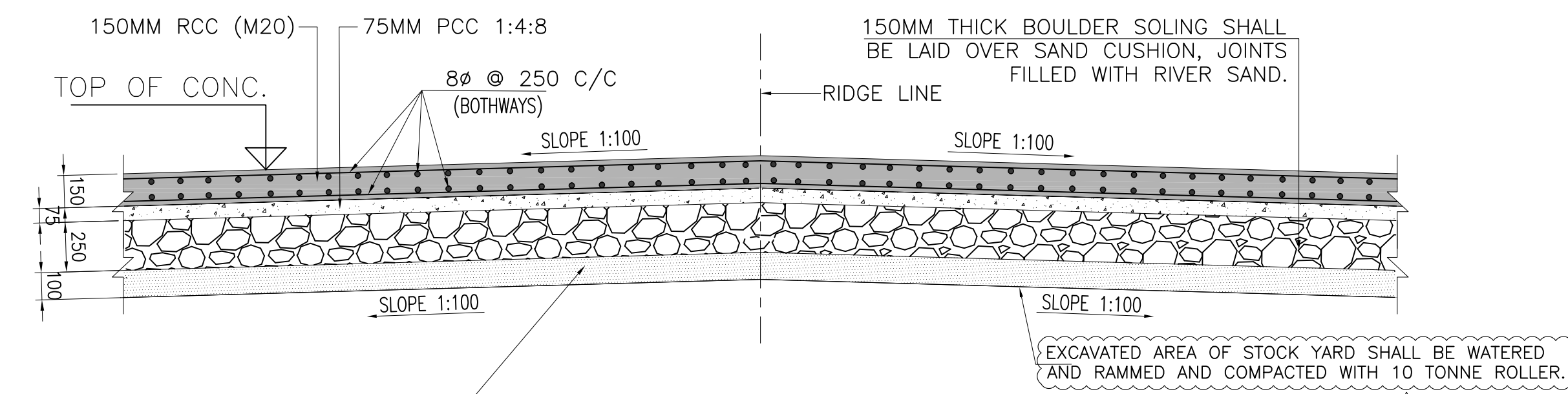
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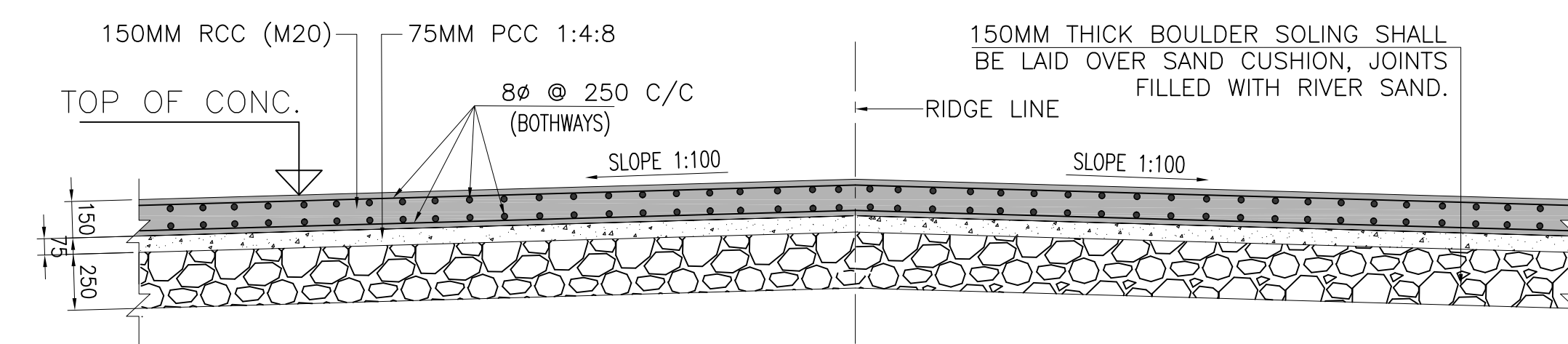
SECTION 4-4



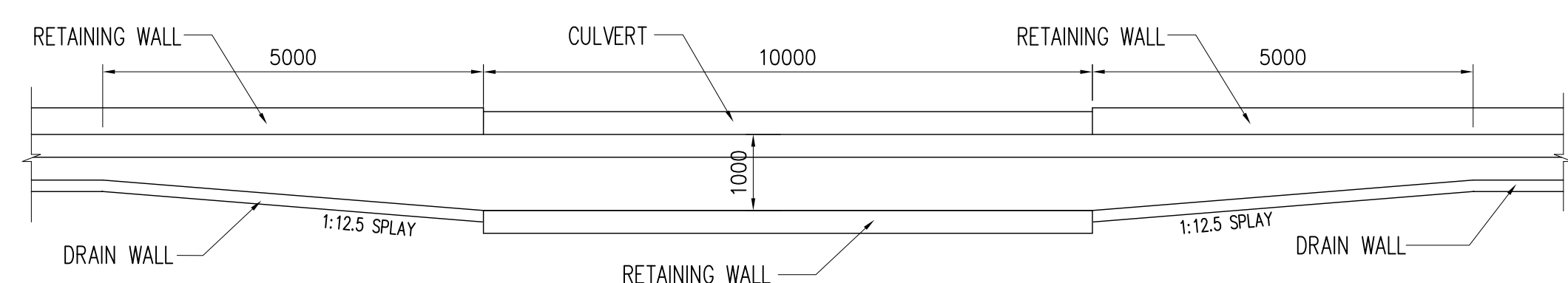
DETAIL-C



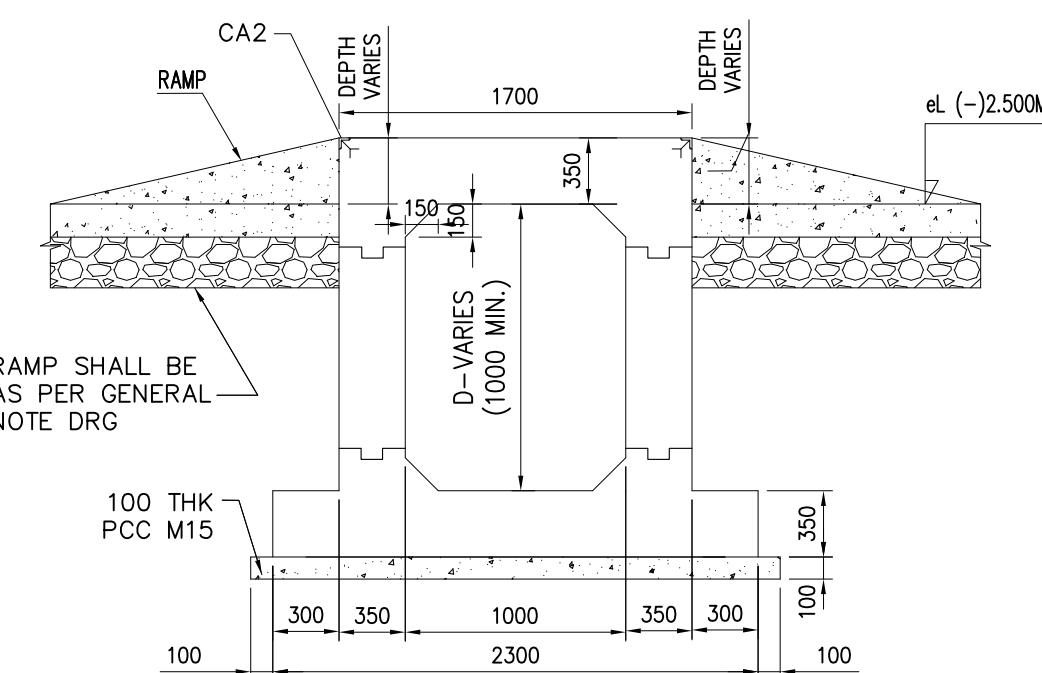
TYP. DETAIL OF SLAB
(BETWEEN COAL STOCK PILE)



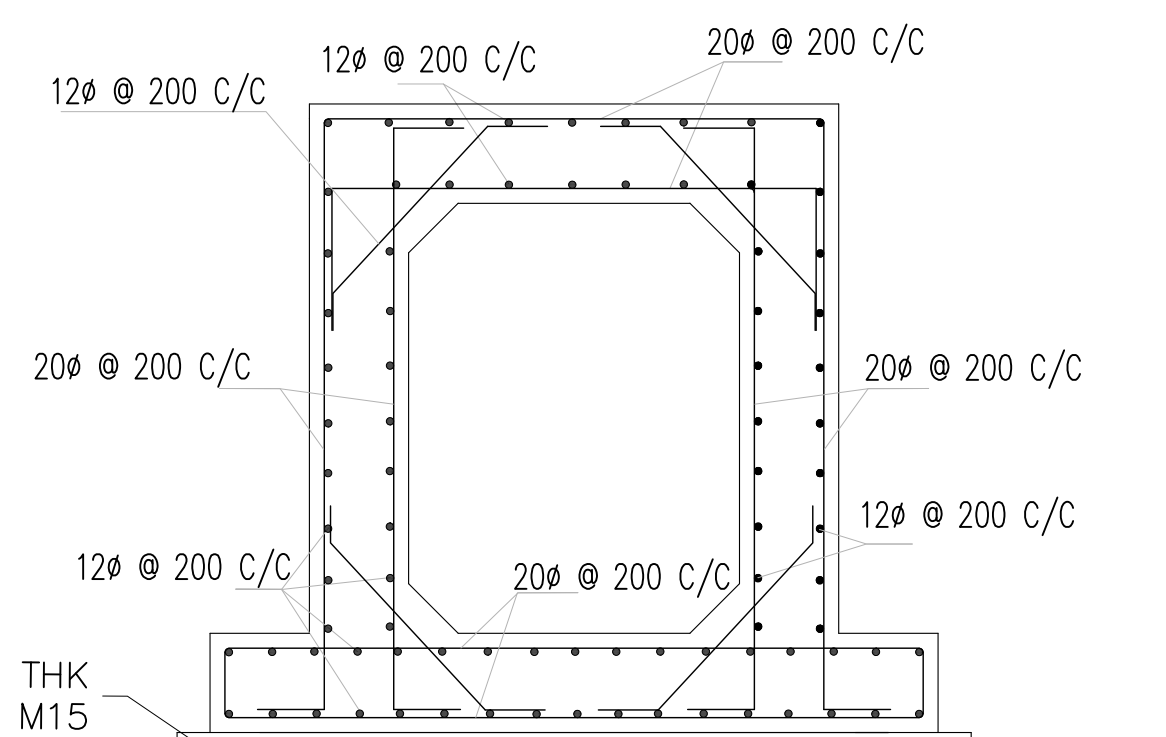
TYP. DETAIL OF SLAB
(BETWEEN RAIL)



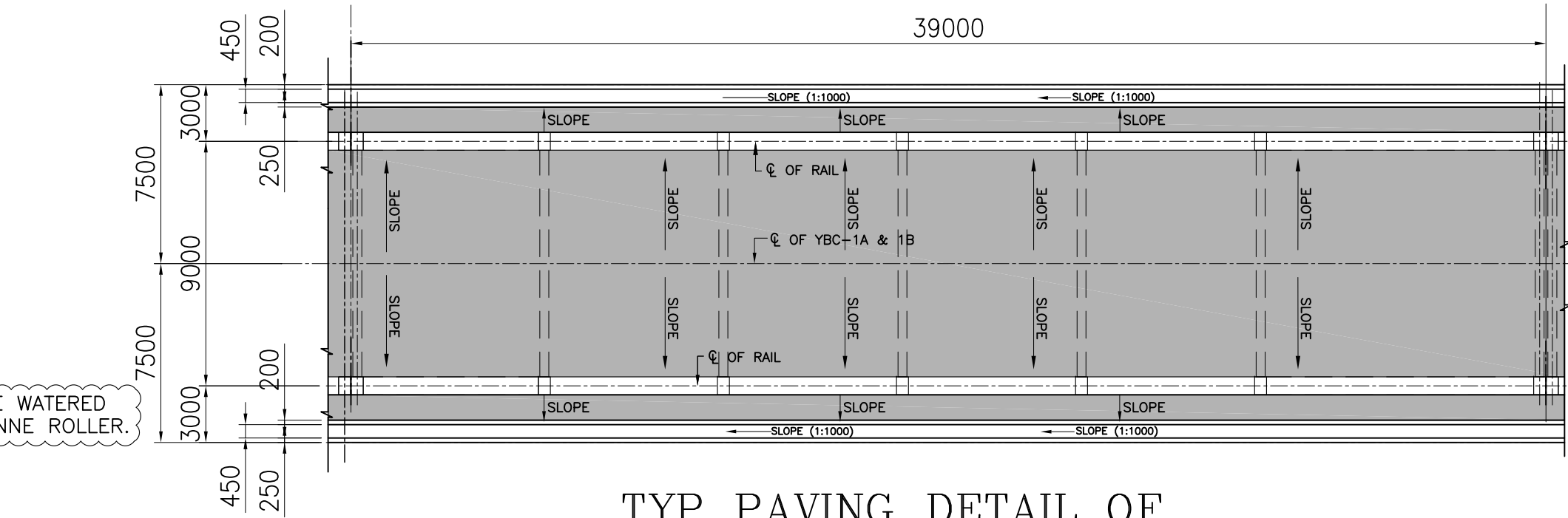
PLAN OF INTERCONNECTION BETWEEN 10000MM WIDE
BOX CULVERT AND 450MM WIDE DRAIN



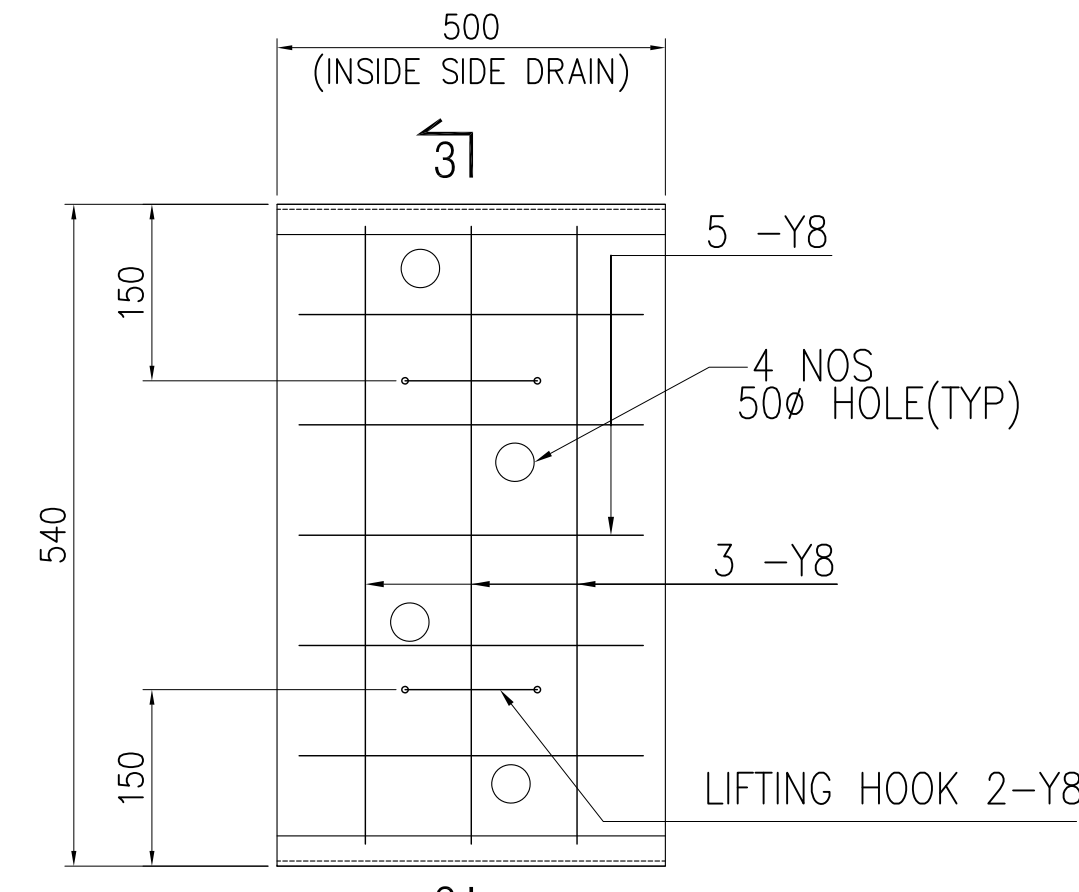
TYP. DETAILS OF BOX CULVERT
AT DOZER CROSSING AND CONV. CROSSING



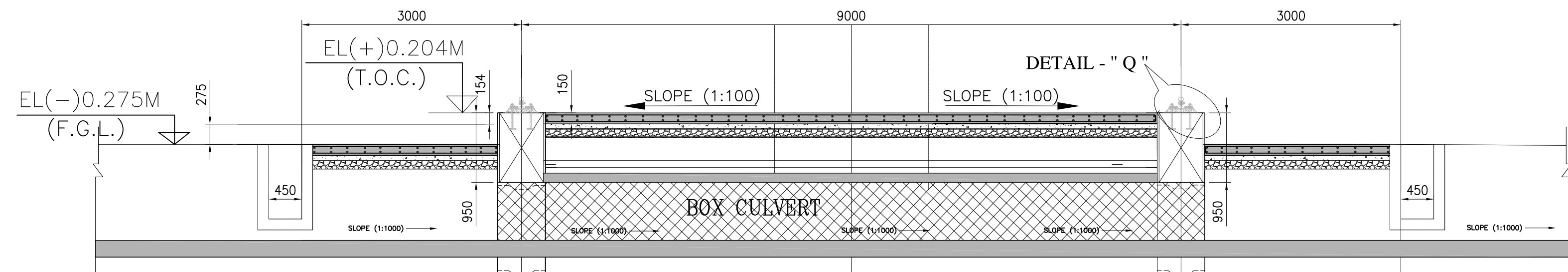
REINFORCEMENT DETAILS OF BOX CULVERT
AT DOZER CROSSING



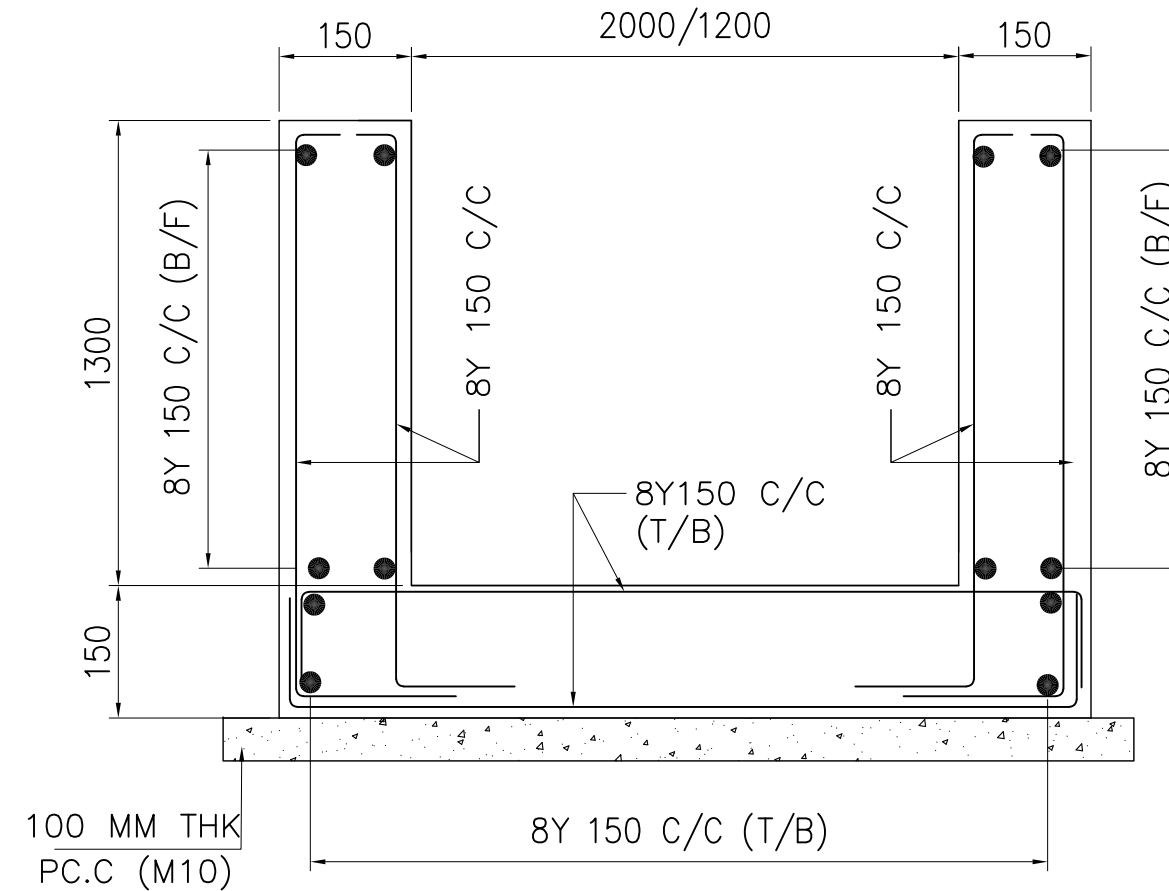
TYP PAVING DETAIL OF
GRADE SLAB S/R RAILS



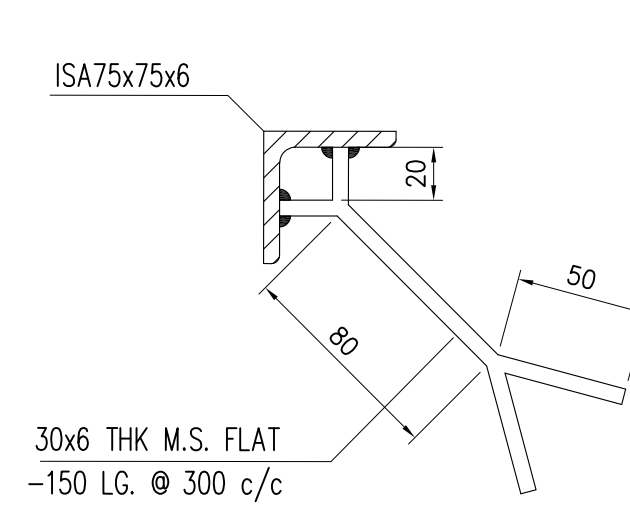
COVER SLAB
(75 MM THK. PRECAST
PERFORATED SLAB)



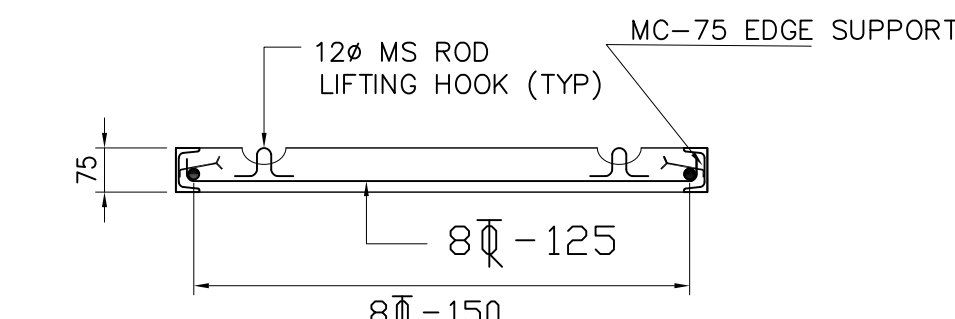
SECTION R-R



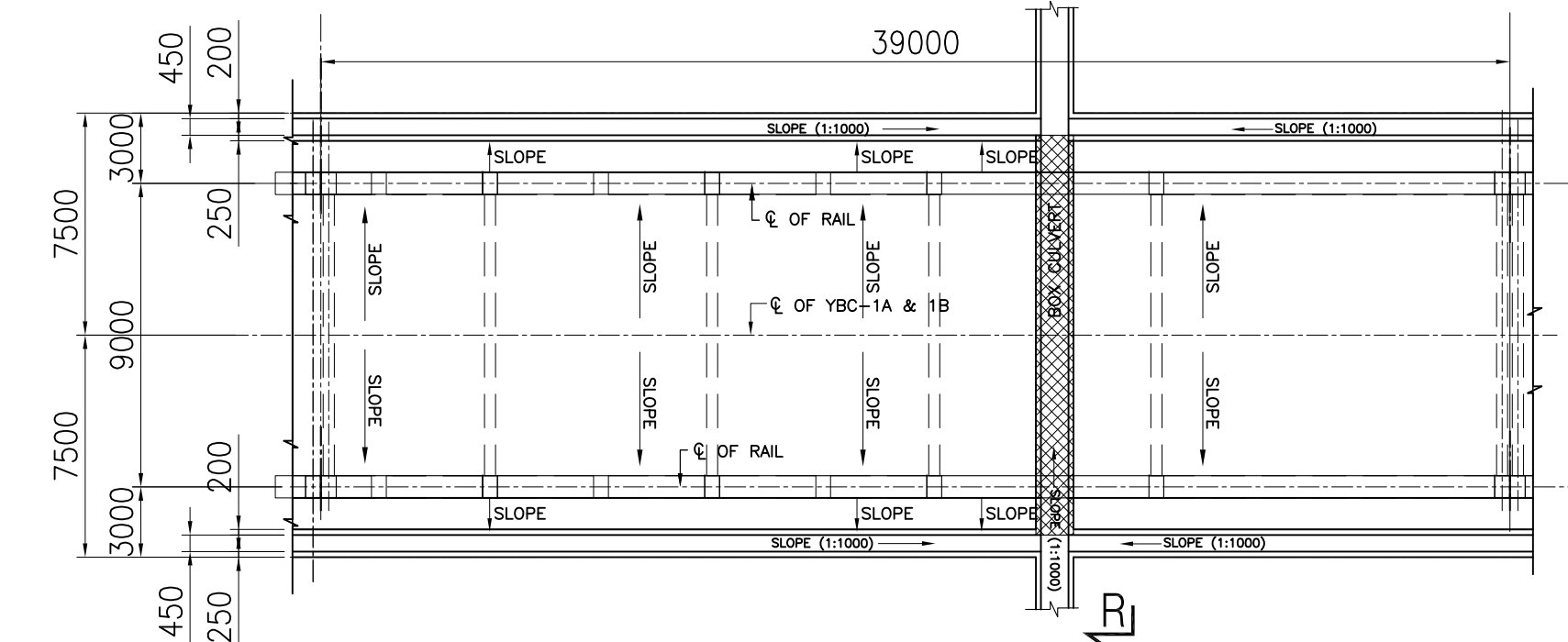
REINFORCEMENT DETAIL OF
TENSION RELIEF DRUM POCKET



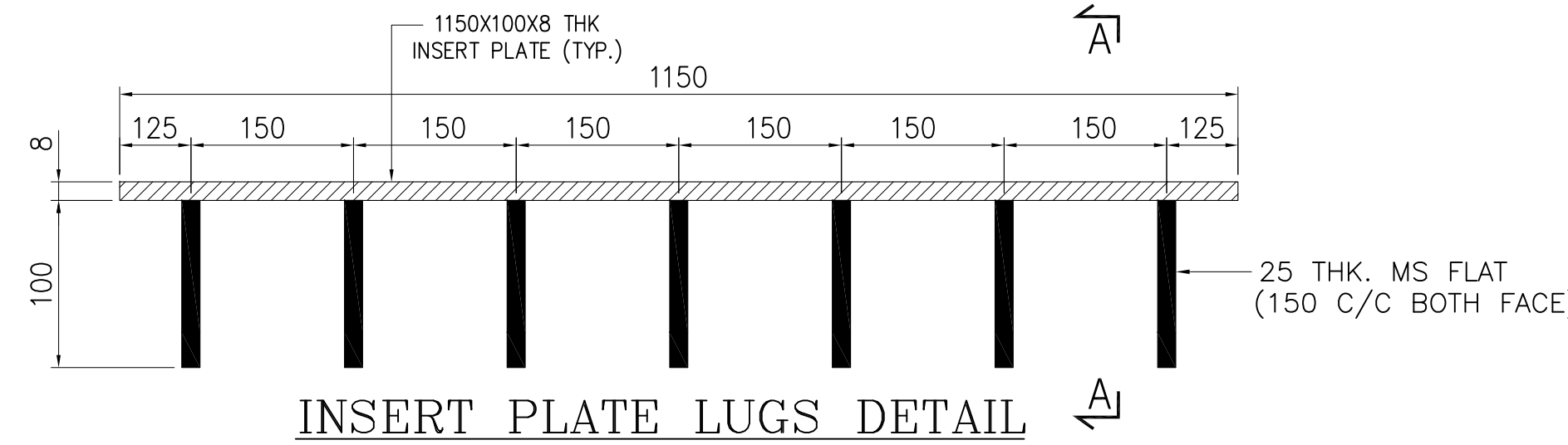
DETAIL - CA2
FOR CURB ANGLE



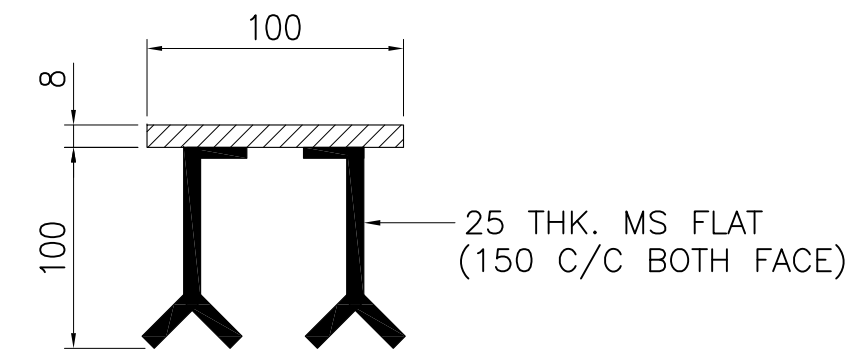
SECTION 3-3



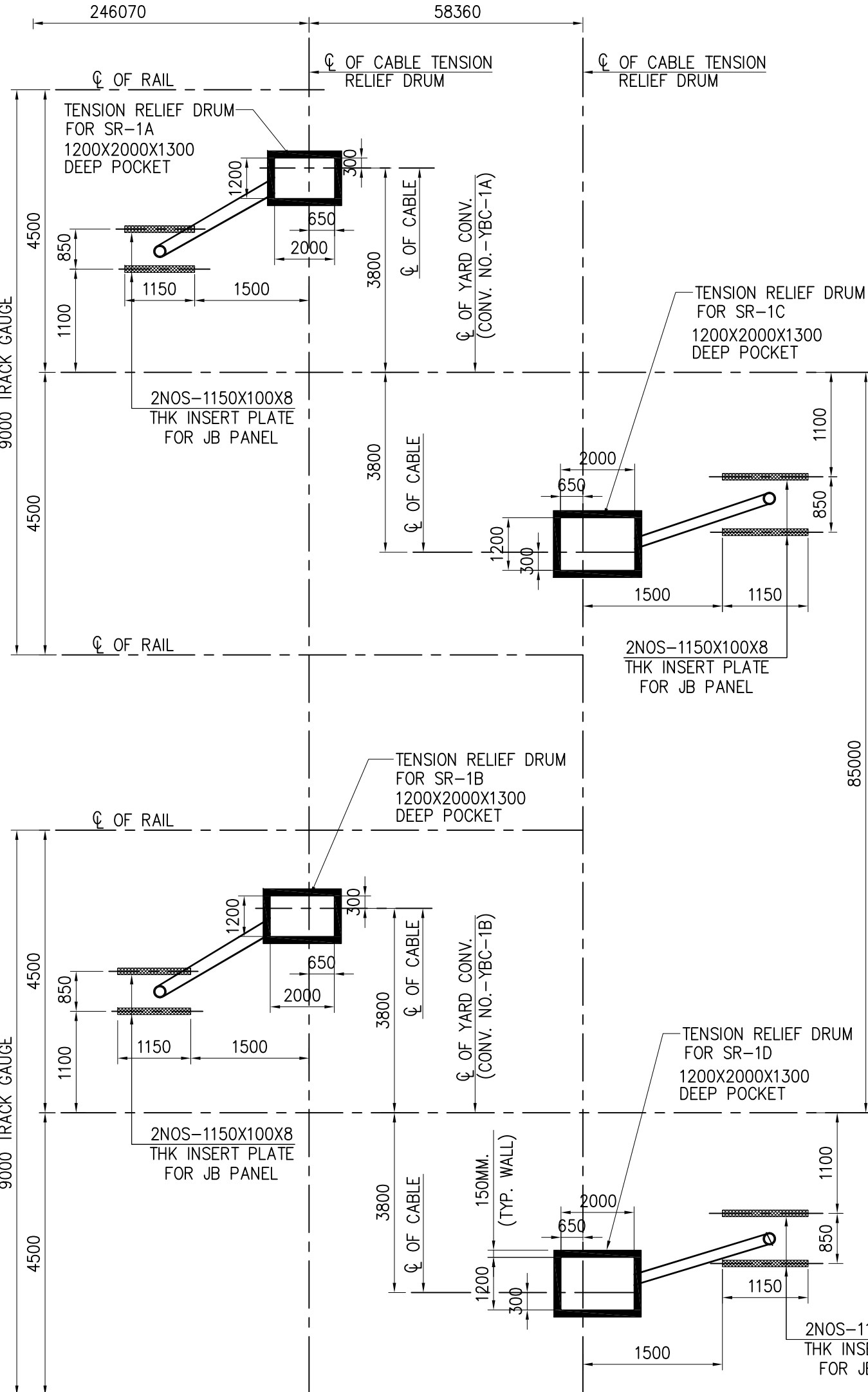
DETAIL-M
BOX CULVERT DETAIL AT CONV. CROSSING



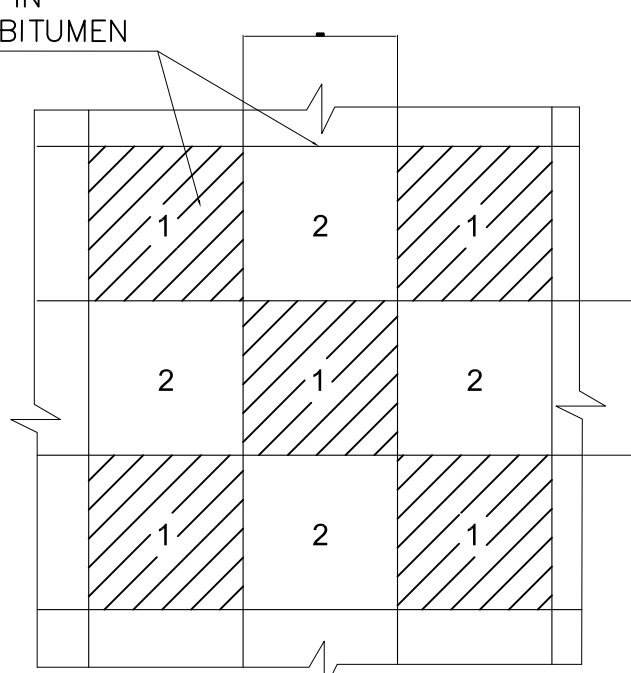
INSERT PLATE LUGS DETAIL



SECTION A-A



DETAIL-X



CONSTRUCTION SEQUENCE OF
COAL STOCK PILE PAVEMENT

JOB No.:	IS-14-2004
STATUS OF DRAWING:	FOR APPROVAL
DISTRIBUTION OF PRINTS	QTY.
REV. 01	NAME: VIPINDAS, SIGN: -sd-, DATE: 20.11.2018, CHECKED: RANJAN, APPROVED: SCC
REV. 02	NAME: VIPINDAS, SIGN: -sd-, DATE: 20.11.2018, CHECKED: RANJAN, APPROVED: SCC
REV. 03	NAME: VIPINDAS, SIGN: -sd-, DATE: 20.11.2018, CHECKED: RANJAN, APPROVED: SCC

CUSTOMER :	TAMILNADU GENERATION AND DISTRIBUTION CORPORATION
CUSTOMER CONSULTANT:	DESEIN CONSULTING ENGINEERS NEW DELHI INDIA
PROJECT :	2x660 MW ENNORE SEZ SUPERCRITICAL THERMAL POWER PROJECT AT ASH DYKE OF NCTPS, CHENNAI-57.
EPC CONTRACTOR :	BHARAT HEAVY ELECTRICALS LTD INDUSTRIAL SYSTEMS GROUP BANGALORE
DIRECTORY :	A0-688
FILE NO. :	-
TITLE :	GA & R/F DETAILS OF DRAINS, RETAINING WALLS AND CULVERTS IN STOCK PILE
SCALE :	NTS
WEIGHT(Kgs.) :	
REF DRG. :	
DRAWING NO. :	IS-1-CE-688-108-C238
SHEET NO. 02	NO.OF SHTS. 02
REV. :	03

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FORM-66.101

that only vertical reaction is transferred from gallery and no horizontal force in longitudinal direction is transferred from gallery to transfer points and vice-versa.

Transverse deflection of trestle due to wind /seismic load shall not exceed trestle height/1000 as stipulated in IS 11592. Longitudinal deflection of trestle shall also be within limits.

All RC trestle pedestals should be raised to (+) 0.5 m above FGL. Trestles shall be of structural steel braced adequately and provided at suitable locations.

Piling shall be used for trestles foundation.

14.06.00 Coal stock yard

Entire area shall be excavated to average 250mm depth and given slope of 1 in 100 in suitable directions as approved. Entire excavated area shall be watered and rammed and compacted with 10 tonne roller. 100mm thick river sand cushion layer shall be placed over compacted subgrade and consolidated by flooding 150mm thick boulder soling shall be laid over sand cushion, joints filled with river sand. Over boulder soling, 75mm thick lean concrete (1:4:8) shall be spread. Final layer shall be minimum 150mm thick RCC slab of grade M20 having double layer reinforcement. Slope is to be maintained through all layers. The coal stack area shall be graded with suitable slope for draining the surface by longitudinal drains shall be of RCC trenches with graded gravel packets at about 1.5m intervals on the sides to trap coal dust. Weepholes shall be provided in the trench walls at the locations of filter pockets for collecting surface water in the longitudinal rains for discharging into the main surface drain to be provided by the Contractor by the side of the road. Retaining wall 1m depth to be provided around the crushed coal pile to prevent coal spillage into the drain. Necessary control joints in the grade slab shall be considered to avoid temperature and shrinkage cracks in the slab. The design of coal stack area should take care of loads arising due to dozer movement and shall be designed to sustains coal water pressure.

Suitable soiling with mortar cover shall be provided between rails for stacker reclaimer and reclaimer machines.

14.07.00 Cable gallery

Cable galleries shall made of tubular steel sections. The tubular steel sections shall be of circular/ rectangular/ square shape. The circular steel tube shall conform to IS:1161 and rectangular/ square steel sections shall confirm to IS:4923. The steel structures using tubular sections shall be designed and fabricated as per IS:806 – “Code of practice for use of steel tubes in general building construction.” And EN 1993-1-8:2005.

14.08.00 Drainage of CHP Area

Suitable drainage arrangement shall be provided for underground structures if any with sump pumps. Coal stockyards and surrounding areas also shall have suitable surface drainage facilities.

14.09.00 Road / Rail Crossings:



Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : SKD Created on : 01/05/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-42

Co-ordinates E=(-)2435.729
N=3594.193

Field Test	Nos	Samples	Nos	Commencement Date : 17/04/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 19/04/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.191 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 2.15 m.

DESCRIPTION	SYMBOL	N-VALUE							SAMPLES	
		EACH DIVN. = 15cm							Ref. No	Depth (m)
0.00m										
Filled up soil consists of light grey, fly ash.									DS-1	0.50
		0	0	0					SPT-1	1.00-1.45
									*UDS-1	2.00-2.45
3.00m										
Very loose, steel grey, clayey silty sand. Observed kankar.		0	0	0					SPT-2	3.00-3.45
									UDS-2	4.00-4.45
		0	0	1					SPT-3	5.00-5.45
7.50m										
Very loose, brownish grey, silty sand.									UDS-3	6.00-6.45
		1	1	2					SPT-4	7.00-7.45
									UDS-4	8.00-8.45
10.00m										
Loose, light greenish grey, clayey silty sand.									SPT-5	9.00-9.45
		1	2	2					UDS-5	10.00-10.45
									DS-2	11.00
14.50m										
Medium dense, light greenish grey, clayey silty sand.		2	3	3					SPT-6	11.50-11.95
									DS-3	12.50
									*UDS-6	13.00-13.45
17.50m										
Very dense, light greenish grey, clayey silty sand.									DS-4	14.00
		3	8	18					SPT-7	14.50-14.95
									DS-5	15.50
20.30m										
									*UDS-7	16.00-16.45
									DS-6	17.00
		9	17	34					SPT-8	17.50-17.95
									DS-7	18.50
									*UDS-8	19.00-19.45
									DS-8	20.00

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

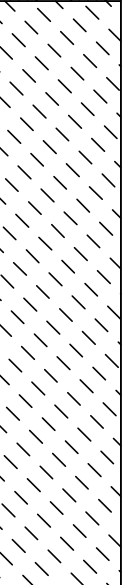
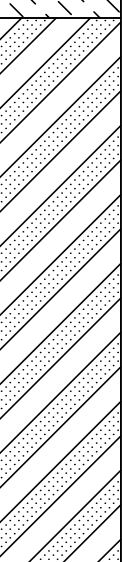
Job No : 3476 Created by : SKD Created on : 01/05/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-42

Co-ordinates E=(-)2435.729
N=3594.193

Field Test	Nos	Samples	Nos	Commencement Date : 17/04/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 19/04/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.191 m.
		Water Sample (WS)	0	Water Struck At : Standing Water Depth : 2.15 m.

DESCRIPTION	SYMBOL	N-VALUE						SAMPLES	
		EACH DIVN. = 15cm						Ref. No	Depth (m)
20.30m Very dense, light greenish grey, clayey silty sand.		17	28	34	62			SPT-9	20.50-20.95
					58			DS-9	21.50
		13	26	32				SPT-10	22.00-22.45
23.00m Very dense, light greenish grey, silty sand.		17	37	48	85			DS-10	23.00
					95			SPT-11	23.50-23.95
		21	41	54				DS-11	24.50
					78			SPT-12	25.00-25.45
26.00m Hard, yellowish brown, silty clay with sand mixture. Observed yellowish patches.		22	30	48	73			DS-12	26.00
					65			SPT-13	26.50-26.95
		20	31	42				DS-13	27.50
					66			SPT-14	28.00-28.45
		18	28	37				DS-14	29.00
					75			SPT-15	29.50-29.95
		16	27	39				DS-15	30.50
					68			SPT-16	31.00-31.45
33.50m Very dense, yellowish brown, silty sand with yellowish patches.		19	26	42	62			DS-16	32.00
					79			SPT-17	32.50-32.95
		17	24	38				DS-17	33.50
					78			SPT-18	34.00-34.45
		23	35	44				DS-18	35.00
					78			SPT-19	35.50-35.95
		20	32	46				DS-19	36.50
					78			SPT-20	37.00-37.45
		27	35	43				DS-20	38.00
N.B. - '*' means sample could not be recovered.								SPT-21	38.50-38.95
40.45m								DS-21	39.50
								SPT-22	40.00-40.45

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : SKD Created on : 01/05/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-43

Co-ordinates E=(-)2342.831 N=3563.927

Field Test	Nos	Samples	Nos	Commencement Date : 19/04/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 21/04/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.071 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 2.00 m.

DESCRIPTION	SYMBOL	N-VALUE							SAMPLES	
		EACH DIVN. = 15cm							Ref. No	Depth (m)
0.00m										
Filled up soil consists of light grey, fly ash.		0	0	0					DS-1	0.50
									SPT-1	1.00-1.45
									*UDS-1	2.00-2.45
2.50m		0	0	0					SPT-2	3.00-3.45
Very loose, deep grey, clayey silty sand. Observed yellowish patches.									UDS-2	4.00-4.45
		0	0	1					SPT-3	5.00-5.45
									UDS-3	6.00-6.45
		0	1	1					SPT-4	7.00-7.45
8.00m									*UDS-4	8.00-8.45
Loose, light grey, silty sand.		0	2	3					SPT-5	9.00-9.45
									UDS-5	10.00-10.45
									DS-2	11.00
11.50m		1	2	5					SPT-6	11.50-11.95
Loose, light greenish grey, clayey silty sand.									DS-3	12.50
									*UDS-6	13.00-13.45
									DS-4	14.00
14.50m		4	7	11					SPT-7	14.50-14.95
Medium dense, light greenish grey, clayey silty sand.									DS-5	15.50
									UDS-7	16.00-16.45
									DS-6	17.00
17.50m		10	18	27					SPT-8	17.50-17.95
Dense to very dense, light greenish grey, clayey silty sand.									DS-7	18.50
									*UDS-8	19.00-19.45
									DS-8	20.00
20.30m										

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : SKD Created on : 01/05/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-43

Co-ordinates E=(-)2342.831
N=3563.927

Field Test	Nos	Samples	Nos	Commencement Date : 19/04/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 21/04/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.071 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 2.00 m.

DESCRIPTION	SYMBOL	N-VALUE						SAMPLES	
		EACH DIVN. = 15cm						Ref. No	Depth (m)
20.30m Dense to very dense, light greenish grey, clayey silty sand.		14	26	32	58			SPT-9	20.50-20.95
22.00m					64			DS-9	21.50
Very dense, light greenish grey, silty sand.		13	28	36				SPT-10	22.00-22.45
					59			DS-10	23.00
		11	24	35				SPT-11	23.50-23.95
					74			DS-11	24.50
		16	31	43				SPT-12	25.00-25.45
					74			DS-12	26.00
		13	28	46				SPT-13	26.50-26.95
					78			DS-13	27.50
		14	30	48				SPT-14	28.00-28.45
29.00m					59			DS-14	29.00
Hard, yellowish brown, silty clay with sand mixtures. Observed yellowish patches.		12	23	36				SPT-15	29.50-29.95
					56			DS-15	30.50
		15	22	34				SPT-16	31.00-31.45
					66			DS-16	32.00
		16	27	39				SPT-17	32.50-32.95
					67			DS-17	33.50
		13	25	42				SPT-18	34.00-34.45
					72			DS-18	35.00
35.50m		15	32	40				SPT-19	35.50-35.95
Very dense, steel grey, silty sand. Observed yellowish patches.					74			DS-19	36.50
		14	33	41				SPT-20	37.00-37.45
					78			DS-20	38.00
		19	33	45				SPT-21	38.50-38.95
					82			DS-21	39.50
N.B. - '*' means sample could not be recovered.		21	34	48				SPT-22	40.00-40.45
40.45m									

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : SKD Created on : 01/05/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-44

Co-ordinates E=(-)2435.729
N=3504.965

Field Test	Nos	Samples	Nos	Commencement Date : 16/04/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 17/04/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.211 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 2.10 m.

DESCRIPTION	SYMBOL	N-VALUE							SAMPLES	
		EACH DIVN. = 15cm							Ref. No	Depth (m)
0.00m										
Filled up soil consists of light grey, fly ash.									DS-1	0.50
		0	0	0					SPT-1	1.00-1.45
									*UDS-1	2.00-2.45
3.00m										
Very loose, deep brownish grey, clayey silty sand. Observed kankar.		0	0	0					SPT-2	3.00-3.45
									UDS-2	4.00-4.45
		0	0	0					SPT-3	5.00-5.45
7.00m										
Very loose to loose, brownish grey, silty sand.									UDS-3	6.00-6.45
		0	0	1					SPT-4	7.00-7.45
									UDS-4	8.00-8.45
11.50m										
Very loose to loose, light greenish grey, clayey silty sand.		1	2	2					SPT-5	9.00-9.45
									*UDS-5	10.00-10.45
									DS-2	11.00
14.50m										
Medium dense, light greenish grey, clayey silty sand.		2	4	3					SPT-6	11.50-11.95
									DS-3	12.50
									*UDS-6	13.00-13.45
17.50m										
Dense to very dense, light greenish grey, clayey silty sand.		5	8	11					DS-4	14.00
									SPT-7	14.50-14.95
									DS-5	15.50
20.30m										
									*UDS-7	16.00-16.45
									DS-6	17.00
		8	18	27					SPT-8	17.50-17.95
									DS-7	18.50
									*UDS-8	19.00-19.45
									DS-8	20.00

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

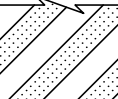
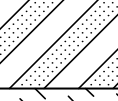
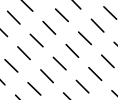
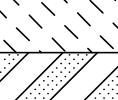
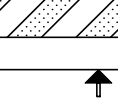
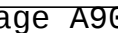
Job No : 3476 Created by : SKD Created on : 01/05/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-44

Co-ordinates E=(-)2435.729 N=3504.965

Field Test	Nos	Samples	Nos	Commencement Date : 16/04/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 17/04/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.211 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 2.10 m.

DESCRIPTION	SYMBOL	N-VALUE						SAMPLES	
		EACH DIVN. = 15cm						Ref. No	Depth (m)
20.30m Dense to very dense, light greenish grey, clayey silty sand.		13	28	34	62			SPT-9	20.50-20.95
21.50m		11	24	35	59			DS-9	21.50
Very dense, brownish grey, silty sand.		10	26	36	62			SPT-10	22.00-22.45
23.50m		18	32	44	76			DS-10	23.00
Very dense, light brownish grey, silty sand with yellowish patches.		14	34	48	82			SPT-11	23.50-23.95
27.50m		8	19	33	52			DS-11	24.50
Hard, yellowish grey, silty clay with sand mixtures & traces of yellow patches.		14	21	31	52			SPT-12	25.00-25.45
32.00m		17	24	40	64			DS-12	26.00
Very dense, yellowish grey, silty sand with traces of yellow patches.		13	30	41	71			SPT-13	26.50-26.95
36.50m		17	29	39	68			DS-13	27.50
Very dense, yellowish grey, clayey silt with sand mixture & yellowish patches.		17	27	37	64			SPT-14	28.00-28.45
40.45m		15	26	34	60			DS-14	29.00
N.B. - '*' means sample could not be recovered.		19	33	45	78			SPT-15	29.50-29.95
		18	29	41	70			DS-15	30.50
								SPT-16	31.00-31.45
								DS-16	32.00
								SPT-17	32.50-32.95
								DS-17	33.50
								SPT-18	34.00-34.45
								DS-18	35.00
								SPT-19	35.50-35.95
								DS-19	36.50
								SPT-20	37.00-37.45
								DS-20	38.00
								SPT-21	38.50-38.95
								DS-21	39.50
								SPT-22	40.00-40.45

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : SKD Created on : 01/05/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-45

Co-ordinates E=(-)2263.294
N=3482.785

Field Test	Nos	Samples	Nos	Commencement Date : 24/04/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 27/04/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.173 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 1.95 m.

DESCRIPTION	SYMBOL	N-VALUE							SAMPLES	
		EACH DIVN. = 15cm							Ref. No	Depth (m)
0.00m										
Filled up soil consists of light grey, fly ash.		2	2	3				5	DS-1	0.50
									SPT-1	1.00-1.45
									WS-1	1.95
									*UDS-1	2.00-2.45
2.50m										
		0	1	1				2	SPT-2	3.00-3.45
									*UDS-2	4.00-4.45
		0	0	0				0	SPT-3	5.00-5.45
									UDS-3	6.00-6.45
Very loose, deep grey, clayey silty sand.										
		0	0	0				0	SPT-4	7.00-7.45
									UDS-4	8.00-8.45
		1	1	1				2	SPT-5	9.00-9.45
									UDS-5	10.00-10.45
11.00m										
									DS-2	11.00
		3	6	7				13	SPT-6	11.50-11.95
Medium dense, light greenish grey, silty sand.									DS-3	12.50
									UDS-6	13.00-13.45
									DS-4	14.00
14.50m										
		8	15	18				33	SPT-7	14.50-14.95
									DS-5	15.50
									UDS-7	16.00-16.45
									DS-6	17.00
Dense, light greenish grey, silty sand.									SPT-8	17.50-17.95
		10	16	21				37	DS-7	18.50
									UDS-8	19.00-19.45
									DS-8	20.00
20.00m										
20.30m										

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : SKD Created on : 01/05/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-45

Co-ordinates E=(-)2263.294
N=3482.785

Field Test	Nos	Samples	Nos	Commencement Date : 24/04/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 27/04/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.173 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 1.95 m.

DESCRIPTION	SYMBOL	N-VALUE					SAMPLES	
		EACH DIVN. = 15cm					Ref. No	Depth (m)
Very dense, steel grey, silty sand with clay binder.		15	25	31	56		SPT-9	20.50-20.95
					60		DS-9	21.50
		17	26	34			SPT-10	22.00-22.45
					69		DS-10	23.00
		19	27	42			SPT-11	23.50-23.95
					63		DS-11	24.50
Hard, light grey, silty clay with sand mixtures.		18	28	35			SPT-12	25.00-25.45
					68		DS-12	26.00
		17	29	39			SPT-13	26.50-26.95
					69		DS-13	27.50
		21	31	38			SPT-14	28.00-28.45
					72		DS-14	29.00
Very dense, yellowish grey, clayey silty sand. Observed light grey patches.		19	32	40			SPT-15	29.50-29.95
					79		DS-15	30.50
		17	29	50			SPT-16	31.00-31.45
					84		DS-16	32.00
		21	35	49			SPT-17	32.50-32.95
					85		DS-17	33.50
Very dense, yellowish brown / steel grey, clayey silty sand.		22	33	52			SPT-18	34.00-34.45
					69		DS-18	35.00
		18	25	44			SPT-19	35.50-35.95
					76		DS-19	36.50
		20	27	49			SPT-20	37.00-37.45
					87		DS-20	38.00
Very dense, yellowish grey, silty sand. N.B. - '*' means sample could not be recovered.		25	39	48			SPT-21	38.50-38.95
					>100		DS-21	39.50
		29	57	50			SPT-22	40.00-40.40
					10.0 cm	Pentn.		

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : Chandrani Created on : 01/04/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO.I-46

Co-ordinates E=(-)2558.680
N=3471.452

Field Test	Nos	Samples	Nos	Commencement Date : 24/03/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 25/03/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.076 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 1.90 m.

DESCRIPTION	SYMBOL	N-VALUE							SAMPLES	
		EACH DIVN. = 15cm.							Ref. No	Depth (m)
0.00m Filled up soil consists of light grey, fly ash.		1	2	2				4	DS-1	0.50
									SPT-1	1.00-1.45
2.50m Very soft, brownish grey, silty clay.		0	0	0				0	*UDS-1	2.00-2.45
									SPT-2	3.00-3.45
5.00m Very soft, deep grey, silty clay with sand mixture.		0	0	0				0	*UDS-2	4.00-4.45
									SPT-3	5.00-5.45
7.00m Very loose, deep grey, clayey silty sand.		0	0	1				1	UDS-3	6.00-6.45
									SPT-4	7.00-7.45
8.50m Very loose, light brownish grey, clayey silty sand.		2	2	2				4	UDS-4	8.00-8.45
									SPT-5	9.00-9.45
11.00m Loose, light yellowish grey, clayey silty sand.		3	3	4				7	UDS-5	10.00-10.45
									DS-2	11.00
									SPT-6	11.50-11.95
14.50m Medium dense, light yellowish grey, clayey silty sand.		6	8	10				18	DS-3	12.50
									UDS-6	13.00-13.45
									DS-4	14.00
									SPT-7	14.50-14.95
									DS-5	15.50
									UDS-7	16.00-16.45
									DS-6	17.00
		9	13	16				29	SPT-8	17.50-17.95
									DS-7	18.50
									*UDS-8	19.00-19.45
20.00m Dense, light greenish grey, clayey silty sand with yellow patches.									DS-8	20.00
21.00m		12	16	20				36	SPT-9	20.50-20.95

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : Chandrani Created on : 01/04/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO.I-46

Co-ordinates E=(-)2558.680
N=3471.452

Field Test	Nos	Samples	Nos	Commencement Date : 24/03/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 25/03/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 9.076 m.
		Water Sample (WS)	0	Water Struck At : Standing Water Depth : 1.90 m.

DESCRIPTION	SYMBOL	N-VALUE							SAMPLES	
		EACH DIVN. = 15cm.							Ref. No	Depth (m)
Dense, light greenish grey, clayey silty sand with yellow patches.									DS-9	21.50
Very dense, light greenish grey, clayey silty sand with yellow patches.		17	30	37					SPT-10	22.00-22.45
									DS-10	23.00
		17	31	39					SPT-11	23.50-23.95
Very dense, light yellowish grey, silty coarse sand.									DS-11	24.50
		16	32	42					SPT-12	25.00-25.45
									DS-12	26.00
Hard, light brownish grey, silty clay.		12	17	25					SPT-13	26.50-26.95
									DS-13	27.50
		16	23	38					SPT-14	28.00-28.45
									DS-14	29.00
Hard, light yellowish grey, silty clay with sand mixture.		15	22	35					SPT-15	29.50-29.95
									DS-15	30.50
									SPT-16	31.00-31.45
Very dense, light yellowish grey, clayey silty sand.		17	28	42					DS-16	32.00
		16	26	40					SPT-17	32.50-32.95
									DS-17	33.50
		21	32	37					SPT-18	34.00-34.45
Very dense, light whitish grey, silty coarse sand. Observed gravel.									DS-18	35.00
		25	36	44					SPT-19	35.50-35.95
									DS-19	36.50
		14	20	29					SPT-20	37.00-37.45
Dense, light yellowish grey, clayey silty sand. Observed white patches.									DS-20	38.00
		16	22	28					SPT-21	38.50-38.95
Very dense, light yellowish grey, clayey silty sand. Observed white patches.									DS-21	39.50
		20	22	32					SPT-22	40.00-40.45
N.B. - '*' means sample could not be recovered.										

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : SKD Created on : 27/04/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-47

Co-ordinates E=(-)2435.400 N=3397.010

Field Test	Nos	Samples	Nos	Commencement Date : 12/03/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 13/03/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 8.887 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 1.90 m.

DESCRIPTION	SYMBOL	N-VALUE							SAMPLES	
		EACH DIVN. = 15cm							Ref. No	Depth (m)
0.00m										
Filled up soil consists of light grey, fly ash.		5	7	4				11	DS-1	0.50
									SPT-1	1.00-1.45
									*UDS-1	2.00-2.45
2.50m								1	SPT-2	3.00-3.45
Very loose, yellowish grey to deep grey, silty sand with clay binder.		0	0	1					UDS-2	4.00-4.45
								0	SPT-3	5.00-5.45
		0	0	0					UDS-3	6.00-6.45
								1	SPT-4	7.00-7.45
8.00m									UDS-4	8.00-8.45
Loose, steel grey / light greenish grey, clayey silty sand.		2	2	3				5	SPT-5	9.00-9.45
									UDS-5	10.00-10.45
11.50m		4	6	7				13	DS-2	11.00
									SPT-6	11.50-11.95
									DS-3	12.50
									UDS-6	13.00-13.45
Medium dense, steel grey / light greenish grey, clayey silty sand.		7	10	13				23	DS-4	14.00
									SPT-7	14.50-14.95
									DS-5	15.50
									UDS-7	16.00-16.45
17.50m		11	18	23				41	DS-6	17.00
									SPT-8	17.50-17.95
Dense, steel grey / light greenish grey, clayey silty sand.									DS-7	18.50
									UDS-8	19.00-19.45
20.00m									DS-8	20.00
20.30m										

Project : Geotech. Inv. Work for 2x660MW Coal Based STPP at Ash Dyke of NCTPS, Chennai. **CETEST**

Job No : 3476 Created by : SKD Created on : 27/04/2015 Sheet No:

BORE LOG DATA SHEET

BORE HOLE NO. I-47

Co-ordinates E=(-)2435.400
N=3397.010

Field Test	Nos	Samples	Nos	Commencement Date : 12/03/2015
Penetrometer (SPT)	22	Undisturbed (UDS)	8	Completion Date : 13/03/2015
Cone (Pc)		Penetrometer (SPT)	22	Bore Hole Diameter : 150 mm.
Vane (V)		Disturbed (DS)	21	Level Of Ground : 8.887 m.
		Water Sample (WS)	0	Water Struck At :
				Standing Water Depth : 1.90 m.

DESCRIPTION	SYMBOL	N-VALUE						SAMPLES	
		EACH DIVN. = 15cm						Ref. No	Depth (m)
20.30m Very dense, yellowish grey, silty sand.		15	24	31	55			SPT-9	20.50-20.95
					56			DS-9	21.50
		14	23	33				SPT-10	22.00-22.45
					59			DS-10	23.00
		16	25	34				SPT-11	23.50-23.95
24.50m Hard, deep brown, silty clay with sand mixture. Observed yellowish patches.					63			DS-11	24.50
		17	26	37				SPT-12	25.00-25.45
					67			DS-12	26.00
		19	28	39				SPT-13	26.50-26.95
27.50m Hard, light grey, silty clay with sand mixture. Observed yellowish & brownish patches.					62			DS-13	27.50
		21	27	35				SPT-14	28.00-28.45
					66			DS-14	29.00
		23	29	37				SPT-15	29.50-29.95
					71			DS-15	30.50
		27	32	39				SPT-16	31.00-31.45
					81			DS-16	32.00
		29	36	45				SPT-17	32.50-32.95
33.50m Very dense, yellowish to brownish grey, clayey silty sand. Observed steel grey patches					57			DS-17	33.50
		18	25	32				SPT-18	34.00-34.45
					54			DS-18	35.00
		16	23	31				SPT-19	35.50-35.95
36.50m Very dense, yellowish grey, silty sand.					83			DS-19	36.50
		17	34	49				SPT-20	37.00-37.45
					>100			DS-20	38.00
		27	46	59				SPT-21	38.50-38.95
					>100			DS-21	39.50
N.B. - '*' means sample could not be recovered. 40.45m		32	57	58				SPT-22	40.00-40.45

CORRECTION FOR STANDARD PENETRATION TEST VALUES

Bore Hole No:	Starting Depth (M)	Ending Depth (M)	Average Depth (M)	Field 'N' Values	Cor. 'N' for Ovp. & Dilatancy (if reqd)	Reduced Level (M)	Stratum	Computed Phi in Degrees
BH-I-41	23.50	23.95	23.73	46	24	-14.74	VI	35
BH-I-41	25.00	25.45	25.23	37	21	-16.24	VI	34
BH-I-41	26.50	26.95	26.73	40	21	-17.74	VI	34
BH-I-41	28.00	28.45	28.23	44	44	-19.24	V	
BH-I-41	29.50	29.95	29.73	47	47	-20.74	V	
BH-I-41	31.00	31.45	31.23	65	29	-22.24	VI	37
BH-I-41	32.50	32.95	32.73	69	29	-23.74	VI	37
BH-I-41	34.00	34.45	34.23	59	26	-25.24	VI	36
BH-I-41	35.50	35.95	35.73	68	28	-26.74	VI	36
BH-I-41	37.00	37.45	37.23	71	28	-28.24	VI	37
BH-I-41	38.50	38.95	38.73	78	30	-29.74	VI	37
BH-I-41	40.00	40.45	40.23	77	29	-31.24	VI	37
BH-I-42	1.00	1.45	1.23	0	00	7.97	FILL	
BH-I-42	3.00	3.45	3.23	0	00	5.97	IV-A	26
BH-I-42	5.00	5.45	5.23	1	01	3.97	IV-A	26
BH-I-42	7.00	7.45	7.23	3	03	1.97	IV-A	27
BH-I-42	9.00	9.45	9.23	4	04	-0.03	IV-A	27
BH-I-42	11.50	11.95	11.73	6	05	-2.53	IV-A	28
BH-I-42	14.50	14.95	14.73	26	19	-5.53	IV	33
BH-I-42	17.50	17.95	17.73	51	28	-8.53	VI	36
BH-I-42	20.50	20.95	20.73	62	31	-11.53	VI	37
BH-I-42	22.00	22.45	22.23	58	29	-13.03	VI	37
BH-I-42	23.50	23.95	23.73	85	38	-14.53	VI	39
BH-I-42	25.00	25.45	25.23	95	41	-16.03	VI	40
BH-I-42	26.50	26.95	26.73	78	34	-17.53	VI	38
BH-I-42	28.00	28.45	28.23	73	32	-19.03	VI	38
BH-I-42	29.50	29.95	29.73	65	29	-20.53	VI	37
BH-I-42	31.00	31.45	31.23	66	29	-22.03	VI	37
BH-I-42	32.50	32.95	32.73	75	31	-23.53	VI	37
BH-I-42	34.00	34.45	34.23	68	28	-25.03	VI	36
BH-I-42	35.50	35.95	35.73	62	26	-26.53	VI	36
BH-I-42	37.00	37.45	37.23	79	31	-28.03	VI	37
BH-I-42	38.50	38.95	38.73	78	30	-29.53	VI	37
BH-I-42	40.00	40.45	40.23	78	29	-31.03	VI	37
BH-I-43	1.00	1.45	1.23	0	00	7.85	FILL	
BH-I-43	3.00	3.45	3.23	0	00	5.85	IV-A	26
BH-I-43	5.00	5.45	5.23	1	01	3.85	IV-A	26
BH-I-43	7.00	7.45	7.23	2	02	1.85	IV-A	27
BH-I-43	9.00	9.45	9.23	5	05	-0.15	IV-A	28
BH-I-43	11.50	11.95	11.73	7	06	-2.65	IV-A	29
BH-I-43	14.50	14.95	14.73	18	15	-5.65	IV	32
BH-I-43	17.50	17.95	17.73	45	26	-8.65	VI	36

CORRECTION FOR STANDARD PENETRATION TEST VALUES

Bore Hole No:	Starting Depth (M)	Ending Depth (M)	Average Depth (M)	Field 'N' Values	Cor. 'N' for Ovp. & Dilatancy (if reqd)	Reduced Level (M)	Stratum	Computed Phi in Degrees
BH-I-43	20.50	20.95	20.73	58	30	-11.65	VI	37
BH-I-43	22.00	22.45	22.23	64	31	-13.15	VI	37
BH-I-43	23.50	23.95	23.73	59	29	-14.65	VI	37
BH-I-43	25.00	25.45	25.23	74	34	-16.15	VI	38
BH-I-43	26.50	26.95	26.73	74	33	-17.65	VI	38
BH-I-43	28.00	28.45	28.23	78	34	-19.15	VI	38
BH-I-43	29.50	29.95	29.73	59	59	-20.65	V	
BH-I-43	31.00	31.45	31.23	56	56	-22.15	V	
BH-I-43	32.50	32.95	32.73	66	66	-23.65	V	
BH-I-43	34.00	34.45	34.23	67	67	-25.15	V	
BH-I-43	35.50	35.95	35.73	72	29	-26.65	VI	37
BH-I-43	37.00	37.45	37.23	74	29	-28.15	VI	37
BH-I-43	38.50	38.95	38.73	78	30	-29.65	VI	37
BH-I-43	40.00	40.45	40.23	82	30	-31.15	VI	37
BH-I-44	1.00	1.45	1.23	0	00	7.99	FILL	
BH-I-44	3.00	3.45	3.23	0	00	5.99	IV-A	26
BH-I-44	5.00	5.45	5.23	0	00	3.99	IV-A	26
BH-I-44	7.00	7.45	7.23	1	01	1.99	IV-A	26
BH-I-44	9.00	9.45	9.23	4	04	-0.01	IV-A	27
BH-I-44	11.50	11.95	11.73	7	06	-2.51	IV-A	29
BH-I-44	14.50	14.95	14.73	19	16	-5.51	IV	32
BH-I-44	17.50	17.95	17.73	45	26	-8.51	VI	36
BH-I-44	20.50	20.95	20.73	62	31	-11.51	VI	37
BH-I-44	22.00	22.45	22.23	59	30	-13.01	VI	37
BH-I-44	23.50	23.95	23.73	62	30	-14.51	VI	37
BH-I-44	25.00	25.45	25.23	76	34	-16.01	VI	38
BH-I-44	26.50	26.95	26.73	82	36	-17.51	VI	39
BH-I-44	28.00	28.45	28.23	52	52	-19.01	V	
BH-I-44	29.50	29.95	29.73	52	52	-20.51	V	
BH-I-44	31.00	31.45	31.23	64	64	-22.01	V	
BH-I-44	32.50	32.95	32.73	71	30	-23.51	VI	37
BH-I-44	34.00	34.45	34.23	68	28	-25.01	VI	37
BH-I-44	35.50	35.95	35.73	64	27	-26.51	VI	36
BH-I-44	37.00	37.45	37.23	60	25	-28.01	VI	35
BH-I-44	38.50	38.95	38.73	78	30	-29.51	VI	37
BH-I-44	40.00	40.45	40.23	70	27	-31.01	VI	36
BH-I-45	1.00	1.45	1.23	5	05	7.95	FILL	
BH-I-45	3.00	3.45	3.23	2	02	5.95	IV-A	27
BH-I-45	5.00	5.45	5.23	0	00	3.95	IV-A	26
BH-I-45	7.00	7.45	7.23	0	00	1.95	IV-A	26
BH-I-45	9.00	9.45	9.23	2	02	-0.05	IV-A	27
BH-I-45	11.50	11.95	11.73	13	12	-2.55	IV	31

CORRECTION FOR STANDARD PENETRATION TEST VALUES

Bore Hole No:	Starting Depth (M)	Ending Depth (M)	Average Depth (M)	Field 'N' Values	Cor. 'N' for Ovp. & Dilatancy (if reqd)	Reduced Level (M)	Stratum	Computed Phi in Degrees
BH-I-45	14.50	14.95	14.73	33	22	-5.55	VI	34
BH-I-45	17.50	17.95	17.73	37	23	-8.55	VI	35
BH-I-45	20.50	20.95	20.73	56	29	-11.55	VI	37
BH-I-45	22.00	22.45	22.23	60	30	-13.05	VI	37
BH-I-45	23.50	23.95	23.73	69	33	-14.55	VI	38
BH-I-45	25.00	25.45	25.23	63	30	-16.05	VI	37
BH-I-45	26.50	26.95	26.73	68	68	-17.55	V	
BH-I-45	28.00	28.45	28.23	69	69	-19.05	V	
BH-I-45	29.50	29.95	29.73	72	72	-20.55	V	
BH-I-45	31.00	31.45	31.23	79	33	-22.05	VI	38
BH-I-45	32.50	32.95	32.73	84	34	-23.55	VI	38
BH-I-45	34.00	34.45	34.23	83	33	-25.05	VI	38
BH-I-45	35.50	35.95	35.73	69	28	-26.55	VI	36
BH-I-45	37.00	37.45	37.23	76	30	-28.05	VI	37
BH-I-45	38.50	38.95	38.73	87	32	-29.55	VI	38
BH-I-45	40.00	40.40	40.20	>100	35	-31.03	VI	38
BH-I-46	1.00	1.45	1.23	4	04	7.85	FILL	
BH-I-46	3.00	3.45	3.23	0	00	5.85	I	
BH-I-46	5.00	5.45	5.23	0	00	3.85	I	
BH-I-46	7.00	7.45	7.23	1	01	1.85	IV-A	26
BH-I-46	9.00	9.45	9.23	4	04	-0.15	IV-A	27
BH-I-46	11.50	11.95	11.73	7	06	-2.65	IV-A	29
BH-I-46	14.50	14.95	14.73	18	15	-5.65	IV	32
BH-I-46	17.50	17.95	17.73	29	19	-8.65	IV	34
BH-I-46	20.50	20.95	20.73	36	21	-11.65	VI	34
BH-I-46	22.00	22.45	22.23	67	33	-13.15	VI	38
BH-I-46	23.50	23.95	23.73	70	33	-14.65	VI	38
BH-I-46	25.00	25.45	25.23	74	34	-16.15	VI	38
BH-I-46	26.50	26.95	26.73	42	42	-17.65	V	
BH-I-46	28.00	28.45	28.23	61	61	-19.15	V	
BH-I-46	29.50	29.95	29.73	57	57	-20.65	V	
BH-I-46	31.00	31.45	31.23	70	30	-22.15	VI	37
BH-I-46	32.50	32.95	32.73	66	28	-23.65	VI	36
BH-I-46	34.00	34.45	34.23	69	29	-25.15	VI	37
BH-I-46	35.50	35.95	35.73	80	31	-26.65	VI	37
BH-I-46	37.00	37.45	37.23	49	22	-28.15	VI	34
BH-I-46	38.50	38.95	38.73	50	22	-29.65	VI	34
BH-I-46	40.00	40.45	40.23	54	23	-31.15	VI	35
BH-I-47	1.00	1.45	1.23	11	11	7.66	FILL	
BH-I-47	3.00	3.45	3.23	1	01	5.66	IV-A	26
BH-I-47	5.00	5.45	5.23	0	00	3.66	IV-A	26
BH-I-47	7.00	7.45	7.23	1	01	1.66	IV-A	26

CORRECTION FOR STANDARD PENETRATION TEST VALUES

Bore Hole No:	Starting Depth (M)	Ending Depth (M)	Average Depth (M)	Field 'N' Values	Cor. 'N' for Ovp. & Dilatancy (if reqd)	Reduced Level (M)	Stratum	Computed Phi in Degrees
BH-I-47	9.00	9.45	9.23	5	05	-0.34	IV-A	28
BH-I-47	11.50	11.95	11.73	13	12	-2.84	IV	31
BH-I-47	14.50	14.95	14.73	23	17	-5.84	IV	33
BH-I-47	17.50	17.95	17.73	41	24	-8.84	VI	35
BH-I-47	20.50	20.95	20.73	55	29	-11.84	VI	37
BH-I-47	22.00	22.45	22.23	56	28	-13.34	VI	37
BH-I-47	23.50	23.95	23.73	59	29	-14.84	VI	37
BH-I-47	25.00	25.45	25.23	63	63	-16.34	V	
BH-I-47	26.50	26.95	26.73	67	67	-17.84	V	
BH-I-47	28.00	28.45	28.23	62	62	-19.34	V	
BH-I-47	29.50	29.95	29.73	66	66	-20.84	V	
BH-I-47	31.00	31.45	31.23	71	71	-22.34	V	
BH-I-47	32.50	32.95	32.73	81	81	-23.84	V	
BH-I-47	34.00	34.45	34.23	57	25	-25.34	VI	35
BH-I-47	35.50	35.95	35.73	54	24	-26.84	VI	35
BH-I-47	37.00	37.45	37.23	83	32	-28.34	VI	38
BH-I-47	38.50	38.95	38.73	>100	36	-29.84	VI	39
BH-I-47	40.00	40.45	40.23	>100	36	-31.34	VI	39
BH-I-48	1.00	1.45	1.23	7	07	7.90	FILL	
BH-I-48	3.00	3.45	3.23	0	00	5.90	I	
BH-I-48	5.00	5.45	5.23	0	00	3.90	I	
BH-I-48	7.00	7.45	7.23	0	00	1.90	I	
BH-I-48	9.00	9.45	9.23	6	06	-0.10	IV-A	28
BH-I-48	11.50	11.95	11.73	16	15	-2.60	IV	32
BH-I-48	14.50	14.88	14.69	24	18	-5.56	IV	33
BH-I-48	17.50	17.95	17.73	34	21	-8.60	VI	34
BH-I-48	20.50	20.95	20.73	39	22	-11.60	VI	35
BH-I-48	22.00	22.45	22.23	52	27	-13.10	VI	36
BH-I-48	23.50	23.95	23.73	61	30	-14.60	VI	37
BH-I-48	25.00	25.45	25.23	70	70	-16.10	V	
BH-I-48	26.50	26.95	26.73	78	78	-17.60	V	
BH-I-48	28.00	28.45	28.23	70	70	-19.10	V	
BH-I-48	29.50	29.95	29.73	57	26	-20.60	VI	36
BH-I-48	31.00	31.45	31.23	60	27	-22.10	VI	36
BH-I-48	32.50	32.95	32.73	57	57	-23.60	V	
BH-I-48	34.00	34.45	34.23	63	63	-25.10	V	
BH-I-48	35.50	35.95	35.73	60	60	-26.60	V	
BH-I-48	37.00	37.45	37.23	65	65	-28.10	V	
BH-I-48	38.50	38.95	38.73	77	77	-29.60	V	
BH-I-48	40.00	40.45	40.23	81	81	-31.10	V	
BH-I-49	1.00	1.45	1.23	7	07	7.94	FILL	
BH-I-49	3.00	3.45	3.23	0	00	5.94	IV-A	26