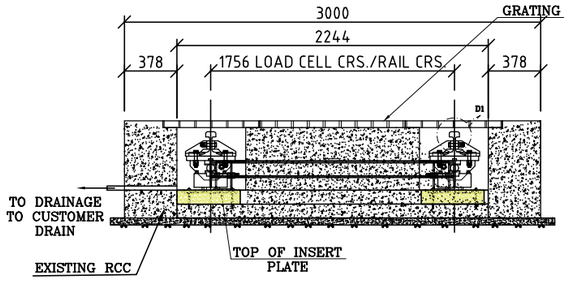
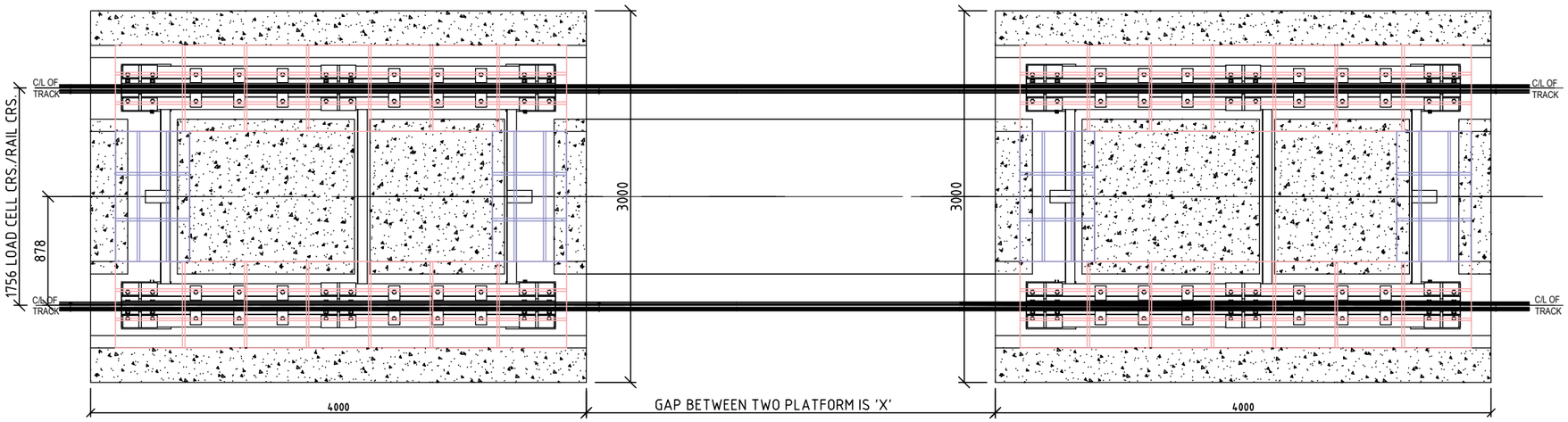


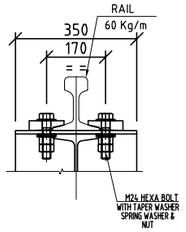
ELEVATION VIEW OF WEIGH BRIDGE FOR BTAP, BOXN, BCFC & BCCW WAGON



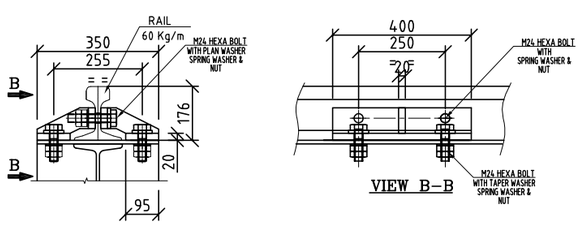
VIEW A–A



PLAN VIEW OF WEIGH BRIDGE FOR BTAP, BOXN ,BCFC & BCCW WAGON



DETAIL–D1



VIEW B–B

DETAIL D2 (RAIL ANTI CREEP)

S. NO.	SILO	GAP BETWEEN TWO PLATFORM (X) mm
1	SILO-1	3909
2	SILO-2	3909
3	SILO-3	3745
4	SILO-4	1977
5	SILO-5	3949
6	SILO-6	3881

TECHNICAL DATA		
GENERAL DATA	EQUIPMENT	STATIC RAIL WEIGH BRIDGE
	EQUIPMENT QTY. (NO.)	6 NOS.
	CAPACITY (T)	120
	ACCURACY	±0.05 % of F.S.
	MODEL	AWB -120T
	MAXIMUM PERMISSIBLE ERROR (e)	50 Kg.
	DISPLAY RESOLUTION (d)	20 Kg.
LOAD CELL DATA	TYPE	COMPRESSION TYPE
	MAKE	ACME
	LOAD CELL CAPACITY	30T
	DEGREE OF PROTECTION	IP 68
	MOC	SS
	QUANTITY/EQUIPMENT	12 NOS.
JUNCTION BOX	MODEL	1503.510
	MAKE	RITTAL
	QUANTITY/EQUIPMENT	2 NOS.

NOTES :–

1. ALL DIMENSIONS ARE IN mm AND LEVELS ARE IN METER UNLESS OTHERWISE NOTED.
2. EXISTING NEAR BY FOUNDATIONS, STRUCTURES, / EQUIPMENTS SHALL BE SUITABLY PROTECTED.
3. EXISTING UNDER GROUND SERVICES SHALL BE SUITABLY PROTECTED.
4. BRIDGE SHALL BE SUPPLIED WITH TWO COAT OF RED OXIDE & TWO COAT OF BLACK SYNTHETIC ENAMEL PAINT.
5. WELD SIZE SHALL BE 4mm FILLET AT SHOP & AT SITE UNLESS NOTED OTHER WISE.
6. RAILS SHALL BE PROVIDED BY NTPC.
7. PLEASE READ THIS DRAWING WITH SCHEMATIC LAYOUT DRAWING NO AAMD000/21–22/RLWB/MP–001.
8. GP–2 GROUTING SHALL USED FOR FOUNDATION BOLT FIXING.

NO.	DATE	REVISION	DRAWN	CHECKED	APPROVED

PRPD BY	
CHKD BY	
APPD BY	

CLIENT
NTPC LIMITED
SIPAT SUPER THERMAL PROJECT,BILASPUR(C.G.)

CONTRACTOR
ACME AUTOMATION PVT. LIMITED
16K–LIA, BHILAI– 490026

DRAWING TITLE: GENERAL ARRANGEMENT AND CIVIL FOUNDATION DRAWING OF 120T RAIL WEIGH BRIDGE

SUBMITTED FOR: APPROVAL — SCALE :– NTS — DATE

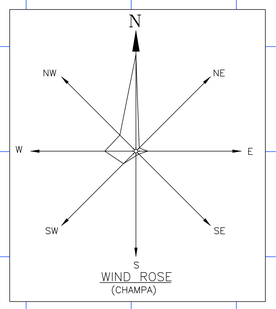
		BY	DATE			
✓	APPROVAL			PRPD	S.D.	21/02/2022
	REFERENCE			CHKD	N.C	21/02/2022
	CONSTRUCTION			APPD BY	L.K.S	21/02/2022
	AS BUILT					

SHEET NO. :– 01 OF 01

JOB NO. 115/21–22 | DRAWING NO. AAMD115/21–22/RLWB/GA–001 | REV. 02

SHEET A3

ANEXURE-I



SIPAT VILLAGE

NAWADIH VILLAGE

JANJI VILLAGE

TO BILASPUR

TO GATORA JN.

KHARANG LEFT BANK CANAL

GREEN BELT

RAW WATER RESERVOIR
(STAGE-I)/(PART-I) MAX. WATER LEVEL = RL(+) 280.5M TOP OF EMBANKMENT = RL(+) 282.0M
SPACE FOR PGCIL'S TRANSMISSION TOWERS

RAW WATER RESERVOIR
(STAGE-I)/(PART-II)
MAX. WATER LEVEL = RL(+) 280.5M
TOP OF EMBANKMENT = RL(+) 282.0M

RAW WATER RESERVOIR
(STAGE-II)
MAX. WATER LEVEL = RL(+) 280.5M
TOP OF EMBANKMENT = RL(+) 282.0M
BED LEVEL = RL(+) 272.0M

765KV SWITCHYARD
RL(+)281.5M

400KV SWITCHYARD

132KV SWITCHYARD

7650/400KV TRANSMISSION LINES CORRIDOR

PROPOSED UNTOWN AREA STAGE-III AREA-120 ACRE (APPROX)

ADDITIONAL BAY FOR STAGE-III

400KV SWYD CONT. ROOM

SWYD. CONTROL BUILDING (MAIN)

MISC. SWGR

11KV SWGR

TRENCH FOR 132 KV

BARRICADE

LAYDOWN (5 ACRES)

IDCT

RAW WATER PIPELINE

SPACE FOR WTP PLANT

LAYDOWN AREA (10 ACRES)
(IN FUTURE, SPACE TO BE USED FOR METHANOL/ HYDROGEN PLANT)

LIME STONE HANDLING

SPACE FOR HYDROBINS

LAYDOWN AREA (20ACRES)
(IN FUTURE, SPACE TO BE USED FOR METHANOL/ HYDROGEN PLANT)

FGL(+)281.5M

CRUSHED COAL STOCK PILE-6
CRUSHED COAL STOCK PILE-5
CRUSHED COAL STOCK PILE-4
CRUSHED COAL STOCK PILE-3
CRUSHED COAL STOCK PILE-2
CRUSHED COAL STOCK PILE-1
SR-3
SR-2
SR-1

CT-4A
CT-4B
CT-5A
CT-5B
CT-3A
CT-3B
CT-2A
CT-2B
CT-1A
CT-1B

T.G HALL

CONSTRUCTION STORES RL(+)281M

STATION AUX. CT

PUMP HOUSE-II
WT MCC CUM CONTROL ROOM-I

CHP CONT. ROOM-I

TH CONT. PANEL

CHP PUMP HOUSE-II

TRACK HOPPER-I

WAGON TIPPLER CONTROL ROOM

CW PUMP HOUSE

SERVICE/ CONTROL BLDG.-I

CHLORINATION BUILDING

CHLORINE GAS EVAPORATOR

CHLORINE GAS NEUTRALISATION

CHLORINE GAS STORAGE

CHLORINE GAS SCRUBBER

CHLORINE GAS BOOSTER PUMP

CHLORINE GAS DOSING

CHLORINE GAS CYLINDER STORAGE

CHLORINE GAS CYLINDER CHANGING

CHLORINE GAS CYLINDER CHANGING CRANE

CHLORINE GAS CYLINDER CHANGING HOIST

CHLORINE GAS CYLINDER CHANGING TROLLEY

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT BRACKET

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT BRACKET BOLT

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT BRACKET NUT

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT BRACKET WASHER

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT BRACKET SPRING WASHER

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT BRACKET PLAIN WASHER

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT BRACKET HEXAGON HEAD BOLT

CHLORINE GAS CYLINDER CHANGING TROLLEY RAIL SUPPORT BRACKET HEXAGON NUT

No. A-1/2021-FSC-Part(5)
Government of India
Ministry of Power

Shram Shakti Bhawan, New Delhi
Dated: 3rd July, 2023

ORDER

Subject: Public Procurement (Preference to Make in India) to provide for Purchase Preference (linked with local content) in respect of Power Sector- Revision- regarding.

Reference: Ministry of Power (MoP) Order No. A-1/2021-FSC-Part(5) dated 16.11.2021.

In partial modification of Ministry of Power's Order No. A-1/2021-FSC-Part(5) dated 16.11.2021, it has been decided to order the following amendment in the said Order (Annexure-I referred to in sub-para (ii) of para 3), with immediate effect, as under:-

Sr. No. of Annexure-I	MoP PPP-MII Order dated 16.11.2021	Amended
43	Energy Meters excluding smart meters- 50 (MLC)	**Energy Meters including Smart Meters- 50 (MLC)**

2. All other provisions of the said Order remain unchanged.

3. This issues with the approval of Hon'ble Minister for Power and NRE.

(Anoop Singh Bisht)
Deputy Secretary to the Government of India

To:

1. Secretary to Government of India (All Ministries/ Departments of Government of India) (As per list)
2. Secretary (Coordination), Cabinet Secretariat
3. CEO, NITI Aayog
4. Chief Secretaries of all States/ UTs
5. Comptroller and Auditor General of India
6. Secretary, DPIIT, Chairman of Standing Committee for implementation of Public Procurement Order, 2017
7. Director General, Bureau of Indian Standards (BIS)
8. Joint Secretary, DPIIT, Member-Convener of Standing Committee for implementation of Public Procurement Order, 2017
9. Chairperson, CEA
10. CMDs of CPSEs, CMD NLC, Chairman of DVC/ BBMB/ EESL, DGs of BEE/ CPRI/ NPTI
11. All Additional Secretaries/ JSs/ EA/ CE, Ministry of Power

Copy to:

Director (Technical), NIC with a request to publish the Order on the website of Ministry of Power

Annexure-I

Sl. No.	Electrical Equipment for Generation, Transmission and Distribution sectors with sufficent local capacity and competition	Class-I Local Supplier (Minimum Local Content (%)
	(A) Common items for Transmission, Distribution and Generation Sector	
1	Power Transformers (up to 765 kV, including Generator transformers)	60
2	Instrument Transformer (up to 765 kV)	60
3	Transformer Oil Dry Out System (TODOS)	60
4	Reactors up to 765 kV	60
5	Oil Impregnated Bushing (up to 400 kV)	60
6	Resin Insultated Paper (RIP) bushings (up to 145 kV)	50
7	Circuit Breakers (up to 765 kV AC - Alternating Current)	60
8	Disconnectors/Isolators (up to 765 kV AC)	60
9	Wave trap (up to 765 kV AC)	60
10	Oil Filled Distribution Transformers up to & Including 33 kV [Cold Rolled Grain Oriented (CRGO)/Amorphous, Aluminium/Copper wound]	60
11	Dry Type Distribution Transformer upto and including 33 kV (CRGO/Amorphous, Aluminium/Copper wound)	60
12	Conventional Conductor	60
13	Accessories for Conventional conductors	60
14	High Temperature/High Temperature Low Sag (HTLS) conductors (such as Composite core, GAP, ACSS, INVAR, AL59) and Accessories	60
15	Optical ground wire (OPGW) – all designs	60
16	Fiber OpticTerminal Equipment (FOTE) for OPGW	50
17	OPGW related Hardware and Accessories	60
18	Remote Terminal Unit (RTU)	50
19	Power Cables and accessories up to 33 kV	60
20	Control cables including accessories	60
21	XLPE Cables up to 220 kV	60
22	Substation Structures	60
23	Transmission Line Towers	60
24	Porcelain (Disc/Long Rod) Insulators	60
25	Bus Post Insulators (Porcelain)	60
26	Porcelain Disc Insulators with Room Temperature Vulcanisation (RTV) coating	50
27	Porcelain Longrod Insulators withRoom Temperature Vulcanisation (RTV) coating	50
28	Hardware Fittings for Porcelain Insulators	60
29	Composite/Polymeric Long Rod Insulators	60
30	Hardware Fittings for Polymer Insulators	60
31	Bird Flight Diverter (BFD)	60
32	Power Line Carrier Communication (PLCC) System (up to 800 kV)	60
33	Gas Insulated Switchgear (up to 400 kV AC)	60
34	Gas Insulated Switchgear (above 400 kV AC)	50
35	Surge/Lightning Arrester (up to 765 kV AC)	60
36	Power Capacitors	60
37	Packaged Sub-station (6.6 kV to 33 kV)	60
38	Ring Main Unit (RMU) (up to 33 kV)	60
39	Medium Voltage (MV) GIS Panels (up to 33 kV)	60

40	Automation and Control System/Supervisory Control and data Acquisition (SCADA) System in Power System	50
41	Control and Relay Panel (including Digital/Numerical Relays)	50
42	Electrical Motors 0.37 kW to 1 MW	60
43	Energy Meters including Smart Meters	50
44	Control & power cables and Accessories (up to 1.1 kV)	60
45	Diesel Generating (DG) set	60
46	DC system (DC Battery & Battery Charger)	60
47	AC & DC Distribution Board	60
48	Indoor Air Insulated Switchgear (AIS) upto 33 kV	60
49	Poles (PCC, PSCC, Rolled Steel Joist, Rail Pole, Spun, Steel Tubular)	60
50	Material for Grounding/earthing system	60
51	Illumination system	60
52	Overhead Fault Sensing Indicator (FSI)	50
53	Power Quality Meters	50
54	Auxilliary Relays	50
55	Load Break Switch	50
	(B) Hydro Sector	
56	Hydro Turbine & Associated equipment	
	a) Francis Turbine	60
	b) Kaplan Turbine	60
	c) Pelton Turbine	50
57	Main Inlet Valve & Associated Equipment	60
58	Penstock Protection Valve and Associated Equipment	60
59	Governing system & Accessories	60
60	Generator for Hydro Project & Associated Equipment	60
61	Static Excitation System	60
62	Workshop Equipment	60
63	Cooling Water System	60
64	Compressed Air System	60
65	Drainage/Dewatering System	60
66	Fire Protection System	60
67	Heating, Ventilation & Air Conditioning System (HVAC)	60
68	Oil Handling System	60
69	Mechanical Balance of Plant (BOP) Items	60
	(C) Thermal Sector	
	Boiler Auxiliaries	
70	Air Pre-Heater	60
71	Steam Coil Air Pre Heater (SCAPH)	60
72	Steam soot blowers [wall blowers & Long Retractable Soot Blower (LRSB)]	60
73	Auxiliary Steam Pressure Reducing & Desuperheating (PRDS)	60
74	Fuel oil system	60
75	Seal air Fan	60
76	Ducts and dampers	60
77	Duct expansion joints	60
78	Blowdown tanks	60
79	Coal burners and oil burners	60
80	Coal mills	60
81	Gear Box of Coal Mill	50
82	Coal feeders	60
83	Primary Air Fans	60

84	Forced Draft Fans	60
85	Induced Draft Fans	60
86	Forced Draft (FD)/Induced Draft (ID)/ Primary Air (PA) Fan Servo Motor Assembly	50
87	Tubes (Carbon Steel)	50
88	Steam pipes (Carbon Steel)	50
89	Steam drum	50
90	Separator	50
91	Selective Catalytic Reduction (SCR)	50
	Electro-Static Precipitators (ESPs)	
92	Casing	60
93	Electrodes	60
94	Rapping System	60
95	Hopper Heaters	60
96	Transformer Rectifiers	60
97	Insulators	60
	Turbine & Auxiliaries	
98	Turbine (High Pressure/Intermediate Pressure/Low Pressure)	50
99	Condensate Extraction Pumps	60
100	Condenser On line Tube Cleaning System (COLTC)	60
101	Debris filters	60
102	Deaerator	60
103	Drain Cooler and Flash Tank	60
104	ECW Pump	50
105	Plate Heat Exchanger	50
106	Self- cleaning filters	50
107	Condensate Polishing Units (CPUs)	60
108	Chemical Dosing System	60
109	Oil Filter	60
110	Gland Steam Condenser	60
111	Oil Purifying Centrifuge	50
112	Water Cooled Condenser	50
113	Boiler Feed Pumps (BFPs)	50
	Generator and Auxillieries	
114	Generator (including Seal Oil System, Hydrogen Cooling System, Stator water cooling system)	60
	Electrical Works	
115	Control and metering equipment	60
	Control & Instrumentation System (C&I System)	
116	Thermocouples	50
117	Measuring instruments [Resistance Temperature Detectors (RTDs)], Local gauges	50
118	Actuators (Pneumatic and conventional electric)	50
119	Interplant Communication/ Public Address (PA) system except IP based	50
	Coal Handling Plant	
120	Conveyors	60
121	Wagon Tippler	60
122	Side Arm Charger	60
123	Paddle feeder	60
124	Crushers & Screens	60
125	Dust suppression (dry fog & plain water) system	60
126	Air Compressors	50
127	Magnetic separators & metal detectors	60
128	Coal Sampling System	60
129	Stacker cum reclaimer	60
130	Belt weighing & monitoring system	60

131	Wheel & axle assembly (without bearings) for Bottom Opening Bottom Release (BOBR) Wagons	60
	Ash Handling System	
132	Clinker grinder	60
133	Water jet ejectors	60
134	Scrapper chain conveyor	60
135	Dry fly ash vacuum extraction system	60
136	Pressure pneumatic conveying system	60
137	Ash water & ash slurry pumps	60
138	Compressors, air dryers & air receivers	50
139	Ash water recovery system	60
	Raw Water Intake & Supply System	
140	Travelling water screens	60
141	Raw water supply pumps	60
142	Valves, RE joints etc.	60
	Water Treatment System and Effluent Treatment System	
143	Clarification plant	60
144	Filtration plant	60
145	Ultra filtration plant	50
146	Reverse Osmosis (RO) plant and its membrane	55
147	De-Mineralised water plant (DM Plant)	60
148	Chlorination plant	60
149	Chemical dosing system	60
150	Effluent Treatment Plant	60
	Circulationg Water (CW) & Auxiliary Circulating Water (ACW) System	
151	CW & ACW Pumps	60
152	Butter Fly (BF) valves, Non-return Valves (NRVs) etc.	60
153	Rubber Expansion (RE) joints	60
154	Air release valves	60
	Cooling Towers (NDCT/ IDCT)-Natural-Draft and Induced Draft Cooling Tower	
155	Water Distribution System	60
156	Spray nozzles	60
157	Packing	60
158	Drift eliminators	60
159	Cooling Tower (CT) Fans (for Induced Draft Cooling Towers IDCT)	60
160	Gear boxes, shafts & motors (for IDCT)	60
	Air Conditioning & Ventilation System	
161	Split & window air conditioners	60
162	Chilling/ condensing unit [upto 500 ton of refrigeration(TR)]	55
163	Air Handling Unit (AHU) and Fresh air unit	60
164	Cooling Towers	60
165	Air Washing Units (AWUs), axial fans, roof extractors	60
166	Ducts, louvers & dampers	60
	Flue Gas Desulphurization (FGD)	
167	Spray Nozzles,	50
168	Spray header	50
169	Oxidation Blowers	50
170	Limestone wet Ball Mill	50
171	Slurry Handling Pumps for FGD system	50
172	Booster Fans for FGD system	50
173	Carbon Steel Ducts and Dampers for FGD	60
174	Storage Tanks and Silos	60
175	Process Water Pump for FGD system	50
	(D) Other Common Items	

	Fire protection and detection system	
176	Motor driven fire water pumps	60
177	Diesel engine driven fire water pumps	60
178	Hydrant system for the power plant.	60
179	High velocity water spray system	60
180	Medium velocity water spray system	60
181	Foam protection system	60
182	Inert gas flooding system	60
183	Fire tenders	60
184	Portable fire-extinguishers	60
185	Cranes, EOT cranes, gantry crane & chain pulley blocks etc.	60
186	Elevator	60

(E) Minimum Local Content percentages in Engineering, Procurement & Construction (EPC) / Turnkey project

In case the contract is awarded through the EPC route, the contractor should comply with the requirement of MLC for individual items as listed in Annexure-I and should purchase these items only from Class-I Local supplier. In addition, MLC for complete EPC project may also be prescribed as below:

	(1) Package Based Works	**Minimum Local Content (%)**
1	Boiler	60
2	TG System (Water Cooled Condenser)	60
3	Ash Handling Plant	60
4	Coal Handling Plant	60
5	Electro-static Precipitator (ESP)	60
6	Circulating Water (CW) System	60
7	Cooling Tower	60
8	Water Treatment System	60
9	Air Conditioning System (below 500TR)	60
10	Flue Gas Desusphurisation (FGD) System	60
11	Station Control & Instrumentation (C&I)	50
12	Hydro Power Projects (Electro-Mechanical Works)	60
	Gas based generation	
	Overall Gas Turbine Package (on finished Product basis)	
13	< 44 MW	60
14	44 –145 MW	50
	Overall Combined Cycle Gas Turbine (CCGT) Package (on finished Product basis)	
15	< 44 MW	60
16	44 – 145 MW	60
17	> 150 MW	60
	(2) Project as a whole	
1	Works and service contracts in Power Sector	60
2	Transmission Line with Conventional conductors (ACSR, AAAC, AL-59 etc.)	60
3	Transmission Line with High temperature Low Sag (HTLS) conductors	60
4	HVAC Substation Air Insulated (AIS)	60
5	HVAC Substation Gas Insulated (GIS)	60
6	HVDC Substation	60
7	Distribution Sector	60

Amendment 03 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	G-01 to G-02	1
2	TG-17 to TG-21	2
3	SG-50 to SG-54	3-4
4	MH-58 to MH-62	5-6
5	LA-2	7
6	EE-80 to EE-84	8
6	C-22 to C-24	9-10
7	D3-59 to D3-66	11-13
8	Annexures to Amendment 03	

Amendment 03 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
G-01	C	GTR	45/119	26.03.00 (a)	The final test as to prove the Functional Guarantees shall be conducted at Site by the Contractor in presence of the Employer. To conduct such tests, the contractor's Commissioning, start-up Engineer shall **make the unit ready (including tuning and all other enabling activities as required for PG tests) before start of initial operation**. Such test shall be conducted along with the Initial Operations.	The final test as to prove the Functional Guarantees shall be conducted at Site by the Contractor in presence of the Employer. To conduct such tests, the contractor's Commissioning, start-up Engineer shall **make the unit ready before start of initial operation**. Such test shall be conducted along with the Initial Operations.
G-02	VI/A	IV	2 of 76	1.00.01 g)	……Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test / initial operation.	……Control system loop tuning required to limit the variation of parameters during performance guarantee testing shall be completed prior to PG Test **& during** initial operation.

Amendment 03 to Technical Specifications (Section VI)

S. No.	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No.	Clause No.		
TG-17.	A	IIA-06	3 of 10	2.02.08	Portable turbine preservation system consisting of …… per station shall be provided.	Portable **Main** turbine preservation system consisting of …… per station shall be provided.
TG-18.	A	SUB-SECTION-VI/MAN SPARES, CHAPTER-02, STEAM TURBINE GENERATOR	25 of 34	4.00.00 A. EHC System related instrumentation (5)	High pressure hoses for HPBP, High Pressure LPBP etc.	~~High pressure~~ Hoses for HP ~~BP~~ **and** ~~High Pressure~~ LP ~~BP~~ **Bypass system** ~~etc.~~
TG-19.	A	IIA-06	2 of 10	2.02.04	Steam turbine control fluid……. respects for the 800 MW unit.	Steam turbine control fluid……. respects for the 800 MW unit. **Fire Resistant Fluid for main turbine control fluid system shall be preferably sourced from Domestic Manufacturer.**
TG-20.	B	A-24	1 of 6	1.01.01	Elevator shall be of conventional type for TG building. The elevator shall meet the quality of international standard.	Elevator shall be of conventional type for TG building. ~~The elevator shall meet the quality of international standard~~.
TG-21.	B	G-04	28 of 227	5.7	**Comparison with guarantees** Comparison with guarantee should be made using corrected value of generator output and Heat Rate which are calculated in clause 5.5 and 5.6 as follows.	**Comparison with guarantees** Comparison with guarantee should be made using corrected value of generator output and Heat Rate which are calculated in clause ~~5.5~~ **5.4** and 5.6 as follows.

Amendment 03 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">SN</th><th colspan="4">SPECIFICATION REFERENCE</th><th rowspan="2">EXISTING</th><th rowspan="2">READ AS</th></tr>
<tr><th>SEC/ PART</th><th>SUBSEC.</th><th>PAGE NO.</th><th>CLAUSE NO.</th></tr>
<tr><td>SG.50</td><td>VI/A</td><td>I-B</td><td>11 of 19</td><td>Annexure-IV-2</td><td>Domestic Coal Characteristics
Annexure-IV-2
Amended vide amendment Sl. No. SG.3</td><td>Domestic Coal Characteristics
Annexure-IV-2 revised as attached</td></tr>
<tr><td>SG.51</td><td>VI/A</td><td>VI, Ch.-01</td><td>17 of 38</td><td>1.20.00</td><td>Auxiliary Steam Pressure Reducing & Desuperheating System</td><td>Auxiliary Steam Pressure Reducing & Desuperheating System- Revised as attached</td></tr>
<tr><td>SG.52</td><td>VI/B</td><td>A-02</td><td>40 of 67</td><td>13.01.02 (c)</td><td>Horizontal ducts to be designed… shall be at least 1300 kg/m^3.</td><td>Horizontal ducts to be designed… shall be at least 1300 kg/m^3. For economizer/APH/duct hopper design, the fly ash bulk density shall be considered as 650 kg/m3 for volumetric calculation, and for load/structure calculations it shall be as per Cl. No. 4.01.02 (C), Sub-sec. A-01, Part B, Section VI</td></tr>
<tr><td>SG.53</td><td>VI/A</td><td>VI Chapter 1</td><td>20 of 39</td><td>1.22.06</td><td>
<table>
<tr><td>1.22.06</td><td>Slurry Pumps (Absorber Slurry Recirculation Pump, Gypsum Bleed Pumps, Mill Circuit Pump, Limestone Supply Pumps and any other slurry pumps)</td><td></td></tr>
<tr><td></td><td>1. …</td><td>…</td></tr>
<tr><td></td><td>2. Casing Liners</td><td>2 no. of each type</td></tr>
<tr><td></td><td>3…</td><td></td></tr>
</table>
</td><td>
<table>
<tr><td>1.22.06</td><td>Slurry Pumps (Absorber Slurry Recirculation Pump, Gypsum Bleed Pumps, Mill Circuit Pump, Limestone Supply Pumps and any other slurry pumps)</td><td></td></tr>
<tr><td></td><td>1. …</td><td>….</td></tr>
<tr><td></td><td>2. Casing Liners (where replaceable liners are provided)</td><td>2 no. of each type</td></tr>
<tr><td></td><td>2A. Complete Casing (For the Absorber Slurry Recirculation/Gas Cooling Pump/Recycle Pump/All Slurry Pumps)</td><td>1 Set* of each type and size</td></tr>
<tr><td></td><td>3…</td><td></td></tr>
</table>
</td></tr>
</table>

Amendment 03 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">SN</th><th colspan="4">SPECIFICATION REFERENCE</th><th rowspan="2">EXISTING</th><th rowspan="2">READ AS</th></tr>
<tr><th>SEC/ PART</th><th>SUBSEC.</th><th>PAGE NO.</th><th>CLAUSE NO.</th></tr>
<tr><td>SG.54</td><td>VI/A</td><td>IA</td><td>5 OF 8</td><td>4.02.00</td><td>Pre-commissioning and Commissioning activities

The contractor’s scope…subsequent initial operation.

The employer shall issue…each Unit free of charge.

<table><tr><td>Unit Size</td><td>800 MW</td></tr><tr><td>Fuel Oil</td><td>11200 kL</td></tr><tr><td>Coal</td><td>2.7 lakh MT</td></tr></table>…</td><td>Pre-commissioning and Commissioning activities

The contractor’s scope…subsequent initial operation.

The employer shall issue…each Unit free of charge.

<table><tr><td>Unit Size</td><td>800 MW</td></tr><tr><td>Fuel Oil</td><td>11200 kL</td></tr><tr><td>Coal</td><td>3.8 lakh MT</td></tr></table>…</td></tr>
</table>

Amendment 03 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-58	VI/A	IIA-16	9/18	1.01.07 (e) (Amendment MH-20)	The fine ash and coarse ash after classification shall be stored in RCC/Structural steel hoppers, separate for fine ash and coarse ash respectively**. The capacity and number of the fine ash hoppers and coarse ash hoppers shall be as per the tender Drws. For (Vacuum + Pressure) system, Minimum (1 W + 1S) Coarse Ash Hoppers shall be provided.**	The fine ash and coarse ash after classification shall be stored in RCC/Structural steel hoppers, separate for fine ash and coarse ash respectively**. The capacity and number of the fine ash hoppers and coarse ash hoppers shall be as per the tender Drws.**
MH-59	VI/A	IIA-16	6/18	1.01.06 (b) (ii) (Amendment MH-20)	Two (2) nos. Intermediate fly ash storage silos (Structural steel Silos) of 250 MT effective storage capacity each …….. …… fly ash storage system. Refer Tender Drw. for number of outlets below intermediate Silos.	Two (2) nos. Intermediate fly ash storage silos (Structural steel**/RCC** Silos) of 250 MT effective storage capacity each …….. …… fly ash storage system. Refer Tender Drw. for number of outlets below intermediate Silos.
MH-60	VI/A	IIA-16	13/18	1.01.08 (b) (Amendment MH-49)	Required number of lengths of combined ash slurry disposal MS pipelines from combined ash…… …… as specified and as required. For garlanding of **Mine Void**, MS bends shall be provided. The length of total combined Ash disposal pipelines shall be 39,000 m (excluding fittings and including branch pipes for garlanding of ash dyke-Lagoon 1, Lagoon 2 and Lagoon 3). Slurry lines to be routed through the available space (refer Topographical & contour survey drw of Ash Pipeline corridor) adjacent to the existing disposal corridor upto the Ash Dykes. Slurry shall be discharged into any of the Lagoons from any of the disposal pipelines.	Required number of lengths of combined ash slurry disposal MS pipelines from combined ash…… …… as specified and as required. For garlanding of **Ash Dyke**, MS bends shall be provided. The length of total combined Ash disposal pipelines shall be 39,000 m (excluding fittings and including branch pipes for garlanding of ash dyke-Lagoon 1, Lagoon 2 and Lagoon 3). Slurry lines to be routed through the available space (refer Topographical & contour survey drw of Ash Pipeline corridor) adjacent to the existing disposal corridor upto the Ash Dykes. Slurry shall be discharged into any of the Lagoons from any of the disposal pipelines.
MH-61	VI/B	A-01	87/87	4.04.15	**Dust extraction system** Type: Dry type dust extraction system Location: Truck un-loading points (**Biomass & Limestone**), Junction Towers (limestone/Biomass discharge & receipt points), limestone crusher house (including belt feeder & vibrating screening feeder) and limestone/**Biomass** storage Shed/Silo.	**Dust extraction system** Type: Dry type dust extraction system Location: Truck un-loading points (**Biomass & Limestone**), Junction Towers (limestone/Biomass discharge & receipt points), limestone crusher house (including belt feeder & vibrating screening feeder) and limestone/**Biomass** storage Shed/Silo. **In case of any discrepancy w.r.t Dust collection locations, refer. Coal + Biomass Flow Diagram and Limestone Flow diagram**

Amendment 03 to Technical Specifications (Section VI)

MH-62	VI/B	A-01	84 of 87	4.04.01 (b) (Amendment MH-25)	The rated capacity of all Gypsum handling conveyors shall be **150 MTPH**.	The rated capacity of all Gypsum handling conveyors shall be **55 MTPH.**
				4.04.01 (c) (Amendment MH-25)	Belt speed for 65 MTPH conveyors shall not be more than 2.0 m/s.	Belt speed **for Limestone (150 MTPH) & Gypsum (55 MTPH)** conveyors shall not be more than 2.0 m/s.

Amendment 03 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
LA-2	Part B	G-03	12 of 15	1.03.00 (52)	Bidder to route ash slurry pipelines on pedestal and pipe culverts shall be provided at rail/road crossings.	Bidder to route non-cast basalt ash slurry pipelines on pedestal only and pipe culverts shall be provided at rail/road crossings.

Amendment 03 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
EE-80	VI/E				SINGLE LINE DIAGRAM SWITCHYARD 9500-999-POE-J-001 Rev A 9500-999-POE-J-002 Rev A	SINGLE LINE DIAGRAM SWITCHYARD 9500-999-POE-J-001 Rev B 9500-999-POE-J-002 Rev B
EE-81	Clarifi-cation-02, S No 55				Bidder understanding is not correct. Specification cl.no. **1.11.06** Sub -Section B-04 Section-VI, Part-B to be followed.	Bidder understanding is not correct. Specification cl.no. **1.09.05.a(1)** Sub -Section B-04 Section-VI, Part-B to be followed.
EE-82	Clarifi-cation-02, S No 57				Bidder understanding is not correct. Specification cl.no. **1.06.07** Sub -Section B-04 Section-VI, Part-B to be followed.	Bidder understanding is not correct. Specification cl.no. **1.04.07** Sub -Section B-04 Section-VI, Part-B to be followed.
EE-83	Clarifi-cation-02, S No 58				Bidder understanding is not correct. Specification cl.no. **1.11.00** Sub -Section B-04 Section-VI, Part-B to be followed. If valid type test report are not available then type test is to be conducted.	Bidder understanding is not correct. Specification cl.no. **1.01.02 & 1.09.03** Sub -Section B-04 Section-VI, Part-B to be followed. If valid type test report are not available then type test is to be conducted.
EE-84	Clarifi-cation-02, S No 913				Bidder understanding is not correct. Specification cl.no. **1.11.03** Sub -Section B-04 Section-VI, Part-B to be followed.	Bidder understanding is not correct. Specification cl.no. **1.09.03** Sub -Section B-04 Section-VI, Part-B to be followed.

Amendment 03 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">SN</th><th colspan="4">Specification Reference</th><th rowspan="2">Existing</th><th rowspan="2">Read as</th></tr>
<tr><th>Part</th><th>Sub Sec</th><th>Page No</th><th>Clause No</th></tr>
<tr><td>C-22</td><td>VI/A</td><td>SUB-SECTION-VI
CHAPTER-02
STEAM TURBINE GENERATOR</td><td>27 of 34</td><td>6.00.00</td><td>Electrical Actuators<table><tr><td>1</td><td>Actuators</td><td>1 no. of each type and rating</td></tr><tr><td>2</td><td>Power unit for modulating actuator</td><td>2 nos. of each type</td></tr><tr><td>3</td><td>DC-DC unit / Power Units</td><td>2 nos. of each type</td></tr><tr><td>4</td><td>Electronic cards</td><td>2 nos. of each type</td></tr><tr><td>5</td><td>Position feedback transmitters</td><td>2 nos. of each type</td></tr><tr><td>6</td><td>Control Unit</td><td>2 nos. of each type</td></tr><tr><td>7</td><td>Torque And limit switch assembly of each unit</td><td>2 nos. of each type</td></tr><tr><td>8</td><td>Electronic PCB of all types</td><td>10% of each type & model</td></tr><tr><td>9</td><td>Absolute Encoder (replaceable part)</td><td>5% of each type & model</td></tr><tr><td>10</td><td>Electronic Torque sensor</td><td>5% of each type & model</td></tr></table></td><td>Electrical Actuators<table><tr><td>(i)</td><td>Electronic PCB of all types</td><td>10% of each type & model</td></tr><tr><td>(ii)</td><td>Absolute Encoder (Replaceable part)</td><td>5% of each type & model</td></tr><tr><td>(iii)</td><td>Electronic Torque sensor</td><td>5% of each type & model</td></tr><tr><td>(iv)</td><td>Electrical Actuator</td><td>1 no. of each type, class, size and model</td></tr><tr><td>(v)</td><td>Actuators gear box assembly of each type (as applicable)</td><td>5% or 1nos whichever max of each type and model</td></tr></table></td></tr>
<tr><td>C-23</td><td>VI/A</td><td>SUB-SECTION-VI
CHAPTER-02
STEAM TUR-BINE GENERA-TOR</td><td>27 of 34</td><td>7.00.00
8.00.00</td><td></td><td>7.00.00 ACTUATORS & ACCESSORIES FOR CONTROL VALVES (FOR ALL SERVICES UNDER THIS CHAPTER)<table><tr><td>1</td><td>Pneumatic and electro-hydraulic actuator assembly</td><td>1 No. of each type, model and rating</td></tr><tr><td>2</td><td>Diaphragms, O’ rings, seals etc. of all types make etc.</td><td>5 Nos.</td></tr><tr><td>3</td><td>Solenoid valves (if applicable)</td><td>1 No.</td></tr></table></td></tr>
</table>

<table>
<tr>
<td></td><td></td><td></td><td></td><td></td>
<td>Note: In case the main population of any item is only one no., then the spare quantity shall also be one no., overriding requirements indicated in clause 1.00.00 to 6.00.00 above.</td>
<td>
<table>
<tr><td>4</td><td>Positioner units /smart positioners (complete unit) & accessories (link assembly). also applicable to hydraulic control</td><td>2 Nos.</td></tr>
<tr><td>5</td><td>Pneumatic air-filter/Regulator of each type, make rating etc.</td><td>2 Nos. of each type</td></tr>
<tr><td>6</td><td>Air lock relays</td><td>1 No. of each type, model and rating</td></tr>
<tr><td>7</td><td>Proportional valve , hydraulic solenoids, Pilot valves, Proportional valves, Position feedback trasnmitters (if applicable)</td><td>1nos of each type</td></tr>
<tr><td>8</td><td>Hydraulic actuators seals(set), Piston/Stem</td><td>1 nos of each type</td></tr>
</table>
8.00.00 ACTUATORS & ACCESSORIES FOR PNEUMATICALLY OPERATED ISOLATION / BLOCK VALVES (FOR ALL SERVICES UNDER THIS CHAPTER)
<table>
<tr><td>1.</td><td>Pneumatic actuator assembly</td><td>1 No. of each type, model and rating,</td></tr>
<tr><td>2.</td><td>Diaphragms, O’ rings, seals etc. of all types make etc.</td><td>5 Nos.</td></tr>
<tr><td>3.</td><td>Limit switches (complete unit) & accessories (link assembly)</td><td>2 nos.</td></tr>
<tr><td>4.</td><td>Pneumatic air-filter/Regulator of each type, make rating etc.</td><td>2 nos.</td></tr>
</table>
Note: In case the main population of any item is only one no., then the spare quantity shall also be one no., overriding requirements indicated in clause 1.00.00 to 8.00.00 above.
</td>
</tr>
<tr>
<td>C-24</td><td>VI/B</td><td>SUB-SECTION-IIIC-17 ELECTRICAL ACTUATORS</td><td>2 of 4</td><td>4.11.00</td><td></td>
<td>
<table>
<tr><td>SIL Certification</td><td>All actuators shall be certified for SIL 2 or better.</td></tr>
</table>
</td>
</tr>
</table>

Amendment 03 to Technical Specifications (Section VI)

SN	SPECIFICATION REFERENCE				Existing	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
D3-59	VI / A	IID	1.00.01		All steel structures shall be fabricated in factory, transported, and erected at site. All factory-fabricated structures shall have bolted field connections. Coal bunkers with hoppers, Lime stone and Biomass Silo, Chimney flue liners, CW duct liners can either be fabricated at factory in segments, transported and welded at site before erection or fabricated at site. For coal/Lime/Biomass bunkers, hoppers and chimney flue liners, to prevent coal dust/flue gas leakages, the applicable field joints shall necessarily be welded. Note: Steel structures shall mean plant and non-plant building structures, boiler & ESP support structures, Coal, limestone and Gypsum handling structures, AHP structures, chimney flue liners support platforms & stairs, pipe and cable support structures. Civil, structural and architectural works though not explicitly mentioned in the above list but required for the completion of the various systems of the package shall also be in the scope of the bidder.	Steel structures for following facilities as mentioned below shall be fabricated in factory, transported, and erected at site. 1. Technological Structures such as Boiler, ESP including Hopper and Bunker support Structure. Any structure whose design and fabrication drawings are not provided to Owner shall also be considered as technological structure. 2. Main Power House Building including Control Tower. All factory-fabricated structures shall have bolted field connections. For balance structures bidder has the option to fabricate at factory or at site meeting all the quality and inspection requirements as defined elsewhere in the technical specifications. For coal/Lime/Biomass bunkers, hoppers and chimney flue liners, to prevent coal dust/flue gas leakages, the applicable field joints shall necessarily be welded. No additional land than what is mentioned in technical specifications, shall be provided by Owner for site fabrication. Bidder has to make all necessary arrangements of land, electricity, water, security, etc. on its own. No claim, whatsoever, regarding time extension and financial implication for site fabrication shall be entertained at any point of time. Note : Steel structures shall mean plant and non-plant building structures, boiler & ESP support structures, Coal, limestone and Gypsum handling structures, AHP structures, chimney flue liners support platforms & stairs, pipe and cable support structures. Civil, structural and architectural works though not explicitly mentioned in the above list but required for the completion of the various systems of the package shall also be in the scope of the bidder.
D3-60	VI / B	D-1-8	8.07.00		**FABRICATION & ERECTION OF STEEL STRUCTURES** The fabrication shall be done as per fabrication drawing which would clearly indicate various details of joints to be welded, type of weld, length and size of weld. All steel structures shall be fabricated in factory, transported and erected at site. All factory fabricated structures shall have bolted field connections.	**FABRICATION & ERECTION OF STEEL STRUCTURES** Steel structures which are to be fabricated in factory shall have bolted field connection. Steel structure which are to be fabricated at site can have bolted field connections or welded connection. The fabrication shall be done as per fabrication drawing which would clearly indicate various details of joints to be welded, type of weld, length and size of weld and bolt details. For coal bunkers, hoppers and chimney flue liners, to prevent coal dust/flue gas leakages, the applicable field joints shall necessarily be welded.

Amendment 03 to Technical Specifications (Section VI)

					Coal bunkers, Lime storage silo and biomass silo with hoppers and chimney flue liners can either be fabricated at factory in segments, transported and welded at site before erection or fabricated at site. For coal bunkers, hoppers and chimney flue liners, to prevent coal dust/flue gas leakages, the applicable field joints shall necessarily be welded. Note: Steel structures shall mean Plant and Non-Plant building structures, boiler & ESP support structures, CHP structures, AHP structures, chimney flue liners support platforms & stairs, pipe and cable support structures. Site welding can be permitted in special cases where final inputs are not available before release of fabrication drawings. Before dispatching the fabricated structural members to site, it shall be ensured that all parts in the assembly fit accurately together by carrying out pre-assembly of fabricated structural members having bolted field joints, in the factory. All steelwork before and after manufacturing shall be smooth, straight and free of deformations, cracks, twists and burrs. All steelwork shall be cut and fabricated to a tolerance of ± 1.5 mm in its length and location of matching bolt holes for field connections.	For factory fabricated structures, site welding can be permitted in special cases where final inputs are not available before release of fabrication drawings. Before dispatching the fabricated structural members to site, it shall be ensured that all parts in the assembly fit accurately together by carrying out pre-assembly of fabricated structural members having bolted field joints, in the factory. All steelwork before and after manufacturing shall be smooth, straight and free of deformations, cracks, twists and burrs. All steelwork shall be cut and fabricated to a tolerance of ± 1.5 mm in its length and location of matching bolt holes for field connections. Note: I. Fabrication facilities (like cutting, welding, NDT, shot blasting, painting, Storage & Preservation, lifting, drilling and handling etc.) including qualified & experienced manpower shall be at par with factory. II. Quality checks presently envisaged in MQP shall be tied up in FQP. III. Inspection will be carried out by FQA / Site QA. IV. For site fabricated structures, bidder has to submit a comprehensive proposal comprising of storage facilities, layout, shot blasting, painting, preservation for Owner's approval within 06 months of LOA.
D3-61	**VI/A**	**IID**	**1.00.00**	**5of 8**	29) Two nos. covered sheds (70mX20M) with steel superstructure and metal sheeting at roof and side sheeting above 1 meter of brick wall with RCC column, beam & Foundation.	29) Two nos. covered sheds (70mX20M) **(dimensions from centre line to centre line of Columns)** with steel **truss** and metal sheeting at roof and side sheeting above 1 meter of brick wall with RCC column, beam & Foundation. **The minimum clear height of shed shall be 3.0m from the top of ground floor finish to lowest point of truss inside the shed**.
D3-62	**VI / B**	**D-1-12(D)**	Annexure -B of Annexure-D	2of 2	SITE SPECIFIC DESIGN PARAMETERS The various design parameters, as defined in IS: 875 (Part-3), to be adopted for the project site shall be as follows: a) The basic wind speed "Vb" at ten metres above the mean ground level : 47 metres/second b) The risk coefficient "K1" : 1.07 c) Category of terrain : Category-2	SITE SPECIFIC DESIGN PARAMETERS The various design parameters, as defined in IS: 875 (Part-3), to be adopted for the project site shall be as follows: a) The basic wind speed "Vb" at ten metres above the mean ground level : **39 metres/second** b) The risk coefficient **"K1" : 1.06** c) Category of terrain : Category-2
D3-63	**VI / B**	**D-1-9**	**Table A & B**		Annexure- AC 2	**Revised** Annexure- AC 2

Amendment 03 to Technical Specifications (Section VI)

D3-64	VI / B				Amendment 01 Sl. No. D1-31	Deleted
D3-65	VI / B				Amendment 01 Sl. No. D1-33	Deleted
D3-66	Amendment Sl. No. D2-55					Annexure to Amendment D2-55

ANNEXURE-IV-2

DOMESTIC COAL CHARACTERISTICS

Sipat 800	Coal Characteristics Sipat Stage III					
S.No.	Characteristics	Range of coal supplies 95%			Range of coal supplies 5%	
	(as received basis)	Column - 1	Column - 2	Column - 3	Column - 1	Column - 2
1.0	PROXIMATE ANALYS	Design	Worst	Best	Worst	Best
1.1	Total Moisture (%)	14	16	13	17	10
1.2	Ash (%)	41	45	37	46	34
1.3	Volatile Matter (%)	22	19	24	18	25
1.4	Fixed Carbon (%)	23	20	26	19	31
1.5	Total (%)	100.00	100.00	100.00	100.00	100.00
2.0	ULTIMATE ANALYSIS					
2.1	Carbon (%)	34.02	30.53	37.94	29.23	42.75
2.2	Hydrogen (%)	2.75	2.25	2.85	2.1	2.95
2.3	Sulphur (%)	0.45	0.35	0.6	0.35	0.65
2.4	Nitrogen(%)	0.83	0.63	1.2	0.55	1.3
2.5	Oxygen(%)(By differ	6.95	5.24	7.41	4.77	8.35
2.8	Total Moisture (%)	14	16	13	17	10
2.9	Ash (%)	41	45	37	46	34
	Total	100	100	100	100	100
2.10	GCV (Kcal/Kg)	3400	3000	3750	2900	4100
2.11	Hard Grove Index	50	47	55	45	60
3.0	ASH ANALYSIS					
3.1	Silica (%)	58.59	56.81	59.20	55.00	57.90
3.2	Alumina(%)	26.77	27.42	27.10	29.07	29.18
3.3	Iron Oxide (%)	8.80	9.80	7.80	8.00	6.00
3.4	Titania	1.66	1.78	1.56	0.48	1.48
3.5	Phosphoric Anhydric	0.19	0.10	0.24	0.80	0.10
3.6	Lime (%)	1.38	1.48	1.32	1.00	1.00
3.7	Magnesia (%)	1.00	1.13	0.97	2.31	0.50
3.8	Sulphuric Anhydride	0.05	0.04	0.10	0.40	1.70
3.9	Sodium Oxide (%)	0.10	0.08	0.15	0.30	0.20
3.10	Balance Alkalies (by	1.46	1.36	1.56	2.64	1.94
	Total	100.00	100.00	100.00	100.00	100.00
4.0	ASH FUSION RANGE					
	REDUCING ATMOSPHERE					
4.1	Initial Deformation T	1150.00	1100.00	1200.00	1100.00	1200.00
4.2	Hemispherical Temp	1300.00	1250.00	1350.00	1250.00	1350.00
4.3	Fusion Temperature	1400.00	1400.00	1400.00	1400.00	1400.00

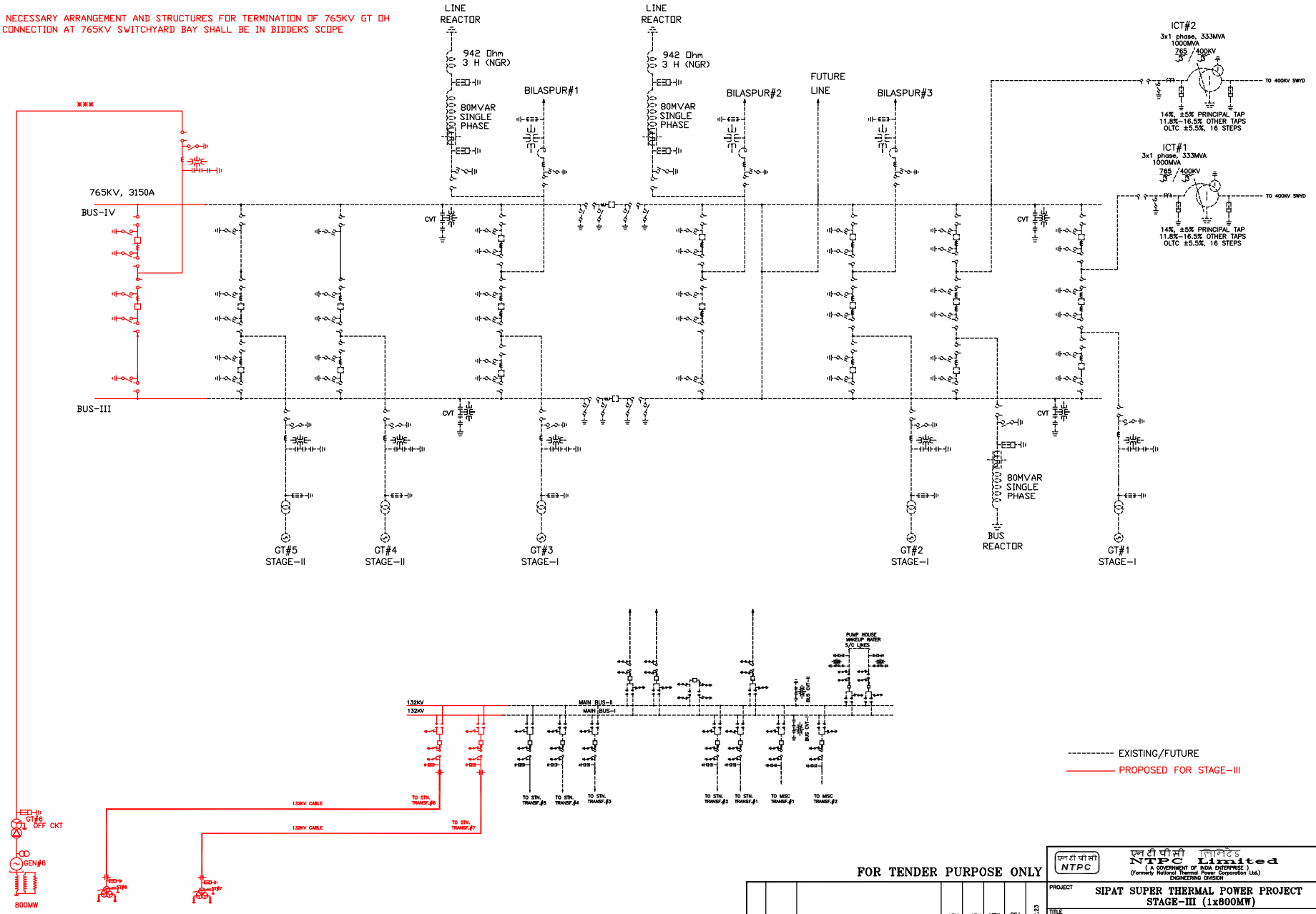
Note: For FGD design and guarantee conditions- HCL (ppm) wet-45 & HF (ppm) wet-12 may be considered.

1.20.00	**Auxiliary Steam Pressure Reducing & Desuperheating System**	
	A. High Capacity PRDS System (MS)	
	1. Steam pressure reducing cum desuperheating valves	**1 nos.**
	1.1 Stem	**1 no.**
	1.2 Disc	**1 nos.**
	1.3 Body seat rings	**1 nos. for each type, size and rating of valves**
	1.4 Gland packings	4 nos. for each type, size and rating of valves
	1.5 Pressure seal ring	4 nos.
	1.6 Gasket	4 nos.
	B. Low Capacity PRDS System (CRH)	
	1. Steam pressure reducing valve	**1 nos.**
	1.1 Stem	**1 nos.**
	1.2 Disc	**1 nos.**
	1.3 Body seat rings	**1 nos. for each type/size**
	1.4 Gland packings	4 nos. for each size, type & rating of valves
	1.5 Pressure seal ring	4 nos.
	1.6 Gaskets	2 nos.

*** 1) AN INDICATIVE ROW OF 60 MTRS HAS BEEN CONSIDERED IN GLP FOR INDICATION PURPOSE. ACTUAL ROW REQUIREMENT SHALL BE AS PER THE TYPE OF TOWER AND LINE CONFIGURATION CONSIDERED DURING DETAILED ENGINEERING.

2) BIDDER MAY EXPLORE TO USE NARROW BASE TRANSMISSION TOWER AS PER CBIP MANUAL TRANSMISSION LINE 323 GUIDELINES FOR OPTIMIZATION OF ROW REQUIREMENT BASED ON ACTUAL SPACE AVAILABILITY AT SITE.

3) NECESSARY ARRANGEMENT AND STRUCTURES FOR TERMINATION OF 765KV GT OH CONNECTION AT 765KV SWITCHYARD BAY SHALL BE IN BIDDERS SCOPE



FOR TENDER PURPOSE ONLY

NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)
(Formerly National Thermal Power Corporation Ltd.)
ENGINEERING DIVISION

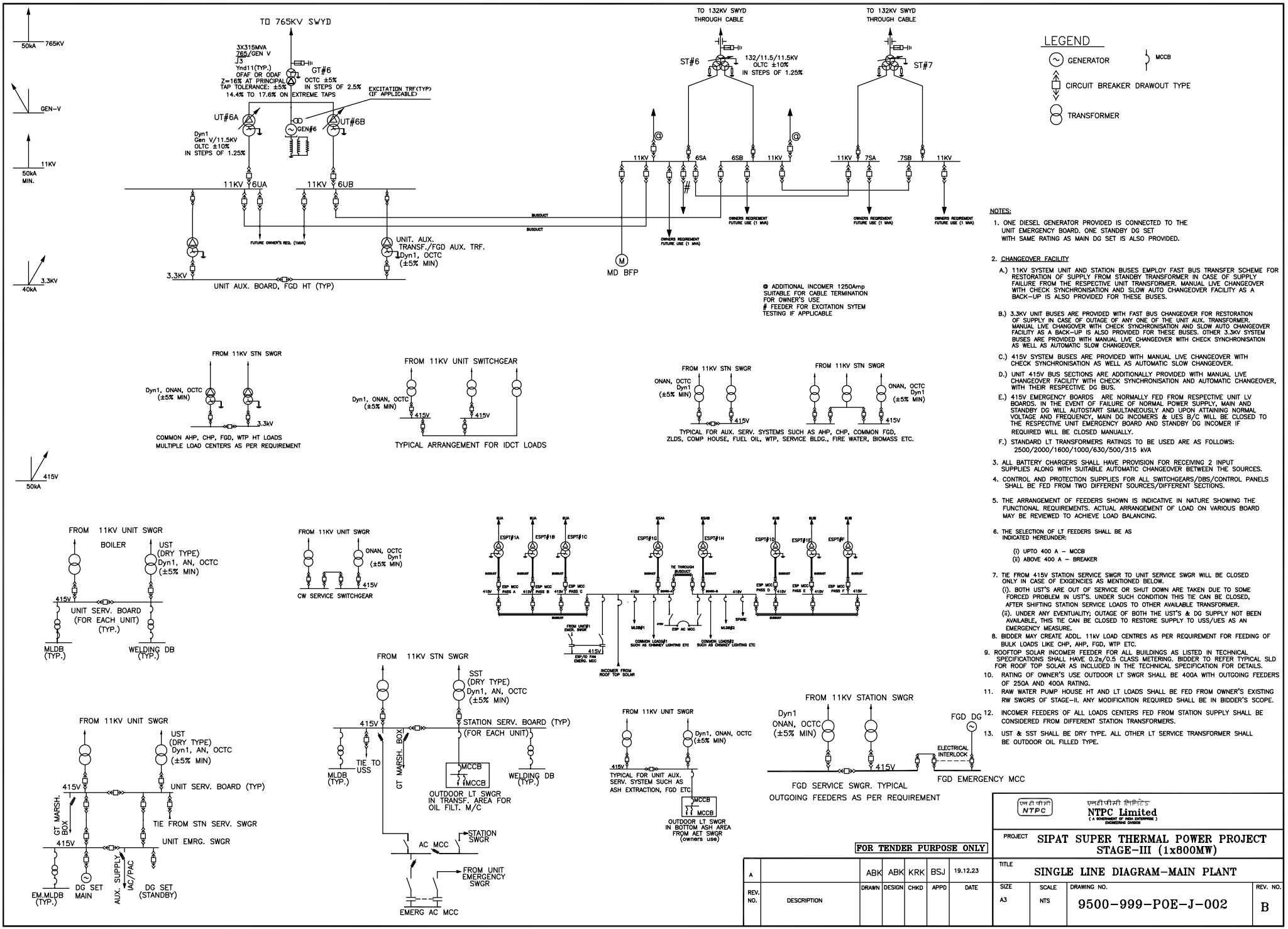
PROJECT: SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1x800MW)

TITLE: SINGLE LINE DIAGRAM-SWITCHYARD

REV. NO.		DESCRIPTION	DRAWN	DESIGN	CHKD	APPD	DATE
			ABK	ABK	KRK	BSJ	19.12.23

SIZE | DATE | DRAWING NO. 9500-999-POE-J-001 | REV. NO. B

SWITCHYARD SLD



NOTES:

1. ONE DIESEL GENERATOR PROVIDED IS CONNECTED TO THE UNIT EMERGENCY BOARD. ONE STANDBY DG SET WITH SAME RATING AS MAIN DG SET IS ALSO PROVIDED.
2. CHANGEOVER FACILITY
   A.) 11KV SYSTEM UNIT AND STATION BUSES EMPLOY FAST BUS TRANSFER SCHEME FOR RESTORATION OF SUPPLY FROM STANDBY TRANSFORMER IN CASE OF SUPPLY FAILURE FROM THE RESPECTIVE UNIT TRANSFORMER. MANUAL LIVE CHANGEOVER WITH CHECK SYNCHRONISATION AND SLOW AUTO CHANGEOVER FACILITY AS A BACK-UP IS ALSO PROVIDED FOR THESE BUSES.
   B.) 3.3KV UNIT BUSES ARE PROVIDED WITH FAST BUS CHANGEOVER FOR RESTORATION OF SUPPLY IN CASE OF OUTAGE OF ANY ONE OF THE UNIT AUX. TRANSFORMER. MANUAL LIVE CHANGOVER WITH CHECK SYNCHRONISATION AND SLOW AUTO CHANGEOVER FACILITY AS A BACK-UP IS ALSO PROVIDED FOR THESE BUSES. OTHER 3.3KV SYSTEM BUSES ARE PROVIDED WITH MANUAL LIVE CHANGEOVER WITH CHECK SYNCHRONISATION AS WELL AS AUTOMATIC SLOW CHANGEOVER.
   C.) 415V SYSTEM BUSES ARE PROVIDED WITH MANUAL LIVE CHANGEOVER WITH CHECK SYNCHRONISATION AS WELL AS AUTOMATIC SLOW CHANGEOVER.
   D.) UNIT 415V BUS SECTIONS ARE ADDITIONALLY PROVIDED WITH MANUAL LIVE CHANGEOVER FACILITY WITH CHECK SYNCHRONISATION AND AUTOMATIC CHANGEOVER, WITH THEIR RESPECTIVE DG BUS.
   E.) 415V EMERGENCY BOARDS ARE NORMALLY FED FROM RESPECTIVE UNIT LV BOARDS. IN THE EVENT OF FAILURE OF NORMAL POWER SUPPLY, MAIN AND STANDBY DG WILL AUTOSTART SIMULTANEOUSLY AND UPON ATTAINING NORMAL VOLTAGE AND FREQUENCY, MAIN DG INCOMERS & UES B/C WILL BE CLOSED TO THE RESPECTIVE UNIT EMERGENCY BOARD AND STANDBY DG INCOMER IF REQUIRED WILL BE CLOSED MANUALLY.
   F.) STANDARD LT TRANSFORMERS RATINGS TO BE USED ARE AS FOLLOWS: 2500/2000/1600/1000/630/500/315 kVA
3. ALL BATTERY CHARGERS SHALL HAVE PROVISION FOR RECEIVING 2 INPUT SUPPLIES ALONG WITH SUITABLE AUTOMATIC CHANGEOVER BETWEEN THE SOURCES.
4. CONTROL AND PROTECTION SUPPLIES FOR ALL SWITCHGEARS/DBS/CONTROL PANELS SHALL BE FED FROM TWO DIFFERENT SOURCES/DIFFERENT SECTIONS.
5. THE ARRANGEMENT OF FEEDERS SHOWN IS INDICATIVE IN NATURE SHOWING THE FUNCTIONAL REQUIREMENTS. ACTUAL ARRANGEMENT OF LOAD ON VARIOUS BOARD MAY BE REVIEWED TO ACHIEVE LOAD BALANCING.
6. THE SELECTION OF LT FEEDERS SHALL BE AS INDICATED HEREUNDER:
   (i) UPTO 400 A – MCCB
   (ii) ABOVE 400 A – BREAKER
7. TIE FROM 415V STATION SERVICE SWGR TO UNIT SERVICE SWGR WILL BE CLOSED ONLY IN CASE OF EXIGENCIES AS MENTIONED BELOW.
   (i). BOTH UST'S ARE OUT OF SERVICE OR SHUT DOWN ARE TAKEN DUE TO SOME FORCED PROBLEM IN UST'S. UNDER SUCH CONDITION THIS TIE CAN BE CLOSED, AFTER SHIFTING STATION SERVICE LOADS TO OTHER AVAILABLE TRANSFORMER.
   (ii). UNDER ANY EVENTUALITY; OUTAGE OF BOTH THE UST'S & DG SUPPLY NOT BEEN AVAILABLE, THIS TIE CAN BE CLOSED TO RESTORE SUPPLY TO USS/UES AS AN EMERGENCY MEASURE.
8. BIDDER MAY CREATE ADDL. 11KV LOAD CENTRES AS PER REQUIREMENT FOR FEEDING OF BULK LOADS LIKE CHP, AHP, FGD, WTP ETC.
9. ROOFTOP SOLAR INCOMER FEEDER FOR ALL BUILDINGS AS LISTED IN TECHNICAL SPECIFICATIONS SHALL HAVE 0.2s/0.5 CLASS METERING. BIDDER TO REFER TYPICAL SLD FOR ROOF TOP SOLAR AS INCLUDED IN THE TECHNICAL SPECIFICATION FOR DETAILS.
10. RATING OF OWNER'S USE OUTDOOR LT SWGR SHALL BE 400A WITH OUTGOING FEEDERS OF 250A AND 400A RATING.
11. RAW WATER PUMP HOUSE HT AND LT LOADS SHALL BE FED FROM OWNER'S EXISTING RW SWGRS OF STAGE-II. ANY MODIFICATION REQUIRED SHALL BE IN BIDDER'S SCOPE.
12. INCOMER FEEDERS OF ALL LOADS CENTERS FED FROM STATION SUPPLY SHALL BE CONSIDERED FROM DIFFERENT STATION TRANSFORMERS.
13. UST & SST SHALL BE DRY TYPE. ALL OTHER LT SERVICE TRANSFORMER SHALL BE OUTDOOR OIL FILLED TYPE.

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FOR TENDER PURPOSE ONLY

REV. NO.	DESCRIPTION	DRAWN	DESIGN	CHKD	APPD	DATE
A		ABK	ABK	KRK	BSJ	19.12.23

एनटीपीसी NTPC — एनटीपीसी लिमिटेड NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT STAGE-III (1x800MW)

TITLE: SINGLE LINE DIAGRAM-MAIN PLANT

SIZE	SCALE	DRAWING NO.	REV. NO.
A3	NTS	9500-999-POE-J-002	B

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TABLE –A **ANNEXURE - AC-2 REVISED**

INTERIOR FINISHING SCHEDULE

S. NO.	DESCRIPTION OF AREA	FLOOR FINISH	WALL FINISH	CEILING FINISH
1.	Main power house Building.			
	a) Unloading Bay	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	b) Cable vault	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	c) Balance area including passage	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	d) SWAS Room	Matt Finished Vitrified ceramic tiles.	Aluminium composite panel cladding on walls and columns upto false ceiling level	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	e) Equipment Area, ESP SWGR/ ACP Room/ UAF Room	Cement concrete with Metallic hardener topping	Acrylic distemper.	Acrylic distemper (except metal deck area)
	f) UPS Battery charger room	Matt finished Vitrified ceramic tiles.	Aluminium composite panel cladding on walls and columns upto false ceiling level	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	g) Deaerator floor	Cement concrete with Metallic hardener topping.		-

	h) Operating Floor	20 mm thick heavy duty anti skid full body vitrified tile in TG Hall. Rubber flooring at TG deck.	Colour coated Metal cladding on A-Row& Gable end, up to crane girder level.	Metal deck roofing (bottom of sheeting with RAL 9002 finish)
	i) General circulation and movement areas	20 mm thick heavy duty anti skid full body vitrified tile		Acrylic distemper (except metal deck area).
	j) Switchgear room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	k)MCC Room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	l) Control room area including control room	Matt Finish Vitrified ceramic tiles flooring of size 1000 x1000 mm	Partition in fire rated glass with fire rated frames with 2 hr fire rating & Metal Batten panel cladding for columns and walls	Metal Batten panel ceiling in combination with demountable translucent stretch ceiling membrane or as per approved design.
	m) control equipment room,	Matt finish Vitrified ceramic tiles.	Partition in fire rated glass with fire rated frames with 2 hr fire rating &Aluminium composite panel cladding for columns and walls	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	n)Conference room, senior executive room., Computer Room	Matt finish Vitrified ceramic tiles	Partition in fire rated glass with fire rated frames with 2 hr fire rating &Aluminium composite panel cladding for columns and walls	Mineral fiber board false ceiling in combination with GRG plaster board border

	o) Record room	ceramic tiles	Acrylic distemper.	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	p) Locker room	Ceramic Tiles	Acrylic Emulsion Paint	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	q) Toilet area	ceramic tiles	Digitally glazed ceramic wall tiles up to False Ceiling Height	Calcium Silicate False Ceiling
	r) Office Room, Staff Room	Matt Finished Vitrified ceramic tiles.	Partition in fire rated glass with fire rated frames with 2 hr fire rating &Aluminium composite panel cladding for columns and walls	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	s) Laboratory area	Vitrified Ceramic / Acid/alkali resistant tiles.	Designer ceramic wall tiles up to False Ceiling Height/ Aluminium composite panel cladding for columns and walls in case of A.C Panel	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design

	t) RCC Stair case	18mm thick Granite (Polished and honed Finished) stone	Polished Granite Stone up to 1.2m. ht. & Acrylic Distemper Paint over wall putty finish for balance height.	Acrylic Distemper
	u) Lift and Staircase Lobby	18mm thick polished granite stone as pattern.	18mm thick polished granite & glass mosaic tile cladding up to False Ceiling Height	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	v) Passages and general circulation areas.	Deleted	Deleted	Deleted
	w) Battery Room	Acid and alkali resistant tile.	Acid and alkali resistant tile up to 1.2m height and chemical resistant paint for balance height	Chemical Resistant paint except in locations where Metal deck has been provided
	x) Oil canal, oil room, oil purification Tank and other areas where oil spillage is likely to occur.	75 mm thick A.R. Brick	12 mm thick A.R. Tile	As above except oil canal.
	y)Pathways including roof area.	22mm thick concrete chequered tiles.	-	-
2.	**ESP control building/Air compressor house**			

	a) Operating/Maintenance areas	Cement concrete with Metallic hardener topping	Pre color coated metal panel cladding.	Acrylic distemper (except metal deck area)
	b) Office Room, Staff Room	Digitally glazed Vitrified tiles.	Aluminium composite panel cladding on walls and columns	Mineral fiber Board False Ceiling
	c) Control Room	Digitally glazed Vitrified tiles.	Aluminium composite panel cladding on walls and columns in ESP Control Room Building	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	d) MCC Room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	e) RCC Stair case	18mm thick Granite (Polished and Honed Finished) stone	Polished Granite stone up to 1.2m.ht. & Acrylic Distemper	Acrylic Distemper (except metal deck area)
	f) Battery Room	Acid, Alkali resistant tile	Acid, Alkali resistant tile 1.2m height / chemical resistant paint above dado	Chemical resistant paint (except metal deck area)
	g) AHU/ AC Plant room/ Cable vault	Cement concrete with Metallic hardener topping	Acrylic Distemper	Acrylic Distemper (except metal deck area)
	h) Toilets	ceramic tiles.	Designer ceramic wall tiles dado up to false ceiling level.	Calcium silicate false ceiling.

3.	**Mill & Bunker building/ T.P.s / Conveyor Galleries**	Cement concrete with Metallic hardener topping	Acrylic distemper on masonry walls/ color coated Metal panel cladding	color coated Metal panel cladding
4.	**Watch Tower**			
	Viewing area	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper
5.	**Fire water booster water pump house.**			
	a) Maintenance /Pump floor/PLC	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	b) Control room /PLC.	Matt Finished Vitrified Ceramic Tiles	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	Toilet area	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to 2200 mm	Acrylic distemper
6.	**Ash slurry pump house/ Ash water pump house /Silo Area Utility Building / Transport air compressor house/ Fuel Oil Unloading Pump House with switchgear building& control room /FOPPH Building/ Miscellaneous Switchgear room CW Pump house, Switchgear room, control room/ RW**			

	Pump house, Switchgear room, control room/ /Safety Control Room/Water system control Room Building/Any other Building.			
	a) Operating/Maintenance areas/ MCC room /Switchgear Room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	b) Control room/RIO Room /PLC /Office area.	Matt Finished Vitrified Ceramic Tiles	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	c) Battery Room	Acid, Alkali resistant tile	Acid, Alkali resistant tile 1.2m height / chemical resistant paint above dado	Chemical resistant paint (except metal deck area)
	d) Toilet/Pantry area	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to 2200 mm	Acrylic distemper
	e) RCC Stair case	18 mm thick Marble Stone with grooves	18 mm thick Marble Stone	Acrylic distemper
7.	**O & M WORKERS SHED**			
	a) Rest room	Cement concrete with Metallic hardener topping.	Acrylic distemper	Metal roof

	b) Toilets	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to 2100 high, Acrylic Distemper paint above	Metal roof
8.	**Occupational Health Centre with Crèche Facilities**			
	a) Waiting Lobby cum Reception/ Doctor's Chamber /First Aid Room/ Patient Room	Matt finish vitrified tiles	Acrylic Emulsion paint	Acrylic Emulsion paint
	a) Driver's Room	Digitally Glazed vitrified tiles	Acrylic Distemper Paint	Acrylic Distemper Paint
	c)Toilet area	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to false ceiling level.	Calcium Silicate False Ceiling
9.	**Car Parking**			

	a) Covered Parking	Concrete Blocks	Acrylic distemper	Acrylic distemper
10.	**Parking Shed**			
		Concrete Blocks		
11	**Switchyard Control room Building**			
	a) Lounge/Passage	Marble Stone	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	b) Lab	ceramic tiles.	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	c) Office/ SAS Room/Conference Room/ Change Room	Matt Finished Vitrified Ceramic Tiles	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	d) Porch	Marble Stone		
	e) Toilet/ Pantry	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to false ceiling level.	Calcium Silicate False Ceiling
	f) Switchgear room/Store Room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper

	g) Battery Room	Acid, Alkali resistant tile	Acid, Alkali resistant tile 1.2m height / chemical resistant paint above dado	Chemical resistant paint
12.	**NOT USED**			
13.	**Coal, Lime, Biomass and Gypsum Handling Plant Buildings**			
	a) Non-Air-conditioned space.	Cement concrete with Metallic hardener topping	Acrylic distemper over wall putty	Acrylic distemper
	b) R.C.C Staircase	18 mm thick granite flooring	1200 high Glass mosaic tiles and Acrylic Emulsion paint over wall putty above	Acrylic distemper
	c) Toilet area	ceramic tiles.	Digitally Glazed ceramic wall tiles dado up to false ceiling level.	Calcium silicate false ceiling
	d) Battery room	Acid, Alkali resistant tile	Acid/Alkali resistant tile and chemical resistant paint above dado.	Chemical resistant paint.
	e) Entrance/ Reception	18 mm thick Granite Stone	Acrylic emulsion paint and Glass	Acrylic distemper

			Mosaic tiles cladding	
	f) Passages	18 mm thick Granite Stone	Acrylic emulsion paint	Acrylic distemper
	g) Air-Conditioned Space	Vitrified Ceramic Tiles	Acrylic emulsion paint	Mineral Fiber Board false ceiling
14.	**Water & Effluent treatment plant buildings & Other auxiliary building.**			
	a) Workshop/ Operating/Maintenance areas/MCC areas	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	b) Office Room, Staff Room	Vitrified ceramic tiles.	Acrylic emulsion paint	Mineral fiber board false ceiling.
	c) Control room	Vitrified Ceramic Tiles	Acrylic emulsion paint	Mineral fiber board false ceiling.
	d) Acid/Alkali storage area/ CW treatment area/DM plant area/ Regeneration area/	Acid, Alkali resistant tile as per requirement.	Acid/Alkali resistant tile as per requirement and chemical resistant paint above dado.	Chemical resistant paint.

	Neutralization pit etc.			
	e) RCC Stair case	Marble stone / granite stone.	Marble stone up to1.2 m.ht. & Acrylic Distemper paint.	Acrylic Distemper

Note :

1. All wall above false ceiling shall be plastered.
2. The colour and pattern of finish shall be as per approved details.
3. All materials shall be of reputed and established brand approved by Engineer-in-charge.
4. Wherever alternative materials are specified, the final selection rests with Engineer-in-charge.
5. This finishing schedule shall also be applicable to similar functional areas for all other buildings and facilities.
6. All the finishing materials shall be applied/provided as per manufacturer specification and guidelines under the supervision & guidelines of manufacturer.
7. All electrical conduits in building for Lighting, HVAC and services shall be concealed type. The laying work of electrical conduits shall be done before finishing works.
8. All Plumbing pipes shall be of concealed type. The laying work of plumbing pipes shall be done before finishing works.

TABLE –B

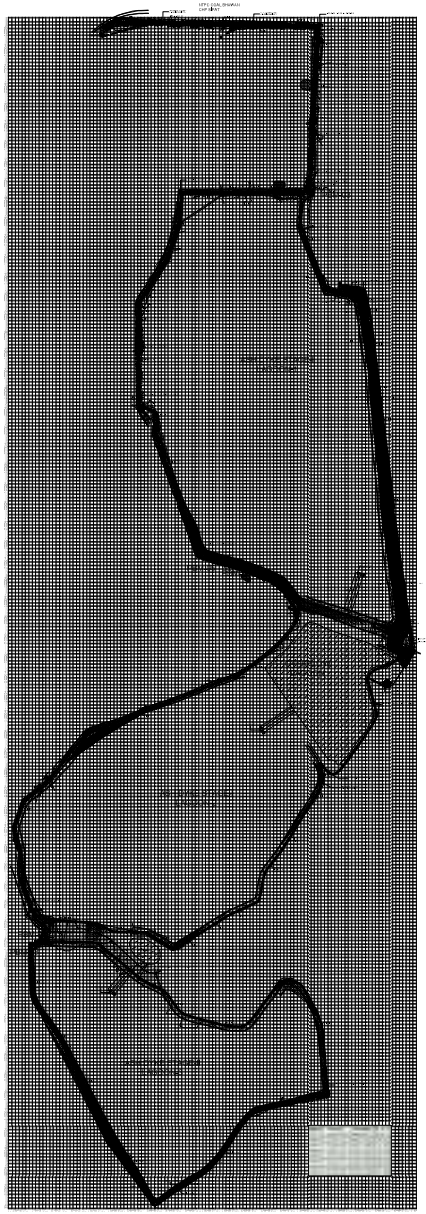
EXTERIOR FINISHES SCHEDULE

Sl.No.	DESCRIPTION OF AREA	WALL AND PROJECTIONS	SOFFIT OF PROJECTIONS
1.	Auxiliary building in steel framed structure.	Premium Acrylic Smooth exterior paint with silicon additives over Texture coat over plastered surface/ Aluminium Composite Panel Approved colour/ colour combination of colour coated metal cladding	Premium Acrylic Smooth exterior paint with silicon additives over Texture Coat over plastered surface Approved colour/ colour combination of colour coated metal cladding
2.	Building with concrete frame work, etc.	Premium Acrylic Smooth exterior paint with silicon additives over Texture coat over plastered surface	Premium Acrylic Smooth exterior paint with silicon additives over Texture coat over plastered surface
3.	Steel Structure, trestles, etc.	High performance Paint of approved specification and shade.	

NOTE : 1. The colour and pattern of finish shall be as finalized by Engineer.

2. All materials shall be of reputed and established brand approved by Engineer.

Annexure to Amendment Sl. No. D2-55 and D3-66





KEYPLAN:



NTS

LEGENDS:-	
GRID LINE	
CONTOUR LINE	
STAGE-I LAGOON-1	
EXISTING PIPELINE 6"	
EXISTING PIPELINE 9"	
EXISTING PIPELINE 18"	
EXISTING PIPELINE 32"	
EXISTING PIPELINE 34"	
STAGE-I LAGOON-2	
EXISTING PIPELINE 12"	
EXISTING PIPELINE 18"	
CORRIDOR	
BOUNDARY WALL	
GATE	
RAILWAY TRACK	
HT LINE	
DRAIN/NALA	
BUILDING	
WELL	
ASPHALTED ROAD	
MOORUM ROAD	
TEMPLE	
GATE	
TBM	
PERMANENT BENCH MARK	
PUMP HOUSE	
POND	
TREES	



SURVEY WAS CARRIED OUT FROM PERMANENT BENCH MARK PROVIDED BY NTPC COAL BHAWAN CHP SIPAT
PBM-01- E=280.242 , N=1689.171
PBM-02- E=282.651 , N=1576.119

NOTES:-

1. ALL LEVELS AND DIMENSION ARE IN METER UNLESS OTHERWISE MENTIONED.
2. SPOT LEVELS AND GRIDS ARE MARKED AT A DISTANCE OF 5.0Mx5.0M.
3. CONTOUR INTERVAL IS 0.50M.

FOR TENDER PURPOSE ONLY

REV.NO.	DESCRIPTION	DRN	DESIGN	CHKD.	M	E	C	GM	CS	APPD	DATE
0	FOR TENDER PURPOSE ONLY	PS	KK		-	-	-	-	-		

CLEARED BY

CONSULTANT: NTPC Limited (A GOVERNMENT OF INDIA ENTERPRISE) ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE II (1X800 MW)

PACKAGE:

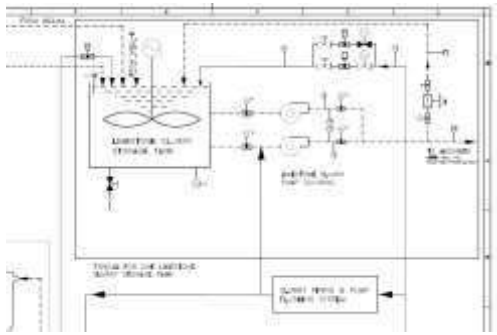
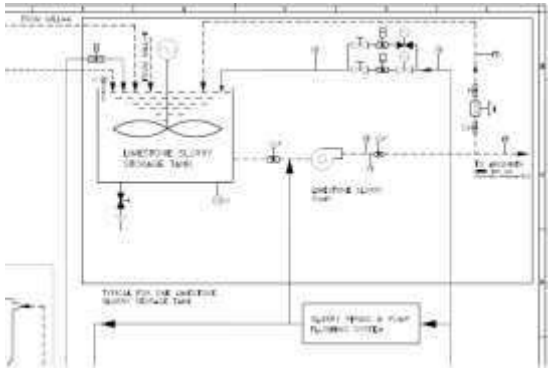
TITLE: TOPOGRAPHICAL SURVEY OUTSIDE PLANT AREA

SIZE	SCALE	DRG. NO.	REV. NO.
A1	NTS	XXXX-001-POC-A-012	A

Amendment 04 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	SG-55 to SG-57	1

Amendment 04 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
SG.55	A	IIA-04	5/7	7.06.00	Corrosion Protection…at clause 13.00.00, **I-M1**, Part B…	Corrosion Protection…at clause 13.00.00, **A-05**, Part B…
SG.56	E	Drg No XXXX-101-POM-A-023 Rev B				
SG.57	E	Drg No XXXX-101-POM-A-024 Rev B			Primary hydro-cyclone feed tank and its pump(s)	Deleted

Amendment 05 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	D5-1	1
2	EE-85 to EE-89	2-3

Amendment 05 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
D5-1	A	IID		2.03.01	d. RCC drains in the entire laydown area and along roads shall be planned so as to ensure proper disposal of rainwater.	d. **RCC/Brick** drains in the entire laydown area and along roads shall be planned so as to ensure proper disposal of rainwater. **RCC drain with culvert to be mandatorily provided at crossings wherever vehicular /material movement is envisaged.**

Amendment 05 to Technical Specifications (Section VI)

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
EE-85	VI/ A	I-A	5.15	29 of 35	765 kV TRANSMISSION LINE: The Bidder/ sub vendor should have designed, fabricated, erected and commissioned at least 30 Km transmission line of 400 kV or above voltage class on towers.	Deleted
EE-86	Amendment EE-35				All the equipment shall be of the latest design and conform to the best modern practice adopted in the extra high voltage field. The Bidder shall offer only such equipment as guaranteed by him to be satisfactory and suitable for 765 kV AC Single circuit transmission line with Quad AAC Bull conductor or equivalent and will give continued good performance.	All the equipment shall be of the latest design and conform to the best modern practice adopted in the extra high voltage field. The Bidder shall offer only such equipment as guaranteed by him to be satisfactory and suitable for One(1) No. of 765kV Single Circuit type Cross country interconnecting overhead Tie line between Sipat Stage-III GT and 765kV Stage-I Switchyard with Quad Bersimis / HEXA ZEBRA Conductor on towers with redundant OPGW connectivity.
EE-87	VI / B	B-10	2.01.01	2 of 21	Interplant cabling for main routes shall be laid along overhead trestles/duct banks. Cables from main plant to switchyard control room shall be laid in overhead trestles or duct bank. In case of Duct banks, pull-pits shall be filled with sand and provided with a PCC covering. Directly buried cables, if essential, shall not have concentration of more than 4 cables in one route. Cables crossing Railway line (if applicable) shall be laid underground through nearest culvert. Necessary statutory clearance if required shall be taken by Bidder. All HT, LT and control cable shall be armoured.	Interplant cabling for main routes shall be laid along overhead trestles/duct banks. Cables from main plant to switchyard control room shall be laid in overhead trestles or duct bank. In case of Duct banks, pull-pits shall be filled with sand and provided with a PCC covering. Directly buried cables, if essential, shall not have concentration of more than 4 cables in one route. Cables crossing Railway line (if applicable) shall be laid underground through nearest culvert / through hume pipes / over head trestle . Necessary statutory clearance if required shall be taken by Bidder. All HT, LT and control cable shall be armoured.
EE-88	VI/ B	B-10	3.02.05	4 of 21	FOR COAL HANDLING PLANT/FGD PLANT/ ESP AREA THE FOLLOWING SHALL ALSO BE APPLICABLE: a) All overhead cable routes shall be along the route of the conveyor gallery on separate supporting structures and cables shall be laid in vertical trays. The bottom of the steel shall be such that the existing facilities, movement of trucks/human beings etc. does not get affected. The cable trestle shall have a minimum 600mm clear walk way and shall have maintenance platforms as required. The bottom of the steel supporting structure shall be generally at 3.0M above the grade level except for rail/road crossings where it shall be at 8.0M above grade level. Tap offs from the overhead cable trestle can be	FOR COAL HANDLING PLANT/FGD PLANT/ ESP AREA THE FOLLOWING SHALL ALSO BE APPLICABLE a) All overhead cable routes shall be along the route of the conveyor gallery on separate supporting structures and cables shall be laid in vertical trays. The bottom of the steel shall be such that the existing facilities, movement of trucks/human beings etc. does not get affected. The cable trestle shall have a minimum 600mm clear walk way and shall have maintenance platforms as required. However, at all road/rail crossings, the level of bottom of steel of the gallery shall be at least 8.0m from the top of road

<table>
<tr>
<td></td><td></td><td></td><td></td><td></td>
<td>through shallow trenches with prior approval of the Employer. Directly buried cable, if essential, shall not have concentration of more than 4 cables on one route.

c) Cables shall not be routed through the conveyor galleries except for the equipment located in the conveyor galleries for a particular conveyor i.e. protection switches, receptacles etc.</td>
<td>surface and 8.5 m from top of rail track.. Tap offs from the overhead cable trestle can be through shallow trenches with prior approval of the Employer. Directly buried cable, if essential, shall not have concentration of more than 4 cables on one route.

c) Cables shall not be routed through the conveyor galleries except for the equipment located in the conveyor galleries for a particular conveyor i.e. protection switches, receptacles etc. and bunker TP related conveyors.</td>
</tr>
<tr>
<td>EE-89</td><td>VI/B</td><td>B-05(B)</td><td>3.01.09</td><td>2 of 10</td>
<td>All numerical relays shall have provision of both current (CT) and voltage (VT) inputs. Relays shall be suitable for both residually connected neutral CT input as well as CBCT input. Relays shall be suitable for CT secondary current of 1A.
<table>
<tr><td>1)</td><td>DB (MV transformer feeders without differential)</td><td>5CT</td><td>3-Ph,1CBCT,1spare</td></tr>
<tr><td>2)</td><td>DBF (MV transformer feeders with differential)</td><td>8CT</td><td>6-Ph,1CBCT,1spare</td></tr>
<tr><td>3)</td><td>DA (MV motor without Diff)</td><td>5CT</td><td>3-Ph,1CBCT,1spare</td></tr>
<tr><td>4)</td><td>DAF (MV motor without Diff)</td><td>8CT</td><td>3-Ph,3Diff,1CBCT, 1spare</td></tr>
<tr><td>5)</td><td>DC (MV incomer)</td><td>6CT</td><td>3-Ph,1 SBEF,1REF,1 spare</td></tr>
<tr><td>6)</td><td>DD/DE-OG/DE-IC (MV Tie, bus coupler)</td><td>4CT</td><td>3-Ph,1 Spare</td></tr>
<tr><td>7)</td><td>DAET (LT incomer)</td><td>5CT</td><td>3-Ph,1 REF,1 spare</td></tr>
<tr><td>8)</td><td>DAE (Bus coupler, Tie)</td><td>4CT</td><td>3-Ph,1spare</td></tr>
<tr><td>9)</td><td>DM (ACB Controlled Motor)</td><td>4CT</td><td>3Ph,1spare</td></tr>
</table>
</td>
<td>All numerical relays shall have provision of both current (CT) and voltage (VT) inputs. Relays shall be suitable for both residually connected neutral CT input as well as CBCT input. Relays shall be suitable for CT secondary current of 1A. Following minimum no. of CT inputs to be provided in numerical relays used for different type of feeders as mentioned below including phase and neutral CT inputs.
<table>
<tr><td>1)</td><td>DB (MV transformer feeders without differential)</td><td>4CT</td></tr>
<tr><td>2)</td><td>DBF (MV transformer feeders with differential)</td><td>7CT</td></tr>
<tr><td>3)</td><td>DA (MV motor without Diff)</td><td>4CT</td></tr>
<tr><td>4)</td><td>DAF (MV motor with Diff)</td><td>7CT</td></tr>
<tr><td>5)</td><td>DC (MV incomer)</td><td>5CT</td></tr>
<tr><td>6)</td><td>DD/DE-OG/DE-IC (MV Tie, bus coupler)</td><td>4CT</td></tr>
<tr><td>7)</td><td>DAET (LT incomer)</td><td>4CT</td></tr>
<tr><td>8)</td><td>DAE (Bus coupler, Tie)</td><td>4CT</td></tr>
<tr><td>9)</td><td>DM (ACB Controlled Motor)</td><td>4CT</td></tr>
<tr><td>10)</td><td>DG I/C</td><td>7CT</td></tr>
</table>
</td>
</tr>
</table>

Amendment 06 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	SG.58	1

Amendment 06 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
SG.58	A	I-A	16 of 35	4.25.1	**Route-1: Qualified Wet Limestone based Flue Gas Desulphurisation (FGD) System Manufacturer (QFGDM)** The Bidder or Bidder's sub-vendor should have designed, engineered, supplied, erected/supervised erection and commissioned/supervised commissioning of at least one (1) no. of wet limestone based Flue Gas Desulphurisation System, having flue gas treatment capacity of not less than **23,00,000** Nm3/hr, with desulphurisation efficiency of at least 90 %, operating in a pulverised coal fired power plant. The above wet limestone based Flue Gas Desulphurisation System should have been in successful operation for a period not less than one (1) year.	**Route-1: Qualified Wet Limestone based Flue Gas Desulphurisation (FGD) System Manufacturer (QFGDM)** The Bidder or Bidder's sub-vendor should have designed, engineered, supplied, erected/supervised erection and commissioned/supervised commissioning of at least one (1) no. of wet limestone based Flue Gas Desulphurisation System, having flue gas treatment capacity of not less than **20,00,000** Nm3/hr, with desulphurisation efficiency of at least 90 %, operating in a pulverised coal fired power plant. The above wet limestone based Flue Gas Desulphurisation System should have been in successful operation for a period not less than one (1) year.

Amendment 07 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	G-03	1

Amendment 07 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
G-03	A	IV	8 of 73	1.01.02 Note (iv)	Contractor's aggregate liability to pay liquidated damages for failure to attain the functional guarantee shall not exceed **Fifteen percent (15%)** of the Contract Price.	Contractor's aggregate liability to pay liquidated damages for failure to attain the functional guarantee shall not exceed **Twelve percent (12%)** of the Contract Price.

Amendment 08 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	D8-1 to D8-2	1
2	MH 63 to MH 64	2
3	SG-59 to SG-60	3
4	Annexure to Amendment	

Amendment 08 to Technical Specifications (Section VI)

S. No.	SPECIFICATION REFERENCE				Existing	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
D8-1	VI / B	D-1-5	5.31.00	67 of 69	**FQA BUILDING** FQA building shall be RCC construction of single or double storey……..and pantry has to be provided as per specifications mentioned elsewhere in the technical specifications.	DELETED
D8-2	NTPC's Clarification at (i) of Sl. no. 703 of Clarification 02 for FQA lab building				(i) Bidder's understanding is not correct. FQA lab is in bidder scope. FQA lab is permanent building.	(i) DELETED

Amendment 08 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
MH-63	VI/A	IIA-16	13 of 18	1.01.08 (c) (Amendment MH-49)	Complete ash slurry piping along with bends, supports, bolts, nuts, clamps etc. from combined ash slurry pump shed to Dyke end. All the piping inside the pump house shall be basalt lined. Cast Basalt pipelines along the ash slurry corridor shall be provided at Road/Rail crossing (Culverts, Trenches & Bridges, if any).	Complete ash slurry piping along with bends, supports, bolts, nuts, clamps etc. from combined ash slurry pump shed to Dyke end. All the piping inside the pump house shall be basalt lined. Cast Basalt pipelines along the ash slurry corridor shall be provided at Road/Rail crossing (Culverts, Trenches & Bridges, if any). Design, engineering & supply of complete ash slurry disposal system up to ash dyke including garlanding and erection & commissioning of ash slurry disposal system within plant boundary is in bidder's scope.
MH-64	VI/A	III/ Terminal point & Exclusions	2 of 3	4.01.00	MECHANICAL a) Supply of limestone and Biomass. b) Fuel Oil unloading & storage system c) Fugitive dust suppression system at ash pond d) AWRS outside plant e) Raw water pump house	MECHANICAL a) Supply of limestone and Biomass. b) Fuel Oil unloading & storage system c) Fugitive dust suppression system at ash pond d) AWRS outside plant e) Raw water pump house f) Erection & commissioning of Ash slurry piping system outside plant boundary

Amendment 08 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
SG.59	A	I-A	20 of 35	4.26.1 (c) and (f)	(c) Wet lime-stone Grind-ing mills; Hori-zontal Wet Ball mill; Wet Lime-stone based FGD appli-cation in Coal fired power plant or any other process ap-plication.; 20 T/hr (mini-mum) with pul-verizing fineness not less than 90% thru 325 mesh. (f) Vac-uum Belt fil-ters; Belt type; Wet Lime-stone based FGD appli-cation in Coal fired power plant or in any other pro-cess appli-cation; 35 T/hr (mini-mum)	(c) Wet lime-stone Grind-ing mills; Hori-zontal Wet Ball mill; Wet Lime-stone based FGD appli-cation in Coal fired power plant or any other process ap-plication.; 12 T/hr (mini-mum) with pul-verizing fineness not less than 90% thru 325 mesh. (f) Vac-uum Belt fil-ters; Belt type; Wet Lime-stone based FGD appli-cation in Coal fired power plant or in any other pro-cess appli-cation; 19 T/hr (mini-mum)
SG.60	A	3K	68,69 and 73 of 361	1.00.00 C. & F.		For revised 3K for Wet limestone Grinding mills and vacuum belt filters refer to Annexure 1 to this amendment

C. **Wet limestone Grinding mills:** We declare that, we/our Sub-Vendor, have manufactured and supplied at least one (1) number of **12** T/hr (minimum) with pulverizing fineness not less than 90% thru 325 mesh, working in Wet limestone based FGD application in Coal fired power plant and which has been in successful operation for minimum one(1) year reckoned as on the techno-commercial bid opening date of EPC package, as per the details furnished below:

Sl. No.	Description	Reference Work
1.	Name of the reference plant & location:	
2.	Client name and his address:	
3.	Whether power plant is coal fired	-*Yes/*No
4.	Whether operating in a Wet Limestone based FGD application in Coal fired power plant	-*Yes/*No
5.	Name of equipment manufacturer & address:	
6.	Date of commission of the equipments:	
7.	Model no. of the equipment:	
8.	Brief Technical particulars of the equipments:	
9.	Capacity- pulverizing thru	……TPH with fineness not less than 90% 325mesh
10.	Whether the equipment(s) are in successful operation in atleast one (01) plant for a period not less than one (01) year reckoned as on the techno-commercial bid opening date of EPC package	-*Yes/*No
11.	Flue gas Desulphurization system details:	*Technical extract/ *paper letter/ *email/ *Drawing from user or *contract document or *scheme or *any document in public domain enclosed at annexure....to Attachment-3K
12.	Scope of Work:	*Letter of Award or *Contract or *P.O. enclosed at Annexure.....to Attachment-3K

13.	Performance details:	*Certificate/*Letter/*E-mail from End user enclosed at Annexure.....to ttachment-3K

*** Strike off whichever is not applicable.**

F. **Vacuum Belt filters:** We declare that, we/our Sub-Vendor, have manufactured and supplied at least one (1) number of Vacuum Belt filter of minimum **19** T/Hr capacity, Belt type, working in Wet Limestone based FGD application in Coal fired power plant and which has been in successful operation for minimum one(1) year reckoned as on the techno-commercial bid opening date of EPC package, as per the details furnished below:

Sl. No.	Description	Reference Work
1.	Name of the reference plant & location:	
2.	Client name and his address:	
3.	No. of units and capacity in MW of unit:	
4.	Whether power plant is coal fired	-*Yes/*No
5.	Whether operating in a Wet Limestone based FGD application in coal fired power plant	-*Yes/*No
6.	Name of equipment manufacturer & address:	
7.	Date of commission of the equipment:	
8.	Model no. of the equipment:	
9.	Brief Technical particulars of the equipment:	
10.	Capacity-……TPH	
11.	Whether the equipment(s) are in successful operation in atleast one(01) plant for a period not less than one (01) year reckoned as on the techno-commercial bid opening date of EPC package	-*Yes/*No
12.	Flue gas Desulphurization system details:	*Technical extract/ *paper letter/ *email/ *Drawing from user or *contract document or *scheme or *any document in public domain enclosed at annexure....to Attachment-3K
13.	Scope of Work:	*Letter of Award or *Contract or *P.O enclosed at Annexure.....to Attachment-3K
14.	Performance details:	*Certificate/*Letter/*E-mail from End user enclosed at

Amendment 09 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	D9-1 to D9-3	1

Amendment 09 to Technical Specifications (Section VI)

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Section / Part	Sub-Section	Clause No.	Page No.		
D9-1	VI/Part A	III	4.03.00	2-3 of 3	Civil a) Green belt development and afforestation b) Township c) Landscaping d) Raw water reservoir	Civil a) Green belt development and afforestation b) Township c)Landscaping d) Raw water reservoir **e) Civil and Structural works outside plant boundary for Ash slurry disposal system.**
D9-2	VI/Part B	D-1-6	6.02.07	6 of 23	**Temperature Load** For temperature loading, the total temperature variation shall be considered as 2/3 of the average maximum annual variation in temperature. …… The maximum distance of the expansion joint shall be as per the provisions of IS 800 and IS 456 for steel and concrete structures respectively.	**Temperature Load** For temperature loading, the total temperature variation shall be considered as 2/3 of the average maximum annual variation in temperature. …… The maximum distance of the expansion joint shall be as per the provisions of IS 800 and IS 456 for steel and concrete structures respectively. **In Limit state design, the partial safety factor for temperature load in load combinations shall be taken same as specified for dead load (DL) in Table 4 of IS 800: 2007 for steel structures and in Table 18 of IS 456 for concrete structures.**
D9-3	VI/Part B	D-1-6	6.02.08	6 of 23	**Differential Settlement Loads** Structures shall be designed considering an additional load on account of differential settlement of 1 in 1000 between any two adjacent columns, subject to a maximum differential settlement of 8 mm in case of foundations resting on soils & 4mm in case of foundations resting on rock/ pile. …… In the structural analysis for differential loads, following approach may be considered: All the alternate columns in structure shall be applied downward displacement as described above and analyzed at a time. The resultant forces/ reactions shall be considered with reversible effects for design of structures and footings.	**Differential Settlement Loads** Structures shall be designed considering an additional load on account of differential settlement of 1 in 1000 between any two adjacent columns, subject to a maximum differential settlement of 8 mm in case of foundations resting on soils & 4mm in case of foundations resting on rock/ pile. …… In the structural analysis for differential loads, following approach may be considered: All the alternate columns in structure shall be applied downward displacement as described above and analyzed at a time. The resultant forces/ reactions shall be considered with reversible effects for design of structures and footings**. In Limit state design, the partial safety factor for differential settlement load in load combinations shall be taken same as specified for dead load (DL) in Table 4 of IS 800: 2007 for steel structures and in Table 18 of IS 456 for concrete structures.**

Amendment 10 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	LA-03	1
2	SG-61	2
3	QA-2 to QA-17	3-7
	Annexure-Updated indicative sub vendor list (QA-SG)	

Amendment 10 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
LA-3	Part B	G-03	4 of 16	1.02.00(b)(xii)	Office area for 20 nos. executive approx. 30 m2 inclusive of conference area, toilet and pantry as detailed in civil part. This area shall be positioned over the CR with good aesthetic view and noise and dust isolation.	Office area for 25 nos. executive approx. 350 m2 inclusive of conference area, toilet and pantry as detailed in civil part. This area shall be positioned over the CR with good aesthetic view and noise and dust isolation.

Amendment 10 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">S. No.</th><th colspan="4">SPECIFICATION REFERENCE</th><th rowspan="2">Instead of</th><th rowspan="2">Read as</th></tr>
<tr><th>Sec/ Part</th><th>Sub-Sec-tion</th><th>Page No.</th><th>Clause No.</th></tr>
<tr><td>SG.61</td><td>VI/B</td><td>A-01</td><td>27,28 of 87</td><td>1.05.22.01</td><td>CHIMNEY
A "wet Chimney" shall…through bypass duct.
Single-flue shall be… at least 150 m.
The Bidder shall…schedule of BPS.
The Contractor, shall…FGD system in operation.
The chimney flue liner…per ASTM B 898-11.
Alternatively, Contractor can also…supplier of the lining system.

Transition duct inside…</td><td>CHIMNEY
A "wet Chimney" shall…through bypass duct.
Single-flue shall be… at least 150 m.
The Bidder shall…schedule of BPS.
The Contractor, shall…FGD system in operation.
The chimney flue liner…per ASTM B 898-11.
Alternatively, Contractor can also…supplier of the lining system.
The borosilicate glass blocks shall comply with the following minimum requirements:
Physical Properties of Borosilicate Glass Block
<table><tr><th>S.N</th><th>Parameter</th><th>Unit</th><th>Values</th></tr><tr><td>1</td><td>Density</td><td>Kg/m3</td><td>180-210</td></tr><tr><td>2</td><td>Compressive Strength</td><td>MPa</td><td>≥1.3</td></tr><tr><td>3</td><td>Flexural Strength</td><td>MPa</td><td>≥1.0</td></tr><tr><td>4</td><td>Absorption of Moisture</td><td>% by Volume</td><td>≤ 0.2</td></tr><tr><td>5</td><td>Water vapor permeability</td><td>µg/(Pa-m-s)</td><td>≤ 0.007</td></tr><tr><td>6</td><td>Combustibility</td><td></td><td>None</td></tr><tr><td>7</td><td>Coefficient. of linear Thermal Expansion</td><td>/°C</td><td>≤5.5X10-6</td></tr><tr><td>8</td><td>Maximum Service Temperature (unloaded)</td><td>°C</td><td>450</td></tr><tr><td>9</td><td>Thermal Conductivity at mean temperature (10°C)</td><td>W/m.K</td><td>≤ 0.064</td></tr><tr><td>10</td><td>Boro Content</td><td>% in weight</td><td>≥10</td></tr></table>
Transition duct inside…</td></tr>
</table>

Amendment 10 to Technical Specifications (Section VI)

S. No.	SPECIFICATION REFERENCE				Instead of	Read as
	Part	Sub-Section	Clause No.	PAGE NO.		
QA-2	B	E-08	Clause 1.01.01, 1b & 1c	2 of 26	**Creep requirements for High Pressure Cast Steel Enclosures:-** b)Steels chosen for design metal temperatures between 400°C to 540°C AND having less than 3% chromium, shall require 5 years performance feed back experience in the absence of which, creep rupture test will be required to be carried out for **maximum** test duration of 1000 hrs/mutually agreed parameters for NTPC approval. c)Steels chosen for design metal temperatures above 540°C AND/OR having more than 3% chromium, shall require 10 years performance feed back experience OR adequate stress rupture data, in the absence of which, creep rupture test will be required to be carried out for **maximum** test duration of 1000 hrs/mutually agreed parameters for NTPC approval.	**Creep requirements for High Pressure Cast Steel Enclosures:-** b)Steels chosen for design metal temperatures between 400°C to 540°C AND having less than 3% chromium, shall require 5 years performance feed back experience in the absence of which, creep rupture test will be required to be carried out for **minimum** test duration of 1000 hrs/mutually agreed parameters for NTPC approval. c)Steels chosen for design metal temperatures above 540°C AND/OR having more than 3% chromium, shall require 10 years performance feed back experience OR adequate stress rupture data, in the absence of which, creep rupture test will be required to be carried out for **minimum** test duration of 1000 hrs/mutually agreed parameters for NTPC approval.
QA-3	B	E-08	Clause 1.01.03, (a) 2b & 2c	4 of 26	**Creep requirements for Rotor forgings (monoblock and/or discs), Impulse Wheel & Nozzle Box and coupling forgings :-** b)Steels chosen for design metal temperatures between 400°C to 540°C AND having less than 3% chromium, shall require 5 years performance feed back experience in the absence of which, creep rupture test will be required to be carried out for **maximum** test duration of 1000 hrs/mutually agreed parameters for NTPC approval. c)Steels chosen for design metal temperatures above 540°C AND/OR having more than 3% chromium, shall require 10 years performance feed back experience OR adequate stress rupture data, in the absence of which, creep rupture test will be required to be carried out for **maximum** test duration of 1000 hrs/mutually agreed parameters for NTPC approval.	**Creep requirements for Rotor forgings (monoblock and/or discs), Impulse Wheel & Nozzle Box and coupling forgings :-** b)Steels chosen for design metal temperatures between 400°C to 540°C AND having less than 3% chromium, shall require 5 years performance feed back experience in the absence of which, creep rupture test will be required to be carried out for **minimum** test duration of 1000 hrs/mutually agreed parameters for NTPC approval. c)Steels chosen for design metal temperatures above 540°C AND/OR having more than 3% chromium, shall require 10 years performance feed back experience OR adequate stress rupture data, in the absence of which, creep rupture test will be required to be carried out for **minimum** test duration of 1000 hrs/mutually agreed parameters for NTPC approval.

QA-4	B	E-12	Clause 1.00.00, Sl.No.4	2 of 4	Dry running withstand capability shall be demonstrated and established on one Boiler Feed Pump and its corresponding booster pump. Feed pump shall be capable of accepting complete loss of water and must be capable of being shut down in a controlled manner and brought down to rest after being tripped from design condition with simultaneous closure of suction valve. To demonstrate the capability during shop testing, suction valve actuation should be fast in order to ensure operation during vapour phase. Pump shall then be restarted and bring it back to design condition.	Deleted
QA-5	B	E-12	Clause 1.00.00, Sl.No.5	3 of 4	Visual Cavitation Test on one first stage production impeller of Boiler Feed Pump shall be carried out to demonstrate absence of Cavitation at Design Speed in Cold Water. The test will establish the cavitation characteristic of one production first stage impeller to confirm that the cavity length under dynamically scaled site conditions corresponding to design point will not exceed an agreed size. This test shall be carried out at 25%, 50%,65%,80%,100% and 125% of Design Flow.	Deleted
QA-6	B	E-59	Clause 4.0 (b)	2 of 6	**PURCHASE AND SERVICE** b) Structural steel (plates and rolled sections i.e. channels, beams & angles) conforming to IS 2062 and Reinforcement steel conforming to IS 1786 supply if in the scope of the contractor shall be procured from Primary Steel Producers (Refer NOTE below). Currently, Primary Steel Producers acceptable are SAIL, JSW Steel Ltd, Jindal Steel & Power, Tata steel Ltd. (for Reinforcement steel/TMT bars), RINL (for long products/Rolled sections and Reinforcement steel/TMT bars), Arcelormittal Nippon Steel India Ltd. (for Flat products/ Steel Plates), ESL Steel Ltd. (for Reinforcement steel/TMT bars) and JSW Ispat Special Products Ltd. (for long products/Rolled sections and Reinforcement steel/TMT bars). Subsequently, if any new Primary Steel Producer/s are proposed during execution of contract, the same may be considered for acceptance subject to meeting the following qualifying requirements: i) The proposed supplier should be a Primary Steel Producer, having a minimum production capacity of one million tons per annum (MTPA). ii) The proposed supplier should be a regular manufacturer of Steel Plates and / or Rolled Sections and / or Reinforcement Steel for the last two years as on date of submission of proposal. iii) The proposed supplier should also be a registered licensee with Bureau of Indian Standards for BIS: 1786/2062 at the time of submission of proposal. NOTE: The “Primary Steel Producer” shall mean Steel Producer of any capacity, irrespective of process route, starting their operations from iron making using iron ore, virgin or processed, with	**PURCHASE AND SERVICE** b) Structural steel (plates and rolled sections i.e. channels, beams & angles) conforming to IS 2062 and Reinforcement steel conforming to IS 1786 supply if in the scope of the contractor shall be procured from the Steel Producers (Refer NOTE below). Currently, Steel Producers acceptable are: 1. SAIL, 2. JSW Steel Ltd, 3. Jindal Steel & Power, 4. RINL (for long products/Rolled sections and Reinforcement steel/TMT bars), 5. JSW Ispat Special Products Ltd. (for long products/Rolled sections and Reinforcement steel/TMT bars). 6. Arcelormittal Nippon Steel India Ltd. (for Flat products/ Steel Plates), 7. Tata steel Ltd. (for Reinforcement steel/TMT bars), and 8. ESL Steel Ltd. (for Reinforcement steel/TMT bars) Subsequently, if any new Steel Producer/s are proposed by the main contractor during execution of contract, the same may be considered for acceptance subject to meeting the following qualifying requirements: i) The proposed supplier should be a Steel Producer, having a minimum production capacity of one million tons per annum (MTPA).

					necessary refining facilities and rolling/processing facilities, at a single location or else in multiple locations provided that the entire gamut of iron & steel production, from iron making to finished steel production, is owned by the same company or its subsidiary company(ies). Provided that the iron making capacity is sufficiently matching the steel making capacity. Further, downstream units should use material from the upstream units of the same company or its subsidiaries. In case of non-availability of certain steel section/s i.e. Angle smaller than 100x100x10 mm, MS flats, rounds, square bars and chequered plate from above acceptable primary steel producers, an option is given to the Main contractor to source these sections directly from SAIL Conversion/Wet Leasing agent subject to the conditions given at point no. A) below: A) Approval conditions for procurement of structural steel sections through SAIL Conversion/Wet Leasing agent: 1. Main Contractor to ensure continuity of BIS license of the manufacturer for the sections being manufactured for Employer supply. 2. Billets shall be procured from Employer approved Main Steel Producers. Proper records for traceability from raw material to final product shall be maintained. 3. 100% chemical analysis of the raw material (Billets) shall be carried out as per IS: 2830. Testing of one sample per 40 MT for each type of section or part thereof shall be carried out as per IS: 2062 on finished product. 4. Each lot of delivery of finished product shall be accompanied with co-relatable Manufacturer's Test Certificate (MTC). MTC of finished sections shall be correlated with original MTC for Billets received from Main Steel Producer and Manufacturer Test Report of chemical analysis of Billets mentioned at point no.3. MTC of finished sections shall include the reference of MTC for Billets from Main Steel Producer. 5. Employer will have access to carry out the surveillance checks for in-process stage. 6. In case of any defects are seen in the material, Main Contractor will replace the material without any cost implication to Employer. In case of non-availability of certain size/s of steel tubes conforming to IS:1161 and Hollow (square and rectangular) steel sections conforming to IS: 4923 from above acceptable primary steel producers, the same may be sourced from BIS approved sources	ii) The proposed supplier should be a regular manufacturer of Steel Plates and / or Rolled Sections and / or Reinforcement Steel for the last two years as on date of submission of proposal. iii) The proposed supplier should also be a registered licensee with Bureau of Indian Standards for BIS: 1786/2062 at the time of submission of proposal. NOTE: "The "Steel Producer" shall mean Steel Producer of any capacity, irrespective of process route, starting their operations from iron making using iron ore, virgin or processed, with necessary refining facilities and rolling/processing facilities, at a single location or else in multiple locations provided that the entire gamut of iron & steel production, from iron making to finished steel production, is owned by the same company or its subsidiary company(ies). Provided that the iron making capacity is sufficiently matching the steelmaking capacity. Further, downstream units should use material from the upstream units of the same company or its subsidiaries." A) Approval conditions for procurement of structural steel sections through SAIL Conversion/Wet Leasing agent: In case of non-availability of certain steel sections such as angel 100X100X10 mm or smaller size, MS flats, rounds bars, square bars and chequered plate from NTPC acceptable steel producers (non-availability to be established by supporting documents), an option is given to the Main contractor to source these sections directly from SAIL approved Conversion/Wet Leasing agent subject to the conditions given below: 1. The validity of BIS License of the finished sections shall be ensured by the Main contractor. 2. Billets shall be procured from Owner acceptable Steel Producers. Proper records for traceability from raw material to final product shall be maintained. 3. Testing of one sample per 40 MT for each type of section/size or part thereof shall be carried out as per IS: 2062 on finished product for physical and chemical properties. The sampling and testing for physical and chemical tests on finished product at Conversion/Wet Leasing agent shall be mandatorily witnessed by main contractor with prior consent of Owner. 4. Each lot of delivery of finished product shall be accompanied with co-relatable Manufacturer's Test Certif-

					having valid BIS license subject to the conditions given at point no. B) below: B) Approval conditions for procurement of Steel tubes conforming to IS: 1161 and Hollow (square and rectangular) steel sections conforming to IS: 4923 from BIS approved sources: 1. Main Contractor to ensure continuity of BIS license of the manufacturer for the sections being manufactured for Employer supply. 2. Raw materials shall be procured from Employer approved Main Steel Producers. 3. 100% chemical analysis of the raw material (steel) shall be carried out as per IS: 228. Testing of samples of steel tubes and hollow sections from each lot shall be carried out as per IS: 1161 & IS: 4923 respectively on finished product. 4. Each lot of delivery of finished product shall be accompanied with co-relatable Manufacturer's Test Certificate (MTC). 5. Employer will have access to carry out the surveillance checks for in-process stage. 6. In case of any defects are seen in the material, Main Contractor will replace the material without any cost implication to Employer. The specific methodology to be followed for above procurement through conversion route/BIS approved sources route shall be subject to approval by Employer in advance.	icate (MTC). MTC of finished sections shall be correlated with original MTC for Billets received from NTPC acceptable Steel Producers. 5. Owner will have access to carry out the surveillance checks for in-process stage. 6. In case of any defects are seen in the material, Main Contractor will replace the material without any cost implication to Owner. B) Approval conditions for procurement of Steel tubes conforming to IS: 1161 and Hollow (square and rectangular) steel sections conforming to IS: 4923 from BIS approved sources: Steel tubes conforming to IS:1161 and Hollow (square and rectangular) steel sections conforming to IS: 4923 shall be sourced from BIS approved sources having valid BIS license subject to complying and ensuring the following conditions by Main contractor: 1. The validity of BIS License of the finished sections shall be ensured by the Main contractor. 2. Raw materials shall be procured from Owner acceptable Steel Producers. 3. Testing of samples of steel tubes and hollow sections from each lot shall be carried out as per IS: 1161 & IS: 4923 respectively on finished product. 4. Each lot of delivery of finished product shall be accompanied with co-relatable Manufacturer's Test Certificate (MTC). 5. Owner will have access to carry out the surveillance checks for in-process stage. 6. In case of any defects are seen in the material, Main Contractor will replace the material without any cost implication to Owner. The specific methodology to be followed for Procurement of Structural Steel and Reinforcement Steel through Conversion route/BIS approved sources shall be subject to approval by NTPC in advance.

Amendment 10 to Technical Specifications (Section VI)

S. No.	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
QA -7	VI-B	E 01	2 0F 13	1.01.02 (h)	Boroscopy examination shall be carried out for those headers which will be interconnected with other headers by welding.	Boroscopy examination **of all headers shall be carried out to check presence of any foreign material.**
QA-08	VI-B	E 01	3 of 13	1.01.03(i)	Nil	**Austenitic Stainless-Steel tubes & coils shall be Solution Heat Treated, Stored, preserved and handled so as to avoid Stress Corrosion Cracking due to Chloride contamination**.
QA-09	VI-B	E 04	2 of 5	1.07.04	Nil	**Each pump shall be subjected to a performance test at the manufacturer's works under as near actual site conditions as possible.**
QA-10	VI-B	E 04	3 of 5	1.09.06	Nil	**Trial assembly & run test of Vacuum Belt Filter system shall be carried out at shop**
QA-11	VI-B	E 04	3 of 5	1.11.04	Nil	**Assembled agitators shall be subjected to run test at the manufacturer's works.**
QA-12	VI-B	E 04	4 of 5	1.13.04	Performance test shall be carried out on each blower as per technical specification/ Relevant standard	Performance test shall be carried out on each Oxidation blower as per technical specification/ relevant standard **at the manufacturer's works under as near actual site conditions as possible.**
QA-13	VI-B	E-04	5 of 5	1.17.00	**BOROSILICATE LINING:** Borosilicate block shall conform to NTPC data sheet and to be tested as per Relevant applicable standard	**BOROSILICATE LINING:** Borosilicate block, Adhesive & Primer materials shall conform to NTPC approved data sheet and to be tested as per relevant applicable standard
QA-14	VI-C	GTR	34 of 119	22.17.00	List of NTPC approved sub vendors against similar Pkg/items is attached as Section-VI, Part-B, Chapter E-60 Indicative sub-vendor list.	List of NTPC approved sub vendors against similar Pkg/items is attached as Section-VI, Part-B, Indicative sub-vendor list. (Copy attached)
QA-15	VI-C	GTR	34 of 119	22.17.00(iii)	Factory Registration Certificate.	Valid Factory License/Registration certificate (as applicable)
QA-16	VI-C	GTR		Annexure-VII	Factory Registration Certificate.	Valid Factory License/Registration certificate (as applicable)
QA-17	VI-C	GTR		Annexure-VIII	METHODOLOGY FOR SAMPLING FOR TESTING OF REPAIRED WELD JOINTS	METHODOLOGY FOR SAMPLING FOR TESTING OF WELD JOINTS

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1	**RAPH**	I			REFER SUB QR ITEM LIST Refer Note 1				STATIC COMPONENTS, ROTATING COMPONENTS, GUIDE/SUPPORT BEARINGS-NTPC APPROVED VENDORS
2	**FD, PA & ID FANS**	I			REFER SUB QR ITEM LIST Refer Note 1				STATIC, ROTATING COMPONENTS AND BLADES - NTPC APPROVED VENDORS
3	**COAL MILL**	I			REFER SUB QR ITEM LIST Refer Note 1				MILL COUPLING, PGB, GRINDING ROLLS, BULL RING SEGMENTS, MILL HOUSING, SEPARATOR AND OTHER MAIN COMPONENTS - FROM NTPC APPROVED SOURCES
4	**ESP**	I			REFER SUB QR ITEM LIST Refer Note 1				COLLECTING ELECTRODE, EMITTING ELECTRODE - NTPC APPROVED VENDORS
5	**GRAVIMETRIC COAL FEEDERS**	I			REFER SUB QR ITEM LIST Refer Note 1				
6	**RECIRCULATION PUMP**	I			REFER SUB QR ITEM LIST Refer Note 1				
7	**AUXILIARY BOILER**	I			REFER SUB QR ITEM LIST Refer Note 1				
8	**ESP SUPPORT STRUCTURE (AUTO WELDED COLUMNS & ROOF BEAMS)**	I			NTPC APPROVED SOURCES		A		REFER BOILER STRUCTURE LIST
		$			VALLOUREC & MANNESMANN TUBES	FRANCE, GERMANY	A		CS & AS T-11, T-22, T-23, T-91, T-92
		$			TENNARIS GLOBAL SERVICES SA, URUGUAY	DALMINE, ITALY	A		CS & AS T-11, T-22
		$			TENNARIS GLOBAL SERVICES SA, URUGUAY	SILCO, ROMANIA	A		CS & AS T-11, T-22, T-23, T-91
		$			TENNARIS GLOBAL SERVICES SA,URUGUAY	NKK TUBES, JAPAN	A		CS & AS T-11, T-22, T-91
		$			MAHARASHTRA SEAMLESS LTD	RAIGAD	A		CS HOT FINISHED OD:21.0 MM TO 168.3 MM WT: 2.0 MM TO 20.0 MM COLD FINISHED OD:19.0 MM TO 88.9 MM WT: 1.0 MM TO 12.0 MM
		$			IBF S.P.A	ITALY	A		CS & AS T-11, T-12, T-22, T-91
		$			JFE STEEL CORPORATION	JAPAN	A		CS & AS T-11, T-22, T-23, T-91, T-92

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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9	SEAMLESS TUBES	$			TUBOS REUNIDOS INDUSTRIAL, S.L.U	SPAIN	A		CS & AS T-11, T-22, T-23, T-91, T-92
		$			JINDAL SAW LIMITED	NASHIK	A		CS & AS T-11, T-12, T-22 HOT FINISHED OD: 33.4 MM TO 168.3 MM WT: 3.5 MM TO 21.95 MM COLD FINISHED OD: 6.0 MM TO 140.0 MM WT: 0.8 MM TO 15.0 MM
		$			REMI METALS GUJARAT LTD	BHARUCH	A		CS & AS T-11, T-12, T-22 HOT FINISHED OD: 28.6 MM TO 177.8 MM WT: 3.0 MM TO 28.0 MM COLD FINISHED OD: 9.0 MM TO 127.0 MM WT: 1.6 MM TO 20.0 MM
		$			WAYMAN GORDAN	USA	A		CS,T11,T12,T22,T91
		$			BENTELER STEEL/TUBE GMBH	GERMANY	A		CS,T-11, T23, T-22, T-91 & T-92
		$			HEAVY METALS & TUBES LTD	AHMEDABAD	A		CS HOT FINISHED UP TO OD: 76.2 MM AND WT:12.0 MM
		$			PRODUCTOS TUBULARES,	SPAIN	A		CS & AS T-11, T-22. T-23. T-91
		$			ISMT	AHMEDNAGAR,BARAMATI	A		CS, T11, 12, 22 HOT FINISHED OD: 38.0 MM TO 273.0 MM WT: 3.5 MM TO 40.0 MM COLD FINISHED OD: 18.0 MM TO 140.0 MM WT: 1.5 MM TO 15.0 MM
		$			NIPPON STEEL & SUMITOMO METAL CORPORATION	JAPAN	A		CS, T-11, T-22, T23, T-91, & T-92
		$			BENTELER STEEL/TUBE GMBH	GERMANY	A		CS, T-11, T23, T-22, T-91 & T-92
		$			BHEL SSTP	TRICHY	A		CS, T-11, T-12, T-22 & T91 (OD 21.30 TO 133 MM & WALL THICKNESS 2MM TO 14MM (HOT FINISHED / COLD DRAWN SIZE)
		I			M/s Heavy Metals & Tubes	MEHSANA GUJARAT	A		CS & AS up to T91 (1. SA 213 T91 CDS: OD 19.05-76.2mm & WT 1.65-16.15mm 2. SA 213 T91 HFS: OD 26.7-76.2mm & WT 3.05-12mm 3. SA 335 P91 CDS & HFS: OD 76.2-127mm & WT 3.5-21mm)

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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10	**SEAMLESS TUBES(RIFFLED)**	**$**			SALZGITTER MANNESAMANN PRECISION	FRANCE	A		CS
11	**SEAMLESS TUBES(SS)**	**$**			KOBE SPECIALITY STEEL CO LTD	JAPAN	A		SS304, SS347H
		$			SMST	ITALY	A		SS304, 347H, SUPER 304
		$			TUBACEX	SPAIN	A		SS304, 347H, SUPER 304
		$			PASCO SPL STEEL CO.	SOUTH KOREA	A		SS304, 347H, SUPER 304
		$			NIPPON STEEL & SUMITOMO METAL CORPORATION	JAPAN	A		SS 304, SS347H, SUPER 304 OD UP TO 114.3 MM
		I			M/s TUBACEX	VALSAD	A		347H, SUPER 304H (OD 33.4 to 76.2 mm & WT 3.5 to 14.1mm. 347H : OD 26.7 to 31.8mm & WT 7.2 to7.8mm)
		I			M/S CHANDAN STEEL LTD	VALSAD	A		347H, SUPER 304H (OD 33.4 to 76.2 mm & WT 3.5 to 14.1mm. 347H : OD 26.7 to 31.8mm & WT 7.2
		I			M/S RATNAMANI METALS AND TUBES LT	MEHSANA	A		SUPER 304H (OD 33.4 to 76.2 mm & WT 3.5 to 14.1mm) , SS 347H (OD 26.7 to 31.8mm & WT 7.2 to 7.8mm
		I			M/s Welspun	Bharuch	A		347H, SUPER 304H (OD 33.4 to 76.2 mm & WT 3.5 to 14.1mm. 347H : OD 26.7 to 31.8mm & WT 7.2 to7.8mm)
		$			TENNARIS GLOBAL SERVICES SA, URUGUAY	DALMINE, ITALY	A		CS & AS P-11, P-22, P-91
		$			TENNARIS GLOBAL SERVICES SA, URUGUAY	SILCO, ROMANIA	A		CS & AS T-11, T-22, T-91 UPTO DIA 159 MM
		$			TENNARIS GLOBAL SERVICES SA,URUGUAY	NKK TUBES, JAPAN	A		CS & AS T-11, T-22, T-91
		$			VALLOUREC & MANNESMANN TUBES	FRANCE, GERMANY	A		CS & AS P-11, P-22, P-91. P-92
		$			TUBOS REUNIDOS INDUSTRIAL, S.L.U	SPAIN	A		CS & AS P-11, P-22, P-91

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12	SEAMLESS PIPES	$			ISMT	AHMEDNAGAR, BARAMATI	A		CS, T11, 12, 22 HOT FINISHED OD: 38.0 MM TO 273.0 MM WT: 3.5 MM TO 40.0 MM COLD FINISHED OD: 18.0 MM TO 140.0 MM WT: 1.5 MM TO 15.0 MM
		$			REMI METALS GUJARAT LTD	BHARUCH	A		CS & AS T-11, T-12, T-22 HOT FINISHED OD: 28.6 MM TO 177.8 MM WT: 3.0 MM TO 28.0 MM COLD FINISHED OD: 9.0 MM TO 127.0 MM WT: 1.6 MM TO 20.0 MM
		$			VALCONVY TRUB CHOMUTOV,	CZECH REPUBLIC	A		CS & P-12 & P-22
		$			ARCELORMITTAL TUBULAR PRODUCTS ROMAN S.A	ROMANIA	A		CS
		$			WAYMAN GORDAN	USA	A		CS & AS P-11, P-22, P-91
		$			MAHARASHTRA SEAMLESS LTD	RAIGAD	A		CS HOT FINISHED OD:219.1 MM TO 355.6 MM WT: 6.35 MM TO 35.1 MM COLD FINISHED OD:19.0 MM TO 88.9 MM WT: 1.0 MM TO 12.0 MM
		$			PRODUCTOS TUBULARES,	SPAIN	A		CS & AS P-11, P-12, P-22, P-91
		$			NIPPON STEEL & SUMITOMO METAL CORPORATION	JAPAN	A		CS & AS P-11, P-22, P-91 & P-92
		$			TENNARIS GLOBAL SA, URUGUAY	NKK TUBES, ITALY	A		P-91, P-22, P-11, P12, CS
		$			JINDAL SAW LIMITED	NASHIK	A		CS, T11, 12, 22 HOT FINISHED OD: 33.4 MM TO 168.3 MM WT: 3.5 MM TO 21.95 MM COLD FINISHED OD: 6.0 MM TO 140.0 MM WT: 0.8 MM TO 15.0 MM
		$			IBF S.P.A	ITALY	A		P-92, P-91, P-22, P-11, P12, CS
		$			JFE STEEL CORPORATION	JAPAN	A		P-92, P-91, P-22, P-11, P12, CS
		$			BHEL SSTP	TRICHY	A		CS
		$			BENTELER STEEL/TUBE GMBH	GERMANY	A		P-11, P-22, P-91, P-92 UP TO OD 160 MM
		$			RINGMILL SPA	ITALY	A		CS OD UP TO 914 MM & WT UP TO 102 MM & AS P-91
		$			FORGIATURA MORANDINI SRL	ITALY	A		CS & AS P-11, P-22, P-91 & P-92

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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13	PLATES AND ROLLED SECTION (CS & AS EXCLUDING CS- IS:2062 GRADES)	$			INDUS STEEL	BELGIUM	A		CS-SA515 AS UP T0 GR-91
		$			ILSENBURGER GROBBLECH	GERMANY	A		CS-SA 299, SA515, BS EN 10025, AS UP TO GRADE 91
		$			DILLINGER-GTSVENTES	GERMANY	A		CS-SA 299, SA515, BS EN 10025, A36, AS UP TO GRADE 91
		$			SIJ ACRONI D.O.O., SLOVENIA	SLOVENIA	A		CS- SA515, BS EN 10025, A36, AS UP TO GRADE 91
		$			THYSSENKRUPP	GERMANY	A		CS- SA515 BS EN 10025 A36, AS UP TO GRADE 22
		$			INDUSSTEEL LOIRE	FRANCE	A		CS-SA 299, SA515; AS UP TO GRADE 22
		$			ARCELLOR MITAL NIPPON STEEL (Formerly ESSAR Steel)	HAZIRA	A		CS- SA515, BS EN 10025, A36, AS GRADE 12 &22
		$			VOESTALPINE GROBBLECH GMBH	AUSTRIA	A		CS- SA515 BS EN 10025 A36, AS UP TO GRADE 22
		$			SAIL	BHILAI/SALEM	A		CS- SA515 BS EN 10025 A36, AS UP TO GRADE 22
		$			NIPPON STEEL	JAPAN	A		CS- SA515 BS EN 10025 A36, AS UP TO GRADE 22
		$			POSCO	SOUTH KOREA	A		CS- SA515 BS EN 10025 A36, AS UP TO GRADE 22
		$			REINER BRACH GMBH & CO.	GERMANY	A		CS- SA 299 SA515 BS EN 10025 A36, AS UP TO GRADE 22
		$			UTTAM VALUE STEEL LTD	WARDHA	A		ALLOY STEEL PLATES AS PER A-204 & A-387 UPTO THICKNESS OF 40MM FOR STRUCTURAL STEEL APPLICATION , IN NON-PRESSURE PARTS.
14	PLATES & ROLLED SECTION (CS-IS 2062 STRUCTURAL STEEL GRADES)	$			REFER TO SUB-VENDORS MENTIONED IN THE TECHNICAL SPECIFICATIONS clause 4.0 of QA-Civil chapter (E-59), Section-VI/ Part-B		A		
		$			OUTOKUMPU	SWEDEN	A		SS PLATES UP TO 20 MM THK
		$			INDUSSTEEL	BELGIUM	A		GRADE-304,309,310,316

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15	PLATES(SS)	$			JSL STAINLESS	JAIPUR	A		LINER SS 304
		$			INDUSSTEEL LOIRE	FRANCE	A		GRADE-304,309,310,316
		$			SAIL	BHILAI/SALEM	A		GRADE-304,309,310,317
		$			COLUMBUS STAINLESS STEEL	SOUTH AFRICA	A		GRADE-304,309,310,318
16	SEPARATOR & STORAGE TANK	I			ALSTOM	USA	A		
		I			BHEL	TRICHY	A		
		I			GE INDIA	DURGAPUR	A		
		I			DOOSAN	SOUTH KOREA	A		
		I			L&T-MHPS BOILERS PVT LTD	HAZIRA	A		
17	HEADERS AND SUCTION MANIFOLDS	I			ALSTOM	USA	A		
		I			BHEL	TRICHY	A		
		I			GE INDIA	DURGAPUR	A		
		I			DOOSAN	CHENNAI	A		
		I			DOOSAN VINA	VIETNAM	A		
		I			L&T-MHPS BOILERS PVT LTD	HAZIRA	A		
18	SPIRAL WATER WALLS	I			BHEL	TRICHY	A		
		I			GE INDIA	DURGAPUR	A		
		I			ALSTOM	USA	A		
		I			DOOSAN	CHENNAI	A		
		I			DOOSAN VINA	VIETNAM	A		
		I			DOOSAN	SOUTH KOREA	A		
19	TUBULAR PRODUCTS(COILS & PANELS) EXCLUDING SPIRAL WALLS	I			GE INDIA	DURGAPUR	A		
		I			BHEL	TRICHY	A		
		I			ALSTOM	USA	A		
		I			DOOSAN	CHENNAI	A		
		I			DOOSAN VINA	VIETNAM	A		
		I			DOOSAN	SOUTH KOREA	A		

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		I			L&T-MHPS BOILERS PVT LTD	HAZIRA	A		
		I			MHI	JAPAN	A		
20	CRITICAL PIPING /PCP(MS, CRH, HRH, FW) AND BOILER PIPING	I			BHEL	TRICHY, THIRUMAYAM	A		
		I			GE INDIA	DURGAPUR	A		
		I			DOOSAN	SOUTH KOREA	A		
		I			BHR	GERMANY	A		
		I			DEE DEVELOPMENT	PALWAL	A		
		I			BENTEC	USA	A		
		I			L&T PIPING CENTRE	HAZIRA	A		
		I			SEONGHWA IND CO LTD	SOUTH KOREA	A		
21	MISC HP PIPING EXCLUDING CRITICAL PIPING(CS, AS UP TO GRADE 91)	I			BHEL	TRICHY	A		
		I			GE INDIA	DURGAPUR	A		
		I			DOOSAN	SOUTH KOREA	A		
		I			BHR	GERMANY	A		
		I			DEE DEVELOPMENT	PALWAL	A		
		I			BENTEC	USA	A		
		I			L&T PIPING CENTRE	HAZIRA	A		
		I			SEONGHWA IND CO LTD	SOUTH KOREA	A		
		I			PAL ENGG	YAMUNANAGAR	A		
22	MISC HP PIPING EXCLUDING CRITICAL PIPING(CS, AS UP TO GRADE 22)	I					A		ABOVE MENTIONED PIPING VENDORS ARE ALSO ACCEPTABLE
		I			ISGEC	YAMUNANAGAR	A		UP TO GRADE 22
		I			UNITECH MACHINES LTD	SAHARANPUR	A		ONLY FOR CS GRADE
		I			BEND JOINTS PVT LTD	BHOPAL	A		ONLY FOR CS GRADE
		I			SEAM INDUSTRIES PVT LTD	NAGPUR	A		ONLY FOR CS GRADE
		I			S&G	PALWAL	A		CS & AS UP TO GRADE 22 (EXCEPT BOILER PIPING & CRITICAL PIPING)
		I			FLASH FORGE	VISAKHAPATNAM	A		ONLY FOR CS GRADE

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23	MIXING SPHERES	I			GE INDIA	DURGAPUR	A		
		I			BHEL	TRICHY	A		
		I			ALSTOM	USA	A		
		I			DOOSAN	SOUTH KOREA	A		
24	COAL BURNER ASSY & SOFA/OFA PORT/AA PORT	I			ALSTOM	USA	A		
		I			BHEL	TRICHY	A		
		I			DOOSAN	SOUTH KOREA	A		
		I			L&T-MHPS PVT LTD	HAZIRA	A		
		I			DEE DEE ENGINEERING ENTERPRISES	TRICHY	A		
25	AIR COOLED OIL GUN ASSEMBLY	I			BHEL	TRICHY	A		
		I			SIGMA POWER	TRICHY	A		
		I			DOOSAN	SOUTH KOREA	A		
26	HFO/LFO PUMPS								
		I			ALEKTON	CHENNAI	A		
		I			UT PUMPS	FARIDABAD	A		
		I			ROTO PUMPS LTD.	GREATER NOIDA	A		
		I			ALLWEILER INDIA PVT.LTD.	GERMANY	A		
		I			BOURMANN	GERMANY	A		
		I			TUSHACO PUMPS PVT LTD/ALLWEILER INDIA PVT.LTD.	DAMAN	A		
		I			LEISTRITZ PUMPEN GmbH	GERMANY	A		
		I			KRAL	AUSTRIA	A		
27	SOOT BLOWERS(LRSB, WALL DESLAGGER, ROTARY BLOWER, TEMP PROBE)	I			BHEL	TRICHY	A		
		I			CLYDE BERGMANN	NOIDA	A		UNDER THE SUPERVISION OF M/S CLYDE BERGMANN, GERMANY
		I			CLYDE BERGEMANN	GERMANY	A		

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		I			DIAMOND POWER SPECIALITY LTD	SCOTLAND	A		
		I			DAIEYOUNG MACHINERY	KOREA	A		
28	ELECTRIC HOIST WITH TROLLEY, UNDERSLUNG CRANE (MAIN BOUGHT OUT ITEMS LIKE HOOK, MOTORS AND CRITICAL C&I ITEMS TO BE FROM NTPC APPROVED SOURCES)	I			CONSOLIDATED HOISTS	SATARA	A		EOT CRANES UPTO 40 MT & HOISTS ABOVE 35 MT
		I			REWA INDUSTRIES	FARIDABAD	A		EOT CRANES UPTO 25 MT
		I			GRIP ENGINEERS	HYDERABAD	A		HOIST UPTO 40 MT
		I			POWER BUILD PVT LTD,	V V NAGAR	A		HOIST UPTO 10 MT
		I			UNIVERSAL HOIST	THANE	A		HOIST UPTO 20 MT
		I			ARMSEL MHE PVT LTD	BANGALORE	A		UP TO 20 MT
		I			ANUPAM INDUSTRIES	VITHAL, UDYOGNAGAR	A		EOT CRANES UPTO 50 MT
		I			TRACTOR TRIFOR	FARIDABAD	A		HOIST UPTO 35 MT
		I			CONSOLIDATED HOISTS	PUNE	A		HOISTS UPTO 20 MT
		I			DYNAMECH CRANES	THANE , MUMBAI	A		UP TO 20 MT
		I			HERCULES HOIST LTD.	MUMBAI	A		HOIST UPTO 30 MT
		I			NAMSUNG MACHINERY	SOUTH KOREA	A		UP TO 25 MT
		I			CENTURY CRANES	PALWAL	A		EOT CRANES UP TO 30 MT
		I			MUKUND	PUNE	A		Size limitation
		I			Mangla Hoist	Greater Noida	A		UPTO 10 MT
29	LP CONDENSATE PUMP	I			ITT GOULD	USA	A		
		I			FLOW SERVE	USA	A		
		I			SULZER	NAVI MUMBAI	A		
		I			CLYDE PUMPS	GHAZIABAD	A		
		I			PUMPSENSE FLUID ENGG. PVT. LTD	HOWRAH	A		
30	SCANNER AIR FAN	I			ANDREW YULE CO. LTD	NADIA	A		
		I			ACCEL	AHMEDABAD	A		
		I			PATEL AIRTEMP (I) LTD	GANDHINAGAR	A		
		I			BHEL	RANIPET	A		
		I			CB DOCTOR(IMM)	AHMEDABAD	A		
		I			AIROCHEM ENGINEERING COMPANY	KOLHAPUR	A		
		I			FLAKEWOOD INDIA	CHENNAI	A		

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		I			TLT ENGG. PVT. LTD.,	MEHSANA	A		
31	SEAL AIR FAN	I			CB DOCTOR & CO.	AHMEDABAD	A		
		I			ACCEL	AHMEDABAD	A		
		I			TLT INDIA PVT. LTD.,	MEHSANA	A		
		I			PATEL AIRTEMP (I) LTD.,	GANDHINAGAR	A		
		I			BHEL	RANIPET	A		
		I			ANDREW YULE CO. LTD.,	KALYANI NADIA	A		
		I			FLAKTWOOD	SWEDEN	A		
		I			FLAKEWOOD INDIA	CHENNAI	A		
		I			DRAFT AIR/CHICAGO BLOWERS	AHMEDABAD	A		
		I			REITZ INDIA	CHENNAI	A		
		I			Howden Solyvent (India) Pvt. Ltd	Kanchipuram	A		
		I			NADI AIR TECH P LTD	CHENNAI	A		
32	FURNACE MAINTENANCE PLATFORM(SKY CLIMBER)	I			NY SKYMAN INT. SA	BELGIUM	A		
		I			NV SKCLIMBER EUROPE SA	BELGIUM	A		
		I			DAEO PRECISION IND CO LTD	SOUTH KOREA	A		
33	QUICK ERECT FURNACE SCAFFOLDING	II			BSL	UK	A		
		II			INSTANT UPRIGHT	IRELAND	A		
		II			EASTMAN IMPEX	LUDHIANA	A		CARBON STEEL SCAFFOLDING
		II			BSL	HARIDWAR	A		
		II			ARUFASE	SPAIN	A		
		I			FLEXATHERM EXPANLLOW PVT LTD	VADODARA	A		
		I			FLEXICAN BELLOWS & HOSES PVT LTD	VADODARA	A		
		I			KAY ENGINEERING WORKS	TRICHY	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)

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34	METALLIC EXPANSION JOINT FOR DUCTS	I			RAVI STRUCTURALS	TRICHY	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			MARUTI FABRICATORS	TANJORE	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			K B TECHNOLOGIES	TRICHY	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			AURORA SHAPERS	TRICHY	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			FLEXICAN DURGA FAB(P) LTD	TRICHY	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			SRI DURGA STRUCTURALS	TRICHY	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			REGIONAL ENGINEERING ENTERPRISES	TRICHY	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			SRI RANGA INDUSTRIES	TANJORE	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			ANNAI VAILANKANNI ENGINEERING INDUSTRIES	TANJORE	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			ANNAI VAILANKANNI FABRICATORS UNIT-II	TANJORE	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			ANNAI VAILANKANNI FABRICATORS UNIT-II	TRICHY	A		MANUFACTURE OF STRAIGHT PIECES ONLY (CORNER PIECES FROM NTPC APPROVED SOURCES.)
		I			MECHWELL INDUSTRIES	NASHIK	A		
35	METALLIC EXPANSION JOINT FOR PIPES	I			METALLIC BELLOWS	CHENNAI	A		UP TO 2200 NB
		I			LONESTAR	CHENNAI	A		UP TO 2200 NB
		I			FLEXICON BELLOWS & HOSES	VADODARA	A		UP TO 2200 NB

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
S. N. क्र.सं.	Item / मद	QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No. / क्यूपी. सं.	QP Sub. Schedule क्यूपी उप.अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी
		I			FLEXATHERM EXPANLLOW PVT LTD	VADODARA	A		UPTO 2000 NB
36	LIGHT BONDED MINERAL WOOL	II			PUNJSTAR INSULATION FIBRE COMPANY	BHILAI	A		
		II			SHREERAM EQUITECH	DURG	A		
		II			GOENKA ROCKWOOL (INDIA) LTD	RAIPUR	A		
		II			LLOYDS INSULATION	BHILAI	A		
		II			THERMOCARE ROCKWOOL PVT LTD	RAJNANDGAON	A		
		II			MINWOOL ROCK FIBRES LTD	RAJNANDGAON	A		
		II			LAPINUS ROCKWOOL LTD	GWALIOR	A		
		II			ROCKWOOL INDIA	MEDAK AP	A		
		II			DHANBAD ROCKWOOL INSULATION PVT LTD	DHANBAD	A		
		II			MINSULATE MFG CO. LTD	JAMSHEDPUR	A		
		II			POLYBOND PROJECTS PVT LTD	DURG	A		
		II			HI-TECH ROCK FIBRE LTD	RAJNANDGAON	A		
		II			ROCKWOOL INDUSTRIES	BHILAI	A		
		II			JAMSHEDPUR MINERAL WOOL	JAMSHEDPUR	A		
		II			ROXUL ROCKWOOL	DAHEJ	A		
		II			LION INSULATION	GUNA MP	A		
		I			BHEL	TRICHY	A		
		I			MID AMERICA	USA	A		
		I			MANNESMANN	GERMANY	A		
		I			ITT	GERMANY	A		
		I			PIPE SUPPORTS	UK / THAILAND	A		
		I			UNISON	SOUTH KOREA	A		
		I			PIPE HANGER SUPPORTS PVT LTD	TANJAVORE	A		
		I			GILLARDINI	ITALY	A		
		I			LISEGA	GERMANY	A		
		I			WOOKWANG	SOUTH KOREA	A		

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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37	CLH & VLH	I			BERGEN PIPE SUPPORTS INDIA	CHITTOR	A		CLH UP TO C8-32 RANGE(MAXIMUM LOAD 39.70T). IN CASE OF CLH BEYOND THE RANGE OF C7-27(OF SUPPLIER CATALOGUE) THE SAME SHALL BE SOURCED FROM M/S PIPE SUPORTS, UK/THAILAND.
		I			SANWA TAKI	JAPAN	A		
		I			MH	SPAIN	A		
		I			BROWICK	UK	A		
		I			CARPENTER PATTERSON	UK	A		
		I			CARPENTER PATTERSON INDIA PVT LTD	VELLORE	A		MAXIMUM LOAD: 23877 KG AND MAXIMUM DISPLACEMENT: 220 MM AND UNDER THE SUPERVISION OF M/S CARPENTER PATERSON, UK.
		I			AAA SUPPORTS PVT LTD	VADODARA	A		MAXIMUM LOAD: 1.5MT AND MAXIMUM DISPLACEMENT: 250MM
		I			CARPENTER & PATTERSON	RANIPET	A		SUBJECT TO CONDITIONS AND THE INVOLVEMENT OF THEIR PRINCIPALS
		I			VELAN INC.	CANADA	A		SINGLE STAGE DRAIN VALVES (FORGED), SIZE UPTO 50MM NB, CLASS UPTO 2680 FOR POWER CYCLE PIPING APPLICATION.
		I			LEADER VALVES LTD.	JALANDHAR	A		CC NRV UP NB 800, 150# FOR STG PKG.
		I			BHEL	TRICHY	A		
		I			CRESCENT VALVES	MUMBAI	A		UPTO NB 300 CL 600
		I			VELAND VALVE CORP.	USA	A		GATE V/V 2-34" CL 900-4500 CAST STEEL GATE V/V 18-48" CH50-800
		I			VELAN	UK	A		1) GLOBE V/V 1/4"-2" C14500 (2) BONNETLESS GLOBE V/V 1/2-2.5" CI 150-500)
		I			L&T VALVES	COIMBATORE	A		UP TO CLASS 4500 & GRADE 91
		I			L&T VALVES	KANCHIPURAM	A		Conventional Valves including main steam stop valve Material grade up to SA217 C12A & SA182 F92 and class upto 4500 CL

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38	**CONVENTIONAL VALVES (GATE, GLOBE & CHECK)**	**I**			TRILLIUM FLOW	HUBLI	A		UPTO NB 300 & CL-600, FORGED UPTO NB 50 CL 800
		I			FOURESS ENGG. INDIA LTD.,	THANE	A		(1) 10"X600 # GATE/GLOBE/CHECK VALVES (2) 16"X300# GATE/GLOBE/CHECK VALVES (3) 24"X150# GATE/GLOBE/CHECK VALVE (4) 2"X800 # FS GATE/GLOBE/CHECK (LIST) AS PER BS5352 (B) GATE GLOBE/CHECK VALVES FOR 700# TO 1500#
		I			NITTON VALVES INDIA PVT. LTD.,	AURANGABAD	A		(1) GATE VALVE: UPTO36" CLASS 600 WCB/WCC (2) GLUBE VALVE: UPTO 16" CLASS 300 WCB/WCC (3) CHECK VALVE : UPTO 12" CLASS 600 WCB/WCC & WC6
		I			SAMSHIN LTD.,	SOUTH KOREA	A		(1) GATE - 450 NB 3900 SPL CL SA 217 C12A (GR 91) (2) GLOBE (CAST) - 200 NB 3900 SPL, CL FOR SA 217C12 (G 91) (3) GLOBE (FORGED GR 92) - 50 NB 4500 CL GR SA182 F 92 (4) CHECK (CAST) - 200 NB 3500 SPL CL FOR SA 217C12A (GR91) (5) CHECK (FORGED GR 92) - 50 NB 4500 CL GR SA 182 F 92 (5) ANGLE (FORGED80 NB)
		I			TOA VALVE ENGGINERING INC.	JAPAN	A		CONVENTIONAL VALVES (1) GATE VALVES UPTO SIZE 16", CLASS 4500 UPTO C12A/F91 (2) GATE VALVES UPTO SIZE 26" CLASS 2500 UPTO C12A (3) CHECK VALVES UPTO SIZE 14" CLASS 2500 UPTO C12A (4) GLOBE VALVES UPTO SIZE 3" CLASS 4500 UPTO C12A (5) GLOBE VALVES UPTO SIZE 10" CLASS 1500 & 4" CLASS 2500 UPTO F91

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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		I			FOURESS ENGG. INDIA LTD.	THANE	A		(1) 10"X600 # GATE/GLOBE/CHECK VALVES (2) 16"X300# GATE/GLOBE/CHECK VALVES (3) 24"X150# GATE/GLOBE/CHECK VALVE (4) 2"X800 # FS GATE/GLOBE/CHECK (LIST) AS PER BS5352 (B) GATE GLOBE/CHECK VALVES FOR 700# TO 1500#
		I			BABCOCK VALVES	SPAIN	A		(1)CAST GATE VALVE (CS) VALVE CLASS UPTO 2500SPL & SIZE UPTO 10" (2)CAST GLOBE VALVE (CS) CLASS UPTO 2500SPL & SIZE UPTO 3 INCH (3) FORGED GLOBE VALVE (CS) CLASS UPTO 1500 & SIZE UPTO 1" (4) FORGED GLOBE VALVE (CS) CLASS UPTO TO 800 & SIZE UPTO 1.5"
		I			FORBES MARSHALL PVT LTD	PUNE	A		CONVENTIONAL VALVES :CAST GATE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 10 INCH CAST GLOBE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 3 INCH
		I			BABCOCK WILCOX ESPANOLA	SPAIN	A		CONVENTIONAL VALVES -CAST GATE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 10 INCH CAST GLOBE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 3 INCH
		I			HP VALVES OLDENZAAL B V	NETHERLAND	A		CONVENTIONAL VALVES -CAST GATE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 10 INCH CAST GLOBE VALVE (CS) CLASS UP TO 2500SPL & SIZE UP TO 3 INCH
		I			Aruna Industrial Products Pvt. Ltd.	MADURAI	A		REFER APPROVAL CONDITION

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध सं.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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39	SAFETY VALVES(SPRING TYPE)	I			DRESSER INDUSTRIES	USA	A		
		I			SAMPELL AG	GERMANY	A		
		I			TYCO (PENTAIR VALVES & CONTROLS	USA	A		
		I			FUKUI SEISAKUSHO CO LTD	JAPAN	A		
		I			RIENEKE GMBH	GERMANY			HYDRAULIC TYPE
		I			BOPP & REUTHER	GERMANY	A		HYDRAULIC TYPE
		I			MIEWA CORPORATION	JAPAN	A		(1) SAFETY VALVE SIZE 1/2" TO 6" & 150 TO 4500 CLASS
		I			BHEL	TRICHY	A		
		I			Anderson Greenwood Crosby Sanmar ltd. (earlier PENTAIR SANMAR LTD)	PUDUKOTTAI	A		AUX STEAM SYSTEM: UP TO 6" SIZE AND CLASS UP TO 600
		I			FAINGER LESER VALVES P LTD	AURANGABAD	A		SIZE(INELT/OULET): 200/300 MM APPLICABLE TO MAX DESIGN TEMPERATURE:474 DEG C & PRESSURE:47 KG
40	ELECTROMATIC RELIEF VALVE (ERV)	I			VALVES TECHNOLOGIES	USA	A		(A) 1.5"X3" CLASS 3100- F91 MATERIAL (B) 2.5"X4", CLASS 1500-F91 MATERIAL
		I			FUKUI SEISAKUSHO CO LTD	JAPAN	A		
		I			SAMPELL AG	GERMANY	A		
		I			DRESSER INDUSTRIES	USA	A		
		I			MIEWA CORPORATION	JAPAN	A		SIZE UPTO 65MM & UPTO 4500 CLASS
41	PLUG VALVE	I			FLOW SERVE INDIA CONTROLS	KANCHIPURAM	A		SIZE: 25 TO 300 MM, CLASS 150 & 300
		I			3Z CORP.	SOUTH KOREA	A		
		I			HAWA VALVES	MUMBAI	A		UP TO 10” SIZE AND 300 CLASS

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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		I			M/S. BHEL	TIRUCHIRAPALLI	A		MAIN & AUX COLUMNS, CEILING GIRDERS, BUILT-UP BEAMS
		I			CAPACITE	WADA, PALGHAR	A		(WELDED & BOLTED TYPE)BOILER PRIMARY STRUCTURES (CEILING GIRDER, MAIN COLUMNS, AUX. COLUMN, BOXES, BUCKSTAY, BRACING, MILL BAY STRUCTURE APH SUPPORT STRUCTURE ETC.)
		I			SALEM AUTOMECH (INDIA) PVT. LTD.,	SALEM	A		BOILER STRUCTURES, I.E. CEILING GIRDER
		I			DIAMOND ENGINEERING (CHENNAI) PVT LTD., CHENNAI	KANCHIPURAM	A		FABRICATION OF BOILER STRUCTURES -AWB UNIT-2 FABRICATION OF BOILER STRUCTURES-CEILINER GIRDER, AWB, COLMNS ETC. - BOILER STURCTURES-FABRICATION, TRIAL ASSEMBLY, BLASTING(AWB, COLUMNS, CEILING GIRDER ETC.)
		I			SALEM AUTOMECH UNIT-I & UNIT-II	SALEM	A		CEILING GIRDERS
		I			QUALITY ENGG.WORKS	TRICHY	A		CEILING GIRDERS
		I			INDOFAB	TRICHY			CEILING GIRDERS
		I			SANTHI ENGG. UNIT-II	PUDUKKUDI	A		CEILING GIRDERS
		I			MASTERFAB UNIT-II	DEVARAYANERI	A		CEILING GIRDERS
		I			ARCEOR MITTAL DHAMM PROCESSING PVT LTD	RANIPET	A		(WELDED & BOLTED TYPE)BOILER PRIMARY STRUCTURES (WITHOUT CEILING GIRDER) I.E.MAIN COLUMNS, AUX. COLUMN, BOXES, BUCKSTAY, BRACINGS, MILL BAY STRUCTURE, APH SUPPORT STRUCTURE ETC.)

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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		I			JSW SEVERFIELD STRUCTURES LTD	BELLARY	A		(WELDED & BOLTED TYPE) BOILER PRIMARY STRUCTURES (WITH OUT CEILING GIRDER) I.E, MAIN COLUMNS, AUX. COLUMN, BOXES, BUCKSTAY, BRACINGS, MILL BAY STRUCTURE, APH SUPPORT STRUCTURE ETC.)
		I			ATMASTCO (P) LTD	DURG	A		(WELDED & BOLTED TYPE) BOILER PRIMARY STRUCTURES (WITHOUT CEILING GIRDER) I.E.MAIN COLUMNS, AUX. COLUMN, BOXES, BUCKSTAY, BRACINGS, MILL BAY STRUCTURE, APH SUPPORT STRUCTURE ETC. DUCTS)
		I			ANG INDUSTRIES	SITARGANJ	A		FABRICATION AND SUPPLY WELDED TYPE BOILER STRUCTURES I.E. MAIN COLUMNS (PLUS AND BOX), AUTO WELDED BEAMS AND BRACINGS.
		I			INDIANA GRATINGS PVT LTD	PURANDAR	A		FACTORY FABRICATED CIVIL STRUCTURE POWER HOUSE (TG BUILDING) STRUCTURAL ITEM (MAX SINGLE PIECE SIZE UPTO 15MT) (WELDED & BOLTED TYPE)
		I			ESSAR HEAVY ENGINEERING SERVICES, (A UNIT OF ESSAR PROJECTS INDIA LTD)	SURAT	A		FABRICATION AND SUPPLY OF BUCKSTAYS
		I			SIMPLEX ENGINEERING & FOUNDRY WORKS PVT LTD	BHILAI	A		(WELDED & BOLTED TYPE) BOILER PRIMARY STRUCTURES (WITH OUT CEILING GIRDER) I.E, MAIN COLUMNS, AUX. COLUMN, BOXES, BUCKSTAY, BRACINGS, MILL BAY STRUCTURE, AP
		I			SIMPLEX ENGG & FOUNDRY WORKS	UNIT 2, BHILAI	A		CEILING GIRDERS

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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42	BOILER STRUCTURE & FABRICATION ITEMS(MAIN & AUX COLUMNS, CEILING GIRDERS, BUILT-UP BEAMS, BRACINGS & BUCKSTAY), COAL BUNKER	I			SEAM INDUSTRIES LIMITED	NAGPUR	A		WELDED STRUCTURE UPTO 15T.FABRICATION AND SUPPLY OF BUNKERS & BUNKER STRUCTURES, BUCKSTAYS AND DUCTS.
		I			SHIVAM HITECH STEELS PVT. LTD	BHILAI	A		HORIZONTAL BRACE/CIRCULAR HOLLOW SECTION ,BUCKSTAY,DUCTS
		I			ENESTEE ENGINEERING LTD.,	NAGPUR	A		FABRICATION & SUPPLY OF BUNKERS & BUNKER STRUCTURES ,BUCKSTAY,DUCTS
		I			SSV ENGINEERS PVT. LTD.,	PUNE	A		COAL SILOS, BUCKSTAY, DUCTS
		I			ALLIANCE INTEGRATED METALIKS LTD.,	RAJPURA	A		BOILER PRIMARY STRUCTURES (EXCLUDING CEILING GIRDER)
		I			TECHNOFAB MANUFACTURING LTD.	CHENNAI	A		FABRICATION AND SUPPLY OF BUNKER, BUNKER STRUCTURE, TP'S & CONVEYER GALLERIES,DUCTS
		I			BABY ENGINEERING PVT. LTD.,	THUVAKUDI	A		BOILER PRIMARY STRUCTURES (EXCLUDING CEILING GIRDER) (WELDED & BOLTED TYPE)
		I			COREFAB PROJECTS PVT LTD.,	BHILAI	A		FABRICATION & SUPPLY OF BOILER PRIMARY STRUCTURES - MAIN & AUX. COLUMNS, BUILT UP BEAM, BUCKSTAYS, BRACINGS, MILL BAY STRUCTURE AND APH SUPPORT STRUCTURE (EXCLUDING CEILING GIRDERS),DUCTS (WELDED & BOLTED TYPE)
		I			MIURA INFRASTRUCTURE PVT. LTD	BHILAI-	A		BOILER PRIMARY STRUCTURE - MAIN & AUX. COLUMNS, BUILT UP BEAMS, BOXES, BUCKSTAY, BRACINGS, MILL BAY STRUCTURE, APH SUPPORT STRUCTURE (EXCLUDING CEILING GIRDERS) UPTO MAXIMUM SINGLE PIECE WEIGHT OF 30 MT (WELDED & BOLTED TYPE)

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
S. N. क्र.सं.	Item / मद	QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No. / क्यूपी. सं.	QP Sub. Schedule क्यूपी उप.अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी
		I			METALFAB HIGHTECH PVT LTD.	NAGPUR	A		FABRICATION AND SUPPLY OF BUCKSTAYS ,DUCTS,(WELDED & BOLTED TYPE), COAL BUNKER
		I			WHEELS INDIA LTD.	WARDHA	A		MANUFACTURING OF WELDED TYPE STRUCTURES I.E. AUTOWELDED BEAMS BRACING AND COLUMNS (UPTO 15T) ,BUCKSTAY,DUCTS(WELDED & BOLTED TYPE)
		I			NOVOTECH PROJECTS (I) PVT LTD	KOLKATA	A		BUNKER STRUCTURE, TPS & TRESTLES
		I			JINDAL STEEL & POWER LTD. (JSPL)	RAIGARH	A		PRIMARY STRUCTURE & CEILING GIRDER (WELDED & BOLTED TYPE)
		I			AJANTHA FABRICATOR WORKSUNIT-II	PUDUKKOTTAI	A		BOILER PRIMARY STRUCTURES-COLUMNS, BEAMS, BRACINGS AND CEILING GIRDERS (WELDED & BOLTED TYPE)
		I			FEEDERS LIOYDS	SIKANDRABAD	A		PRIMARY STRUCTURE - MAIN COLUMNS, AUX COLUMNS, BUILT UP BEAMS, BOXES, BUCKSTAY (WELDED & BOLTED TYPE)
		I			L&T HEAVY FORGING & SPECIAL STEEL	HAZIRA	A		CEILING GIRDER
		I			VASAN INDUSTRIES	PUDUKKOTTAI	A		BOILER PRIMARY STRUCTURES(WELDED AND BOLTED TYPE)
		I			REGIONAL ENGINEERING WORKS	THUVVAKKUDY	A		BOILER PRIMARY STRUCTURE(WELDED AND BOLTED TYPE)
		I			VRINDA ENGINEERS	PANAGARH, WB	A		COAL BUNKERS
		I			GREAT INDIA FABRICATORS	YAMUNANAGAR	A		BOILER PRIMARY STRUCTURES EXCLUDING CEILING GIRDER(WELDED AND BOLTED TYPE), LIMITATIONS AS PER APPROVAL CONDITIONS
		I			Goodluck Steel Tubes	Sikenderabad	A		Buckstay
		I			GEW	Sikenderabad	A		Buckstay

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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		I			JSPL	Angul	A		Boiler Primary Structure (Excluding Ceiling Girder)
		I			L&T Limited ECC Workshop	Kanchheepuram	A		Boiler Primary Structure (Excluding Ceiling Girder)
		I			JSPL	Raipur	A		Primary Structure -Ceiling Girder -Sub to approval condition
		I			Steel Infra Solutions Private Limited(SISCOL)	Bhilai	A		Boiler Primary Structure (Excluding Ceiling Girder) and column directly supporting ceiling girders-Sub to approval condition
43	ELECTRO FORGED GRATINGS	II			INDIANA GRATINGS PVT. LTD	PUNE	A		
		II			KARDEANAND UDYOG	PUNE	A		
		II			PREMIER POWER PRODUCTS LTD	HOWRAH	A		
		II			BHOLA RAM STEEL PVT. LTD	PATNA	A		
		II			PINAX STEEL INDUSTRIES PVT LTD	PATNA	A		
		II			GREATWELD STEEL GRATING PVT. LTD	PUNE	A		
		II			VIN FAB ENGG. PVT LTD.,	MUMBAI	A		
		II			Ratan Project & Engineering	Howrah	A		
44	TANKS & VESSELS(IBD, CBD, FLASH TANK ETC)	I			KPHE	SOUTH KOREA	A		
		I			SV TANKS & VESSELS	MUMBAI	A		
		I			PROGEN SYS TECH LTD	CHENNAI	A		UP TO 4 KSC PR
		I			FAB TECH	PUNE	A		
		I			UNITECH MACHINES LTD	SAHARANPUR	A		UP TO 10 KSC PR
		I			SEAM IND P LTD	NAGPUR	A		UP TO 10 KSC PR
		I			SHAKTI HI TECH CONST PVT LTD	CHENNAI	A		UP TO 10 KSC PR
		I			SOUTHERN HEAVY ENGG & FAB PVT LTD	CHENNAI	A		UP TO 10 KSC PR
		I			ALTECH INFRASTRUCTURE(I) PVT LTD	ALWAR	A		UP TO 16 KSC PR
		I			SEAM INDUSTRIES PVT LTD	NAGPUR	A		UP TO 16 KSC PR

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45	SOOT BLOWER PRESSURE REDUCING VALVES & BLOCK	I			REFER QA C&I LIST				
46	FITTINGS(GRADE 91/92)	I			PETROL RACCORD SPA	ITALY	A		FORMED AND FORGED FITTINGS 91/92 GRADE
		I			BOKOYOUNG METAL CO.	SOUTH KOREA	A		FORGED FITTINGS AS PER SA-182 F92 GRADE (REDUCERS, NOZZLE, HALF COUPLING ETC.)
		I			TF TECH CO. LTD	SOUTH KOREA	A		FORGED FITTINGS AS PER SA-182 F92 GRADE (REDUCERS, NOZZLE, HALF COUPLING ETC.)
		I			FLASH FORGE	VIZAG	A		P91 FORMED/FORGED UPTO DIA 273MM & THICK 30MM
		I			BGH EDELSTAHL SIEGEN GMBH	GERMANY	A		MANUFACTURE AND SUPPLY OF FORGED FITTINGS OF CS, AS AND SS GRADES
		I			ERNE FITTINGS GMBH	AUSTRIA	A		P-91 FORMED
		I			GAM RACCORDI SPA	ITALY	A		P-91 FORMED
		I			TECHNO FORGE SPA	ITALY	A		P-91 FORMED
		I			MEGA SPA	ITALY	A		92 GRADE FITTINGS (FORGED)
		I			BASSI LLUIGI SPA	ITALY	A		P-91 FORGED/WELDED
		I			IBF SPA	ITALY	A		FORMED AND FORGED FITTINGS/P92 GRADE
		I			ALLIED INT. (TACTUBI RACCORDI SPA, VIA ROMA 150, 29027 PODENZANO)	ITALY	A		P-91 FORMED
		I			BRUCK STRASSE 16 ENSHEIM	GERMANY	A		P-91 FORGED/WELDED
		I			SUNGKWANG BEND CO. LTD.,	SOUTH KOREA	A		FITTINGS OF P91 AND OF MTERIAL OTHER THAN P91 OF BOILER
		I			TK CORPN. FORGITAL	S KOREA	A		FORMED FITTINGS (ELBOW, TEES, REDUCERS ETC.) OF 92 GRADE.
		I			FORGITAL	ITALY	A		MANUFACTURING AND SUPPLY OF GRADE 91 FORTGINGS (HOLLOW FORGINGS/MATCHING PIECES WITH 508MM DIA X 75MM THICKNESS STUBS WITH OD 245MM.

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		I			DEE DEVELOPMENT	PALWAL	A		GRADE 91 WITH SIZE/TYPE LIMITATIONS
		I			CHW FORGE	GHAZIABAD	A		GRADE 92 WITH SIZE/TYPE LIMITATIONS
		I			FORGIATURA MORANDINI SRL	ITALY	A		GRADE 92 FORGED FITTINGS(REDUCERS, TEES & Y-PIECES)
		I			BHARAT FORGE, PUNE	PUNE	A		GRADE 92 FORGED FITTINGS(REDUCERS, TEES & Y-PIECES)
		I			BOKYOUNG METAL CO.LTD	SOUTH KOREA	A		GRADE 92 FORGED FITTINGS(REDUCERS, NOZZLE, HALF COUPLING)
		I			VIAR SPA	ITALY	A		SEAMLESS FORGED Y-PIECE UP TO GRADE 91
		I			DEE DEVELOPMENT	PALWAL	A		GRADE 92 WITH SIZE/TYPE LIMITATIONS
		I			Goodluck Engineering Co.	Dadri	A		Forged Fittings (91/92 grade)
47	**AUX PRDS SYSTEM (INCLUDING CONTROL VALVE)**	I			REFER C&I LIST				
48	**CHEMICAL DOSING SYSTEM (SKID ASSY) FOR SG SCOPE INCLUDING AUX BOILER**	I			POWER PIPING	TRICHY	A		
		I			V K PUMPS	MUMBAI	A		
		I			MILTON ROY	CHENNAI	A		
		I			TECHNO CONSULTANTS	MUMBAI	A		
		I			POSITIVE METERING SYSTEM	NASIK	A		
		I			PSI ENGG SYSTEM	CHENNAI	A		
		I			Prorites Equipments Pvt. Ltd.	Pune	A		LP Chemical Dosing System (NaOH/Ammonia/Hydrazine)

		Project/ परियोजना : SIPAT 1X800MW				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.:
		Package/ पैकेज: EPC Package							REVISION NO : 04
		Supplier/ आपूर्तिकर्ता:							DATE/ तिथि : 26.03.2024
		Contract No./ अनुबंध स.:							SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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49	SG CW BOOSTER PUMP/ ECW PUMP	I			KBL	WADI	A		
		I			WPIL LTD	GHAZIABAD	A		
		I			SAM TURBO	COIMBATORE	A		
		I			KSB	PUNE	A		
		I			BEST & CROMPTON ENGG LTD	CHENNAI	A		
		I			JYOTI LTD	BARODA	A		
		I			FLOWMORE	GHAZIABAD	A		
50	COAL BUNKER	I			REFER BOILER STRUCTURE LIST		A		REFER BOILER STRUCTURE LIST
51	LUBE OIL SYSTEM FOR MILLS	I			LINCOLN HELIOS	BANGALORE	A		
		I			T A HYDRAULICS	HYDERABAD	A		
		I			CENLUB INDUSTRIES	FARIDABAD	A		
		I			BHEL	HYDERABAD	A		
		I			BIJUR DELIMON INDIA PVT LTD	PUNE	A		
		I			UNIQUE ENGINEERING ENTERPRISE P LTD	HYDERABAD	A		
		I			SOUTHERN LUB	BANGALORE	A		
52	CERAMIC LINED BEND COAL PIPES	I			BHEL EDN	BANGALORE	A		
		I			BMW	HATHRAS/ROURKEE	A		
		I			CARBORANDUM UNIVERSAL	HOSUR	A		
		I			BHEL IP	JAGDISHPUR	A		

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53	KNIFE EDGE GATE VALVES AT MILL OUTLET AND BURNER INLET	I			GALAXY CONTROLS PVT LTD	CHENNAI	A		UP TO SIZE 26'
		I			ORBINOX INDIA PVT LTD	COIMBATORE	A		UP TO SIZE 30"
		I			BRAY CONTROLS	CHENNAI	A		UP TO SIZE 28"
		I			JASH ENGG LTD	INDORE	A		UP TO SIZE 30"
54	VIS FOR FANS	I			GERB	BANGALORE	A		
55	LOS FOR FD, PA & ID FANS	I			PSI ENGG	CHENNAI	A		
		I			CENLUB	FARIDABAD	A		
		I			LINCOLN HELIOS	BANGALORE	A		
		I			BHEL	RANIPET	A		
		I			SOUTHERN LUBRICATION	BANGALORE	A		
		I			TA HYDRAULICS	HYDERABAD	A		
56	GATES AND DAMPERS	I			BACHMANN	FARIDABAD	A		
		I			FOURESS INDIA	BANGALORE	A		
		I			INDIRA DAMPERS	RANIPET	A		
		I			KAMAL ENGG	YAMUNANAGAR	A		
		I			BACHMANN	CHENNAI	A		GUILLOTINE GATE(2700 MM HEIGHT)
		I			DAMPER TECHNOLOGY INDIA PVT LTD	COIMBATORE	A		
		I			Flexatherm Expanllow Pvt.Ltd	Block No-400/B, Karjan, Vadodara	A		Gates & Dampers(Flow Area/Cross-sectional area upto 5600mm X 5600mm)
57	PA Fans	I			Bharat Heavy Electrical Limited	Ranipet	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			L&T- Howden Private limited	Hazia	A		
		I			TLT-Turbo GmBH	Germany	A		
		I			Howden	Denmark	A		
58	ID Fans	I			Bharat Heavy Electrical Limited	Ranipet	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			TLT Turbo GmBH	Germany	A		
		I			L&T Howden Private Limited	Hazira	A		
		I			Howden	Denmark	A		

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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59	FD Fan	I			Bharat Heavy Electrical Limited	Ranipet	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			L&T Howden Private Limited	Hazira	A		
		I			TLT-Turbo GmBH	Germany	A		
		I			Howden	Denmark	A		
60	Coal Pulverisers	I			BHEL	Hyderabad	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			L&T MHPS Boilers Pvt. Ltd.(LMB) (Incl. Manufacturing Facility of L&T)	Hazira	A		
		I			Loesche Energy system India pvt ltd.	Chennai	A		
		I			Doosan Heavy Industries & Construction Co. Ltd	South Korea	A		
61	Raw Coal Feeders	I			Bharat Heavy Electricals Limited	Trichy	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			Schenck Process (Stock Redler India Private Limited, India)	Bengaluru	A		
		I			Merrick Industries Pvt. Ltd., India	Bengaluru	A		
		I			Yamato Scale	Japan	A		
		I			FLSmidth	Haryana	A		
62	Boiler Start Up Drain Re-Circulation Pump	I			Torishima Pump Mfg Co. Ltd.,	Japan	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			Hayward Tyler Limited	UK	A		
		I			KSB AG	Germany	A		
63	Air Pre-Heaters	I			Bharat Heavy Electricals Limited	Ranipet	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			L&T Howden Private Limited	Hazira	A		
		I			Arvos India Pvt.LTd.	Chennai	A		

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
S. N. क्र.सं.	Item / मद	QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No. / क्यूपी. सं.	QP Sub. Schedule क्यूपी उप.अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी
64	Auxiliary Boiler	I			ISGEC John Thampson (IJT)	Yamuna Nagar	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			Thermax Babcock & Wilcox Ltd.	Pune	A		
		I			Bharat Heavy Electricals Limited & BHEL (HVPB)	Trichy, Vizag	A		
65	ESP	I			Bharat Heavy Electricals Limited	Ranipet	A		Sub-QR item: Project specific approval required from NTPC Engineering
		I			Larsen & Toubro Limited	India	A		
		I			GE Power India	India	A		
	Main Contractor approved sources for Boiler & ESP package								
1	ALUMUNIUM CLADDING	III			Main Contractor approved sources				
2	NON IBR PIPING / LP PIPING - PRESSURE UP TO 10 KSC	III			Main Contractor approved sources				
3	CASTABLE REFRACTORY	III			Main Contractor approved sources				
4	POURABLE INSULATION	III			Main Contractor approved sources				
5	STEEL STRUCTURE FOR DUCTS, FURNACE ENCLOSURE, GUIDE, STAIRS & LADDERS, HANDRAILS, PLATFORMS	III			Main Contractor approved sources				
6	SILENCERS	III			Main Contractor approved sources				
7	COAL PIPES & BENDS (WITHOUT CERAMIC LINERS)	III			Main Contractor approved sources				

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:			LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची				DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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8	FITTINGS(CS, SS & AS UP TO GRADE 22)	III			Main Contractor approved sources				
9	ELECTRIC HOIST WITH TROLLEY, UNDERSLUNG CRANE < 05 TON CAPACITY	III			Main Contractor approved sources				
10	DUCTS	III			Main Contractor approved sources				
11	AIR RECEIVER TANK	III			Main Contractor approved sources				
12	COUPLING FOR FANS	III			Main Contractor approved sources				
13	SCAPH	III			Main Contractor approved sources				
14	HP/LP/OXYGEN DOSING SYSTEM	III			Main Contractor approved sources				
15	CE & DE SUSPENSION ASSEMBLY WITH RAPPING(MECHANICAL) MECHANISM	III			Main Contractor approved sources				
16	PERFORATED GD PLATE/SCREEN	III			Main Contractor approved sources				
17	ESP SUPPORT STRUCTURE (COLUMNS & ROOF BEAMS MANUFACTURED FROM ROLLED SECTIONS), CASING	III			Main Contractor approved sources				
18	ESP- MECH SAFETY INTERLOCK	III			Main Contractor approved sources				

S. N. क्र.सं.	Item / मद	QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No. / क्यूपी. सं.	QP Sub. Schedule क्यूपी उप.अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी
19	**STEEL STRUCTURE FOR DUCTS, FURNACE ENCLOSURE, GUIDE, STAIRS & LADDERS, HANDRAILS, PLATFORMS**	**III**			Main Contractor approved sources				
20	**HANGER & SUPPORTS(OTHER THAN CLH & VLH) RIGID HANGERS**	**III**			Main Contractor approved sources				
21	**SNUBBERS**	**III**			Main Contractor approved sources				
22	**Oil Preheater**	**III**			Main Contractor approved sources				
	FGD Package								
1	**Booster Fan**	**I**			**REFER SUB QR ITEM LIST Refer Note 1**				
2	**Slurry Recirculation Pump**	**I**			**REFER SUB QR ITEM LIST Refer Note 1**				
3	**Oxidation Air Blower**	**I**			**REFER SUB QR ITEM LIST Refer Note 1**				
4	**Wet Limestone Grinding Mills**	**I**			**REFER SUB QR ITEM LIST Refer Note 1**				
5	**Slurry Pumps**	**I**			**REFER SUB QR ITEM LIST Refer Note 1**				
6	**Agitators (Vertical and Horizontal)**	**I**			**REFER SUB QR ITEM LIST Refer Note 1**				
7	**Vacuum Belt Filter**	**I**			**REFER SUB QR ITEM LIST Refer Note 1**				
8	**Dampers & Gates**	**I**			REFER TO BOILER PACAKAGE LIST				
9	**Knife Edge Gate Valve**	**I**			REFER TO BOILER/MILL PACAKAGE LIST				

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10	Electric Hoist > 10MT	I			REFER TO BOILER PACAKAGE LIST				
11	Hangers & Supports	II			REFER TO BOILER PACAKAGE LIST				
12	C276 and Titanium Claded plates/sheets	II			NTPC APPROVED SOURCES				
13	Titanium & C276 Plates/Sheets (Raw material)	II			Main Contractor approved sources				
14	Hydrocyclones	II			NTPC APPROVED SOURCES				
15	Insulation / Cladding, Mineral Wool / Piping Insulation	II			REFER TO BOILER PACAKAGE LIST				
16	Carbon steel Plates	$			REFER TO SUB-VENDORS MENTIONED IN THE TECHNICAL SPECIFICATIONS SEC-VI, PART-B				
17	FGD Structure (Column / Beams) (Other than BOP area)	II			Main Contractor approved sources				
18	Spray Nozzle (Absorber)	II			Main Contractor approved sources				
19	Borosilicate Lining (Raw Material)	II			Main Contractor approved sources				
20	Epoxy Primer and Adhesive for Borosilicate Lining	II			Main Contractor approved sources				
21	M.S. Rubber Lined Piping	II			Main Contractor approved sources				
22	Mist. Eliminator (PP/PVC) Including Supports	II			Main Contractor approved sources				
23	Spray Header / Poly propylene Plate / FRP Piping & Fittings	II			Main Contractor approved sources				
24	Absorber Tank including Nozzle and Turrets	II			Main Contractor approved sources				

		Project/ परियोजना : SIPAT 1X800MW Package/ पैकेज: EPC Package Supplier/ आपूर्तिकर्ता: Contract No./ अनुबंध स.:				LIST OF ITEMS REQUIRING QUALITY PLAN AND SUB-SUPPLIER APPROVAL क्वालिटी प्लान तथा सब –वेंडर के अनुमोदन सहित मदों की सूची			DOC. NO./ दस्तावेज सं.: REVISION NO : 04 DATE/ तिथि : 26.03.2024 SUB-SYSTEM उप-प्रणाली: QA-SG(MECH)
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25	Seal Air Fan for Damper	III			Main Contractor approved sources				
26	Absorber Accessories and Shop Fabricated Items, if any	III			Main Contractor approved sources				
27	Tanks other then Absorber Tank	III			Main Contractor approved sources				
28	Ducts, Support Structure, Platform, Stairs, Fasteners, Wet Dry Interface etc.	III			Main Contractor approved sources				
29	Casing / Hopper / Chute / Silo (Other than BOP)	III			Main Contractor approved sources				
30	PEB / Pre-Fabricated-Structure for Shed / Super Structure (Trestle / Gallery) / Structure for Transfer Tower / Crusher House / Silo / Belt etc. / Technological Structure / Secondary Support Structure / Platform Structure etc)	III			Main Contractor approved sources				
31	Manual Hoist	III			Main Contractor approved sources				
32	Application of Rubber Lining of Tanks/ Pipes	III			Main Contractor approved sources				
33	Pipes (IS: 1239 / IS: 3589) & MS Fitting (Other than BOP)	III			Main Contractor approved sources				
34	Strainer	III			Main Contractor approved sources				
35	Spray Nozzle (Atomizing / Emergency Quenching)	III			Main Contractor approved sources				
36	Metallic/Non-Metallic Expansion Joints	III			Main Contractor approved sources				
37	Expansion Joints for Piping	III			Main Contractor approved sources				
38	Rubber / Glass Flake Lining Material	III			Main Contractor approved sources				
39	Electric Hoist Upto 10T	III			Main Contractor approved sources				
40	Lagging / Al Cladding (Other than BOP)	III			Main Contractor approved sources				
41	HDPE Piping & Fitting	III			Main Contractor approved sources				

S. N. क्र.सं.	Item / मद	QP/ Insp. Cat. क्यूपी/ निरी. श्रेणी.	QP No. / क्यूपी. सं.	QP Sub. Schedule क्यूपी उप.अनुसूचि	Proposed sub-supplier/ प्रस्तावित उप आपूर्तिकर्ता	Place/ स्थान	Sub-suppliers approval status / category उप आपूर्तिकर्ता के अनुमोदन की स्थिति /श्रेणी	Sub-supplier Details submission schedule/ उप आपूर्तिकर्ता के विवरण प्रस्तुतीकरण की सूची	Remarks/ टिप्पणी
42	**Handrail / Monorail**	**III**			Main Contractor approved sources				
	SITE ERECTION AGENCY								
1	**Erection Agency for SG, PCP and ESP**				NTPC APPROVED AGENCY				

NOTE -1 : For final Sub-QR approval , document required to be submitted as per Sub-QR requirements given in the specification (to be taken up with NTPC Engineering).

NOTE-2: Vendors under 'A' are approved and accepted by NTPC with/without conditions in the past. Similar conditions as the case may be for the vendor shall be applicable for this project and tied up in the quality plan.

NOTE-3: Predespatch inspection for Alloy/SS Grades needs to be tied up by Main contractor or Third-party inspection agency as required.

NOTE-4 : ($) Review of Mill TC for Raw Material to be done by NTPC and shall be included in the QP of corresponding equipment.

NOTE-5: Raw Material for 91 and above Grade Material Fittings to be from NTPC approved sources as per Raw Material vendor List.

NOTE-6:For Motorized/Pneumatic actuated valves the suppliers for actuators shall be from NTPC approved list, Refer NTPC C&I list.

LEGENDS/ संकेतिका

SYSTEM SUPPLIER/SUB-SUPPLIER APPROVAL STATUS CATEGORY /प्रणाली आपूर्तिकर्ता / सब –वेंडर की स्वीकृति की स्थिति की श्रेणी (SHALL BE FILLED BY NTPC एनटीपीसी द्वारा भरा जाएगा)

A – For these items proposed vendor is acceptable to NTPC. To be indicated with letter "A" in the list along with the condition of approval, if any./ इन मदों के लिए प्रस्तावित वेंडर एनटीपीसी को स्वीकार्य है। अनुमोदन की शर्तें, , यदि कोई हो, के साथ-साथ पत्र "क"

DR – For these items "Detailed required" for NTPC review. To be identified with letter "DR" in the list. एनटीपीसी द्वारा इन मदों की समीक्षा के लिए "विस्तृत ब्यौरे की आवश्यकता" होगी। सूची में "DR" पत्र में इंगित किया जाना चाहिए।

QP/INSPN CATEGORY: क्यूपी / निरीक्षण की श्रेणी:

CAT-I / श्रेणी- I: For these items the Quality Plans are approved by NTPC and the final acceptance will be on physical inspection witness by NTPC. इन मदों के लिए गुणवत्ता योजनाओं को एनटीपीसी द्वारा अनुमोदित किया जाता है और एनटीपीसी द्वारा अंतिम स्वीकृति भौतिक निरीक्षण के दौरान उपलब्ध गवाह के आधार पर दी जाएगी।

CAT-II / श्रेणी- II: For these items the Quality Plans approved by NTPC. However no physical inspection shall be done by NTPC. The final acceptance by NTPC shall be on the basis review of documents as per approved QP. इन मदों के लिए गुणवत्ता योजनाओं

CAT-III/ श्रेणी-III : For these items Quality control to be exercised as per Main contractor Quality Assurance System. The final acceptance by NTPC shall be on the basis of Certificate of Conformance (COC) by Main Contractor.

UNITS/WORKS इकाईयां / कार्य: Place of manufacturing/ निर्माण का स्थान Place of Main Supplier of multi units/works/बहु- इकाइयों / कार्यों के मुख्य सप्लाइर का स्थान.

Amendment 11 to Technical Specifications (Section VI)

SN	Amendment Details	Page No
1	TG-22 to TG-26	1-2
2	G-04	3-8

Amendment 11 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
TG-22	A	IV – FUNCTIONAL GUARANTEES	4 of 73	1.01.01 ii) Unit Heat Rate at 55% TMCR load	Guaranteed Unit Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 Kg/cm2 (abs) and rated Main Steam and Reheat Steam temperature at 77 mmHg(abs) condenser pressure with zero make up at 440 MW load (i.e. 55 % of rated load).	Guaranteed Unit Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and rated Main Steam and Reheat Steam temperature at **60 mmHg(abs)** condenser pressure with zero make up at 440 MW load (i.e. 55 % of rated load).
TG-23	A	IV – FUNCTIONAL GUARANTEES	8 of 73	1.01.03	UNIT HEAT RATE Following tests…… ……independently: (i)…… (ii)…….. (iii) Turbine Cycle Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C **(as selected)** at 77 mmHg(abs) Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load) with one TDBFP in operation. (iv) Efficiency of the Steam Generator at 440 MW unit load (i.e. 55 % of rated load) ……(i.e. 100% of rated load): = THR (100%)/ SG_EFF (100%) Unit Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg. C / **600 to** 610 deg. C **(as selected)** at 77 mmHg(abs) Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load): = THR (55%)/ SG_EFF (55%) Where, THR(100%)…… …… SG_EFF(100%)…… …… THR (55%): Turbine Cycle Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 Kg/cm^2	UNIT HEAT RATE Following tests…… ……independently: (i)…… (ii)…….. (iii) Turbine Cycle Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C (as selected) at **60 mmHg(abs)** Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load) with one TDBFP in operation. (iv) Efficiency of the Steam Generator at 440 MW unit load (i.e. 55 % of rated load) ……(i.e. 100% of rated load): = THR (100%)/ SG_EFF (100%) Unit Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and turbine throttle main steam temperature / reheat steam temp. at turbine inlet of 600 deg. C / 600 to 610 deg. C (as selected) at **60 mmHg(abs)** Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load): = THR (55%)/ SG_EFF (55%) Where, THR(100%)…… …… SG_EFF(100%)…… …… THR (55%): Turbine Cycle Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 Kg/cm^2

Amendment 11 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					(abs) and turbine throttle main steam temperature / re-heat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C **(as selected)** at 77 mmHg(abs) Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load). (To be calculated as per clause 1.01.03.01 of this sub-section) SG_EFF(55%)……	(abs) and turbine throttle main steam temperature / re-heat steam temp. at turbine inlet of 600 deg C / 600 to 610 deg C (as selected) at **60 mmHg(abs)** Condenser pressure with zero make up at 440 MW unit load (i.e. 55 % of rated load). (To be calculated as per clause 1.01.03.01 of this sub-section) SG_EFF(55%)……
TG-24	A	V- Essential Data	1 of 15	1.00.00 A) Tur-bine Generator 4.	55% of rated load under turbine throttle main steam pressure of 150 Kg/cm2 (abs) and rated main steam temperature / reheat steam temp. at turbine inlet of 600 deg. C / 600 to 610 deg. C (as selected) at condenser pressure of 77 mm Hg (abs) with zero make-up with one TDBFP in operation. **(Heat Rate Guarantee)**	55% of rated load under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and rated main steam temperature / reheat steam temp. at turbine inlet of 600 deg. C / 600 to 610 deg. C (as selected) at con-denser pressure of **60 mmHg(abs)** with zero make-up with one TDBFP in operation. (Heat Rate Guaran-tee)
TG-25	B	A-07	6 of 25	1.18.01 c)	55% of rated load under turbine throttle main steam pressure of 150 Kg/cm2 (abs) and rated main steam temperature / rated reheat steam temp. at turbine inlet at condenser pressure of 77 mm Hg (abs) with zero make-up with one TDBFP in operation. **(Heat Rate Guarantee)**	55% of rated load under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and rated main steam temperature / rated reheat steam temp. at turbine inlet at condenser pressure of **60 mmHg(abs)** with zero make-up with one TDBFP in operation. **(Heat Rate Guarantee)**
TG-26	B	A-07	6 of 25	1.18.01	----------	HBD Added 55% of rated load under turbine throttle main steam pressure of 150 Kg/cm^2 (abs) and rated main steam temperature / rated reheat steam temp. at turbine inlet at condenser pressure of 77 mm Hg (abs) with zero make-up with one TDBFP in operation.

Amendment 11 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">SN</th><th colspan="4">Specification Reference</th><th>Existing</th><th>Read as</th></tr>
<tr><th>Part</th><th>Sub Sec</th><th>Page No</th><th>Clause No</th><th></th><th></th></tr>
<tr><td>G-04</td><td>A</td><td>IV – FUNC-TIONAL GUARAN-TEES</td><td>5 of 73</td><td>1.02.01</td><td>
AMOUNT OF LIQUIDATED DAMAGES APPLICABLE FOR CATEGORY-I GUARANTEES
If the performance guarantee(s) … the Contract Price:
<table>
<tr><th>S. No</th><th>Guarantee</th><th>Rate of Liquidated Damages (LD)</th><th>Limiting Value</th></tr>
<tr><td>(i)</td><td>For Increase in the Guaranteed unit heat rate in kcal/kWHr at 800 MW under rated steam conditions at 77 mmHg(abs) condenser pressure with zero make up</td><td>US $ 6,17,945
(US Dollar Six Lakh Seventeen Thousand Nine Hundred Forty Five only) per 1 kcal/kWHr increase in unit heat rate</td><td>Not more than 2081 Kcal/KWHr</td></tr>
<tr><td>(ii)</td><td>For Increase in the Guaranteed unit Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 kg/cm^2 (abs) and rated Main Steam and Reheat Steam temperature at 77 mmHg(abs) condenser pressure with zero make up at 440 MW load (i.e. 55 % of rated load).</td><td>US $ 2,26,580
(US Dollar Two Lakh Twenty Six Thousand Five Hundred Eighty only) per 1 kcal/kWHr increase in unit heat rate</td><td>Not more than 2185 Kcal/KWHr</td></tr>
</table>
</td><td>
AMOUNT OF LIQUIDATED DAMAGES APPLICABLE FOR CATEGORY-I GUARANTEES
If the performance guarantee(s) … the Contract Price:
<table>
<tr><th>S. No</th><th>Guarantee</th><th>Rate of Liquidated Damages (LD)</th><th>Limiting Value</th></tr>
<tr><td>(i)</td><td>For Increase in the Guaranteed unit heat rate in kcal/kWHr at 800 MW load (i.e. 100% of rated load) under rated steam conditions at 77 mmHg(abs) condenser pressure with zero make up</td><td>US $ 6,33,921
(US Dollar Six Lakh Thirty Three Thousand Nine Hundred Twenty One only) per 1 kcal/kWhr increase in unit heat rate</td><td>Not more than 2069 kcal/kWhr</td></tr>
<tr><td>(ii)</td><td>For Increase in the Guaranteed unit Heat rate in kcal/kWHr under turbine throttle main steam pressure of 150 kg/cm^2 (abs) and rated Main Steam and Reheat Steam temperature at 60 mmHg(abs) condenser pressure with zero make up at 440 MW load (i.e. 55 % of rated load).</td><td>US $ 2,32,438
(US Dollar Two Lakh Thirty Two Thousand Four Hundred Thirty Eight only) per 1 kcal/kWHr increase in unit heat rate</td><td>Not more than 2193 kcal/kWHr</td></tr>
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Amendment 11 to Technical Specifications (Section VI)

SN	Specification Reference				Existing				Read as			
	Part	Sub Sec	Page No	Clause No								
					(iii)	For deficiency in Continuous TG output of 840 MW unit load (i.e. 105% of rated load) under rated steam conditions, 77 mmHg (abs) condenser pressure with 0% make-up.	**US $ 1,542** (US One Thousand Five Hundred Forty Two only) per 1 kW shortfall in TG output		**(iii)**	For deficiency in Continuous TG output of 840 MW unit load (i.e. 105% of rated load) under rated steam conditions, 77 mmHg (abs) condenser pressure with 0% make-up.	**US $ 1,803** (US Dollar One Thousand Eight Hundred Three only) per 1 kW shortfall in TG output	
					(iv)	For deficiency in Average Condenser Pressure in mm Hg(abs) measured at 300mm above top row of condenser tube at 840 MW, 0% makeup, design CW temperature and design CW flow	**US $ 6,89,627** (US Dollar Six Lakh Eighty Nine Thousand Six Hundred Twenty Seven only) per 1 mm Hg increase in condenser pressure	Not more than 65 mmHg (abs)	**(iv)**	For deficiency in Average Condenser Pressure in mm Hg(abs) measured at 300mm above top row of condenser tube at 840 MW, 0% makeup, design CW temperature and design CW flow	**US $ 7,03,526** (US Dollar Seven Lakh Three Thousand Five Hundred Twenty Six only) per 1 mm Hg increase in condenser pressure	Not more than 65 mmHg (abs)
					(v)	**Steam Generator Capacity** For shortfall in the guaranteed steam generating capacity in T/h at rated steam parameters at superheater outlet & rated steam temperature at reheater outlet (with	**US $ 2,00,843** (US Dollar Two Lakh Eight Hundred Forty Three only) for every 1 T/hr short fall in steam output	Not less than 102% of the turbine VWO steam flow requirement	**(v)**	**Steam Generator Capacity** For shortfall in the guaranteed steam generating capacity in T/h at rated steam parameters at superheater outlet & rated steam temperature at reheater outlet (with any com-	**US $ 2,34,849** (US Dollar Two Lakh Thirty Four Thousand Eight Hundred Forty Nine only) for every 1 T/hr short fall in steam output	Not less than 102% of the turbine VWO steam flow requirement

Amendment 11 to Technical Specifications (Section VI)

SN	Specification Reference				Existing				Read as			
	Part	Sub Sec	Page No	Clause No								
						any combination of mills working as per Employer's choice) with the coal being fired from within the range specified				bination of mills working as per Employer's choice) with the coal being fired from within the range specified		
					(vi)	**Coal Pulveriser Wear Parts Warranty** Life of Coal Pulveriser wear parts in hours of operation	To be calculated as per clause 1.01.04 of the Functional Guarantees subsection	Not less than 8000 hours		**Coal Pulveriser Wear Parts Warranty** Life of Coal Pulveriser wear parts in hours of operation	To be calculated as per clause 1.01.04 of the Functional Guarantees subsection	Not less than 8000 hours
					(vii)	**ESP Efficiency** For shortfall in guaranteed ESP efficiency in percentage points under conditions specified at clause 1.01.01 (vii) of this sub section	**US $ 14,69,245** (US Dollar Fourteen Lakh Sixty Nine Thousand Two Hundred Forty Five only) for every 0.01% point shortfall in ESP Efficiency	Not less than as worked out to limit ODB to 17 mg/Nm^3 (max.) at ESP outlet before FGD inlet		**ESP Efficiency** For shortfall in guaranteed ESP efficiency in percentage points under conditions specified at clause 1.01.01 (vii) of this sub section	**US $ 14,51,861** (US Dollar Fourteen Lakh Fifty One Thousand Eight Hundred Sixty One only) for every 0.01% point shortfall in ESP Efficiency	Not less than as worked out to limit ODB to 17 mg/Nm^3 (max.) at ESP outlet before FGD inlet
					(viii)	**FGD SO_2 Removal Efficiency** For shortfall in guaranteed SO2 removal efficiency in percentage points under condition stipulated in	**US $ 35,906** (US Dollar Thirty Five Thousand Nine Hundred Six only) for every 0.1% point	SO_2 removal efficiency to achieve SO_2 emission in the Chimney to less than 60 mg per		**FGD SO_2 Removal Efficiency** For shortfall in guaranteed SO2 removal efficiency in percentage points under condition stipulated in clause 1.01.01 (viii) of this	**US $ 35,619** (US Dollar Thirty Five Thousand Six Hundred Nineteen only) for every 0.1% point shortfall in SO_2 removal efficiency	SO_2 removal efficiency to achieve SO_2 emission in the Chimney to less than 60 mg per Nm^3 as per Part-B, Sub-section-A-01

Amendment 11 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">SN</th><th colspan="4">Specification Reference</th><th colspan="4">Existing</th><th colspan="4">Read as</th></tr>
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<tr><td></td><td></td><td></td><td></td><td></td><td></td><td>clause 1.01.01 (viii) of this Sub Section of Technical Specification</td><td>shortfall in SO_2 removal efficiency</td><td>Nm^3 as per Part-B, Sub-section-A-01</td><td></td><td>Sub Section of Technical Specification</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>(ix)</td><td>Limestone Consumption Rate
For increase in guaranteed limestone consumption of FGD system in kg/hr/unit under condition stipulated in clause 1.01.01 (ix) of this Sub Section of Technical Specification</td><td>US $ 3,40,980
(US Dollar Three Lakh Forty Thousand Nine Hundred Eighty only) for every 100 kg/hr increase in limestone consumption rate</td><td>Not more than 8000 kg/hr.</td><td>(ix)</td><td>Limestone Consumption Rate
For increase in guaranteed limestone consumption of FGD system in kg/hr/unit under condition stipulated in clause 1.01.01 (ix) of this Sub Section of Technical Specification</td><td>US $ 3,49,796
(US Dollar Three Lakh Forty Nine Thousand Seven Hundred Ninety Six only) for every 100 kg/hr increase in limestone consumption rate</td><td>Not more than 8000 kg/hr.</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>(x)</td><td>For increase in the Unit Auxiliary power consumption in kW for unit auxiliaries required for continuous unit operation at 100% TMCR i.e. 800 MW unit load.</td><td>US $ 4,661
(US Dollar Four Thousand Six Hundred Sixty One only) per 1 kW increase in Unit Auxiliary Power Consumption.</td><td>Not more than 42000 KW</td><td>(x)</td><td>For increase in the Unit Auxiliary power consumption in kW for unit auxiliaries required for continuous unit operation at 100% TMCR i.e. 800 MW unit load.</td><td>US $ 5,025
(US Dollar Five Thousand Twenty Five only) per 1 kW increase in Unit Auxiliary Power Consumption.</td><td>Not more than 42000 KW</td></tr>
<tr><td></td><td></td><td></td><td></td><td></td><td>(xi)</td><td>For increase in Station auxiliary power consumption comprising of all station Auxiliaries required for con-</td><td>US $ 4,661
(US Dollar Four Thousand Six Hundred Sixty One only) per 1 kW increase in Station</td><td>Not more than 14300 KW</td><td>(xi)</td><td>For increase in Station auxiliary power consumption comprising of all station Auxiliaries required for continuous station operation at 1x800 MW (i.e. 100%</td><td>US $ 5,025
(US Dollar Five Thousand Twenty Five only) per 1 kW increase in Station Auxiliary Power Consumption.</td><td>Not more than 14300 KW</td></tr>
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Amendment 11 to Technical Specifications (Section VI)

<table>
<tr><th rowspan="2">SN</th><th colspan="4">Specification Reference</th><th colspan="2">Existing</th><th colspan="2">Read as</th></tr>
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<tr><td></td><td>tinuous station operation at 1x800 MW (i.e. 100% rated load of the unit).</td><td>Auxiliary Power Consumption.</td><td></td></tr>
<tr><td>(xii)</td><td>Per Unit Cooling Tower - For every 0.2 deg. C rise in Cold Water Temperature from the guaranteed value</td><td>US $ 7,70,370

(US Dollar Seven Lakh Seventy Thousand Three Hundred Seventy only) per for every 0.2 deg C rise in cold water temperature</td><td></td></tr>
<tr><td>(xiii)</td><td>LD for 0.1% increase in APH Leakage (as per part-B guarantee condition description)</td><td>US $ 1,41,252

(US Dollar One Lakh Forty One Thousand Two Hundred Fifty Two only) for every 0.1% point increase from the guaranteed or specified value (whichever is lower).</td><td>The specified value</td></tr>
</table>
NOTE:
i) Each of the liquidated damages specified above shall be independent and these liquidated damages shall be levied concurrently as applicable.
</td><td colspan="2">
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<tr><td></td><td>rated load of the unit).</td><td></td><td></td></tr>
<tr><td>(xii)</td><td>Per Unit Cooling Tower - For every 0.2 deg. C rise in Cold Water Temperature from the guaranteed value</td><td>US $ 7,90,290

(US Dollar Seven Lakh Ninety Thousand Two Hundred Ninety only) per for every 0.2 deg C rise in cold water temperature</td><td></td></tr>
<tr><td>(xiii)</td><td>LD for 0.1% increase in APH Leakage (as per part-B guarantee condition description)</td><td>US $ 1,52,283

(US Dollar One Lakh Fifty Two Thousand Two Hundred Eighty Three only) for every 0.1% point increase from the guaranteed or specified value (whichever is lower).</td><td>The specified value</td></tr>
</table>
NOTE:
i) Each of the liquidated damages specified above shall be independent and these liquidated damages shall be levied concurrently as applicable.
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Amendment 11 to Technical Specifications (Section VI)

SN	Specification Reference				Existing	Read as
	Part	Sub Sec	Page No	Clause No		
					ii) If the contract currency is other than US dollars, then the liquidated damages shall be in equivalent amount in contract currency based on Bill selling exchange rate of State Bank of India prevailing on the date of award of contract. iii) All these liquidated damages for short fall in performance shall be deducted from the contract price as detailed in accompanying General Conditions of Contract (GCC)/ Special Conditions of Contract (SCC) iv) Contractor's aggregate liability to pay liquidated damages for failure to attain the functional guarantee shall not exceed **Twelve percent (12%)** of the Contract Price. v) The LD values are applicable on per unit basis except for the value indicated for auxiliary power consumption for station auxiliaries, which is on station basis. The liquidated damages shall be prorated for the fractional parts of the deficiencies. vi) Bidder not confirming about meeting the limiting values as specified for various guarantees shall not be considered and their bids shall be rejected.	ii) If the contract currency is other than US dollars, then the liquidated damages shall be in equivalent amount in contract currency based on Bill selling exchange rate of State Bank of India prevailing on the date of award of contract. iii) All these liquidated damages for short fall in performance shall be deducted from the contract price as detailed in accompanying General Conditions of Contract (GCC)/ Special Conditions of Contract (SCC) iv) Contractor's aggregate liability to pay liquidated damages for failure to attain the functional guarantee shall not exceed **Twelve percent (12%)** of the Contract Price. v) The LD values are applicable on per unit basis except for the value indicated for auxiliary power consumption for station auxiliaries, which is on station basis. The liquidated damages shall be prorated for the fractional parts of the deficiencies. vi) Bidder not confirming about meeting the limiting values as specified for various guarantees shall not be considered and their bids shall be rejected.

					more coat of water proof cement……	
D1-31	**VI/B**	**D-1-9**	**9.04.10**	**5 of 33**	…..	**White glazed tile** **Above the Over deck insulation, White glazed tile (min. 5mm thick) for roofing over under bed of cement mortar/ concrete, topped with spreading the white cement slurry at an average rate of 2.5 kg/sq m (unless noted otherwise), jointing and joint filling with white cement slurry, laid to plumb and water level in desired pattern, casted in panels, wherever required, shall be provided on the roof of Service Building.**
D1-32	**VI/B**	**D-1-9**	**9.06.02**	**6 of 33**	Deleted	**Over-Deck Insulation** **Roof insulation with 40 mm thick impervious sprayed, closed cell free Rigid Polyurethane foam over deck insulation conforming to IS: 12432 Part-III (density of foam being 40-50 Kg/Cum), over a coat of Polyurethane primer applied @ 6-8 sqm per litre, laid over 400 G Polythene sheet over PUF spray and provided with a wearing course of 40 mm cement screed 1:2:4 (1 cement: 2 coarse sand: 4 stone aggregate 20 mm nominal size) in chequered rough finish, in panels of 2.5m X2.5m and embedded with 24G wire netting and sealing the joints with polymerized mastic, shall be provided on the roof of Service Building above the waterproofing.**
D1-33	**VI/B**	**D-1-9**	**9.13.11**	**18 of 33**	Suitable cut-outs shall be provided in false ceiling to facilitate fixing of lighting fixtures, AC grills, smoke detectors, etc.	Suitable cut-outs shall be provided in false ceiling to facilitate fixing of lighting fixtures, AC grills, smoke detectors, etc. **Batten ceiling:** **Batten ceiling made up of extruded aluminum / metal of minimum 0.6mm thickness with powder coated finish (min. 40 microns) /wooden finish (minimum 0.11mm). The ceiling must have superior acoustics and must adhere to the highest health and safety standards. The battens shall have possibility of curvilinear arrangement. The batten ceiling shall be Greenguard, tested/certified from UL/Intertek. The product shall meet technical requirements of ASTM E84. Batten ceiling of 1"x1" made**

						up of extruded aluminum with "click-on system". Sublimation/Heat transfer method should not be used for better scratch resistance. Die-casted click on joinery shall not be used. **Designer membrane ceiling:** **The ceiling shall be have demountable translucent stretch ceiling membrane with harpoon, corners ready to install. It shall not get discolored & sag. All joints shall be provided with appropriate interface trims to be able to demount the ceiling to access the lights. The ceiling shall be installed using ceiling aluminum suspension system, complete as per manufacturer's installation guidelines and as per approved shop drawings in line with the design intent and approval by Engineer Incharge. LED strips shall be installed using custom aluminum extrusions to ensure longevity of the installation. The ceiling shall have following features and properties: -** **Durable: The systems shall resist shocks and shall not crack with movement or under stretch conditions.** **Safe: The membranes and profiles shall have passed the stringent fire and safety tests.** **The membrane shall have been classified as non-toxic upon burning. The Flexible membrane shall be b-s1-d0 / ASTM E-84 class A tested/certified.** **Green: Membranes shall be 100% recyclable.** **There shall not be any welding defect on Membranes.**
D1-34	**VI/B**	**D-1-5**	**5.02.09 iii**		iii. Architectural Features This building shall be of Structural Steel Framed structure and shall be completely covered with external cladding and RCC roof…… Glazing for A Row & gable end shall be reflective 6mm thick clear toughened glass with Aluminium frame. Hermetically sealed double glazing shall be provided between air conditioned & non air conditioned areas. Internal glazed partition inside CCR/CER/Offsite Control Room and B-Row at operating floor level shall be of fire resistant glass having 2 (Two) hour fire rating	iii. Architectural Features This building shall be of Structural Steel Framed structure and shall be completely covered with external cladding and RCC roof…… Glazing for A Row & gable end shall be reflective 6mm thick clear toughened glass with Aluminium frame. Hermetically sealed double glazing shall be provided between air conditioned & non air conditioned areas. Internal glazed partition inside CCR/CER/Offsite Control Room and B-Row at operating floor level shall be of fire resistant glass having 2 (Two) hour fire rating and with suitable frame. **Light weight aerated concrete panels over that 50 mm thick mineral wool insulation with Single Skin Metal Panel cladding shall be**

					and with suitable frame. Light weight aerated concrete panels with Single Skin Metal Panel cladding shall be provided in exterior of UPS Battery room area and Control Equipment Room area. All internal side of Aerated concrete panel and columns in air-conditioned areas other than CCR in MPH shall be encased with Aluminium Composite panel cladding from inside	**provided in exterior of UPS Battery room area and Control Equipment Room area.**All internal side of Aerated concrete panel and columns in air-conditioned areas other than CCR in MPH shall be encased with Aluminium Composite panel cladding from inside
D1-35	**VI/B**	**D-1-5**	**5.08.01**	**28 of 69**	**WATCH TOWERS** Watch towers shall be RCC construction with all-weather enclosure at 6m height. watch towers shall be provided at 600 m interval along the boundary as well as at corner turning points of the plant boundary. watch towers shall be provided with caged ms ladders.	**WATCH TOWERS** Watch towers shall be RCC construction with all-weather enclosure at 6m height. watch towers shall be provided at 600 m interval along the boundary as well as at corner turning points of the plant boundary. watch towers shall be provided with **MS STAIRCASE.**
D1-36	**VI/B**	**D-1-5**	**5.32.00**	**100 of 127**	**Deleted**	**Sheds for Construction workers and O&M Workers** Sheds for Construction workers and O&M Workers shall be permanent structure with truss roof provided with insulated sheeting with common rest room, cooking area, Food serving kiosk, drinking water facility, toilet and bathing area along with covered verandah for easy approach to facilities. The sheds should be well ventilated. The sheds to be scattered as per work locations and suitably located. Minimum 6 nos of sheds shall be constructed. External finishes shall be Premium smooth Exterior Paint with silicone additives over Texture Coat. Bidder to refer Tender Drawings 1150-999-POC-A-020.
D1-37	**VI/B**	**D-1-9**	**9.02.01**	**1 of 33**	**b)**All stairs shall have a maximum riser height of 175mm and a minimum tread width of 275 mm. Minimum clear width of stair shall be 1200 mm unless specified otherwise.	b) All stairs shall have a maximum riser height of 150mm and a minimum tread width of 300 mm. Minimum clear width of stair shall be 1500 mm unless specified otherwise. The width of staircase shall meet the National Building Code requirements.
D1-38	**VI/B**	**D-1-9**	**9.04.03**	**4 of 33**	Metallic hardener topping -with ordinary grey cement shall be- 12 mm thick (insitu) or finishing the concrete / mortar surfaces topping shall be furnished with neat cement slurry (with ordinary grey cement)	Metallic Hardener Topping shall be 12 mm thick. Metallic Hardening Compound shall be of approved quality consisting of uniformly graded iron particles, free from non-ferrous metal particles, oil, grease sand, soluble alkaline compounds. The ratio of Metallic hardener and Cement shall be 1:4. This mix

						shall be mixed with 6mm nominal stone in Ratio of 1mix : 2 stone. The mixture so obtained shall be laid in 12 mm thickness, on cement concrete floor within 2 to 4 hours of its laying. For laying, The top surface pf underbed shall be roughened with brushes while the concrete is still green and the forms/strips shall be kept projecting up 12 mm over the concrete surface, to receive the metallic hardening compound topping. The topping shall be laid true to provide a uniform and even surface. It shall be firmly pressed into the bottom concrete so as to have good bond with it. After the initial set has started, the surface shall be finished smooth and true to slope with steel floats.
D1-39	**VI/B**	**D-1-9**	**9.04.15**	**5 of 33**	Matt finish (with grooves) Porcelain tiles (for guiding band/s for visually impaired persons in service building) shall be with 3mm groove joints as per approved pattern pointed neatly with 3x4mm stainless epoxy grout SP- 100 of Laticrete or approved equivalent in approved colour to match colour of tile. 24 mm x 24 mm x 3.8 mm thick (minimum) glass mosaic tiles in decorative murals and pattern. Engineered wooden flooring (15mm thick) of Mikasa/ Century/ Pergo / Equivalent shall be provided in VIP area, conference rooms**.**	Matt finish (with grooves) Porcelain tiles (for guiding band/s for visually impaired persons in service building) shall be with 3mm groove joints as per approved pattern pointed neatly with 3x4mm stainless epoxy grout SP- 100 of Laticrete or approved equivalent in approved colour to match colour of tile. **Porcelain tiles shall be provided in Service Building.** 24 mm x 24 mm x 3.8 mm thick (minimum) glass mosaic tiles in decorative murals and pattern. Engineered wooden flooring (15mm thick) of Mikasa/ Century/ Pergo / Equivalent shall be provided in VIP area, conference rooms of Service Building and MPH building.
D1-40	**VI/B**	**D-1-9**	9.07.04	**7 of 33**	For ESP Control Room Building……U profiled galvanized steel channel which is used at the top and bottom	For ESP Control Room Building……..U profiled galvanized steel channel which is used at the top and bottom. **The Outer wall of control room, control equipment room in MPH Building shall be made of aerated concrete panels over that 50 mm thick mineral wool insulation and metal sheeting on outside**
D1-41	**VI/B**	**D-1-5**	5.36.00		**WORKER'S ACCOMODATION BUILDINGS** Worker's Accommodation shall be provided as per NBC requirement and Local factory act. The Building design shall be as per Tender Drawing. It shall have Brick wall around the Kitchen, Toilet, bathroom and washing area.	**WORKER'S ACCOMODATION BUILDINGS** **Accommodation for Workers & staff colony in adequate numbers as required for the project peak demand shall be made in the form of temporary structures which shall be removed after completion of the project. It shall have**

					It shall have Aerated Concrete panel wall with steel structure having sandwich panel roof sheeting.	**facilities for drinking water & sanitation, approach road, dust suppression, drainage, sewage treatment plant, solid waste collection & disposal, fuel for cooking, medical healthcare, creches, Occupational Health Center etc.The Occupational health centre shall be a single storyed RCC framed building of minimum area of 300 sqm. meeting the statutory requirements.**
D1-42	**VI/B**	**D-1-9**	9.06.05	**6 of 33**	Roof Water Proofing Roof water proofing treatment shall be as follows: a) For roofs having structural slope: Top surface of sloped R.C.C. slab shall be finished with 15mm thick cement plaster (1:4). Over the finished surface elastomeric membrane shall be laid. The elastomeric shall comprise of high solid content liquid applied urethane laid over reinforcing layer of polyscrim cloth or non woven geo-textile. The top of the elastomeric membrane shall be finished with 20 mm thick cement: sand (1:4) mortar with chicken wire mesh and pressed precast concrete tiles of 20 mm thickness where applicable shall be laid over mortar at green stage. Provision for thermal expansion of roofing tiles shall be kept by providing an expansion gap in both directions filled up with polysulphide joint sealant. The expansion gap shall be provided in the cement sand mortar underbed layer also. b) For roofs having no structural slope: Screed concrete mix (1:2:4) grading having minimum 25mm thickness at the lowest point of the slope shall be laid over R.C.C. slab and shall be laid as per the slope	Roof Water Proofing Roof water proofing treatment shall be as follows: a) For roofs having structural slope: Top surface of sloped R.C.C. slab shall be finished with 15mm thick cement plaster (1:4). Over the finished surface elastomeric membrane shall be laid. The elastomeric shall comprise of high solid content liquid applied urethane laid over reinforcing layer of polyscrim cloth or non woven geo-textile. The top of the elastomeric membrane shall be finished with 20 mm thick cement: sand (1:4) mortar with chicken wire mesh and pressed precast concrete tiles of 20 mm thickness where applicable shall be laid over mortar at green stage. Provision for thermal expansion of roofing tiles shall be kept by providing an expansion gap in both directions filled up with polysulphide joint sealant. The expansion gap shall be provided in the cement sand mortar underbed layer also. b) For roofs having no structural slope: Screed concrete mix (1:2:4) grading having minimum 25mm thickness at the lowest point of the slope shall be laid over R.C.C. slab and shall be laid as per the slope

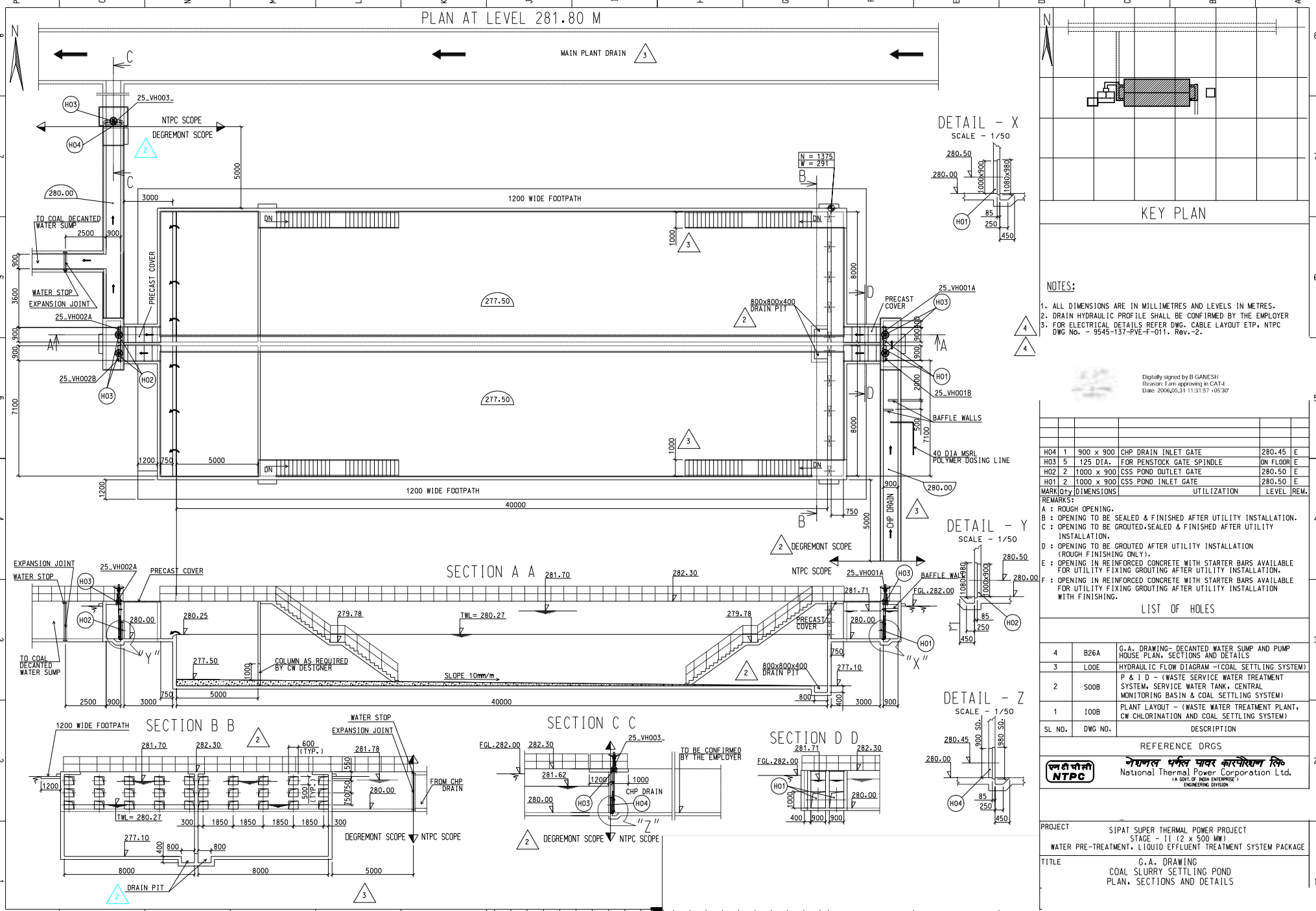
					specified elsewhere in the specification. Top surface of grading underbed shall be finished with 15mm thick cement plaster (1:4). Over the finished surface elastomeric membrane shall be laid and top of the elastomeric membrane shall be finished with 20 mm thick cement: sand (1:4) mortar with chicken wire mesh and pressed precast concrete tiles of 20 mm thickness where applicable shall be laid over mortar at green stage. Provision for thermal expansion of roofing tiles shall be kept by providing an expansion gap in both directions filled up with polysulphide joint sealant. The expansion gap shall be provided in the cement sand mortar underbed layer also.	specified elsewhere in the specification. Top surface of grading underbed shall be finished with 15mm thick cement plaster (1:4). Over the finished surface elastomeric membrane shall be laid and top of the elastomeric membrane shall be finished with 20 mm thick cement: sand (1:4) mortar with chicken wire mesh and pressed precast concrete tiles of 20 mm thickness where applicable shall be laid over mortar at green stage. Provision for thermal expansion of roofing tiles shall be kept by providing an expansion gap in both directions filled up with polysulphide joint sealant. The expansion gap shall be provided in the cement sand mortar underbed layer also. **The elastomeric membrane above mentioned for waterproofing shall be of two component, instant setting, 100% solids spray applied hybrid polyurea polyurethane liquid applied elastomeric seamless waterproofing membrane meeting the requirements of LAM as per ASTM C836 and having excellent tensile strength of 15MPa (As per ASTM D412), elongation more than 450% (as per ASTM D 412), tear strength of 60 Kn/m (As per ASTM D1004/ASTM D624), adhesion to concrete of 2MPa (as per ASTM D 4541), abrasion resistance of 60mg loss (1 Kg,CS 10 Wheels,1000 cycles - As per ASTM D4060), Shore A Hardness of 85 (As per ASTM D2240), resistance to hydrostatic pressure head of 7 Bar (As per ASTM D 5385/ DIN 16726), puncture resistance of 1000N (As per ASTM E154), water vapour permeability of 25 mg/m2/day (As per ASTM E96), Impact resistance of 17 N.m (As per ASTM D2794), Low temperature crack bridging ability up to 3.2mm (As per ASTM C 1305), dynamic crack bridging ability class B 3.2 (as per EN 1062-7 Method B- B3.2) with no crack observed in the coating after 20000 sinusoidal cycles, resistance to root (As per CEN TS/14416) and fire resistance of class B (As per EN 13501-1).The coating shall be applied with a total consumption of 1.6 Kg/Sqm to achieve a total system**

						DFT of 1.5mm, thereby satisfy the requirements of LAM as per ASTM C898 and shall be applied on the entire horizontal surface extending upto 300mm above the FFL on the vertical surface as per the methodology. **The application system includes base preparation of cleaning, brushing and removal of flacky materials, grouting the porous area with cementitious grout, proper coving between slab and wall junctions and priming the surface with two component solvent free epoxy primer which is applied with a consumption of 200 grams per Sqm, followed by spray application of hybrid polyurea waterproofing coating.** **Protective geo textile fabric of minimum 150GSM over the entire membrane with proper overlaps shall be applied.**
D1-43	VI/B	D-1-5	5.18.01.06 3rd para	44 of 69	**Forebay Structure** Forebay consists of retaining wall and forebay slab. The walls shall be analysed as a retaining wall for stability against overturning and sliding, similar to end piers of the pump house. Pressure relief valves and under drainage arrangements shall be provided below the forebay slab to prevent uplift of the forebay slab. Size and spacing of pressure relief valves shall be designed by the Bidder to take care of the uplift due to ground water table. However, centre to centre spacing of PRV shall not exceed 5000mm.The forebay slab shall be designed against uplift due to 50% of the total water head considering ground water table upto FGL. The forebay slab shall be minimum 250 mm thick. The forebay slab shall be structurally separated from the retaining walls and water stops shall be provided at the junction of slab and retaining wall. Hand rails with 32NB (medium) pipe shall be provided on both walls of the forebay.	**Forebay Structure** Forebay consists of both side retaining walls and bottom slab. The side walls shall be analysed as isolated retaining wall for stability against overturning and sliding. The forebay bottom slab shall be structurally separated from the side walls and water stops shall be provided at the junction of bottom slab and retaining wall. Minimum thickness of forebay slab shall be 250 mm. Pressure relief valves and under drainage arrangements shall be provided below the forebay slab to prevent uplift of the forebay slab. Size and spacing of pressure relief valves shall be designed by the Bidder to take care of the uplift due to ground water table. However, centre to centre spacing of PRV shall not exceed 5000mm. Minimum thickness of retaining wall at top shall be 250 mm. Hand rails with 32NB (medium) pipe shall be provided on both walls of the forebay.

Amendment 01 to Technical Specifications (Section VI)

D1-44	VI/A	IID	1.00.00	4 of 8	12. Raw Water system civil Works Civil work associated with the existing Raw water pump house structure and civil works associated with laying of Raw water pipes from Raw water pump house to PT Plant, RW Switchgear//MCC & control room building including transformer foundation.	12. Raw Water system civil Works - Civil works associated with addition/alteration/modification as required in existing Raw Water Pump House (RWPH), Switchgear & Control Room building, Transformer foundation etc. for installation of raw water pumps and associated panels etc. complete as necessary for commissioning of Stage-III system - Civil works associated with laying of Raw water pipes from Raw water pump house to PT Plant and AHP plant
D1-45	**VI/B**	**D-1-5**	5.18.01.01	39 of 69	f) Civil works associated with existing Stage-I Raw Water Pump House with required modification with all necessary arrangement & precautions. Further, associated structure for & including supply of valves/gates are also to be provided for isolation of the connection.	f) **Civil works associated with addition/alteration/modification as required in existing Raw Water Pump House (RWPH for installation of raw water pumps as necessary for commissioning of system**
D1-46					-	For CHP related drawings of existing structures AC-4
D1-47	**VI/B**	**D-1-5**	**5.23.03**		**…**Base plates of trestle columns shall be kept 300 mm above the finished ground level.	**…**Base plates of trestle columns shall be kept 300 mm above the finished ground level. **Encasement of the pedestal shall be done the top of the stiffener plate.**
D1-48	**VI/B**	**D-1-5**	**5.23.12**		Treads and landing shall be suitable for the prescribed loading. The maximum width of openings in gratings shall not exceed 40 mm. The minimum size of main bars shall be 25 x 6 mm and cross bar shall be 6mm. The usual span of grating will not generally exceed 1.5 meters. Stair case gratings shall be galvanized to grade 610g/m^2. All gratings shall be electro forged types.	Treads and landing shall be suitable for the prescribed loading. The maximum width of openings in gratings shall not exceed 40 mm. The minimum size of main bars shall be 40 x 6 mm and cross bar shall be 6mm. The usual span of grating will not generally exceed 1.5 meters. Stair case gratings shall be galvanized to grade 610g/m2. All gratings shall be electro forged types.
D1-49	**VI/B**	**D-1-5**	**5.23.08**		…….Brick wall cladding (1m height above FFL) shall be provided all around the periphery of pump houses.	……Brick wall cladding (1m height above FFL) and sheeting shall be provided all around the periphery of pump houses.

PLAN AT LEVEL 281.80 M



DETAIL - X
SCALE - 1/50

DETAIL - Y
SCALE - 1/50

DETAIL - Z
SCALE - 1/50

SECTION A A

SECTION B B

SECTION C C

SECTION D D

KEY PLAN

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS IN METRES.
2. DRAIN HYDRAULIC PROFILE SHALL BE CONFIRMED BY THE EMPLOYER
3. FOR ELECTRICAL DETAILS REFER DWG. CABLE LAYOUT ETP, NTPC DWG No. - 9545-137-PVE-F-011. Rev.-2.

Digitally signed by B GANESH
Reason: I am approving in CAT-I
Date: 2006.05.31 11:31:57 +05'30'

MARK	Qty	DIMENSIONS	UTILIZATION	LEVEL	REM.
H04	1	900 x 900	CHP DRAIN INLET GATE	280.45	E
H03	5	125 DIA.	FOR PENSTOCK GATE SPINDLE	ON FLOOR	E
H02	2	1000 x 900	CSS POND OUTLET GATE	280.50	E
H01	2	1000 x 900	CSS POND INLET GATE	280.50	E

REMARKS:
A : ROUGH OPENING.
B : OPENING TO BE SEALED & FINISHED AFTER UTILITY INSTALLATION.
C : OPENING TO BE GROUTED,SEALED & FINISHED AFTER UTILITY INSTALLATION.
D : OPENING TO BE GROUTED AFTER UTILITY INSTALLATION (ROUGH FINISHING ONLY).
E : OPENING IN REINFORCED CONCRETE WITH STARTER BARS AVAILABLE FOR UTILITY FIXING GROUTING AFTER UTILITY INSTALLATION.
F : OPENING IN REINFORCED CONCRETE WITH STARTER BARS AVAILABLE FOR UTILITY FIXING GROUTING AFTER UTILITY INSTALLATION WITH FINISHING.

LIST OF HOLES

SL NO.	DWG NO.	DESCRIPTION
4	B26A	G.A. DRAWING- DECANTED WATER SUMP AND PUMP HOUSE PLAN, SECTIONS AND DETAILS
3	L00E	HYDRAULIC FLOW DIAGRAM -(COAL SETTLING SYSTEM)
2	S00B	P & I D - (WASTE SERVICE WATER TREATMENT SYSTEM, SERVICE WATER TANK, CENTRAL MONITORING BASIN & COAL SETTLING SYSTEM)
1	I00B	PLANT LAYOUT - (WASTE WATER TREATMENT PLANT, CW CHLORINATION AND COAL SETTLING SYSTEM)

REFERENCE DRGS

एनटीपीसी NTPC
नेशनल थर्मल पावर कारपोरेशन लि०
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT
STAGE - II (2 x 500 MW)
WATER PRE-TREATMENT, LIQUID EFFLUENT TREATMENT SYSTEM PACKAGE

TITLE: G.A. DRAWING
COAL SLURRY SETTLING POND
PLAN, SECTIONS AND DETAILS

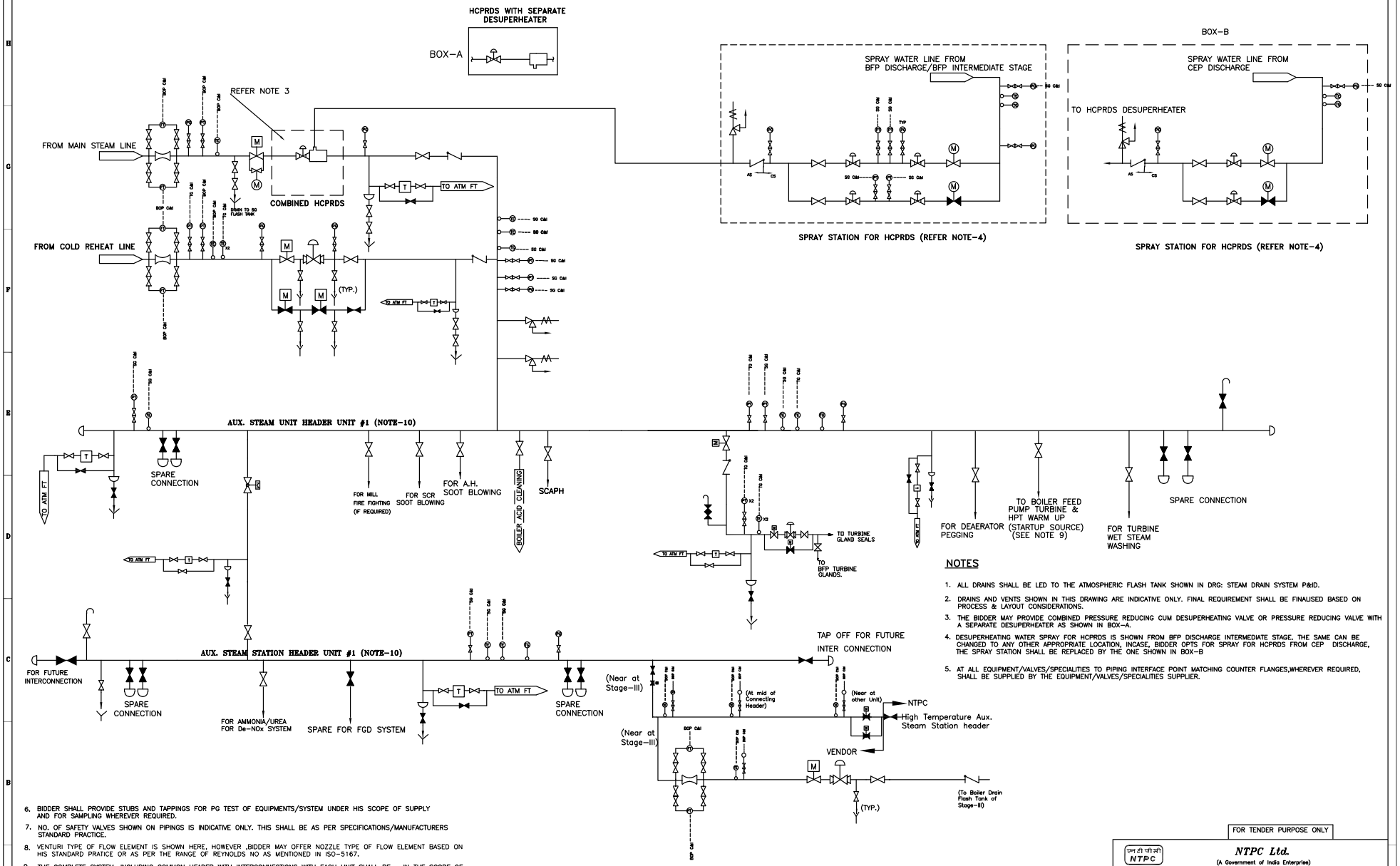
A1

RAW WATER DATA : NTPC, SIPAT

S.N.	Parameter	Revised Data
1	**pH**	7.2-8.7
2	**Turbidity (NTU)**	Max 450
3	**TSS (mg/L)**	Max 600
4	**TDS (ppm)**	260
5	**Total Hardness as CaCO3 (ppm)**	105
6	**Ca- Hardness as CaCO3 (ppm)**	70
7	**Mg- Hardness as CaCO3 (ppm)**	35
8	**Sodium as CaCO3 (ppm)**	25
9	**Potassium as CaCO3 (ppm)**	8
10	**Total Cation (as ppm CaCO3)**	138
11	**P-alkalinity as CaCO3 (ppm)**	7
12	**M-alkalinity as CaCO3 (ppm)**	66
13	**Chloride as Cl^- (ppm)**	40
14	**Sulphate as as CaCO3 (ppm)**	16
15	**Total Anion (as ppm CaCO3)**	138
16	**Iron as Fe (ppm)**	3
17	**Reactive Silica as SiO_2 (ppm)**	20
18	**Non-Reactive Silica as SiO_2 (ppm)**	3
19	**KMnO4 no-Organic Matter (ppm)**	4
20	**TOC (ppm)**	8

Annexure TG-1

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NOTES

1. ALL DRAINS SHALL BE LED TO THE ATMOSPHERIC FLASH TANK SHOWN IN DRG: STEAM DRAIN SYSTEM P&ID.
2. DRAINS AND VENTS SHOWN IN THIS DRAWING ARE INDICATIVE ONLY. FINAL REQUIREMENT SHALL BE FINALISED BASED ON PROCESS & LAYOUT CONSIDERATIONS.
3. THE BIDDER MAY PROVIDE COMBINED PRESSURE REDUCING CUM DESUPERHEATING VALVE OR PRESSURE REDUCING VALVE WITH A SEPARATE DESUPERHEATER AS SHOWN IN BOX–A.
4. DESUPERHEATING WATER SPRAY FOR HCPRDS IS SHOWN FROM BFP DISCHARGE INTERMEDIATE STAGE. THE SAME CAN BE CHANGED TO ANY OTHER APPROPRIATE LOCATION, INCASE, BIDDER OPTS FOR SPRAY FOR HCPRDS FROM CEP DISCHARGE, THE SPRAY STATION SHALL BE REPLACED BY THE ONE SHOWN IN BOX–B
5. AT ALL EQUIPMENT/VALVES/SPECIALITIES TO PIPING INTERFACE POINT MATCHING COUNTER FLANGES,WHEREVER REQUIRED, SHALL BE SUPPLIED BY THE EQUIPMENT/VALVES/SPECIALITIES SUPPLIER.
6. BIDDER SHALL PROVIDE STUBS AND TAPPINGS FOR PG TEST OF EQUIPMENTS/SYSTEM UNDER HIS SCOPE OF SUPPLY AND FOR SAMPLING WHEREVER REQUIRED.
7. NO. OF SAFETY VALVES SHOWN ON PIPINGS IS INDICATIVE ONLY. THIS SHALL BE AS PER SPECIFICATIONS/MANUFACTURERS STANDARD PRACTICE.
8. VENTURI TYPE OF FLOW ELEMENT IS SHOWN HERE, HOWEVER ,BIDDER MAY OFFER NOZZLE TYPE OF FLOW ELEMENT BASED ON HIS STANDARD PRATICE OR AS PER THE RANGE OF REYNOLDS NO AS MENTIONED IN ISO–5167.
9. THE COMPLETE SYSTEM, INCLUDING COMMON HEADER WITH INTERCONNECTIONS WITH EACH UNIT SHALL BE IN THE SCOPE OF VENDOR AND THE SYSTEM SHALL BE DESIGNED SO AS TO ENABLE STARTUP OF ANY UNIT WITH TDBFP BY TAKING MOTIVE STEAM FROM OTHER RUNNING UNITS.
10. THE OPERATING PRESSURE AND TEMPERATURE OF AUX. STEAM UNIT STATION HEADER SHALL BE OPTIMIZED BY THE BIDDER MAINTAINING A MINIMUM 50C SUPERHEAT AND MINIMUM TEMPERATURE OF 310°C.
11. ALL THE INSTRUMENTS SHALL BE IN THE SCOPE OF BIDDER.THE MEASURING INSTRUMENTS INDICATED IN THE TENDER P&ID ARE MINIMUM THAT ARE REQUIRED TO BE PROVIDED BY THE BIDDER.IN CASE ADDITIONAL INSTRUMENTS ARE REQUIRED AS PER THE STANDARD & PROVEN PRACTICE OF BIDDER, THE SAME SHALL BE SUPPLIED WITHIN THIS CONTRACT.
12. SG–C&I,TG–C&I AND BOP–C&I PART OF DDCMIS ARE IN THE CONTRACTOR's SCOPE OF SUPPLY.
13. ALL THE REMOTE INSTRUMENTS TO BE HOOKED UP TO THE SG CONTROL SYSTEM (AUX. PRDS CONTROL SYSTEM) UNLESS INDICATED OTHERWISE.

REV.NO.	DESCRIPTION	DRAWN	DESIGN	CHKD.		APPD.	DATE
A	RELEASED FOR TENDER	AS	AS	PKD	M C&I CLEARED BY	AA	08/02/22

FOR TENDER PURPOSE ONLY

NTPC Ltd.
(A Government of India Enterprise)
ENGINEERING DIVISION

PROJECT	SIZE	SCALE	DRG NO.	REV. NO.
SIPAT STPP STAGE–III (1X800 MW) (EPC PACKAGE)	A–1	NTS	XXXX–999–POM–A–006	B

TITLE: AUXILIARY STEAM SYSTEM P&ID

INSTRUMENTATION CABLE, CONTROL & POWER SUPPLY CABLE, INTERNAL WIRING AND ELECTRICAL FIELD CONSTRUCTION MATERIAL (CABLE SUB-TRAYs ETC

Specification of Instrumentation cable

1.00.00 Common Requirements

S. No.	Property	Requirement
1	Operating Voltage	225 V (peak value)
2.	Codes and standard	All instrumentation cables shall comply with VDE 0815, VDE 0207, Part 4, Part 5, Part 6, VDE 0816, VDE 0472, SEN 4241475, ANSI MC 96.1, IS-8784, IS-10810 (latest editions) and their amendments read along with this specification.
3.	Continuous operation suitability	At 205 Deg C for Type-C cables & heat resistant cables (PTFE F & G instrumentation cables) At 70 Deg C for all other type of cables.
4.	Marking :- a.*Progressive automatic on-line sequential marking of length in meters to be provided at every one meter on outer sheath.* *b.*Marking to read 'FRLS' to be provided at every 5 meters on outer sheath except for Type-C cable	
5.	Allowable Tolerance on overall diameter	+/- 2 mm (maximum) over the declared value in data sheet
6.	Variation in diameter	Not more than 1.0 mm throughout the length of cable.
7.	Color	The outer sheath shall be of blue color.
8.	Others	Repaired cables shall not be acceptable.

1.01.00 Specific Requirements

Specification Requirements	Type-A cable	Type-B cable	Type F & G cable	Type-C cable	PTFE - F & G instrumentation cable
A. CONDUCTORS					
Cross section area	0.5 sq. mm				
Conductor material	ANSI type KX	ANSI type SX	Annealed bare copper	ANSI type KX	Annealed bare copper
Colour code	Yellow-Red	Black-Red	As per VDE-815	Yellow-Red	As per VDE-815

Specification Requirements	Type-A cable	Type-B cable	Type F & G cable	Type-C cable	PTFE - F & G instrumentation cable
Conductor Grade	As per ANSI MC 96.1		Electrolytic	As per ANSI MC 96.1	Electrolytic
No & dia of strands	7x0.3 mm (nom)				
No. of Pairs	2	2	2/4/8/12/16/24/ 48	2	2/4/8/12/16/24/ 48
Max. conductor loop resistance per Km (in ohm) at 20 deg. C	As per ANSI MC 96.1		73.4	As per ANSI MC 96.1	73.4
Reference Standard	As per ANSI MC 96.1		VDE : 0815	As per ANSI MC 96.1	VDE : 0815
B. INSULATION					
Material	Extruded PVC type YI 3			Teflon	Teflon
Thickness in mm (Min/Max)	0.25/0.35			0.4 / 0.50 (nominal)	0.4 / 0.50 (nominal)
Volume Resistivity (Min) in ohm-cm	1 x 10^{14} at 20 deg. C & 1x10^{11} at 70 deg. C.			2.8x 10^{14} at 20 deg. C & 2x10^{11} at 205 deg. C.	2.8x 10^{14} at 20 deg. C & 2x10^{11} at 205 deg. C.
C. PAIRING & TWISTING					
Max. lay of pairs (mm)	50				
Single layer of binder tape on each pair provided	Each core printed with number or Numbered binder tape to be provided on each pair		Yes	Each core printed with number	Each core printed with number or Numbered binder tape to be provided on each pair
Bunch (Unit Formation) for more than 4P	N.A		To be provided	NA	To be provided
Conductor /pair	N.A.		To be	NA	To be

Specification Requirements	Type-A cable	Type-B cable	Type F & G cable	Type-C cable	PTFE - F & G instrumentation cable
identification as per VDE0815			provided		provided
D. SHIELDING					
Type of shielding	Al-Mylar tape				
Individual pair shielding	No		To be provided for F-type cable	No	To be provided for PTFE F type cable
Minimum thickness of Individual pair shielding	No		0.028mm (28 micron)	No	0.028mm (28 micron)
Overall cable assembly shielding	To be provided				
Minimum thickness of Overall cable assembly shielding	0.055 mm (55 micron)				
Coverage / Overlapping	100% / 20%				
Drain wire provided for individual (F Type)/overall shield	Yes, Size- 0.5 sqmm,No of strands-7,Dia of strands-0.3mm,Annealed Tin coated copper				
E. FILLERS (if applicable)					
Non-hygroscopic, flame retardant	To be provided				
F. OUTER SHEATH					
Material	Extruded PVC compound YM1 with FRLS properties			Teflon (i.e. extruded FRP)	Teflon (i.e. extruded FRP)
Minimum Thickness at any point	1.8 mm			0.4 mm	0.4 mm
Nominal Thickness at any point	>1.8 mm			0.5 mm	0.5 mm
Resistant to water, fungus, termite & rodent attack	Required				

Specification Requirements	Type-A cable	Type-B cable	Type F & G cable	Type-C cable	PTFE - F & G instrumentation cable
Minimum Oxygen index as per ASTMD-2863	29 %			N.A.	N.A.
Minimum Temperature index as per ASTMD-2863	250 deg.C			N.A.	N.A.
Maximum Acid gas generation by weight as per IEC-60754-1	20%			N.A.	N.A.
Maximum Smoke Density Rating as per ASTMD-2843	60% (defined as the average area under the curve when of smoke density test plotted on a curve indicating light absorption vs. time as per ASTMD-2843)			N.A.	N.A.
Reference standard	VDE207 Part 5,VDE-816			VDE207 Part 6 ASTM D2116	VDE207 Part 5,VDE-816
G. Electrical Parameters					
Mutual Capacitance Between Conductors At 0.8 Khz (Max.)	200 nF/km		120 nF/km for F 100 nF/km for G	200 nF/km	120 nF/km for F 100 nF/km for G
Insulation Resistance (Min.)	100 M Ohm/Km				
Cross Talk Figure (Min.) At 0.8 Khz	60 dB		60 dB	60dB	60dB
Characteristic Impedance (Max) At 1 Khz	N.A.		320 OHM FOR F-TYPE 340 OHM FOR G-TYPE	N.A.	320 ohm for F-type 340 ohm for G-type
Attenuation Figure At 1 Khz (Max)	N.A.		1.2 db/km	N.A.	1.2 db/km

Specification Requirements	Type-A cable	Type-B cable	Type F & G cable	Type-C cable	PTFE - F & G instrumentation cable
H. COMPLETE CABLE					
Complete Cable assembly	Shall pass Swedish Chimney test as per SEN-SS 4241475 class F3.			N.A.	N.A.
Flammability	Shall pass flammability as per IEEE-383 read in conjunction to this specification			As per manufacturer's standard subject to employer's approval	As per manufacturer's standard subject to employer's approval
I. CABLE DRUM					
Type	Non-returnable wooden drum or steel drum.				
Length	1000 m ± 5% for up to & including 12 pairs 500 m ± 5% for above12 pairs				

Note: Heat resistant instrumentation cable shall have specification as per above column **"PTFE - F & G Instrumentation cable"** and cable shall be suitable for continuous operation at 205 Deg. C

2.00.00 SPECIFICATION OF OPTICAL FIBER CABLES (OFC)

2.01.00 Optic Fiber cable shall be 4/8/12 core, Electrolytically chrome plated corrugated steel taped (ECCST), fully water blocked with dielectric central member for outdoor/indoor application so as to prevent any physical damage. The cable shall have multiple single-mode or multi mode fibers on as required basis so as to avoid the usage of any repeaters. The outer sheath shall have Flame Retardant, UV resistant properties and are to be identified with the manufacturer's name, year of manufacturer, progressive automatic sequential on-line marking of length in meters at every meter.

2.02.00 The cable core shall have suitable characteristics and strengthening for prevention of damage during pulling viz. Dielectric central member, Loose buffer tube design, 4 fibers per buffer tube (minimum), Interstices and buffer tubes duly filled with Thixotropic jelly etc. The cable shall be suitable for a maximum tensile force of 2000 N during installation, and once installed, a tensile force of 1000 N minimum. The compressive strength of cable shall be 3000 N minimum& crush resistance 4000 N minimum. The operating temperature shall be – 20 deg. C to 70 deg.C

2.03.00 All testing of the fiber optic cable being supplied shall be as per the relevant IEC, EIA and other international standards. Spliced / Repaired cables are not acceptable.

2.04.00 Bidder to ensure that minimum 100% cores are kept as spares in all types of optical fibre

cables.

3.00.00 **SPCIFICATION OF CONTROL & POWER SUPPLY CABLES**

Refer Electrical sub-sections

4.00.00 **INSTRUMENTATION CABLE INSTALLATION AND ROUTING**

4.01.00 Cables shall be segregated as per IEEE Std.-422. In vertically stacked trays, the higher voltage cable shall be in higher position and instrumentation cable shall be in bottom tier of the tray stack. The distance between instrumentation cables and those of other system shall be as follows:

From 11 kV/6.6 kV/3.3 kV tray system	-	914 mm
From 415V tray system	-	610 mm
From control cable tray system	-	305 mm

4.02.00 The cables emanating from redundant equipment/devices shall be routed through different paths. The above segregation of cables & wiring for redundant equipments/devices shall be in accordance with IEEE-Std-422.

4.03.00 Normally 10% spare cores shall be provided when the numbers of pairs of cables are more than four pairs, except for pre-fabricated cables .

4.04.00 Internal panel/cabinet wiring shall be of multi-stranded copper conductor with FRLS PVC insulation without shield and outer sheath meeting the requirements of VDE 0815.

4.05.00 Internal Panels / System cabinets wiring and termination of signal cables at DCS marshalling shall be as per standard and proven practice of contractor

5.00.00 **CABLE LAYING AND ACCESSORIES**

Laying of Optic Fiber cables (OFCs) :

Outside Building Area – to be laid necessarily inside covered cable tray of 100 mm with support from trestle structure

Inside Building area- to be laid on separate cable sub trays

While Buried – in separate buried trench approx. 1 meter depth to be laid in 2 " rodent proof HDPE conduits covered with sand, brick, laid breadth -wise and soil along the pipe line.

While crossing roads- to be laid in rodent proof HDPE conduits with sand filling at bottom and sand, soil filling at top with cement concrete.

While crossing canals/ rivers – to be laid in rodent proof HDPE conduits with hume pipe

Laying of Network Cable (UTP/ STP) ,Flame Scanner ,TSI:

Outside Building Area – to be laid necessarily inside separate covered cable tray of 100 mm with support from trestle structure

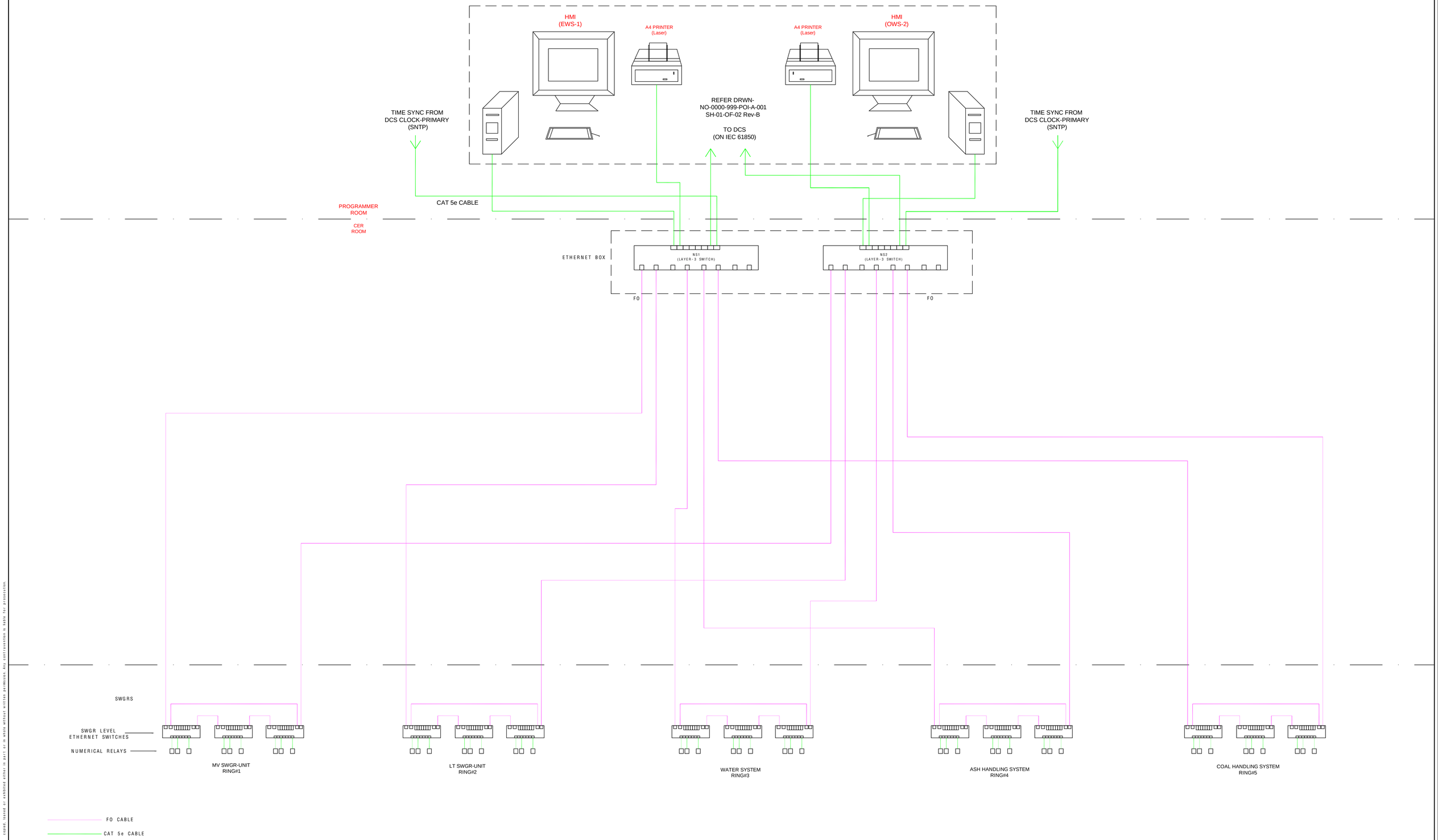
Inside Building Area- to be laid necessarily inside separate covered cable sub-trays.

6.00.00 **FIELD MOUNTED LOCAL JUNCTION BOXES (AS PER STANDARD AND PROVEN**

Practice of vendor

(i)	No. of ways	12/24/36/48/64/72/96/128 with 20% spares terminals.
(ii)	Material and Thickness	4mm thick Fiberglass Reinforced Polyester (FRP).
(iii)	Type of terminal blocks	Rail mounted cage-clamp type suitable for conductor size upto 2.5 mm^2. A M6 earthing stud shall be provided.
(iv)	Protection Class	IP: 55 min. for indoor & IP-65 min for outdoor applications.
(v)	Grounding	To be provided.
(vi)	Color	RAL 7035

11.00.00 **CONDUITS AND CABLE TRAYS TO BE PROVIDED AS PER STANDARD AND PROVEN PRACTISE OF CONTRACTOR.**



NOTES:-

1. ACTUAL NO OF RELAYS, ETHERNET SWITCHES & ITS PORTS SHALL BE IN LINE WITH RELEVANT CLAUSES OF TECHNICAL SPECIFICATIONS.
2. FO CABLES SHALL BE USED TO NETWORK THE ETHERNET SWITCHES.
3. CAT5e/FO CABLE SHALL BE USED TO CONNECT THE NUMERICAL RELAYS (IEDs) TO ETHERNET SWITCHES IN THE SWITCHGEARS.
4. EACH EWS TABLE/CONSOLE SHALL HAVE SPACE FOR KEEPING ONE ADDITIONAL PC (OWS) FOR DC HEALTH MONITORING SYSTEM OF MAIN PLANT & SWITCHYARD BATTERIES.
5. EACH RING SHOULD NOT HAVE MORE THAN 120 RELAYS.

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REV. NO.	DATE	DESCRIPTION	DRAWN	DESIGN	CHKD	APPD
			C	K	CAT	KS

एनटीपीसी लिमिटेड
NTPC Limited
(A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT: STANDARD

TITLE: TYPICAL OVERALL ARCHITECTURE OF SWITCHGEAR RELAY NETWORK

SIZE	SCALE	DRAWING NO.	REV. NO.
A1	NTS	0000-205-POE-A-001	0

ANNEXURE-E2

IG DRONES™

Inventgrid India Pvt. Ltd.

765 kV S/C
Transmission Line from NTPC
Sipat Super Thermal Power Station

Detailed Survey Report



IG DRONES™

Submitted by

Plot no. 517, Lane no. 7, Utkal Hospital Rd,
opp. Power Grid Office, Neeladri Vihar,
Chandrasekharpur, Bhubaneswar, Odisha 751021

765 kV Transmission route survey and tower spotting data

Inventgrid India Pvt. Ltd.	**CUSTOMER** **NTPC LTD.** (A GOVERNMENT OF INDIA ENTERPRISE)
	PROJECT **NTPC LTD Sipat Super Thermal Power Station**

CONTENTS:

1. Introduction
2. Methodology/Workflow
3. Deliverables

LINE-1

List of Annexure		
765 kV S/C Transmission Line from NTPC LTD Sipat Super Thermal Power Station		
NTPC LTD		
Contents		
Sr. No.	**Description**	**Annexure / Appendix No.**
1	Annexures Details	I
2	Methodology	II
3	Tower Schedule	III
4	Crossing Clearance Report	IV
5	Tower Spotting Data	V
6	Sag Tension Calculation	VI

Introduction:

NTPC Limited is planning to construct NTPC LTD Sipat Thermal Power Staion Requirement of 765 KV S/C Transmission Line.

The Detail Survey has been carried out based on the feasibility to construct the transmission lines and as per requirement of the client. The routes were selected after physical inspection and validation of the various routes along with merits, de-merits, the most feasible routes proposed based on physical and Geo-graphical site conditions in our Preliminary Reconnaissance Survey.

This report covers the observation made during Detail Survey of the routes.

Scope of Work:

The scope of work included in order is as follows:

Reconnaissance & Preliminary survey which includes following

Collection of required toposheets from SOI

- Walkover survey using Total Station and toposheets Preliminary survey.
- Railway crossing
  Power line
  crossing
- Road crossing
- Submission or Survey report
- Actual field data along the selected route (enumeration of salient land features like crossing of rivers, nalla, road, railway lines, other transmission / distribution line, nearby habitations, Proximity to airport, etc.)
- Tower spotting & Tower Schedule Sag template, conductor sizing.

.

Methodology of Selection for Route of Transmission Lines:-

- **A total station (TS) or total station theodolite (TST)** is an electronic/optical instrument used for surveying and building construction. It is an electronic transit theodolite integrated with electronic distance measurement (EDM) to measure both vertical and horizontal angles and the slope distance from the instrument to a particular point, and an on-board computer to collect data and perform triangulation calculations.
- Robotic or motorized total stations allow the operator to control the instrument from a distance via remote control. This eliminates the need for an assistant staff member as the operator holds the retro reflector and controls the total station from the observed point. These motorized total stations can also be used in automated setups known as Automated Motorized Total Station (AMTS).

METHOD OF SURVEY:

There are mainly three types of survey by total station:-

1. **Angle measurement**
2. **Distance measurement**
3. **Coordinate measurement**

COORDINATE MEASUREMENT:-

The coordinates of an unknown point relative to a known coordinate can be determined using the total station as long as a direct line of sight can be established between the two points. Angles and distances are measured from the total station to points under survey, and the coordinates (X, Y, and Z; or easting, northing, and elevation) of surveyed points relative to the total station position are calculated using trigonometry and triangulation.

To determine an absolute location, a total station requires line of sight observations and can be set up over a known point or with line of sight to 2 or more points with known location, called free stationing.

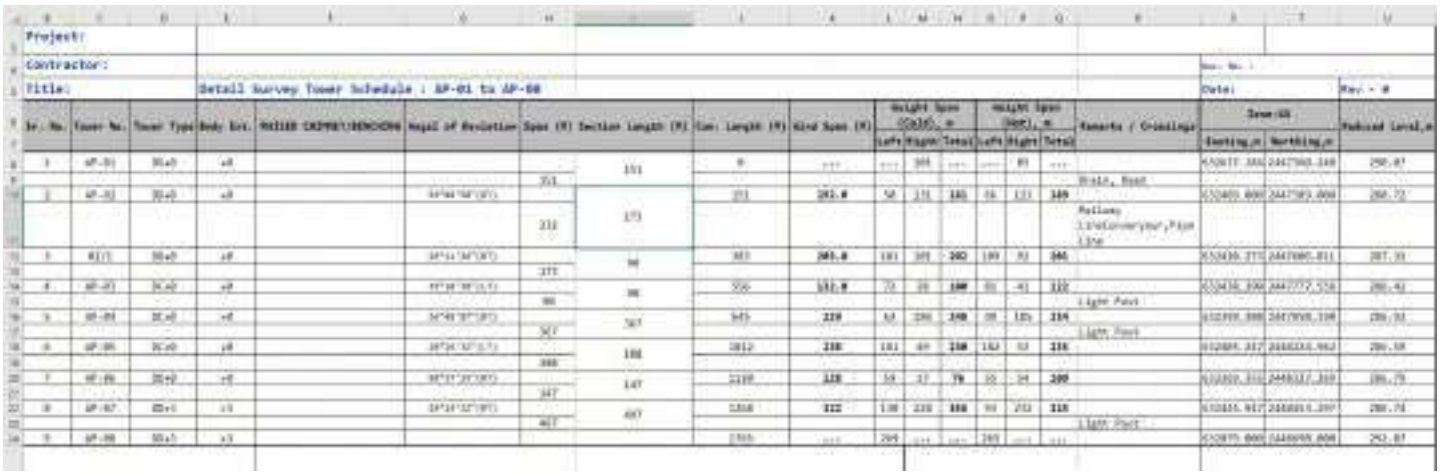
For this reason, some total stations also have a Global Navigation Satellite System receiver and do not require a direct line of sight to determine coordinates. However, GNSS measurements may require longer occupation periods and offer relatively poor accuracy in the vertical axis.

DATA PROCESSING:-

Total station instrument has capability to calculated reduced level and coordinates with reference to benchmark. All the data is imported to AutoCAD format to measure the exact area of required plot. Some models include internal electronic data storage to record distance, horizontal angle, and vertical angle measured, while other models are equipped to write these measurements to an external data collector, such as a hand-held computer.

When data is downloaded from a total station onto a computer, application software can be used to compute results and generate a map of the surveyed area. The newest generation of total stations can also show the map on the touch-screen of the instrument immediately after measuring the points.

Annexure - I



Project:

Contractor:

Title: Detail Survey Tower Schedule : AP-01 to AP-08

Date:

Rev - 0

Sr. No.	Tower No.	Tower Type	Body Ext.	Angle of Deviation	Span (M) Section Length (M)	Cum. Length (M)	Wind Span (M)	Height Span (Gabl), m Left	Right	Total	Height Span (Bott), m Left	Right	Total	Remarks / Crossings	Easting,m	Northing,m	Reduced Level,m
1	AP-01	30+0	+0		151	0	....	....	39	....	....	81	....				
					153									Bridge, Road			
2	AP-02	30+0	+0		173	151	281.8	52	131	183	56	131	189	Railway Line/Conveyor,Pipe Line			
3	AP-03	30+0	+0		98	323	301.8	181	101	282	189	92	281				
4	AP-04	30+0	+0		98	421	332.8	72	28	100	91	41	132	Light Pole			
5	AP-05	30+0	+0		147	519	329	63	286	348	98	136	234	Light Pole			
6	AP-06	30+0	+0		188	666	338	181	69	250	152	53	205				
7	AP-06	30+0	+0		147	813	328	59	17	76	55	34	289				
8	AP-07	30+0	+0		187	960	332	138	220	358	93	232	325	Light Pole			
9	AP-08	30+0	+0		407	1355	....	264	....	....	265	....	....				

Annexure - II

	A	B	C	D	E	F	G	H
1	SL No.	Location	Crossing Structure	Name Of The Building	E	N	Height	Clearance
2			Road					
3	1	AP-01/AP-02	Light pole 1				6.34 M	24.3M
4			Light pole 2				6.33	23.7M
5			Drain					
6			Rail Track					
7			Railway Lines				9.2M	17.4M
8			Light pole 3				6.35	18.6M
9			Road					
10	2	AP-02-AP 02/01	Building 1	M/s POWER MACHINE shed	632462.496	2447519	3.96 M	19.7 M
11			Building 2	CISF watch tower	632400.7723	2447591	4.79M	23.3M
12			Pipe Line					
13			Bridge					
14			Drain					
15			Boundary					
16			Drain					
17			Light pole 4				7.02M	20.9M
18	3	AP 02/01-AP-03	Building 3		632416.8047	2447703	3.35 M	24.6M
19			Building 4	Janjee village house.	632422.0487	2447710	3.02M	24.4M
20			Building 5		632414.7108	2447712	3.23M	24.5M
21			Road					
22			Road					
23			Drain					
24	4	AP-03-AP-04	Light pole 5				6.65M	20.4M
25			Light pole 6				6.78M	20.5M
26			Boundary					

27			Building 6	Ash brick plant-Pump house	632411.5918	2448130	6.49 M	21.5M
28			Building 7	Ash brick plant-operator room	632402.5216	2448147	3.79M	20.7M
29			Building 8	Ash brick plant	632375.4463	2448207	8.81M	19.1M
30			Light pole 7				8.23M	15.5M
31			Light pole 8				9.25M	12.1M
32			Light pole 9				9.54M	10.3M
33			Light pole 10				9.23M	11.0M
34			Light pole 11				10.02M	13.07M
35	5	AP-04-AP-05	Light pole 12				8.52M	19.4M
36			Light pole 13				8.89M	18.6M
37			Light pole 14				9.58	11.3M
38			Light pole 15				9.98M	10.9M
39			Light pole 16				10.07M	13.7M
40			Light pole 17				8.85M	15.7M
41			Light pole 18				6.76M	21.7M
42			Drain					
43			Pond					
44			Boundary	CISF Watch tower	632422.6913	2448270	6.02M	25.9M
45	6	AP-05-AP-06	Road	Ash brick plant STORAGE SHEED.	632357.0247	2448290	3.5M	26.6M
46			Building 9					
47			Building 10					
48			Drain					
49			Boundary					
50	7	AP-06-AP-07	Drain	Ash brick plant-toilet block	632369.1278	2448331	3.38M	23.5M
51			Boundary					
52			Light pole 19				8.05M	21.5M
53			Building 11					
54			Light pole20				5.05M	18.8M
55			Retaining Wall	Toilet block	632436.529	2448469	3.34M	27.3M
56	8	AP-07-AP-08	Boundary	Weigh bridge	632446.4312	2448477	3.12 M	24.2M
57			Building 12					
58			Building 13					
59			Light pole 21				8.25M	15.6M


Union Bank of India
NTPC Material Gate
NTPC SIPAT SILO STAGE-2
Unit 4 NTPC Sipat
Ajay auto parts
Ash silo NTP
NTPC Coal Bhawan Ch

SAG TENSION CALCULATION

765 kV D/C Hexa AL59 Zebra WZ-2 RL-2 TC-2

Normal Span		m	**400**					
Wire			TOP CONDUCTOR	MIDDLE CONDUCTOR	BOTTOM CONDUCTOR	EARTHWIRE	OPGW-1	
Name			AL59 Zebra	AL59 Zebra	AL59 Zebra	GSS	OPGW	
Make/Model No./ Stranding/etc.			AL59	AL59	AL59	7/3.66	ZTT - OPGW-48B1 80 [84.9;41.7]	
Overall Diameter	D	cm	2.772	2.772	2.772	1.098	1.28	
Area	A	cm²	4.545	4.55	4.55	0.736	0.6129	
Unit weight	Wt	kg/m	1.254	1.254	1.254	0.583	0.477	
Ultimate strength	T	kg	11012.5	11012.5	11012.5	6972.5	8657.4	
Young's modulus	E	kg/cm²	561000	561000	561000	1930000	1398031	
Coefficient of expansio	α	/°C	0.000023	0.000023	0.000023	0.0000115	0.000014	
Controlling case								
Temperature		°C	32	32	32	0	0	
Wind Pressure		kg/m²	0.0	0.0	0.0	0.0	0	
K calculation by FOS/Tension/SAG			FOS	FOS	FOS	SAG	SAG	
FOS/Tension/SAG Required			4.545	4.545	4.545	7.763	7.763	
VALUES FOR TOP CONDUCTOR			**TOP CONDUCTOR - AL59 Zebra AL59**					
Case Description			32° • Nil (0) Wind	32° • Full (142.9) Wind	32° • 0.75 wind	0° • Nil wind	85° • Nil wind	
Wire Tension		kg	**2422.8**	**6005.5**	**4984.2**	**2907.5**	**1930.8**	
% Use			22.00%	54.53%	45.26%	26.40%	17.53%	
Maximum % Use Allowed			22%	70%	70%	70%	70%	
Sag PARABOLA		m	**10.352**			**8.626**	**12.989**	
VALUES FOR MIDDLE CONDUCTOR			**MIDDLE CONDUCTOR - AL59 Zebra AL59**					
Case Description			32° • Nil (0) Wind	32° • Full (136.2) Wind	32° • 0.75 wind	0° • Nil wind	85° • Nil wind	
Wire Tension		kg	**2422.8**	**5817.6**	**4836.9**	**2907.5**	**1930.8**	
% Use			22.00%	52.83%	43.92%	26.40%	17.53%	
Maximum % Use Allowed			22%	70%	70%	70%	70%	
Sag PARABOLA		m	**10.352**			**8.626**	**12.989**	
VALUES FOR BOTTOM CONDUCTOR			**BOTTOM CONDUCTOR - AL59 Zebra AL59**					
Case Description			32° • Nil (0) Wind	32° • Full (127.5) Wind	32° • 0.75 wind	0° • Nil wind	85° • Nil wind	
Wire Tension		kg	**2422.8**	**5571.1**	**4644.6**	**2907.5**	**1930.8**	
% Use			22.00%	50.59%	42.18%	26.40%	17.53%	
Maximum % Use Allowed			22%	70%	70%	70%	70%	
Sag PARABOLA		m	**10.352**			**8.626**	**12.989**	
CALCULATION FOR EARTHWIRE					**GSS 7/3.66**			
Case Description			32° • Nil (0) Wind	32° • Full (174.9) Wind	32° • 0.75 wind	0° • Nil wind	53° • Nil wind	
Wire Tension		kg	**1341.4**	**3223.4**	**2696.6**	**1502.0**	**1254.5**	
% Use			19.24%	46.23%	38.68%	21.54%	17.99%	
Maximum % Use Allowed			20%	70%	70%	70%	70%	
Sag PARABOLA		m	**8.693**			**7.763**	**9.294**	
% Sag of Earthwire to Sag of		%	84%			90%	72%	
CALCULATION FOR OPGW-1					**OPGW ZTT - OPGW-48B1-80 [84.9;41.7]**			
Case Description			32° • Nil (0) Wind	32° • Full (174.9) Wind	32° • 0.75 wind	0° • Nil wind	53° • Nil wind	
Wire Tension		kg	**1086.1**	**3099.6**	**2586.3**	**1228.9**	**1009.0**	
% Use			12.55%	35.80%	29.87%	14.19%	11.66%	
Maximum % Use Allowed			20%	40%	40%	40%	40%	
Sag PARABOLA		m	**8.783**			**7.763**	**9.455**	
% Sag of OPGW to Sag of Co		%	85%			90%	73%	

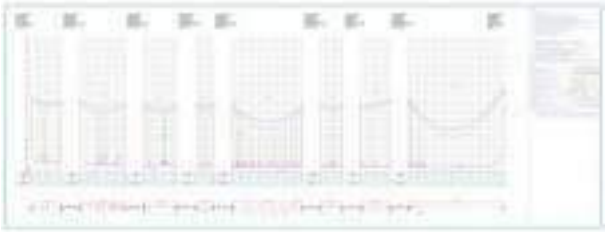
Annexure - III

	A	B	C	D	E
1	SL	Easting	Northing	Height of the Trees	
2	1	632878	2448586	10.21	
3	2	632868.2	2448591	8.77	
4	3	632869.2	2448573	10.23	
5	4	632861.9	2448584	11.73	
6	5	632851.4	2448576	10.25	
7	6	632810.2	2448564	10.27	
8	7	632749.1	2448532	5.07	
9	8	632680.6	2448558	3.67	
10	9	632636.4	2448529	9.3	
11	10	632582.6	2448475	5.64	
12	11	632557.5	2448465	8.62	
13	12	632556.3	2448475	7.75	
14	13	632559.1	2448497	10.25	
15	14	632528.3	2448479	9.55	
16	15	632516.3	2448490	10.25	
17	16	632521.5	2448474	10.85	
18	17	632519.7	2448463	8.12	
19	18	632530.4	2448454	7.59	
20	19	632494.6	2448464	7.59	
21	20	632492.7	2448443	8.16	
22	21	632430.7	2448473	7.93	
23	22	632428.4	2448463	7.88	
24	23	632424.2	2448452	12.51	
25	24	632423.1	2448443	6.35	
26	25	632415.8	2448425	10.49	
27	26	632408.1	2448405	8.94	
28	27	632403	2448396	7.49	
29	28	632397.2	2448389	7.91	
30	29	632406.2	2448389	11.24	
31	30	632404.8	2448378	3.87	
32	31	632390.7	2448366	6.67	
33	32	632383.6	2448358	5.67	
34	33	632379.6	2448364	4.89	
35	34	632372.3	2448360	7.59	
36	35	632378.5	2448354	6.65	
37	36	632374.9	2448347	7.32	
38	37	632370.9	2448344	8.15	
39	38	632361.8	2448333	12.12	
40	39	632355.8	2448326	6.36	

	A	B	C	D
42	41	632354.3	2448317	5.33
43	42	632355.4	2448304	6.79
44	43	632358	2448278	7.59
45	44	632412.7	2448225	3.27
46	45	632410.5	2448126	5.58
47	46	632404.3	2448131	7.41
48	47	632394.3	2448129	6.87
49	48	632385.6	2448129	6.89
50	49	632379.7	2448129	8.99
51	50	632429.9	2447842	7.59
52	51	632439.7	2447804	8.81
53	52	632448.3	2447780	12.15
54	53	632457.8	2447774	4.57
55	54	632609.5	2447365	5.05
56	55	632600.9	2447361	4.36
57	56	632604.2	2447375	6.05
58	57	632591.9	2447367	9.12
59	58	632595.6	2447388	7.85
60	59	632595	2447399	8.41
61	60	632593.9	2447404	7.52
62	61	632567.2	2447363	10.19
63	62	632551.5	2447369	7.28
64	63	632554.6	2447378	9.33
65	64	632555.3	2447389	9.62
66	65	632563.1	2447398	7.71
67	66	632542.1	2447394	10.13
68	67	632549.5	2447404	10.09
69	68	632412.9	2448168	2.63
70	69	632454.9	2447744	8.74
71	70	632427.7	2447712	2.3
72	71	632461.3	2447691	4.82
73	72	632457.8	2447685	11.55
74	73	632463.8	2447677	6.34
75	74	632424.5	2447640	5.78
76	75	632421.2	2447603	3.46
77	76	632453.4	2447506	6.21
78	77	632461.4	2447446	8.51
79	78	632470.3	2447455	8.24
80	79	632480.3	2447453	9.26

	A	B	C	D
82	81	632434.2	2447460	4.89
83	82	632456.4	2447463	2.89
84	83	632460.8	2447429	8.19
85	84	632474.2	2447433	8.61
86	85	632474.6	2447440	8.37
87	86	632472.6	2447422	7.3
88	87	632460.2	2447417	9.38
89	88	632480.3	2447416	6.34
90	89	632494.8	2447417	10.67
91	90	632513.8	2447417	9.53
92	91	632521.4	2447416	11.43
93	92	632518.7	2447408	9.53
94	93	632531.7	2447417	10.17
95	94	632519.2	2447422	10.7
96	95	632532.2	2447402	2.3
97	96	632430.7	2447518	4.04
98	97	632551.1	2447410	10.09
99	98	632541.8	2447419	10.09
100	99	632535.9	2447409	10.09
101	100	632506.6	2447442	10.09





Conclusion:-

In conclusion, the pre-construction survey for the transmission line corridor has been instrumental in site selection, environmental impact assessment, regulatory compliance, risk mitigation, cost estimation, and stakeholder engagement.

Following a thorough inspection, we have identified and properly investigated the locations for 8 transmission line towers within the corridor. Our diligent assessment ensures that these spots are well-suited for the construction, taking into account all necessary factors to ensure the structural integrity, safety, and overall success of the transmission line project. This meticulous investigation reaffirms our commitment to a reliable and well-planned infrastructure development.

Tower No.AP-01
Tower Type:DD+0
X=632637.12
Y=2447360.25
Wind Span:.
Weight Span (Cold):=.....
.....(L)+101(R)
Weight Span (Hot):=.....
.....(L)+85(R)

Tower No.AP-02
Tower Type:DD+0
X=632488.00
Y=2447369.00
Wind Span:192
Weight Span (Cold):=181
50(L)+131(R)
Weight Span (Hot):=189
66(L)+123(R)

Tower No.02/D1
Tower Type:DD+0
X=632410.27
Y=2447606.81
Wind Span:203
Weight Span (Cold):=202
101(L)+101(R)
Weight Span (Hot):=201
109(L)+92(R)

Tower No.AP-03
Tower Type:DC+0
X=632438.29
Y=2447777.56
Wind Span:132
Weight Span (Cold):=100
72(L)+28(R)
Weight Span (Hot):=122
81(L)+41(R)

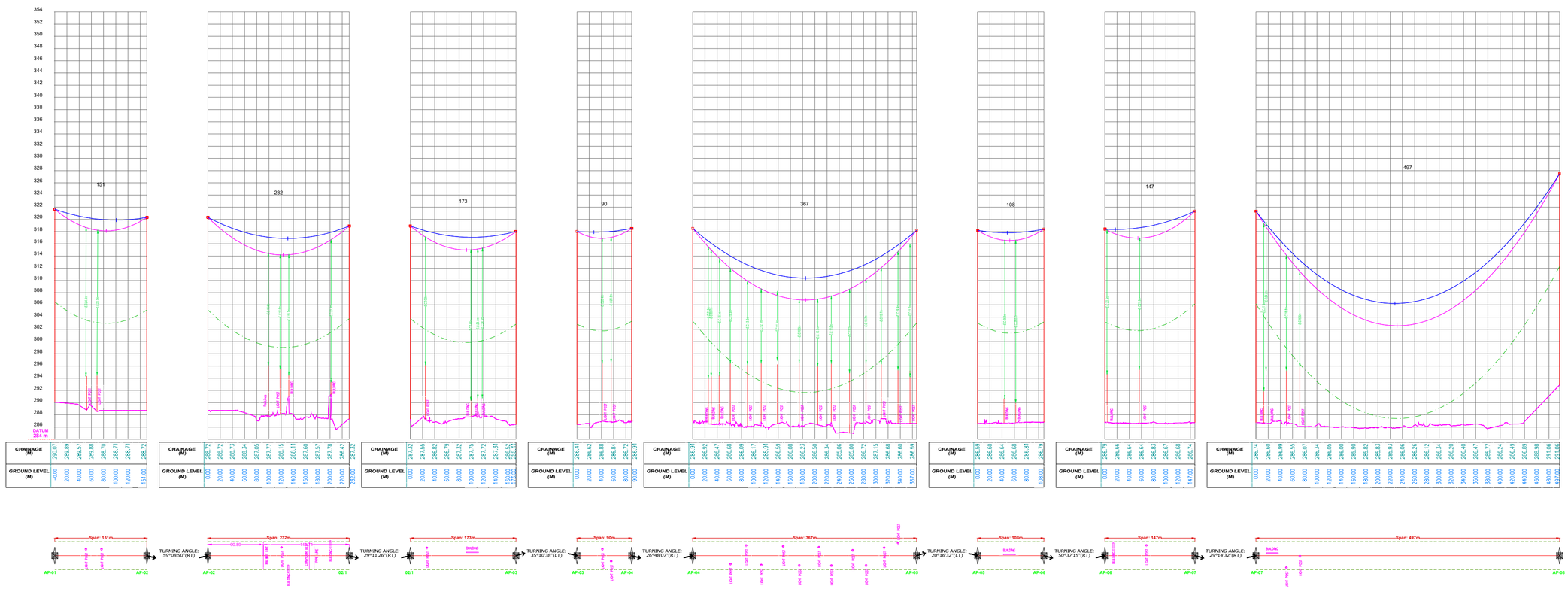
Tower No.AP-04
Tower Type:DC+0
X=632395.21
Y=2447855.19
Wind Span:220
Weight Span (Cold):=248
62(L)+186(R)
Weight Span (Hot):=234
49(L)+185(R)

Tower No.AP-05
Tower Type:DC+0
X=632405.25
Y=2448224.96
Wind Span:238
Weight Span (Cold):=230
181(L)+49(R)
Weight Span (Hot):=235
182(L)+53(R)

Tower No.AP-06
Tower Type:DD+0
X=632369.35
Y=2448327.27
Wind Span:128
Weight Span (Cold):=76
59(L)+17(R)
Weight Span (Hot):=109
55(L)+54(R)

Tower No.AP-07
Tower Type:DD+3
X=632445.30
Y=2448453.30
Wind Span:322
Weight Span (Cold):=358
130(L)+228(R)
Weight Span (Hot):=323
93(L)+232(R)

Tower No.AP-08
Tower Type:DD+3
X=632879.00
Y=2448698.00
Wind Span:.
Weight Span (Cold):=.....
269(L)+.....(R)
Weight Span (Hot):=.....
265(L)+.....(R)



NOTE :-

1. ALL DIMENSIONS ARE IN m.
2. ELECTRICAL CLEARANCE FOR RAILWAY CROSSING DETAILS :-
   - i.) PRIOR APPROVAL OF RAILWAY AUTHORITY IS TO BE OBTAINED.
   - ii.) MINIMUM CLEARANCE BETWEEN LOWEST POINT OF 400kV LINE CONDUCTOR AND RAIL LEVEL SHALL BE 19.20m. HOWEVER APPROVAL OF RAILWAY CROSSING FROM RAILWAY AUTHORITY HAS TO BE OBTAINED IN EACH CASE.
   - iii.) THE CROSSING SPAN SHALL BE LIMITED TO 300M.
   - iv.) THE CROSSING SHALL NORMALLY BE AT RIGHT ANGLE TO THE RAILWAY TRACK.
   - v.) CROSSING SHOULD BE DONE WITH D TYPE TOWER.
3. MINIMUM CLEARANCE FOR POWER LINE CROSSING
   - i) FOR UP TO 400kV : 5.49MM
   - ii) FOR UP TO 765kV: 7.94MM
4. TELECOMMUNICATION LINE CROSSING :-
   - i.) THE ANGLE OF CROSSING SHALL BE AS NEAR TO 90° AS POSSIBLE. HOWEVER DEVIATION TO THE EXTENT OF 30° MAY BE PERMITTED UNDER EXCEPTIONALLY DIFFICULT SITUATIONS.
   - ii) THE NUMBER OF CONSECUTIVE SPANS BETWEEN THE SECTION POINTS SHALL NOT EXCEED 15 IN PLAIN TERRAIN AND 10 SPANS IN HILLY TERRAIN. A SECTION POINT SHALL COMPRISE OF TENSION POINT WITH B TYPE, C TYPE OR D TYPE TOWER AS APPLICABLE.
5. FOR ALL NATIONAL HIGHWAY CROSSING TENSION TOWER IS TO BE USED AND THE CROSSING SPAN IS NOT TO EXCEED 250 METERS.
6. WAY LEAVE CLEARANCE : 23.0M EITHER SIDE FROM THE C.L. OF THE TOWER

Legends

Sr.No.	Description	Symbol
1).	Alignment	
2).	Power Line Corridor	
3).	Cold Curve / Hot Curve	
4).	Ground Clearance / Ground Profile	
5).	House / Ground Profile Side Hill	
6).	Railway Track	
7).	National Highway / State Highway	
8).	Road / Cart Track	
9).	110KV / 132KV / 220KV / 400KV & ABOVE TL	
10).	66kV / 33kV Line	
11).	11kV Line / LT Line	
12).	Telephone Line / Fence	
13).	Pond / Canal / Nala / River	
14).	Bund / Well / Tube Well / Tree	

Notes:-

1. ALL DIMENSIONS ARE IN METER OTHERWISE STATED
2. KINDLY REFER TOWER SCHEDULE FOR FURTHER DETAILS ABOUT WIND AND WEIGHT SPAN
3. UTM (ZONE :- 44) COORDINATE SYSTEM HAS BEEN ADOPTED FOR DETAILED SURVEY



LEGEND

- Building
- Under ConstructionBuilding
- CC Road
- Kacha Road
- Electric Wire
- Tower Location
- Electric Pole
- Drain
- Pond
- Boundary Wall
- Light Post
- Tree
- Pipe line
- Rail Track
- Plant
- Offset
- Divider
- Footpath
- Bridge
- Proposed Tranmsission Line
- Proposed Tranmsission Line Corridor

Trees Serial number 66

Height of the Trees 10.64

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DRAWING NO.: EMI-CG1521-1-001

ANNEXURE-I

765/132kV SWITCHYARD CONTROL ROOM

PRINTER (A4 COLOUR)
PRINTER (A3/A4 B/W)
ECS
ECS
80" LVS approval is under process.
GATEWAY TO 400/132kV SAS ON IEC-6-870-5-104
GATEWAY TO RLDC ON IEC-6-870-5-101
LVS
80" XGA LVS
OWS (SERVER MAIN)
OWS (SERVER STANDBY)
E&FRS
19" MONITOR
EFS
100 MBPS REDUNDANT FIBER OPTIC TCP/IP RING ON IEC 61850 PROTOCOL

BCU PANELS

ICT#1 | TIE(ICT#1-GT#1) | GT#1 | BUS REACTOR | TIE(BS-ICT#2) | ICT#2 | GT#2 | TIE(GT#2)
TIE(SEONI#2) | SEONI#2 | SEONI#1 | TIE(SEONI#1-GT#3) | GT#3 | GT#4 | TIE(GT#4) | TIE(GT#5)
GT#5 | ISLANDING | BUS SECTION#1 | BUS SECTION#2 | TIME SYNC. AND COMMON SERVICES

PROTECTION PANELS

ICT#1-TIE-GT#1 DIAMETER | BUS REACTOR-TIE-ICT#2 DIAMETER | GT#2-TIE DIAMETER | TIE-SEONI#2 DIAMETER
SEONI#1-TIE-GT#3 DIAMETER | GT#4-TIE DIAMETER | TIE-GT#5 DIAMETER | BUS BAR-I | BUS BAR-II | DISTURBANCE RECORDER

C&R ROOM

EWS(PORTABLE)

MAIN CONTROL ROOM-1

OWS
E&FRS
PRINTER (A4 COLOUR)
GENERATOR-1
GENERATOR-2
GENERATOR-3
DISTURBANCE RECORDER

MAIN CONTROL ROOM-2

OWS
E&FRS
GENERATOR-4
GENERATOR-5
DISTURBANCE RECORDER

2 Portable EWS - one for main plant and one for switchyard are to be supplied

S.NO.	DESCRIPTION	QTY.	HARDWARE/SOFTWARE SPECIFICATION
1.	OPERATOR WORKSTATION (OWS) SOFTWARE	4	PROCESSOR: INTEL P-IV, CLOCK SPEED: 3.0GHz OR MORE, DISK CONFIGURATION: 80GB SATA HARD DISK DRIVE, RAM: 1GB, CDROM DRIVE: 40XR/W, DVD COMB 24X, COMMUNICATION PORTS: 1 PARALLEL & 2 SERIAL, VDU: 19" TFT, VDU RESOLUTION: 1600x1280 PIXELS, KEY BOARD: STANDARD QWERTY UK 102 KEYS, MOUSE: 3 BUTTONS. MICROSOFT WINDOWS 2000 OR XP AREVA PACIS CI
2.	ENGINEERING & FAULT RECORDING STATION (E&FRS) (PROTECTION SCOPE) SOFTWARE	3	PROCESSOR: INTEL P-IV, CLOCK SPEED: 3.0GHz OR MORE, DISK CONFIGURATION: 80GB SATA HARD DISK DRIVE, RAM: 1GB, CDROM DRIVE: 40XR/W, DVD COMB 24X, COMMUNICATION PORTS: 1 PARALLEL & 2 SERIAL, VDU: 19" TFT, VDU RESOLUTION: 1600x1280 PIXELS, KEY BOARD: STANDARD QWERTY UK 102 KEYS, MOUSE: 3 BUTTONS. MICROSOFT WINDOWS 2000 OR XP AREVA PACIS SCE (SYSTEM CONFIGURATION EDITOR) AREVA PACIS SMT (SYSTEM MANAGEMENT TOOL) AREVA PACIS CMT (COMPUTER MANAGEMENT TOOL) AREVA RELAY PARAMETERIZATION SOFTWARE S1
3.	GATEWAY SOFTWARE	4	PROCESSOR: INTEL P-IV (INDUSTRIAL GRADE), CLOCK SPEED: 2.8GHz OR MORE, DISK CONFIGURATION: 40GB OR MORE, RAM: 512 MB MICROSOFT WINDOWS 2000 OR XP AREVA PACIS GATEWAY
4.	EWS(PORTABLE)	1 2	LAPTOP MAKE: DELL, PROCESSOR: PENTIUM MOBILE, CLOCK SPEED: 1.8 GHz OR MORE, HDD: 40GB, RAM: 1GB, CDROM DRIVE: 40X, R/W, DVD, 14" TFT SCREEN MICROSOFT WINDOWS 2000 OR XP AREVA PACIS SCE (SYSTEM CONFIGURATION EDITOR) AREVA PACIS SMT (SYSTEM MANAGEMENT TOOL) AREVA PACIS CMT (COMPUTER MANAGEMENT TOOL) AREVA RELAY PARAMETERIZATION SOFTWARE S1
5.	LVS	1	80" XGA LARGE VIDEO SCREEN
6.	EFS	30	EXT. FIBER SWITCH 6Tx + 2Fx REDUNDANT SWITCH, MODEL-H302, MAKE-AREVA
7.	ECS	5	ETHERNET COPPER SWITCH, (16 PORT COPPER), MAKE-CISCO
8.	PRINTER	2	A4 COLOR LASER PRINTER
9.	PRINTER	1	A3/A4 B/W LASER PRINTER
10.	CONV	5	MODBUS TO IEC61850 CONVERTOR
11.	DR	7	DISTURBANCE RECORDER

LEGEND:-
- 100 MBPS ETHERNET UTP LINK
- 100 MBPS REDUNDANT FIBER OPTIC TCP/IP RING ON IEC 61850 PROTOCOL
- COPPER WIRE, RS485 2 WIRE LINK
- COAXIAL CABLE (GPS LINK)

REFR. DRG. NO.	DESCRIPTION

REV.	DESCRIPTION	DRAWN	CHECKED	APPROVED	STATUS
1	AS PER CUSTOMER COMMENTS DATED 04.10.05 AND DISCUSSION DATED 10.10.05	KKL 26.10.05	SNV 26.10.05	RJR 26.10.05	FA
0	FIRST ISSUE	KKL 17.08.05	SNV 22.08.05	RJR 31.08.05	FA

NTPC DRAWING No. 9545-505-PVE-B-601

CLIENT : NATIONAL THERMAL POWER CORPORATION LTD. (A GOVERNMENT OF INDIA ENTERPRISE)

PROJECT : 765kV SWITCHYARD PACKAGE ASSOCIATED WITH SIPAT STPP STAGE-I (3x660MW) & STAGE-II (2x500MW)

LOA NO. : CS-9545-505-2-FC-NOA-4557 Dtd: 16.05.05

MAIN TURNKEY CONTRACTOR: M/S AREVA T&D SA, TOUR AREVA 1, Place de la Coupole, 92084 Paris La Defense, FRANCE

ASSIGNEE TURNKEY CONTRACTOR: ALSTOM T&D SYSTEMS LTD, A 21-24, SECTOR-16, ELECTRONICS NAGAR, NOIDA (INDIA) - 201301

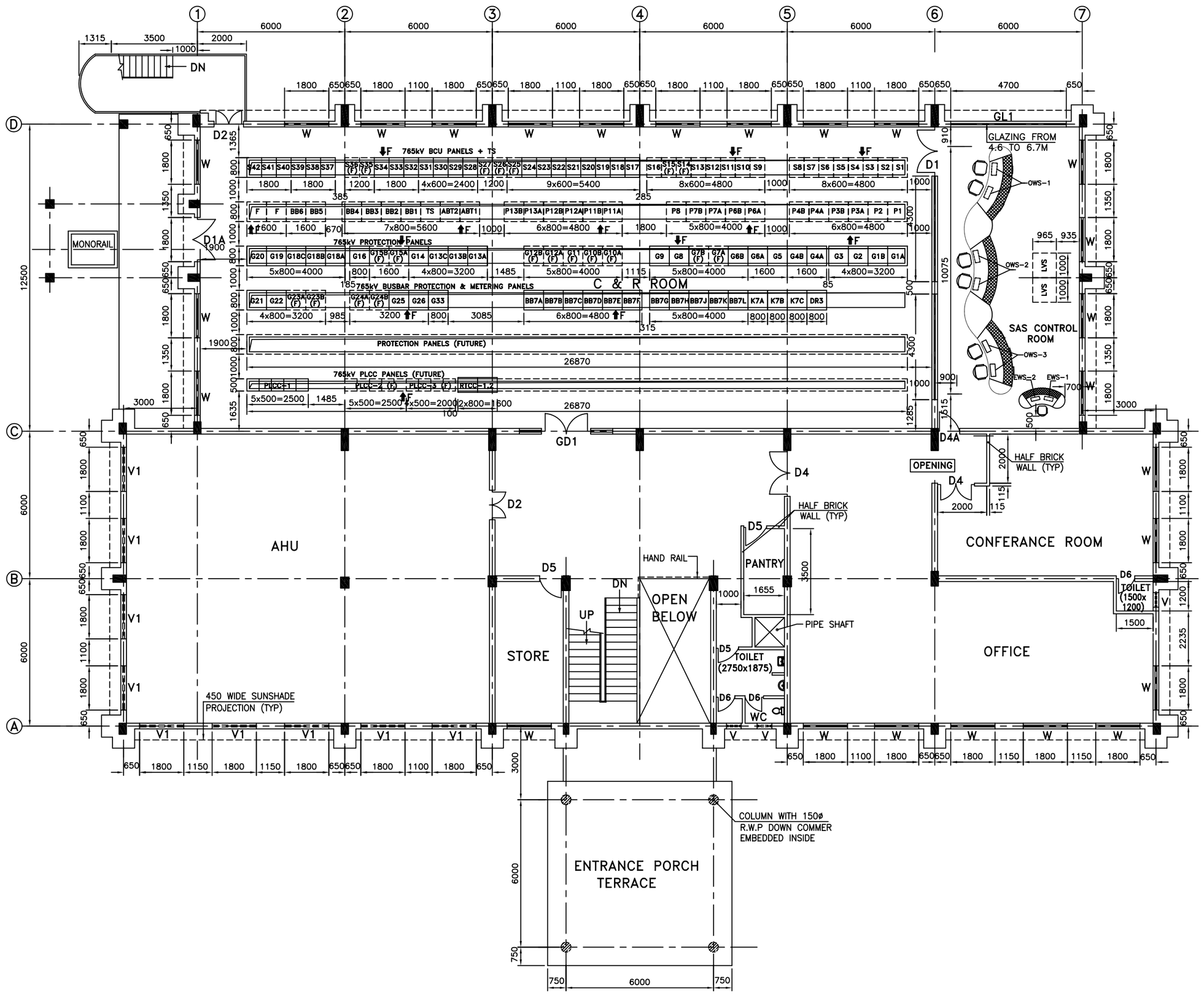
EQUIPT. SUPPLIER : ALSTOM T&D SYSTEMS LTD, A 21-24, SECTOR-16, ELECTRONICS NAGAR, NOIDA (INDIA) - 201301

TITLE : OVERALL SYSTEM ARCHITECTURE

DRAWING NO. EMI-CG1521-1-001

TOTAL SH. 001 | SH.No. 001 | REV. 1 | SCALE NTS

DRAWING NO.:SYS-CS2516-CRL-017



FIRST FLOOR PLAN

(SCALE – 1:125)

PANEL DESCRIPTIONS

SL.No.	PANEL SPECIFICATION	DESCRIPTION	REMARKS
1	P1	132kV O/G LINE–1 TO MWPH PROTN. PANEL (BAY–1)	
2	P2	132kV O/G LINE–2 TO MWPH PROTN. PANEL (BAY–2)	
3	P3A	132kV MISC SERVICE TRANFORMER#2 MAIN PROTN. (BAY–3)	
4	P3B	132kV MISC SERVICE TRANFORMER#2 BACKUP PROTN. (BAY–3)	
5	P4A	132kV MISC SERVICE TRANFORMER#1 MAIN PROTN. (BAY–4)	
6	P4B	132kV MISC SERVICE TRANFORMER#1 BACKUP PROTN. (BAY–4)	
7	P6A	132kV STATION TRANFORMER#1 MAIN PROTN. (BAY–6)	
8	P6B	132kV STATION TRANFORMER#1 BACKUP PROTN. (BAY–6)	
9	P7A	132kV STATION TRANFORMER#2 MAIN PROTN. (BAY–7)	
10	P7B	132kV STATION TRANFORMER#2 BACKUP PROTN. (BAY–7)	
11	P8	132kV BUS COUPLER (BAY–8)	
12	P11A	132kV STATION TRANFORMER#3 MAIN PROTN. (BAY–11)	
13	P11B	132kV STATION TRANFORMER#3 BACKUP PROTN. (BAY–11)	
14	P12A	132kV STATION TRANFORMER#4 MAIN PROTN. (BAY–12)	
15	P12B	132kV STATION TRANFORMER#4 BACKUP PROTN. (BAY–12)	
16	P13A	132kV STATION TRANFORMER#5 MAIN PROTN. (BAY–13)	
17	P13B	132kV STATION TRANFORMER#5 BACKUP PROTN. (BAY–13)	
18	BB1 TO BB6	132kV BUSBAR PROTECTION PANEL	
		BAY CONTROLLER PANEL FOR	
19	S1	132kV LINE–1 TO MWPH BAY	
20	S2	132kV LINE–2 TO MWPH BAY	
21	S3	MISC TRANSFORMER–2 BAY	
22	S4	132kV MISC TRANSFORMER–1 BAY	
23	S5	132kV I/C–3 FROM IBT–3 BAY	
24	S6	132kV STATION TRANSFORMER–1 BAY	
25	S7	132kV STATION TRANSFORMER–2 BAY	
26	S8	132kV BUS COUPLER BAY	
27	S9	132kV I/C–2 FROM IBT–2 BAY	
28	S10	132kV I/C–1 FROM IBT–1 BAY	
29	S11	132kV STATION TRANFORMER#3 BAY	
30	S12	132kV STATION TRANFORMER#4 BAY	
31	S13	132kV STATION TRANFORMER#5 BAY	
32	S14	FUTURE BCU PANEL	
33	S15	FUTURE BCU PANEL	
34	S16	TIME SYNCRONIZER / COMMON SERVICES PANEL	
		PROTECTION PANEL	
35	G1A	765kV ICT#1 (BAY–1) PROTN.	
36	G1B	765kV ICT#1 (BAY–1) PROTN.	
37	G2	765kV TIE BREAKER PROTN. WITHOUT A/R (BAY–2)	
38	G3	765kV GT#1 (BAY–3)	
39	G4A	765kV BUS REACTOR (BAY–4) PROTN.	
40	G4B	765kV BUS REACTOR (BAY–4) PROTN.	
41	G5	765kV TIE BREAKER PROTN. WITHOUT A/R (BAY–5)	
42	G6A	765kV ICT#2 (BAY–6) PROTN.	
43	G6B	765kV ICT#2 (BAY–6) PROTN.	
44	G7A	FOR FUTURE BAY	
45	G7B	FOR FUTURE BAY	
46	G8	765kV TIE BREAKER PROTN. WITHOUT A/R (BAY–8)	
47	G9	765kV GT#2 (BAY–9)	
48	G10A	FOR FUTURE BAY	
49	G10B	FOR FUTURE BAY	
50	G11	FOR FUTURE BAY	
51	G12A	FOR FUTURE BAY	
52	G12B	FOR FUTURE BAY	
53	G13A	765kV SEONI#2 (BAY–13) MAIN–1 PROTN.	
54	G13B	765kV SEONI#2 (BAY–13) MAIN–2 PROTN.	
55	G13C	765kV SEONI#2 (BAY–13) LINE REACTOR PROTN.	
56	G14	765kV TIE BREAKER PROTN. WITH A/R (BAY–14)	
57	G15A	FOR FUTURE BAY	
58	G15B	FOR FUTURE BAY	
59	G16	765kV BUS SECTION PROTN. (BAY–16 & 17)	
60	G18A	765kV SEONI#1 (BAY–18) MAIN–1 PROTN.	
61	G18B	765kV SEONI#1 (BAY–18) MAIN–2 PROTN.	
62	G18C	765kV SEONI#1 (BAY–18) LINE REACTOR PROTN.	
63	G19	765kV TIE BREAKER PROTN. WITH A/R (BAY–19)	
64	G20	765kV GT#3 (BAY–20)	
65	G21	765kV GT#4 (BAY–21)	
66	G22	765kV TIE BREAKER PROTN. WITH A/R (BAY–22)	
67	G23A	FOR FUTURE BAY	
68	G23B	FOR FUTURE BAY	
69	G24A	FOR FUTURE BAY	
70	G24B	FOR FUTURE BAY	
71	G25	765kV TIE BREAKER PROTN. WITH A/R (BAY–25)	
72	G26	765kV GT#5 (BAY–26)	
73	G33	765kV ISLANDING CIRCUIT	
74	BB7A	765kV BUSBAR PROTN. ICT#1 & GT#1	
75	BB7B	765kV BUSBAR PROTN. BUS REACTOR & ICT#2	
76	BB7C	765kV BUSBAR PROTN. FUTURE (BAY–7) & GT#2	
77	BB7D	765kV BUSBAR PROTN. CENTRAL UNITS M1 & M2	
78	BB7E	765kV BUSBAR PROTN. SEONI#2 & FUTURE (BAY–14)	
79	BB7F	765kV BUSBAR PROTN. BUS SECTIONS (BAY–16 & 17)	
80	BB7G	765kV BUSBAR PROTN. BUS SECTIONS (BAY–16 & 17)	
81	BB7H	765kV BUSBAR PROTN. SEONI#1 GT#3	
82	BB7J	765kV BUSBAR PROTN. CENTRAL UNITS M1 & M2	
83	BB7K	765kV BUSBAR PROTN. GT#4 & FUTURE (BAY–23)	
84	BB7L	765kV BUSBAR PROTN. GT#4 & FUTURE (BAY–24)	
85	K7A	765kV METERING PANEL	
86	K7B	765kV METERING PANEL	
86	K7C	765kV METERING PANEL	
87	DR3	LINE DISTURBANCE RECORDER SEONI LINE#1 & 2	
88	PLCC–1	FOR SEONI LINE#1 & 2	
89	PLCC–2	FOR FUTURE	
90	PLCC–3	FOR FUTURE	
91	RTCC–1,2	765kV ICT–1 & 2	
		BAY CONTROLLER PANEL FOR	
92	S17	ICT#1	
93	S18	TIE (ICT#1–GT#1)	
94	S19	GT#1	
95	S20	BUS REACTOR	
96	S21	TIE (BR–ICT#2)	
97	S22	ICT#2	
98	S23	GT#2	
99	S24	TIE (GT#2)	
100	S25	FOR FUTURE BAY	
101	S26	FOR FUTURE BAY	
102	S27	FOR FUTURE BAY	
103	S28	TIE (SEONI#2)	
104	S29	SEONI#2	
105	S30	SEONI#1	
106	S31	TIE (SEONI#1–GT#3)	
107	S32	GT#3	
108	S33	GT#4	
109	S34	TIE (GT#4)	
110	S35	FOR FUTURE BAY	
111	S36	FOR FUTURE BAY	
112	S37	TIE (GT#5)	
113	S38	GT#5	
114	S39	BUS SECTION–1	
115	S40	BUS SECTION–2	
116	S41	TIME SYNC.	
117	S42	NETWORKING	
118	OWS1	OPERATOR WORK STATION–1 FOR 132kV	NOT IN PRESENT SCOPE
119	OWS2	OPERATOR WORK STATION–2 FOR 132kV	NOT IN PRESENT SCOPE
121	OWS3	OPERATOR WORK STATION–3 FOR 765kV	
122	EWS1	ENGINEERING WORK STATION FOR 132kV	NOT IN PRESENT SCOPE
123	EWS2	ENGINEERING WORK STATION FOR 765kV	
124	LVS	LARGE VIDEO SCREEN	

REVIEWED AND ENDORSED BY AREVA — SIGN.

NOTE:–

1. DOTTED PANELS SHOWS EXISTING/FUTURE PANELS.

REFR. DRG. NO.	DESCRIPTION

REV.	DATE	DESCRIPTION	DRAWN	SIGN.	CHKD	SIGN.	APPD	SIGN.	STATUS
2	19.06.06	REVISED AS PER NTPC COMMENTS	SSM		PTK		RNS		FOR APPROVAL
1	08.03.06	REVISED AS PER CUSTOMER COMMENTS	SSM		PTK		RNS		FOR APPROVAL
0	07.12.05	FIRST ISSUE	SSM		PKM		RNS		FOR APPROVAL

CLIENT : **NTPC LIMITED**
(A GOVERMENT OF INDIA ENTERPRISE)

PROJECT : 765kV SWITCHYARD PACKAGE ASSOCIATED WITH SIPAT STPP STAGE–I (3x660MW) & STAGE–II (2x500MW)

LOA NO. : CS–9545–505–2–FC–NOA–4557 Dtd: 16.05.05

MAIN TURNKEY CONTRACTOR: M/S AREVA T&D SA, TOUR AREVA 1, Place de la Coupole, 92084 Paris La Defense, FRANCE

ASSIGNEE TURNKEY CONTRACTOR: AREVA T&D SYSTEMS LTD, A 21–24, SECTOR–16, ELECTRONICS NAGAR, NOIDA (INDIA) – 201301

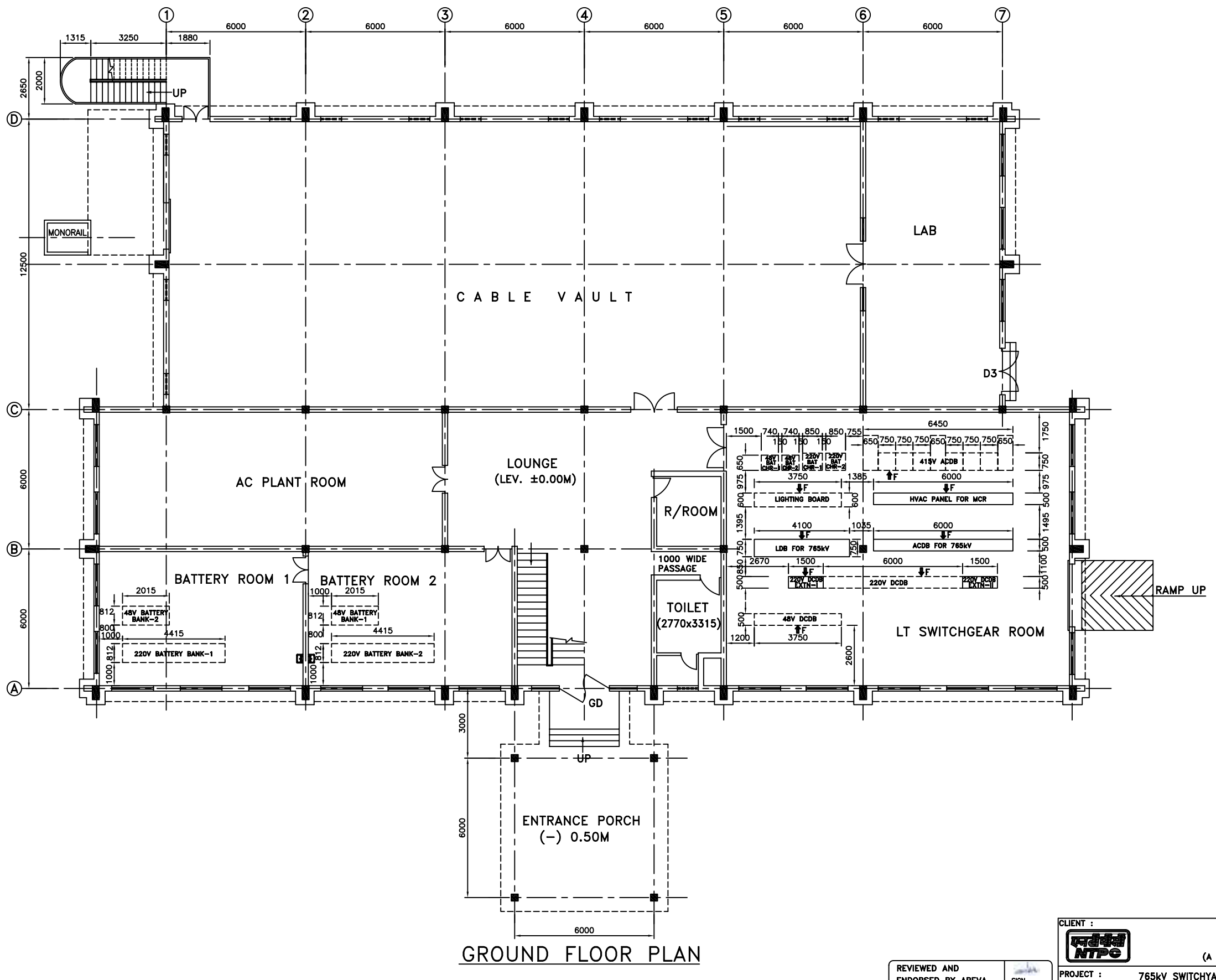
TITLE : CONTROL ROOM LAYOUT

A2	NTPC DRAWING NO.	ALSTOM DRAWING NO.	TOTAL SH. 002	SH.No.	REV.
	9545–505–PVE–F–017	SYS–CS2516–CRL–017	SCALE 1:150	001	2

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DF004

DRAWING NO.:SYS-CS2516-CRL-017



GROUND FLOOR PLAN

REVIEWED AND ENDORSED BY AREVA — SIGN.

NOTE:-
1. DOTTED PANELS SHOWN EXISTING PANELS.

REV.	DATE	DESCRIPTION	DRAWN	SIGN.	CHKD	SIGN.	APPD	SIGN.	STATUS
2	19.06.06	REVISED AS PER NTPC COMMENTS	SSM		PTK		RNS		FOR APPROVAL
1	08.03.06	REVISED AS PER CUSTOMER COMMENTS	SSM		PTK		RNS		FOR APPROVAL
0	07.12.05	FIRST ISSUE	SSM		PKM		RNS		FOR APPROVAL

REFR. DRG. NO. | DESCRIPTION

CLIENT : NTPC LIMITED (A GOVERMENT OF INDIA ENTERPRISE)

PROJECT : 765kV SWITCHYARD PACKAGE ASSOCIATED WITH SIPAT STPP STAGE-I (3x660MW) & STAGE-II (2x500MW)

LOA NO. : CS-9545-505-2-FC-NOA-4557 Dtd: 16.05.05

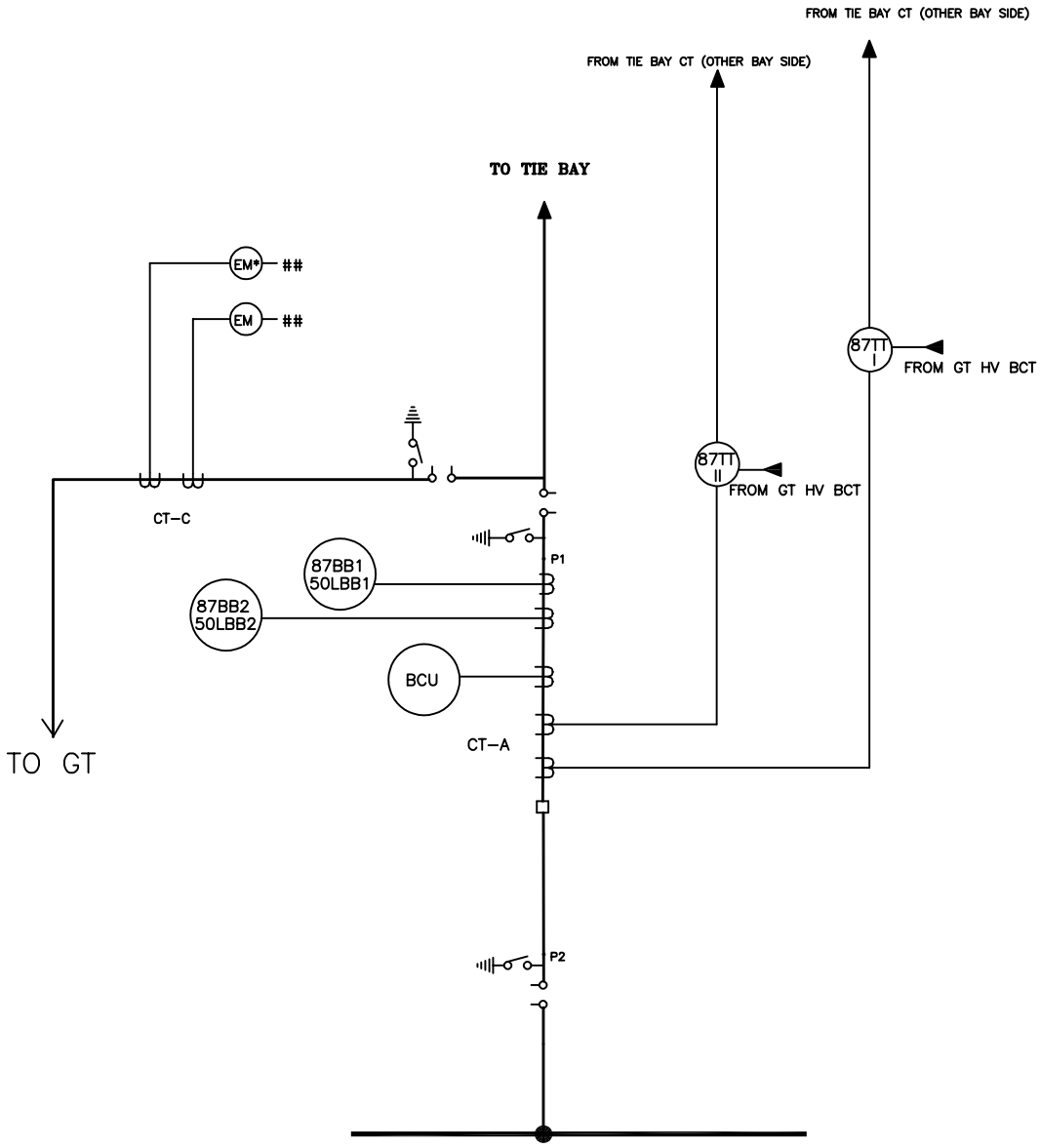
MAIN TURNKEY CONTRACTOR: M/S AREVA T&D SA, TOUR AREVA 1, Place de la Coupole, 92084 Paris La Defense, FRANCE

ASSIGNEE TURNKEY CONTRACTOR: ALSTOM T&D SYSTEMS LTD, A 21-24, SECTOR-16, ELECTRONICS NAGAR, NOIDA (INDIA) - 201301

TITLE : CONTROL ROOM LAYOUT

A3	NTPC DRAWING NO.	ALSTOM DRAWING NO.	TOTAL SH. 002	SH.No.	REV.
	9545-505-PVE-F-017	SYS-CS2516-CRL-017	SCALE 1:175	002	2

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MAIN BUS (ONE AND HALF BREAKER SCHEME)

LEGEND:-

50/51 – BACKUP OVERCURRENT PROTECTION
50N/51N – BACKUP EARTH FAULT PROTECTION
50LBB – BREAKER FAILURE PROTECTION
50LBBT – BREAKER FAILURE PROTECTION FOR TIE BAY CB
87TT-I, 87TT-II – "TEE" DIFFERENTIAL PROTECTION
BCU – BAY CONTROL UNIT
EM – ABT COMPLIANT ENERGY METER
87ST – ST DFFERENTIAL PROTECTION
64RHV – ST HV REF PROTECTION
64RLV – ST LV REF PROTECTION

NOTE:

– Voltage from selected CVT
* – To be provided by owner
** – Breaker with CSD

FOR TENDER PURPOSE ONLY

एन टी पी सी NTPC

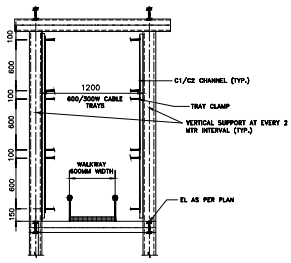
NTPC Ltd.
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

TITLE: **PROTECTION S.L.D. FOR GT BAY**

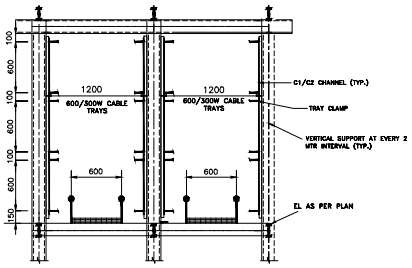
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						A4	N.T.S.	XXXX-999-POE-J-005	0

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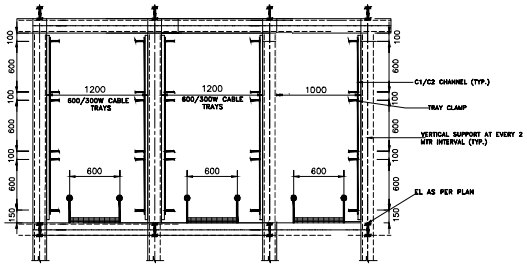
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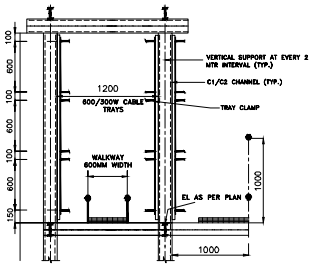
TYPICAL SECTION OF CABLE TRAY ARRANGEMENT (UPTO 6 NOS)
CABLE TRAYS & ITS SUPPORTING ARRANGEMENT TO BE PROVIDED BY CONTRACTOR
(ALL SUPPORT STRUCTURE & CABLE TRAYS ARE IN CONTRACTOR SCOPE).



TYPICAL SECTION OF CABLE TRAY ARRANGEMENT (UPTO 12 NOS)
CABLE TRAYS & ITS SUPPORTING ARRANGEMENT TO BE PROVIDED BY CONTRACTOR
(ALL SUPPORT STRUCTURE & CABLE TRAYS ARE IN CONTRACTOR SCOPE).



TYPICAL SECTION OF CABLE TRAY ARRANGEMENT (UPTO 15 NOS)
CABLE TRAYS & ITS SUPPORTING ARRANGEMENT TO BE PROVIDED BY CONTRACTOR
(ALL SUPPORT STRUCTURE & CABLE TRAYS ARE IN CONTRACTOR SCOPE).



TYPICAL SECTION OF CABLE TRAY ARRANGEMENT (UPTO 9 NOS)
CABLE TRAYS & ITS SUPPORTING ARRANGEMENT TO BE PROVIDED BY CONTRACTOR
(ALL SUPPORT STRUCTURE & CABLE TRAYS ARE IN CONTRACTOR SCOPE).

NOTES:-

1. TRESTLE DIMENSIONS/SPACING ARE TYPICAL AND MODIFICATIONS IF ANY TO BE ADDRESSED DURING DETAIL ENGINEERING.
2. ALL DIMENSIONS ARE IN MM.

REV.NO.	DESCRIPTION	DRWN	DESIGN	CHKD.					APPD	DATE
0	RELEASED FOR CONSTRUCTION	ZSH	DK	KR			-			
					M	E	C	C&I		

CLEARED BY

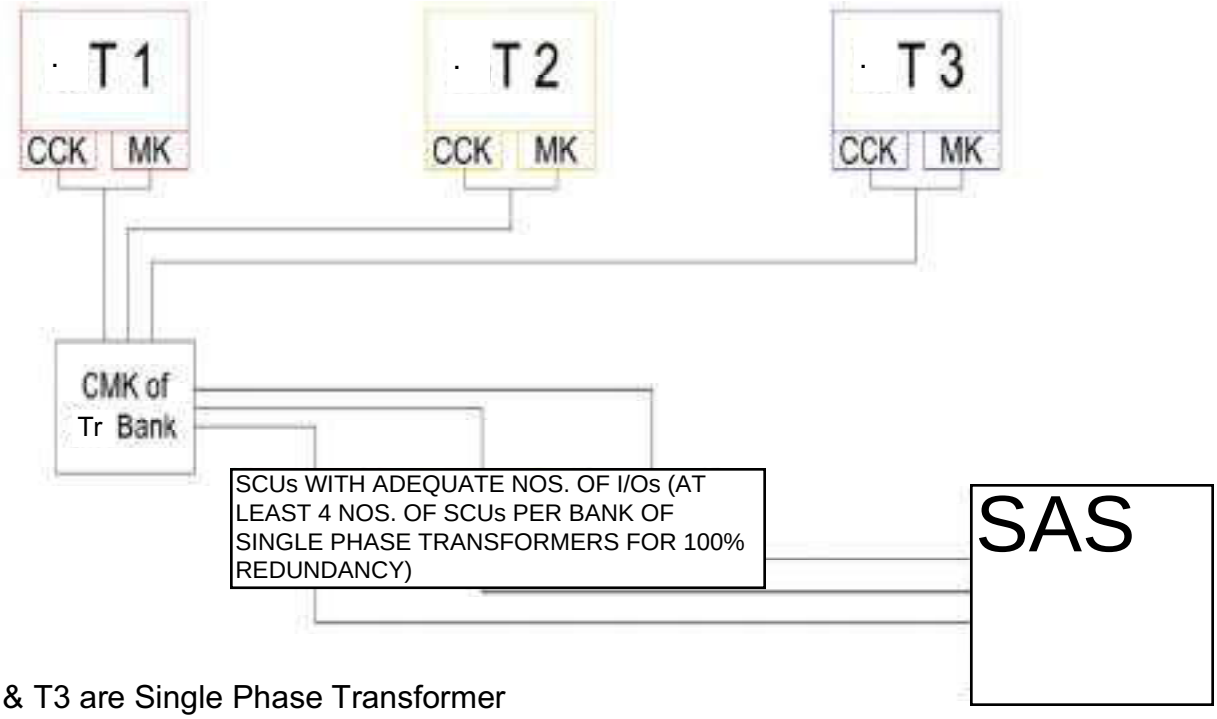
BK-1-LSR

NTPC Limited.
(A Government of India Enterprise)
ENGINEERING DIVISION

PROJECT: SIPAT SUPER THERMAL POWER PROJECT 1X800MW

TITLE: TYPICAL SECTION OF CABLE TRAY ARRANGEMENT IN TRESTLE

SIZE	SCALE	DRG. NO.	REV. NO.
		9500-999-POE-J-004	0



T1,T2 & T3 are Single Phase Transformer

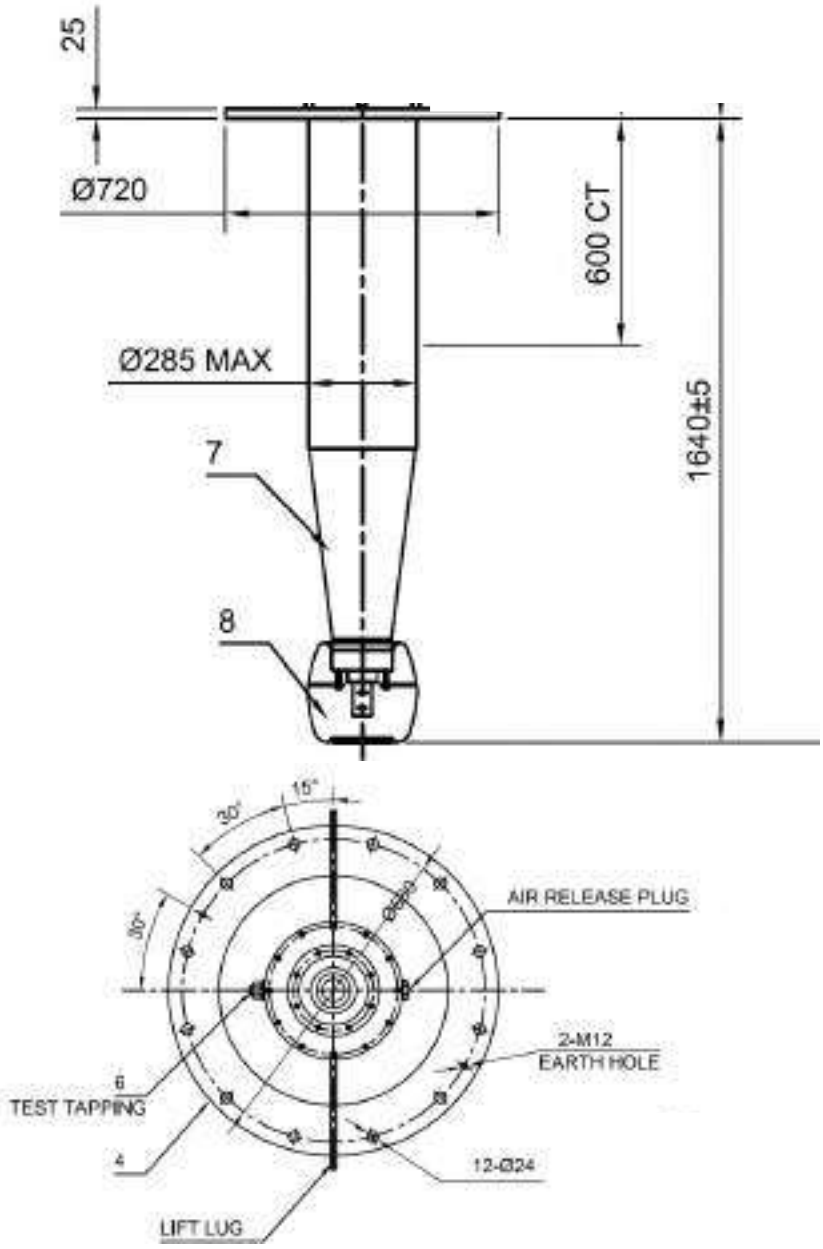
CCK : Cooler Control Kiosk with Fans
MK : Marshalling Kiosk for WTI,OTI,MOG,PRV,CT's,PRV signals etc.
CMK : Common Marshalling Kiosk

NOTE : This is only a single line diagram and does not represent physical location.

Transformer Outdoor Layout

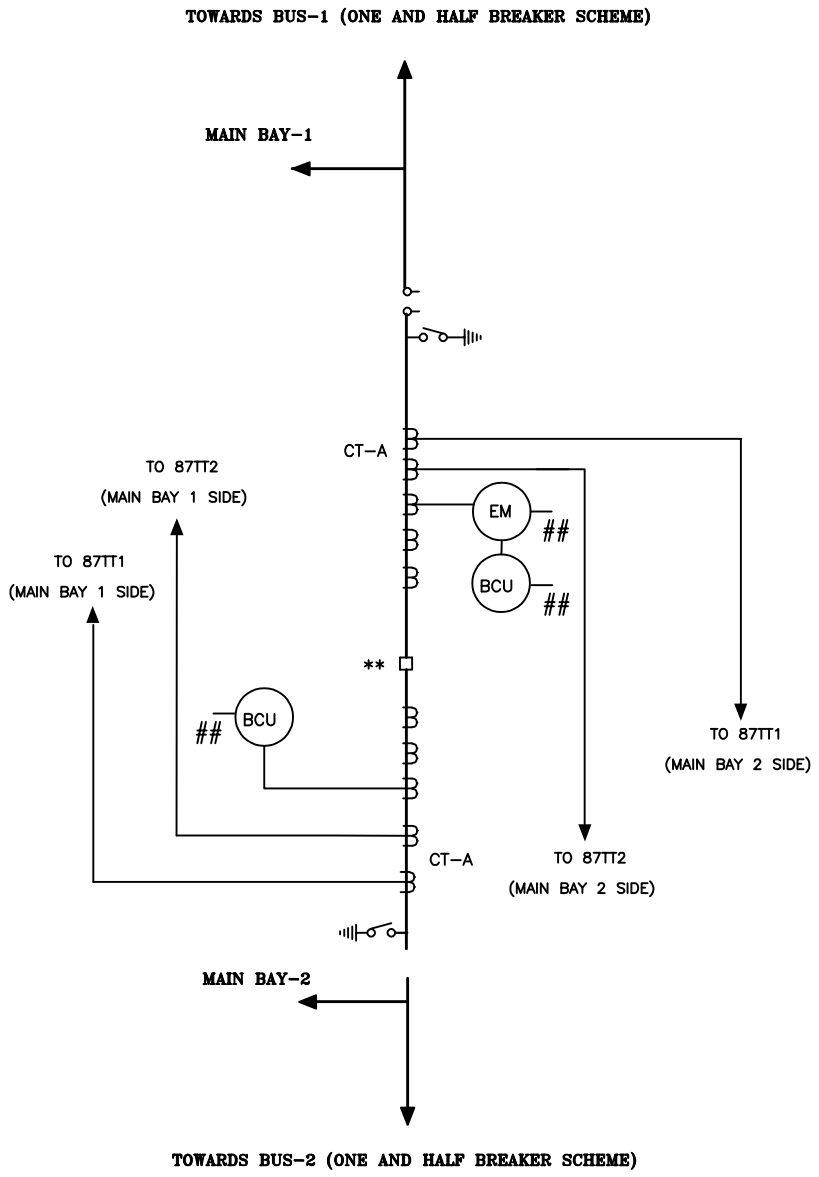
NTPC Ltd. (A Government of India Enterprise) Engineering Division			
Project	Standard Drawing		
Title	Transformer Outdoor Layout		
Size A4	Scale NTS	Drg. no.: 0000-S01-PCE-A-002	Rev. no. 1

Standard Drawing for oil end portion of 420 kV Class RIP Bushing (800-2000 Amp.)



NTPC Ltd. (A Government of India Enterprise) Engineering Division			
Project	Standard Drawing		
Title	Oil end portion of 420 kV class RIP Bushing (800-2000 A)		
Size A4	Scale NTS	Drg. no.: 0000-501-POE-A-006	Rev. no.: 0

BUS BAR arrangemnet shown is indicative only.For actual arrangement please refer key tender SLD.



LEGEND:-

50/51 – BACKUP OVERCURRENT PROTECTION
50N/51N – BACKUP EARTH FAULT PROTECTION
50LBB – BREAKER FAILURE PROTECTION
50LBBT – BREAKER FAILURE PROTECTION FOR TIE BAY CB
87TT-I, 87TT-II – "TEE" DIFFERENTIAL PROTECTION
BCU – BAY CONTROL UNIT
EM – ABT COMPLIANT ENERGY METER
87ST – ST DFFERENTIAL PROTECTION
64RHV – ST HV REF PROTECTION
64RLV – ST LV REF PROTECTION

NOTE:

– Voltage from selected CVT
* – To be provided by owner
** – Breaker with CSD (in case of ST/Reactor Bay)

FOR TENDER PURPOSE ONLY

NTPC Ltd.
(A GOVERNMENT OF INDIA ENTERPRISE)
ENGINEERING DIVISION

TITLE: PROTECTION S.L.D. FOR TIE BAY

REV.NO.	DESCRIPTION	DESIGN	CHKD.	APPD	DATE	SIZE	SCALE	DRG. NO.	REV. NO.
						A4	N.T.S.	XXXX-999-POE-J-009	0

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c) The minimum grades of concrete for different machine foundations and some of other important structural members shall be as follows:

Sl No	Description	Minimum grade of concrete
i)	Foundations & Pedestals; Column Encasements; Tank Foundations (of over-ground steel tanks); Paving/ Ground floor slabs/ Grade slabs/ Floor Slabs/ Roof slabs; Drains/ Trenches/ Sump pits/ Box Culverts; Foundations, sub-structures & super-structures of all buildings UNO; DG/ Transformer foundations;	M25
ii)	ID, FD, PA fan & Mill foundations (block foundations); CWPH/ RWPH, channels & forebays; Wet/ Dry Chimney; NDCT (in-situ)/ IDCT; Water retaining structures/ Pits; CW & CEP Pits; ACC; Pre-cast drains; Boundary wall;	M30
iii)	TG top Deck	M50
iv)	TG Raft/ Substructure	M35
v)	Complete Track Hopper, reclaim hopper, Stacker and Reclaimer foundations, Crusher Deck foundation, Railway load bearing structures, NDCT precast elements, All spring supported machine foundations except TG	M35
vi)	BFP foundations (in case of springs supported) / (in case of block foundation)	M35 / M30
vii)	PCC mat Below foundations	M7.5
viii)	PCC encasement of Pylon supports and CW Pipes;	M20

	Plinth protection	
ix)	Road (Geopolymer concrete) DLC / PQC	M10/ M35

Concrete design mix of M50 grade concrete for TG top deck shall be carried out as per IS 10262 satisfying following conditions /Specification:

i) OPC 43 grade cement shall be used to design M50 grade of concrete mix. However, in case the mix design using OPC 43 grade cement fails to achieve the target strength of M50 grade concrete, OPC 53 grade cement may be used provided adequate precautions for higher heat of hydration and quality assurance measures are in place.

ii) The concrete slump shall be in the range of 150-180mm at pouring point.

iii) Maximum cement content (OPC) shall be limited as stipulated in IS 456.

iv) Free water-cement ratio shall be as per clause 5.1 of IS 10262.

v) PCE type superplasticizers shall be used as high range water reducing admixtures (Type F as per ASTM C494 or equivalent) in the concrete mix. Dosage & mixing methodology of this chemical admixture shall be as per manufacturer's recommendation.

vi) Fly ash shall be not be used as replacement of total cementitious materials.

TABLE –A **ANNEXURE - AC-2**

INTERIOR FINISHING SCHEDULE

S. NO.	DESCRIPTION OF AREA	FLOOR FINISH	WALL FINISH	CEILING FINISH
1.	Main power house Building.			
	a) Unloading Bay	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	b) Cable vault	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	c) Balance area including passage	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	d) SWAS Room	Matt Finished Vitrified ceramic tiles.	Aluminium composite panel cladding on walls and columns upto false ceiling level	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	e) Equipment Area, ESP SWGR/ ACP Room/ UAF Room	Cement concrete with Metallic hardener topping	Acrylic distemper.	Acrylic distemper (except metal deck area)
	f) UPS Battery charger room	Matt finished Vitrified ceramic tiles.	Aluminium composite panel cladding on walls and columns upto false ceiling level	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	g) Deaerator floor	Cement concrete with Metallic hardener topping.		-

	h) Operating Floor	20 mm thick heavy duty anti skid full body vitrified tile in TG Hall. Rubber flooring at TG deck.	Colour coated Metal cladding on A-Row& Gable end, up to crane girder level.	Metal deck roofing (bottom of sheeting with RAL 9002 finish)
	i) General circulation and movement areas	20 mm thick heavy duty anti skid full body vitrified tile		Acrylic distemper (except metal deck area).
	j) Switchgear room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	k)MCC Room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	l) Control room area including control room	Matt Finish Vitrified ceramic tiles flooring of size 1000 x1000 mm	Partition in fire rated glass with fire rated frames with 2 hr fire rating & Metal Batten panel cladding for columns and walls	Metal Batten panel ceiling in combination with demountable translucent stretch ceiling membrane or as per approved design.
	m) control equipment room,	Matt finish Vitrified ceramic tiles.	Partition in fire rated glass with fire rated frames with 2 hr fire rating &Aluminium composite panel cladding for columns and walls	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	n)Conference room, senior executive room., Computer Room	Matt finish Vitrified ceramic tiles	Partition in fire rated glass with fire rated frames with 2 hr fire rating &Aluminium composite panel cladding for columns and walls	Mineral fiber board false ceiling in combination with GRG plaster board border

	o)Record room	ceramic tiles	Acrylic distemper.	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	p)Locker room	Ceramic Tiles	Acrylic Emulsion Paint	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	q)Toilet area	ceramic tiles	Digitally glazed ceramic wall tiles up to False Ceiling Height	Calcium Silicate False Ceiling
	r) Office Room, Staff Room	Matt Finished Vitrified ceramic tiles.	Partition in fire rated glass with fire rated frames with 2 hr fire rating &Aluminium composite panel cladding for columns and walls	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	s)Laboratory area	Vitrified Ceramic / Acid/alkali resistant tiles.	Designer ceramic wall tiles up to False Ceiling Height/ Aluminium composite panel cladding for columns and walls in case of A.C Panel	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design

	t) RCC Stair case	18mm thick Granite (Polished and honed Finished) stone	Polished Granite Stone up to 1.2m. ht. & Acrylic Distemper Paint over wall putty finish for balance height.	Acrylic Distemper
	u) Lift and Staircase Lobby	18mm thick polished granite stone as pattern.	18mm thick polished granite & glass mosaic tile cladding up to False Ceiling Height	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	v) Passages and general circulation areas.	Deleted	Deleted	Deleted
	w) Battery Room	Acid and alkali resistant tile.	Acid and alkali resistant tile up to 1.2m height and chemical resistant paint for balance height	Chemical Resistant paint except in locations where Metal deck has been provided
	x) Oil canal, oil room, oil purification Tank and other areas where oil spillage is likely to occur.	75 mm thick A.R. Brick	12 mm thick A.R. Tile	As above except oil canal.
	y)Pathways including roof area.	22mm thick concrete chequered tiles.	-	-
2.	**ESP control building/Air compressor house**			

	a) Operating/Maintenance areas	Cement concrete with Metallic hardener topping	Pre color coated metal panel cladding.	Acrylic distemper (except metal deck area)
	b) Office Room, Staff Room	Digitally glazed Vitrified tiles.	Aluminium composite panel cladding on walls and columns	Mineral fiber Board False Ceiling
	c) Control Room	Digitally glazed Vitrified tiles.	Aluminium composite panel cladding on walls and columns in ESP Control Room Building	Alluminium false ceiling in combination with GRG plaster board border in column depth or as per approved design
	d) MCC Room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	e) RCC Stair case	18mm thick Granite (Polished and Honed Finished) stone	Polished Granite stone up to 1.2m.ht. & Acrylic Distemper	Acrylic Distemper (except metal deck area)
	f) Battery Room	Acid, Alkali resistant tile	Acid, Alkali resistant tile 1.2m height / chemical resistant paint above dado	Chemical resistant paint (except metal deck area)
	g) AHU/ AC Plant room/ Cable vault	Cement concrete with Metallic hardener topping	Acrylic Distemper	Acrylic Distemper (except metal deck area)
	h) Toilets	ceramic tiles.	Designer ceramic wall tiles dado up to false ceiling level.	Calcium silicate false ceiling.

3.	**Mill & Bunker building/ T.P.s / Conveyor Galleries**	Cement concrete with Metallic hardener topping	Acrylic distemper on masonry walls/ color coated Metal panel cladding	color coated Metal panel cladding	
4.	**Watch Tower**				
	Viewing area	Cement concrete with Metallic hardener topping	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper
5.	**Fire water booster water pump house.**				
	a) Maintenance /Pump floor/PLC	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)	
	b) Control room /PLC.	Matt Finished Vitrified Ceramic Tiles	Acrylic emulsion paint.	Mineral fiber board false ceiling.	
	Toilet area	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to 2200 mm	Acrylic distemper	
6.	**Ash slurry pump house/ Ash water pump house /Silo Area Utility Building / Transport air compressor house/ Fuel Oil Unloading Pump House with switchgear building& control room /FOPPH Building/ Miscellaneous Switchgear room CW Pump house,**				

	Switchgear room, control room/ RW Pump house, Switchgear room, control room/ /Safety Control Room/Water system control Room Building/Any other Building.			
	a) Operating/Maintenance areas/ MCC room /Switchgear Room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	b) Control room/RIO Room /PLC /Office area.	Matt Finished Vitrified Ceramic Tiles	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	c) Battery Room	Acid, Alkali resistant tile	Acid, Alkali resistant tile 1.2m height / chemical resistant paint above dado	Chemical resistant paint (except metal deck area)
	d) Toilet/Pantry area	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to 2200 mm	Acrylic distemper
	e) RCC Stair case	18 mm thick Marble Stone with grooves	18 mm thick Marble Stone	Acrylic distemper
7.	**O & M WORKERS SHED**			

	a) Rest room	Cement concrete with Metallic hardener topping.	Acrylic distemper	Metal roof
	b) Toilets	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to 2100 high, Acrylic Distemper paint above	Metal roof
8.	**Occupational Health Centre with Crèche Facilities**			
	a) Waiting Lobby cum Reception/ Doctor's Chamber /First Aid Room/ Patient Room	Matt finish vitrified tiles	Acrylic Emulsion paint	Acrylic Emulsion paint
	a) Driver's Room	Digitally Glazed vitrified tiles	Acrylic Distemper Paint	Acrylic Distemper Paint
	c)Toilet area	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to false ceiling level.	Calcium Silicate False Ceiling
9.	**Car Parking**			

	a) Covered Parking	Concrete Blocks	Acrylic distemper	Acrylic distemper
10.	**Parking Shed**			
		Concrete Blocks		
11	**Switchyard Control room Building**			
	a) Lounge/Passage	Marble Stone	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	b) Lab	ceramic tiles.	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	c) Office/ SAS Room/Conference Room/ Change Room	Matt Finished Vitrified Ceramic Tiles	Acrylic emulsion paint.	Mineral fiber board false ceiling.
	d) Porch	Marble Stone		
	e) Toilet/ Pantry	ceramic tiles.	Digitally glazed ceramic wall tiles dado up to false ceiling level.	Calcium Silicate False Ceiling
	f) Switchgear room/Store Room	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper

	g) Battery Room	Acid, Alkali resistant tile	Acid, Alkali resistant tile 1.2m height / chemical resistant paint above dado	Chemical resistant paint
12.	**FQA Lab Building**			
	a) Entrance/Corridors	Granite stone	Textured paint	Mineral Fiber Board false ceiling
	b) Office/Staff room /Class Room/ meeting room	Vitrified ceramic tiles.	Acrylic emulsion paint	Mineral fiber board false ceiling.
	c) NDT lab/ storage room/ welding booth/ welding simulator area/ Tool room/ Laboratories	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic Distemper
	d) Toilets/ Pantry	ceramic tiles.	Digitally Glazed ceramic wall tiles dado up to false ceiling level.	Calcium Silicate false ceiling.
	e) Stores	Cement concrete with Metallic hardener topping.	Acrylic distemper.	Acrylic distemper.
	f) RCC Stair case	18mm thick polished Marble stone.	Marble stone up to 1.2m.ht. & Acrylic Distemper above.	Acrylic Distemper

	g) platforms for instruments/equipments	Granite stone	Granite stone up to 1.2m.ht. & Acrylic Distemper above.	Acrylic Distemper
13.	**Coal, Lime, Biomass and Gypsum Handling Plant Buildings**			
	a) Non-Air-conditioned space.	Cement concrete with Metallic hardener topping	Acrylic distemper over wall putty	Acrylic distemper
	b) R.C.C Staircase	18 mm thick granite flooring	1200 high Glass mosaic tiles and Acrylic Emulsion paint over wall putty above	Acrylic distemper
	c) Toilet area	ceramic tiles.	Digitally Glazed ceramic wall tiles dado up to false ceiling level.	Calcium silicate false ceiling
	d) Battery room	Acid, Alkali resistant tile	Acid/Alkali resistant tile and chemical resistant paint above dado.	Chemical resistant paint.
	e) Entrance/ Reception	18 mm thick Granite Stone	Acrylic emulsion paint and Glass Mosaic tiles cladding	Acrylic distemper

	f) Passages	18 mm thick Granite Stone	Acrylic emulsion paint	Acrylic distemper
	g) Air-Conditioned Space	Vitrified Ceramic Tiles	Acrylic emulsion paint	Mineral Fiber Board false ceiling
14.	**Water & Effluent treatment plant buildings & Other auxiliary building.**			
	a) Workshop/ Operating/Maintenance areas/MCC areas	Cement concrete with Metallic hardener topping	Acrylic distemper	Acrylic distemper (except metal deck area)
	b) Office Room, Staff Room	Vitrified ceramic tiles.	Acrylic emulsion paint	Mineral fiber board false ceiling.
	c) Control room	Vitrified Ceramic Tiles	Acrylic emulsion paint	Mineral fiber board false ceiling.
	d) Acid/Alkali storage area/ CW treatment area/DM plant area/ Regeneration area/ Neutralization pit etc.	Acid, Alkali resistant tile as per requirement.	Acid/Alkali resistant tile as per requirement and chemical resistant paint above dado.	Chemical resistant paint.

	e) RCC Stair case	Marble stone / granite stone.	Marble stone up to1.2 m.ht. & Acrylic Distemper paint.	Acrylic Distemper

Note :

1. All wall above false ceiling shall be plastered.
2. The colour and pattern of finish shall be as per approved details.
3. All materials shall be of reputed and established brand approved by Engineer-in-charge.
4. Wherever alternative materials are specified, the final selection rests with Engineer-in-charge.
5. This finishing schedule shall also be applicable to similar functional areas for all other buildings and facilities.
6. All the finishing materials shall be applied/provided as per manufacturer specification and guidelines under the supervision & guidelines of manufacturer.
7. All electrical conduits in building for Lighting, HVAC and services shall be concealed type. The laying work of electrical conduits shall be done before finishing works.
8. All Plumbing pipes shall be of concealed type. The laying work of plumbing pipes shall be done before finishing works.

TABLE –B

EXTERIOR FINISHES SCHEDULE

Sl.No.	DESCRIPTION OF AREA	WALL AND PROJECTIONS	SOFFIT OF PROJECTIONS
1.	Auxiliary building in steel framed structure.	Premium Acrylic Smooth exterior paint with silicon additives over Texture coat over plastered surface/ Aluminium Composite Panel Approved colour/ colour combination of colour coated metal cladding	Premium Acrylic Smooth exterior paint with silicon additives over Texture Coat over plastered surface Approved colour/ colour combination of colour coated metal cladding
2.	Building with concrete frame work, etc.	Premium Acrylic Smooth exterior paint with silicon additives over Texture coat over plastered surface	Premium Acrylic Smooth exterior paint with silicon additives over Texture coat over plastered surface
3.	Steel Structure, trestles, etc.	High performance Paint of approved specification and shade.	

NOTE : 1. The colour and pattern of finish shall be as finalized by Engineer.

2. All materials shall be of reputed and established brand approved by Engineer.

Annexure-AC-3

8.10.00 Controlled Low Strength Material (CLSM)

a. Controlled Low Strength Material (CLSM) may be used for backfilling material in foundation. The compressive strength of CLSM shall be greater than 8.3MPA at 28 days. A typical combination raw material for production of low strength flowable fills is as follows:

Sl No	Raw Material	Typical proportion
1	Pond Ash	90% to 95%
2	Cement	5% to 10%
3	Water	*W/C ratio b/w 3 to 4

*Prior to usage, W/C of mix needs to be checked to get flowable mix.

b. Procedure:

Proportioning and blending materials: The dry materials Cement and Pond ash are to be weighed according to formulations presented above. All the dry materials added into mixer sequentially. The blending of these dry materials allowed for 1-2 minutes prior to the addition of water. After thorough mixing, water is to be added and allowed the mix for another 2 minutes to achieve flowable mix.

c. Flowability: The minimum flowability value should be 200mm as per relevant ASTM standards. Hardening time of flowable fill in the field is measured using Kelly Ball apparatus as per ASTM standards, in general, the hardening time of flowable fills is less than 5 h for low flowability mixes.

d. Pumpability: Flowable fills are usually pumped and placed at the site using the conventional concrete pumping equipment.

e. Permeability: Permeability of most excavatable CLSM is similar to compacted granular fills. It is in the range of 10-4 cm/sec to 10-5 cm/sec. 11 CLSM mixtures of higher strength and high fines content can achieve permeability as low as 10-7 cm/ sec.

f. Shrinkage: Shrinkage and shrinkage cracks do not affect the performance of CLSM. The linear shrinkage of CLSM is about 0.02%.

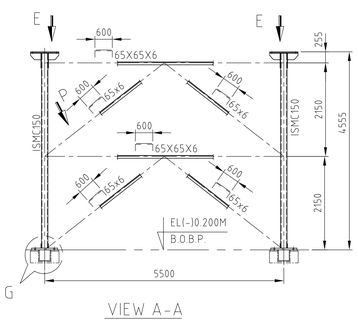
g. Hardening time is referred to as the approximate time required for the flowable fill to change from the initial plastic state to hardened state with an appropriate strength to handle the weight of a person in the field. Hardening time of flowable fill in the field is measured using Kelly Ball apparatus as per ASTM standards. The procedure involves raising and

dropping the Kelly ball to the flowable fill specimen of 400 x 400 x 150 mm and measuring the indentations produced on the upper surface of the fill. Hardening time is represented as the time taken for the fill material to obtain an indentation diameter of less than 76 mm on the surface of the fill. The laboratory determination of hardening time is generally done by visual identification. In general, the hardening time of flowable fills is less than 5 h for low flowability mixes. The hardening time depends on the fineness of the ash used in the mix. Usually coarse grained flowable fill mixes are found to harden within less time when compared to that of finer ash based flowable fills.

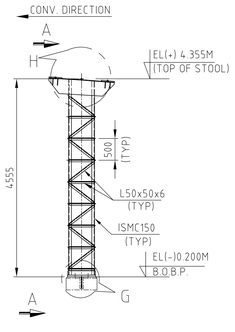
h. Quality control: The American Society for Testing and Materials (ASTM) has introduced five standard test methods for testing freshly mixed controlled low strength material (CLSM). The standard methods are as follows:

1. ASTM D 6103 - Standard Test Method for flow Consistency of Controlled Low Strength Material (CLSM)
2. ASTM D 6023 - Standard Test Method for Unit Weight, Yield, Cement Content and Air Content (Gravimetric) of Controlled Low Strength Material (CLSM)
3. ASTM D 6024 - Standard Test Method for the Ball Drop on Controlled Low Strength Material (CLSM) to determine suitability for load application
4. ASTM D 5971 - Standard Practice for Sampling Freshly Mixed Controlled Low-Strength Material
5. ASTM D 4832 - Standard Test Method for Preparation and Testing of Controlled Low Strength Material (CLSM) Test Cylinders

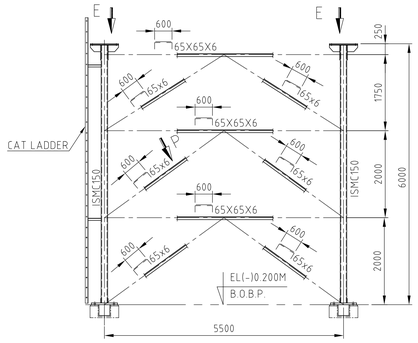
Annexure AC-4



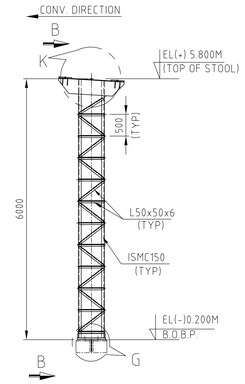
VIEW A-A



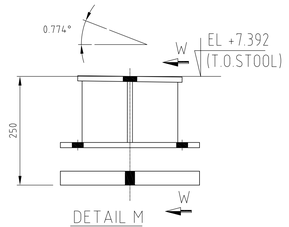
TRESTLE MKD. T1/28



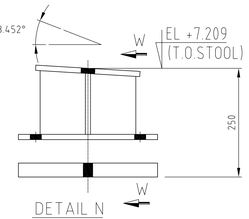
VIEW B-B



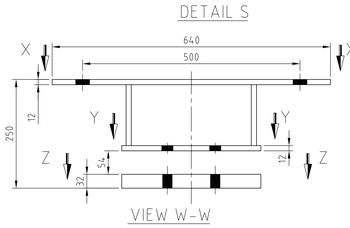
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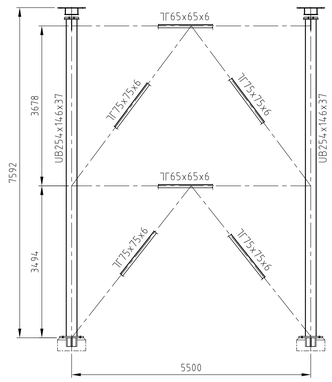
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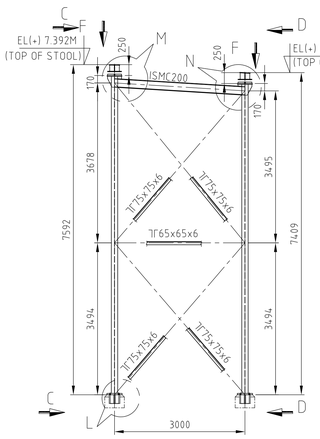
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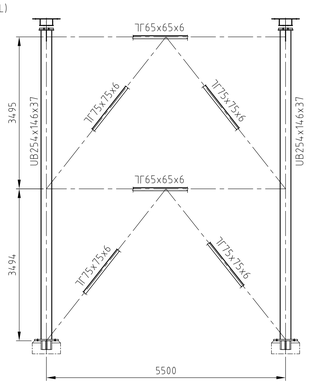
VIEW W-W



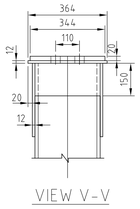
VIEW C-C



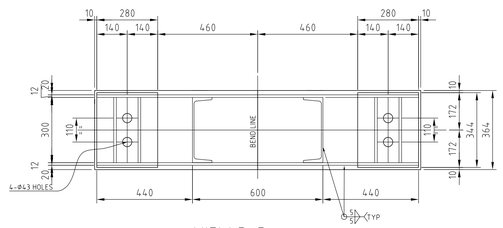
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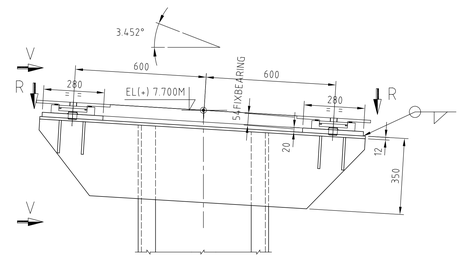
VIEW D-D



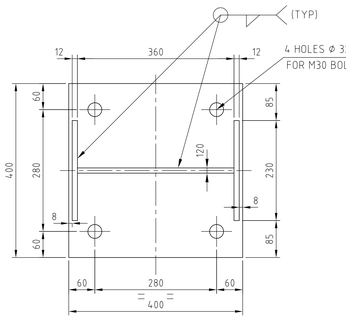
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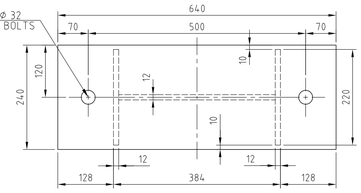
VIEW R-R



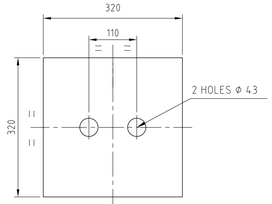
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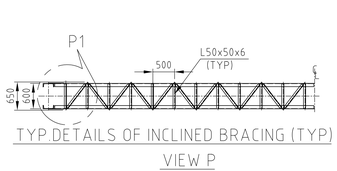
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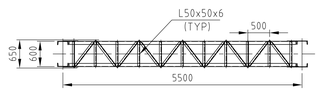
VIEW X-X



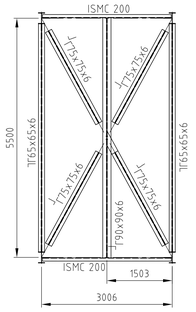
VIEW Z-Z



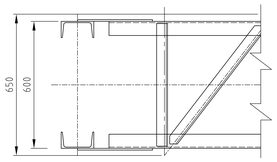
TYP.DETAILS OF INCLINED BRACING (TYP)
VIEW P



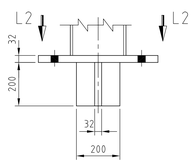
TYP. DETAIL OF HORIZONTAL BRACING
VIEW E-E



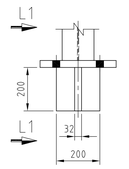
VIEW F-F



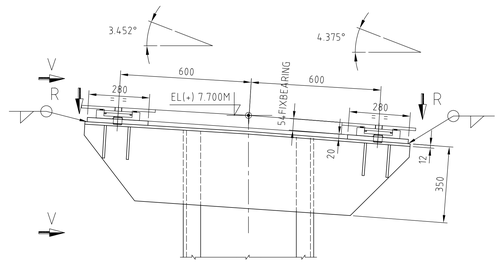
DETAIL P1



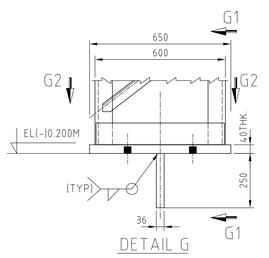
VIEW L1-L1



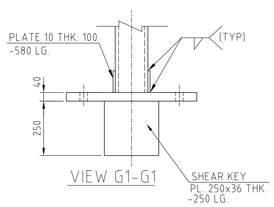
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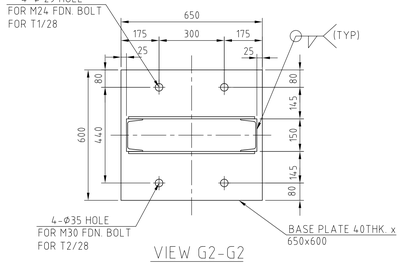
DETAIL H



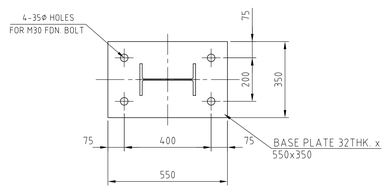
DETAIL G



VIEW G1-G1



VIEW G2-G2
DETAIL OF BASE PLATE FOR T1/28 & T2/28



VIEW L2-L2
DETAIL OF BASE PLATE FOR T3/28

NOTES:-

1. ALL DIMENSIONS ARE IN mm & LEVELS ARE IN metres
2. ALL WELDS ARE 5mm FILLET WELD U.N.O.
3. Ⓕ - FIXED END PROVIDED WITH ELASTOMER BEARING
4. Ⓢ - SLIDING BEARING
5. B.O.B.P. = BOTTOM OF BASE PLATE

REFERENCES:-

1. FOR STR. G. A. OF OF CONV. 28 REFER DRG. NO. M070 C28 6002(SH 2 OF 2)

NTPC DRG. NO : 9545-156-PVC-B-156

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)

PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	06.10.06	MAHESH

Surface Texture as per IS 10719 | Castings as per | General Tolerances for Welded Construction as per ___ for linear ___ for angular | Machined Components as per ___ for linear ___ for angular

Critical dimensions.

Scale	2005	Date	Name
1 : 75	Drawn	11.08.2005	DEEPAK
	Checked	12.08.2005	AKA
	Approved	12.08.2005	B.V.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: STRUCTURAL G.A. OF TRESTLES FOR CONV-28

M070 C28 6002

Q A

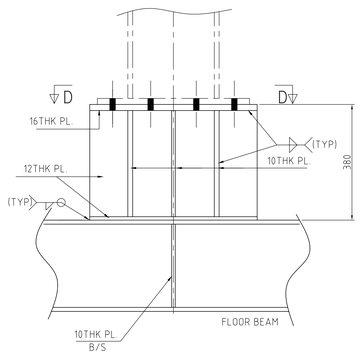
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Dimension | Tolerance

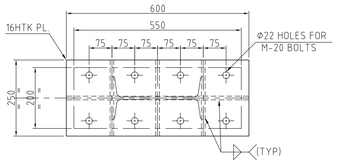
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Sht Size | Revision | ID Number | Drawing Number

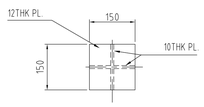
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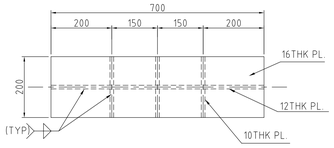
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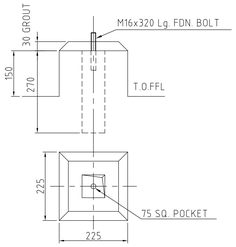
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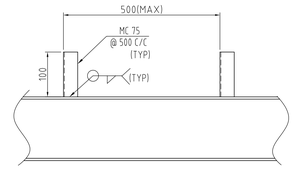
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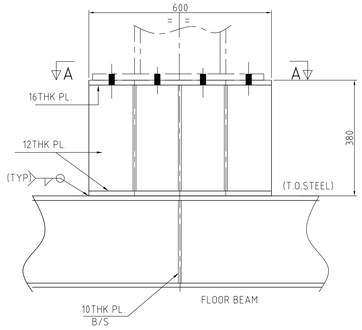
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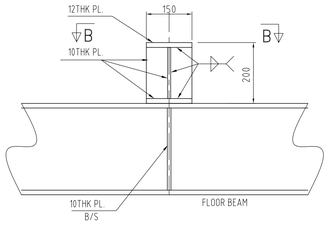
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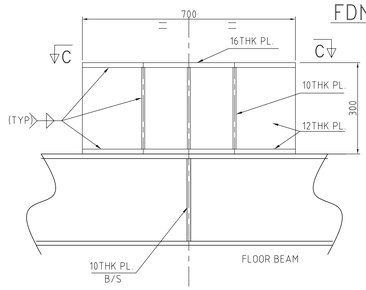
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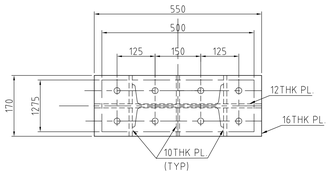
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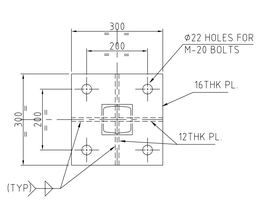
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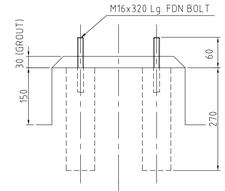
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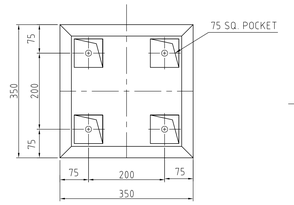


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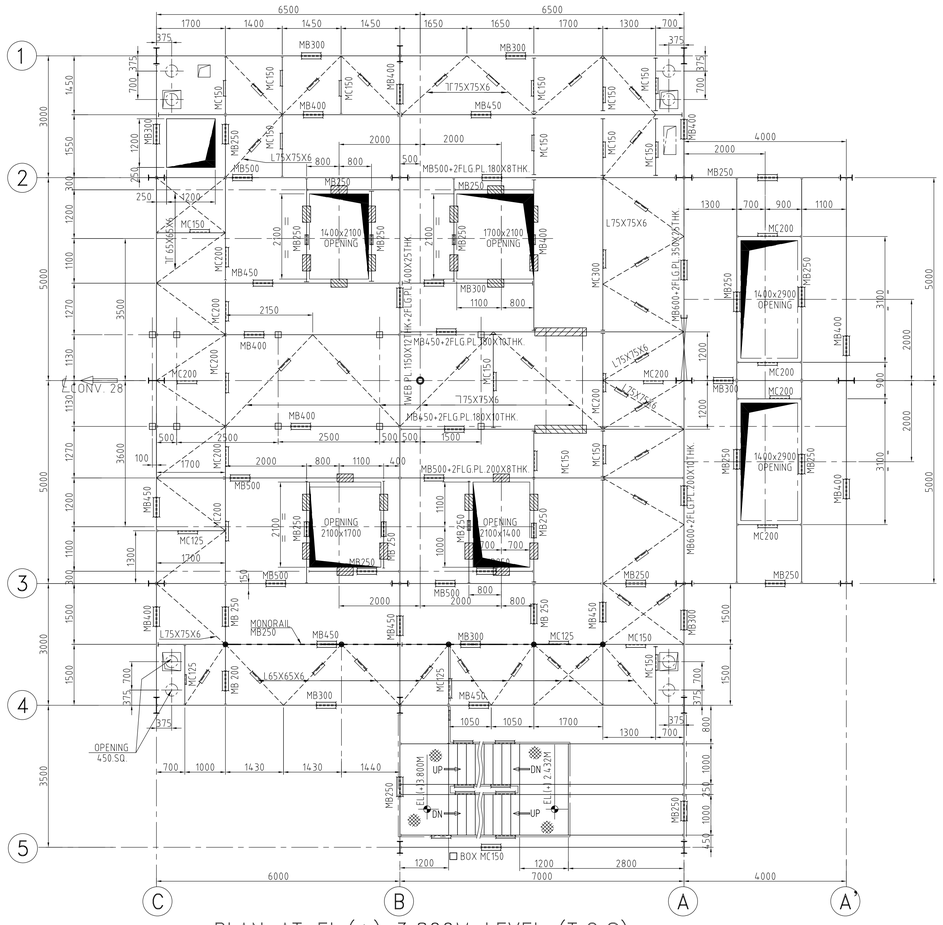


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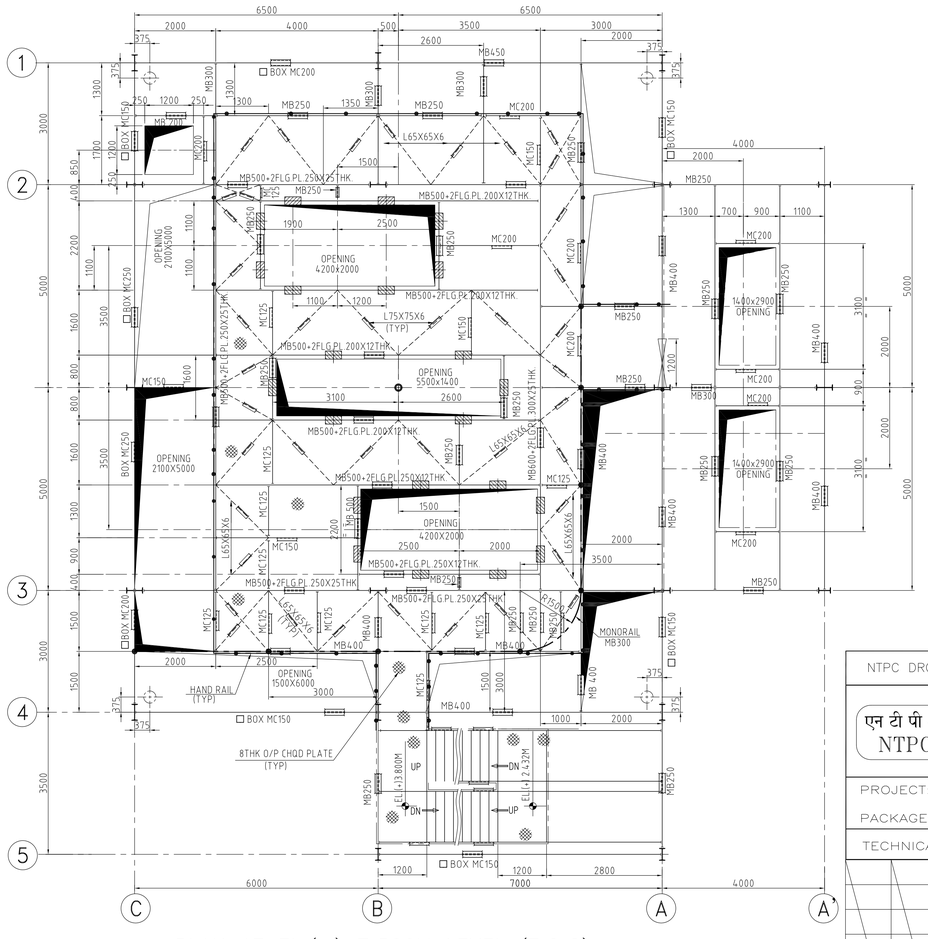
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PLAN AT EL.(+) 3.800M LEVEL (T.O.S)

PLAN AT EL.(+) 4.000M LEVEL (T.O.C)

[FLOOR BRACING L75X75X6 (TYP) U.O.M]



PLAN AT EL.(+) 7.500M LEVEL (T.O.S)

FLOOR BRACING L65X65X6 (TYP)

NOTES :–

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE

2) THIS DRAWING IS BASED ON DRAWING NO.M070 H17 000 0001-1(SH.1 OF 2)REV-E

NTPC DRG. NO : 9545–156–PVC–B–170

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि .

National Thermal Power Corporation Ltd.

(A GOVT. OF INDIA ENTERPRISE)

ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B	NTPC COMMENTS INCOR	14/12/2007	SBS/AKA
A	NTPC COMMENTS INCOR	16/6/2005	DEEPAK/SYP

Surface Texture as per IS 10719 — Castings as per — General Tolerances for Welded Construction as per — Machined Components as per — for linear — for angular

Critical dimensions.

Scale		Date	Name
1:80	Drawn	29.04.05	RDA
	Checked	29.04.05	SYP
	Approved	30.04.05	BV

Dimension Tolerance

Title: GENERAL ARRANGEMENT OF TRANSFER TOWER TP-17 (PLAN)

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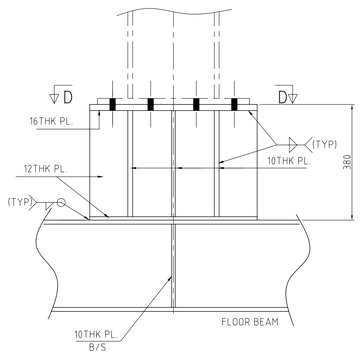
ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

M070 H17 6002

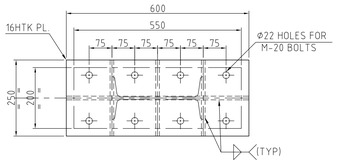
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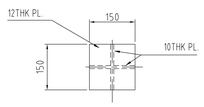
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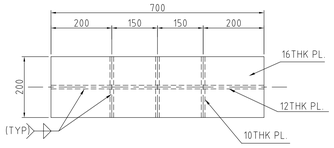
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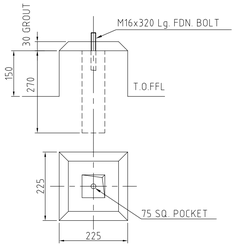
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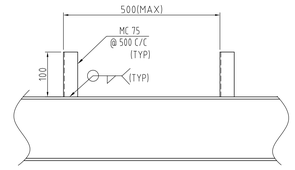
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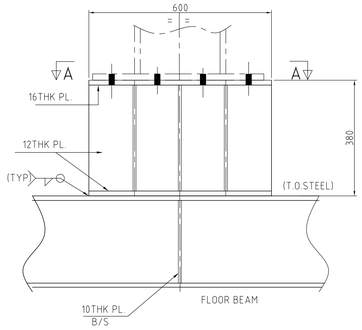
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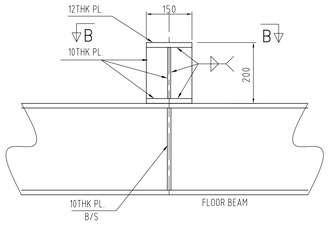
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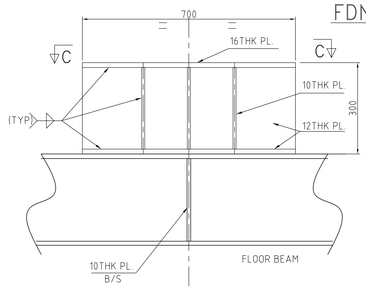
TYPICAL SHEAR CONNECTION FOR DETAIL OF FLOOR BEAMS SUPPORTING R.CC. SLAB



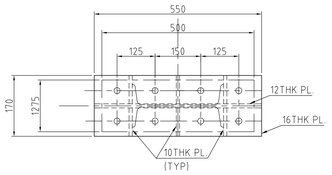
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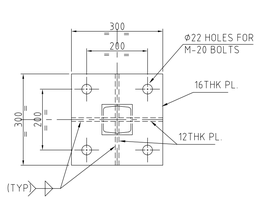
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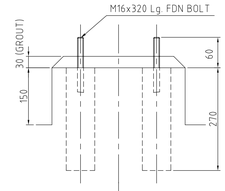
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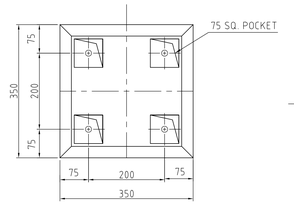


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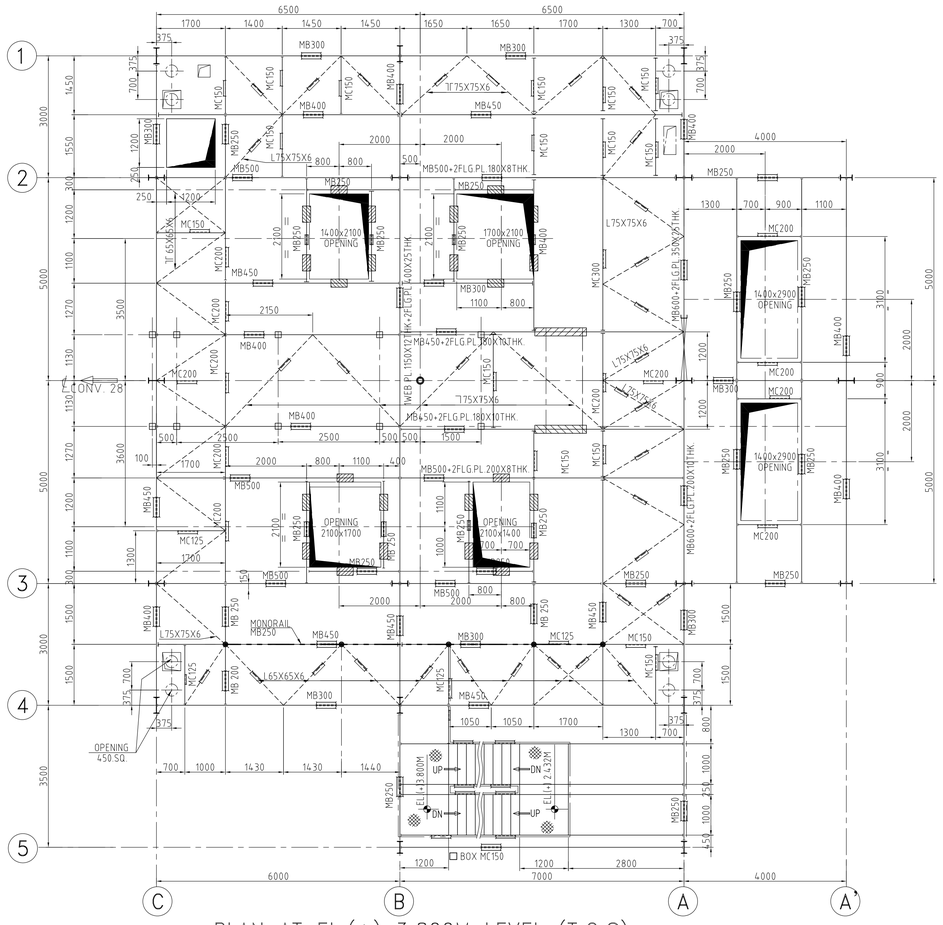


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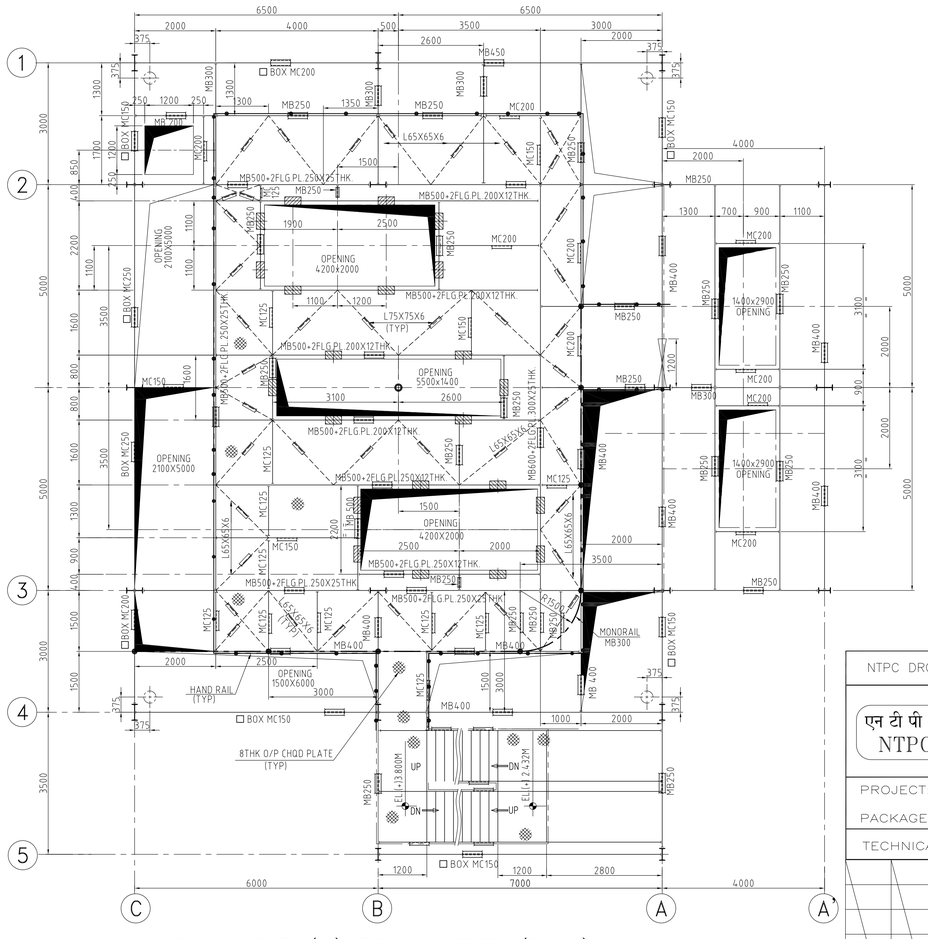
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PLAN AT EL.(+) 3.800M LEVEL (T.O.S)

PLAN AT EL.(+) 4.000M LEVEL (T.O.C)

[FLOOR BRACING L75X75X6 (TYP) U.O.M]



PLAN AT EL.(+) 7.500M LEVEL (T.O.S)

FLOOR BRACING L65X65X6 (TYP)

NOTES :–

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE

2) THIS DRAWING IS BASED ON DRAWING NO.M070 H17 000 0001-1(SH.1 OF 2)REV-E

NTPC DRG. NO : 9545–156–PVC–B–170

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि .

National Thermal Power Corporation Ltd.

(A GOVT. OF INDIA ENTERPRISE)

ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B	NTPC COMMENTS INCOR	14/12/2007	SBS/AKA
A	NTPC COMMENTS INCOR	16/6/2005	DEEPAK/SYP

Surface Texture as per IS 10719 — Castings as per — General Tolerances for Welded Construction as per — Machined Components as per — for linear — for angular

Critical dimensions.

Scale		Date	Name
1:80	Drawn	29.04.05	RDA
	Checked	29.04.05	SYP
	Approved	30.04.05	BV

Dimension Tolerance

Title: GENERAL ARRANGEMENT OF TRANSFER TOWER TP-17 (PLAN)

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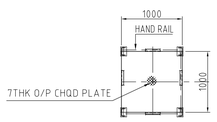
ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

M070 H17 6002

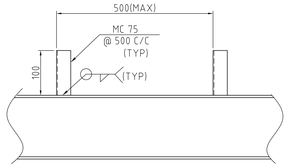
Rev. Sht. | Revision | ID Number | Drawing Number: 0 | A | B

Sheet No. 1 | Total Sheets 2 | 1

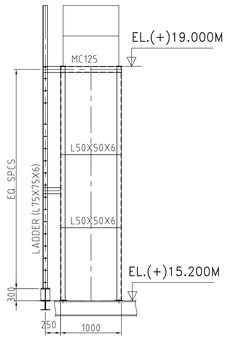
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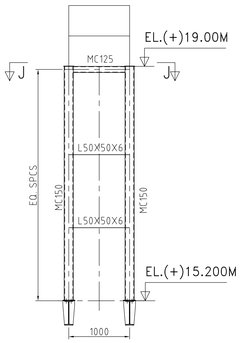
PLAN J–J



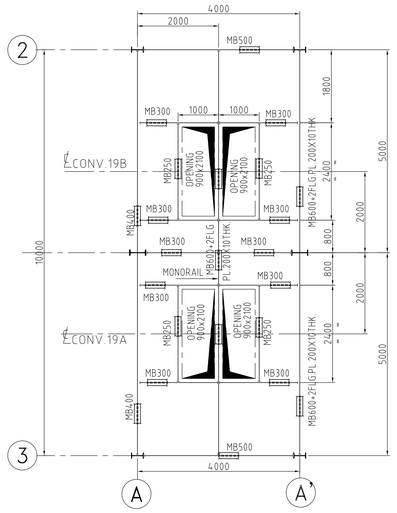
TYPICAL SHEAR CONNECTION FOR DETAIL OF FLOOR BEAMS SUPPORTING R.CC. SLAB



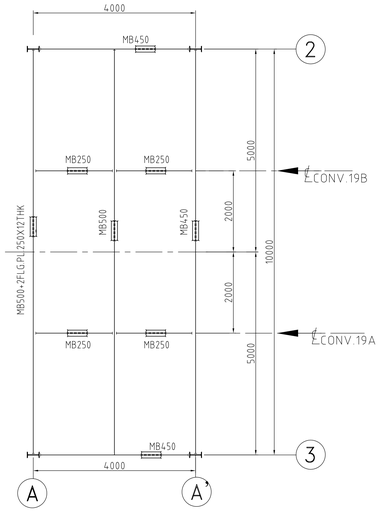
VIEW F–F



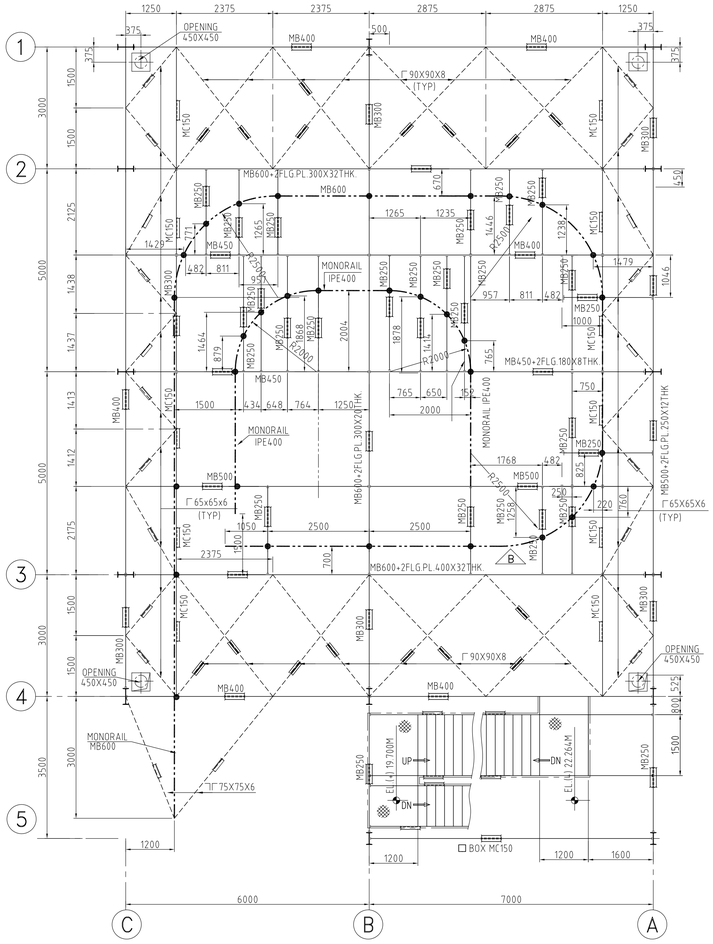
VIEW G–G



PLAN AT EL.(+) 15.600M LEVEL (T.O.S)

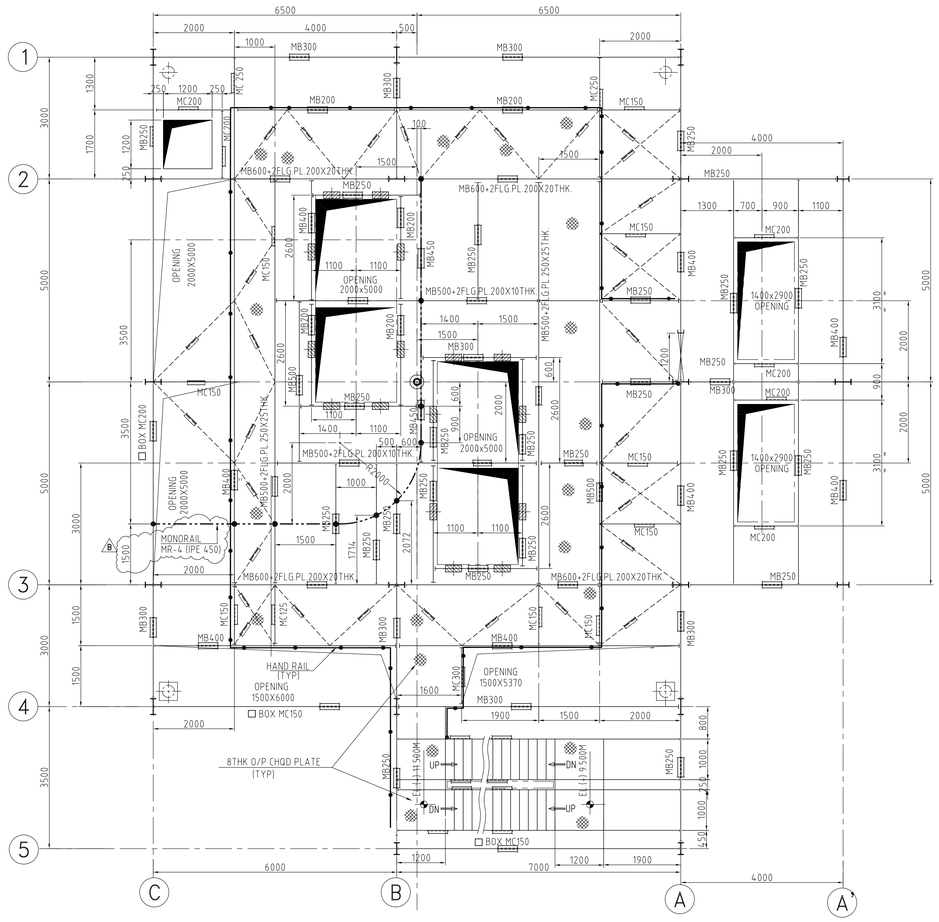


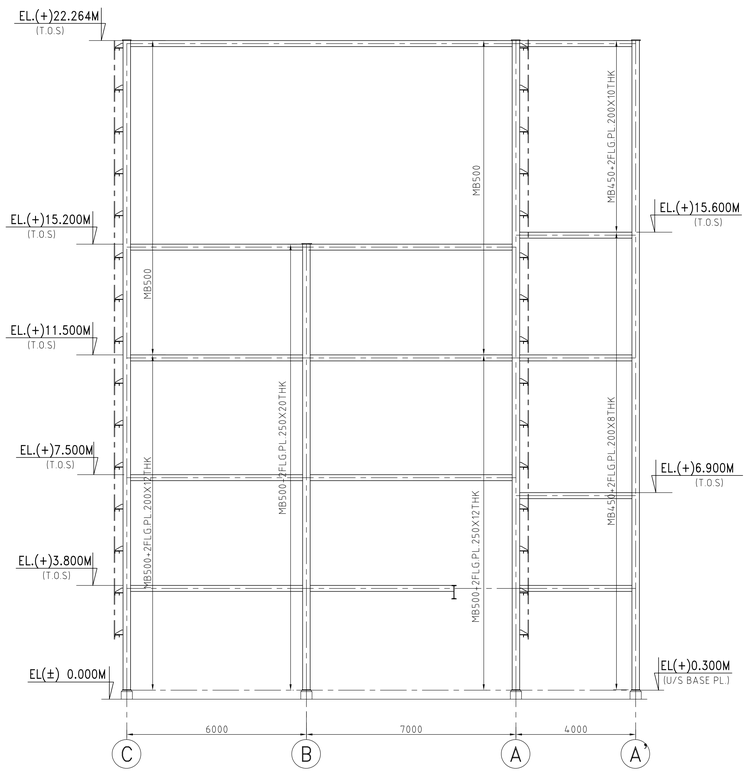
PLAN AT EL.(+) 22.264M LEVEL (T.O.S)



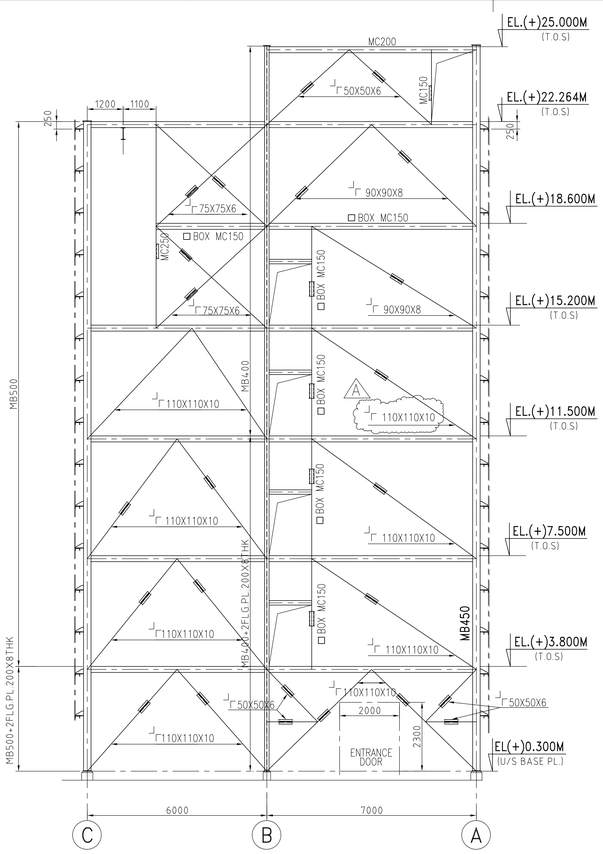
PLAN AT ROOF LEVEL (T.O.S)

PLAN AT EL.(+) 22.264M LEVEL (T.O.S)

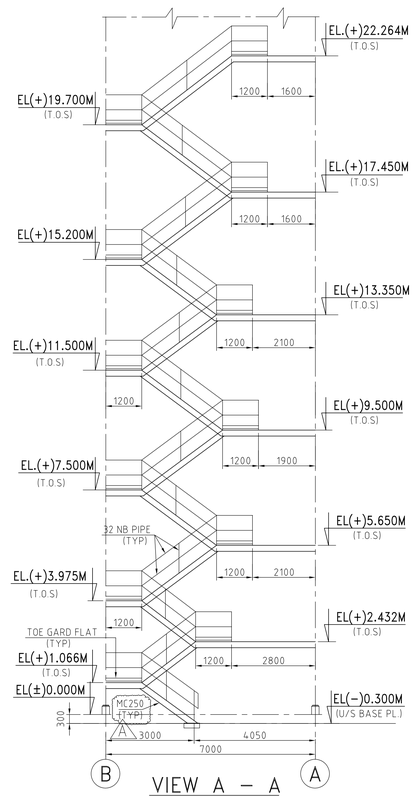

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MC150
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MB250
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MC200
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MB450
MB250
MB250
MB250
1400x2900 OPENING
MB400
3100
5000
MB600
MB200
MB200
1400
1500
MB300
MB500+2FLG.PL.250X25THK
MB400
2000
2600
MB250
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MB500+2FLG.PL.200X10THK
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3100
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3500
BOX MC200
1100
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OPENING 2000x5000
1400
1100
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600
MB500+2FLG.PL.200X10THK
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MC150
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OPENING 2000X5000
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MC150
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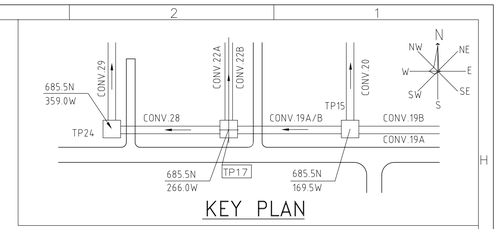
ELEVATION ALONG GRID 3



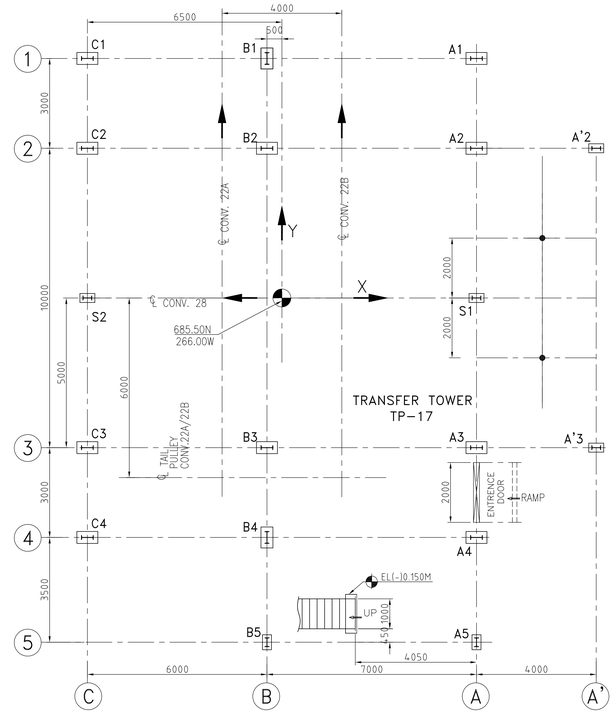
ELEVATION ALONG GRID 4



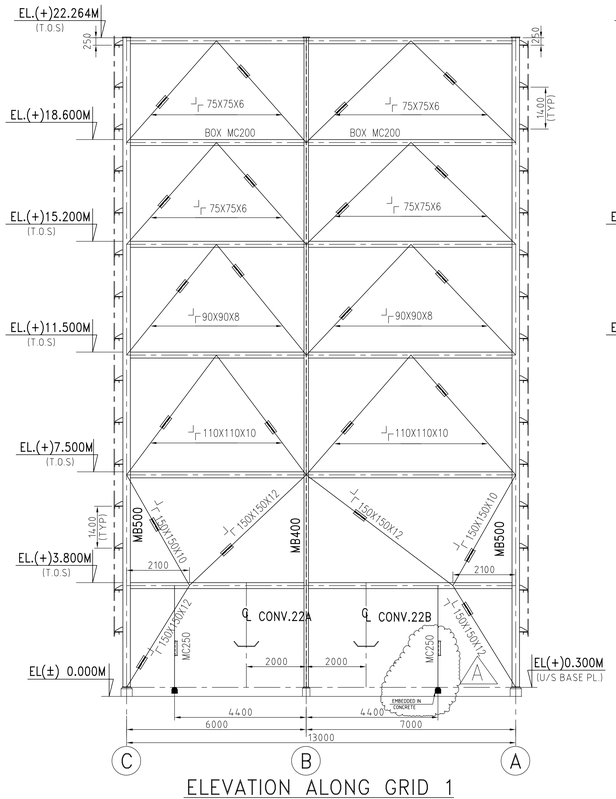
VIEW A − A
ELEVATION OF STAIR CASE



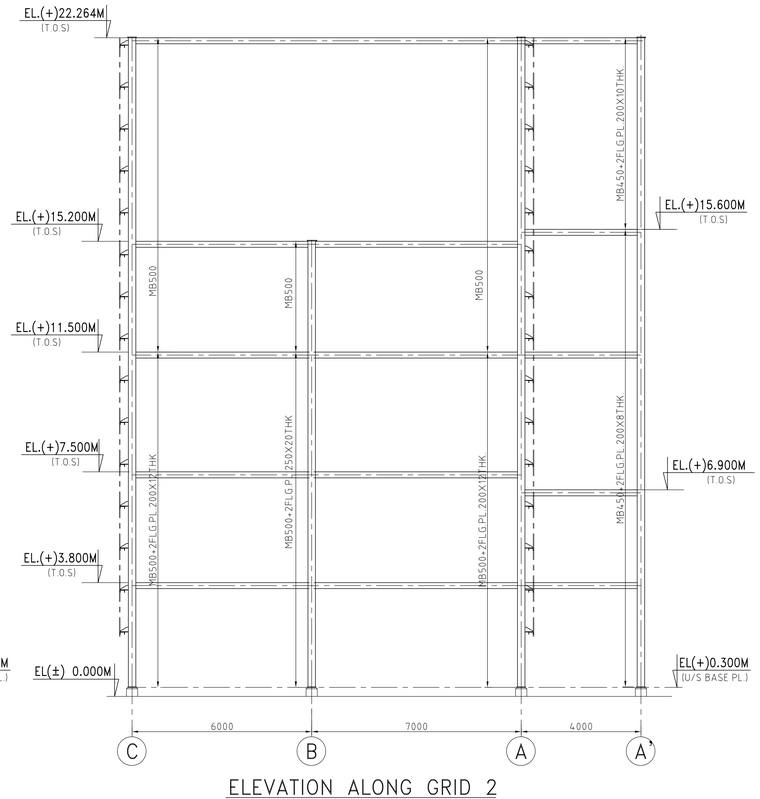
KEY PLAN



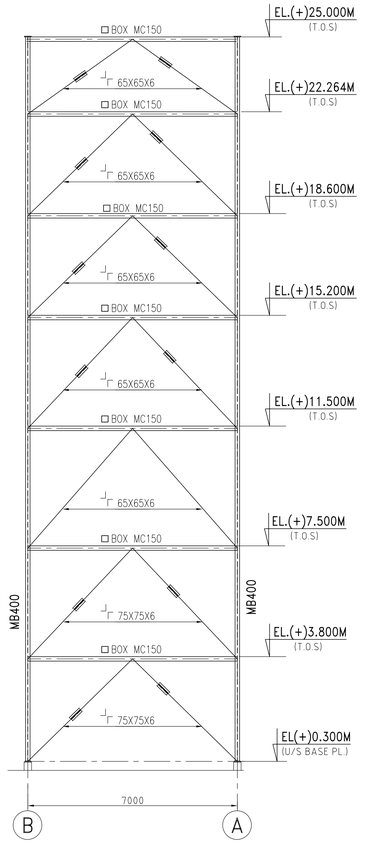
PLAN AT BASE PLATE LEVEL



ELEVATION ALONG GRID 1



ELEVATION ALONG GRID 2



ELEVATION ALONG GRID 5

NOTES :−

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE
2) THIS DRAWING IS BASED ON DRAWING NO.M070 H17 000 0001−1(SH.1 OF 2)REV−E

NTPC DRG. NO : 9545−156−PVC−B−171

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:− SIPAT SUPER THERMAL POWER PROJECT
STAGE−II (2x500MW)
PACKAGE:− COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.−CS−9545−156−2

Index	Description	Date	Name
D			
C			
B	NTPC COMMENTS INCOR.	4/12/2007	SBS/AKA
A	NTPC COMMENTS INCOR.	16/6/2005	DEEPAK/SYP

Surface Texture as per IS: 10719
Castings as per
General Tolerances for Welded Construction as per ____ for linear ____ for angular
Machined Components as per ____ for linear ____ for angular
Critical dimensions.

Scale		Date	Name
1:100	Drawn	29/04/2005	RDA
	Checked	29/04/2005	SYP
	Approved	30/04/2005	B VENU

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title GENERAL ARRANGEMENT OF TRANSFER TOWER TP−17 (ELEVATION)

M070 H17 6003

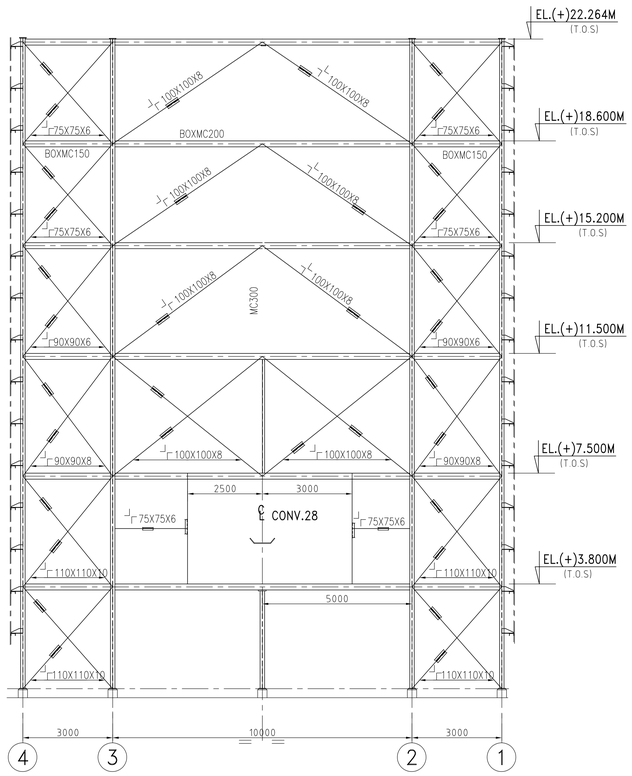
Ø A B

Sheet No. 1 | Total Sheets 2 | A1

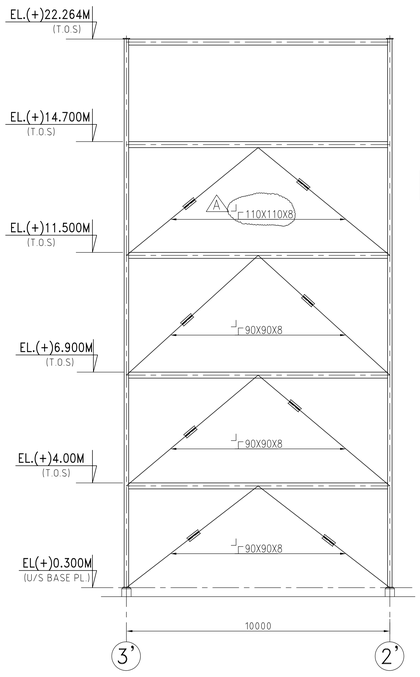
Dimension | Tolerance | Pdf's Size | Revision No. Number | Drawing Number

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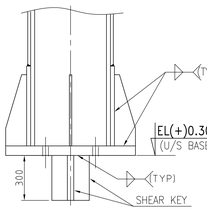
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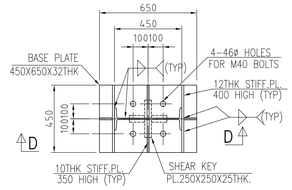
ELEVATION ALONG GRID C



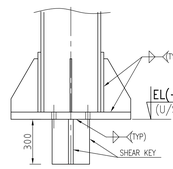
ELEVATION ALONG GRID A'



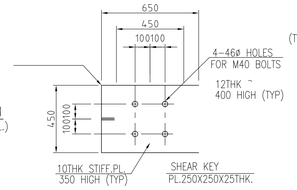
VIEW D – D



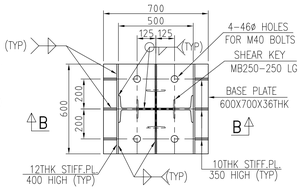
BASE PLATE FOR COL S1



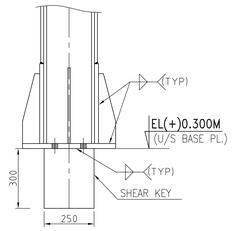
VIEW E – E



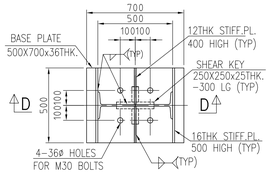
BASE PLATE FOR COL.A'2 & A'3



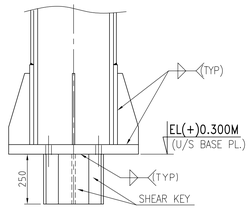
BASE PLATE FOR COLUMN A1/C1 & C4



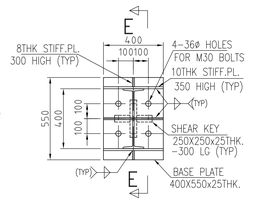
VIEW G – G



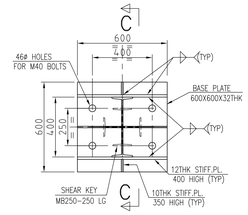
BASE PLATE FOR COL.B2 & B3



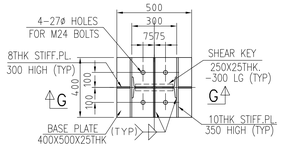
VIEW C – C



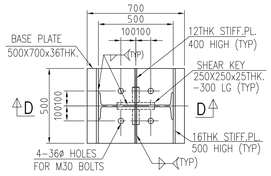
BASE PLATE FOR COLUMN A5/B1 & B5



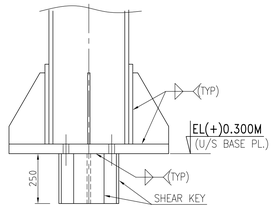
BASE PLATE FOR COLUMN B4



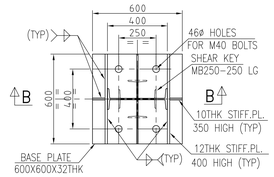
BASE PLATE FOR COL S2



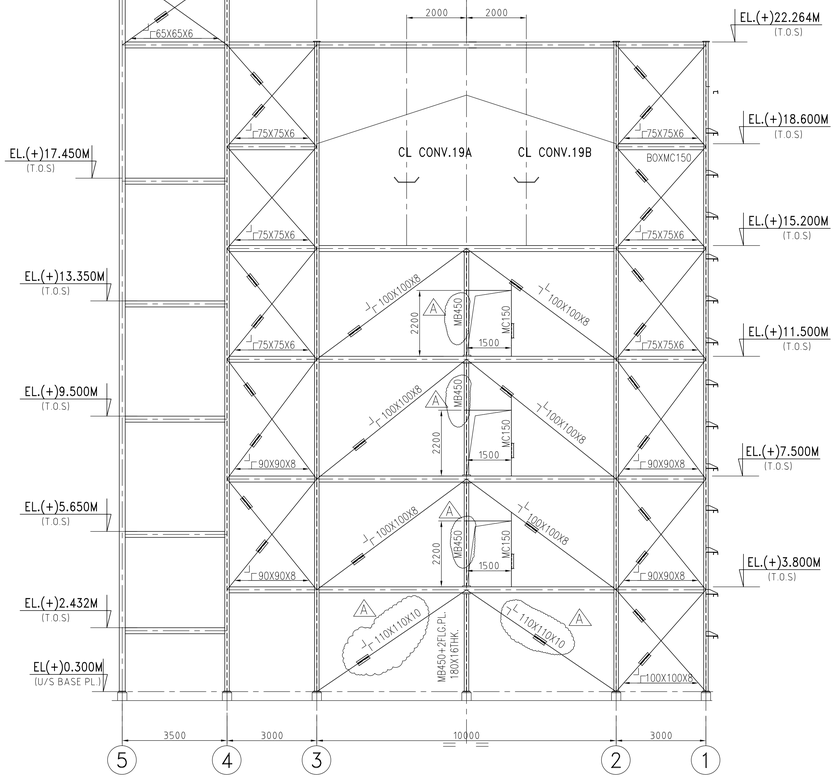
BASE PLATE FOR COL.A2/A3/C2 & C3



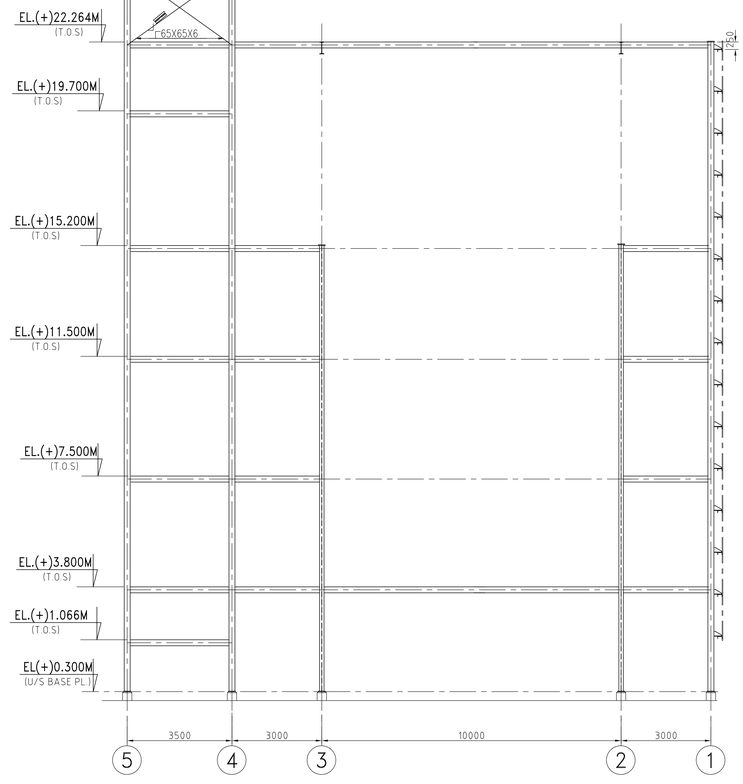
VIEW B – B



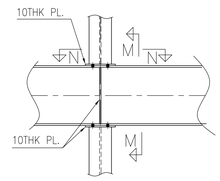
BASE PLATE FOR COLUMN A4



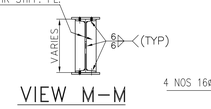
ELEVATION ALONG GRID A



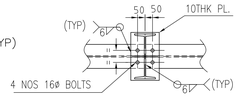
ELEVATION ALONG GRID B



TYPICAL CONNECTION DETAIL OF STUB COUMN



VIEW M–M



PLAN N – N

NOTES :–

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE
2) THIS DRAWING IS BASED ON DRAWING NO.M070 H17 000 0001-1(SH.1 OF 2)REV-E

NTPC DRG. NO : 9545–156–PVC–B–171

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B	NTPC COMMENTS INCOR.	14/12/2007	SBS/AKA
A	NTPC COMMENTS INCOR.	16/6/2005	DEEPAK/SYP

Castings as per | General Tolerances for: Welded Construction as per (for linear / for angular) | Machined Components as per (for linear / for angular)
Surface Texture as per IS: 10719

Scale		Date	Name
1:100	Drawn	29/04/2005	RDA
	Checked	29/04/2005	SYP
	Approved	30/04/2005	B VENU

Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: GENERAL ARRANGEMENT OF TRANSFER TOWER TP–17 (ELEVATION)

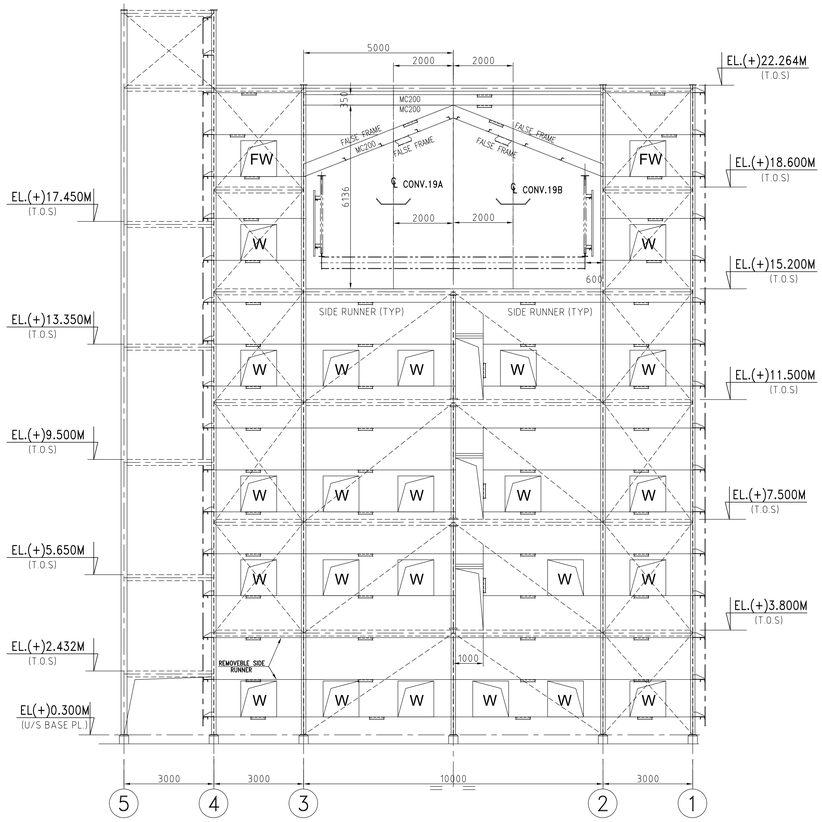
M070 H17 6003

Sheet No. 2 | Total Sheets 2 | A1 | Revision ID. Number | Drawing Number

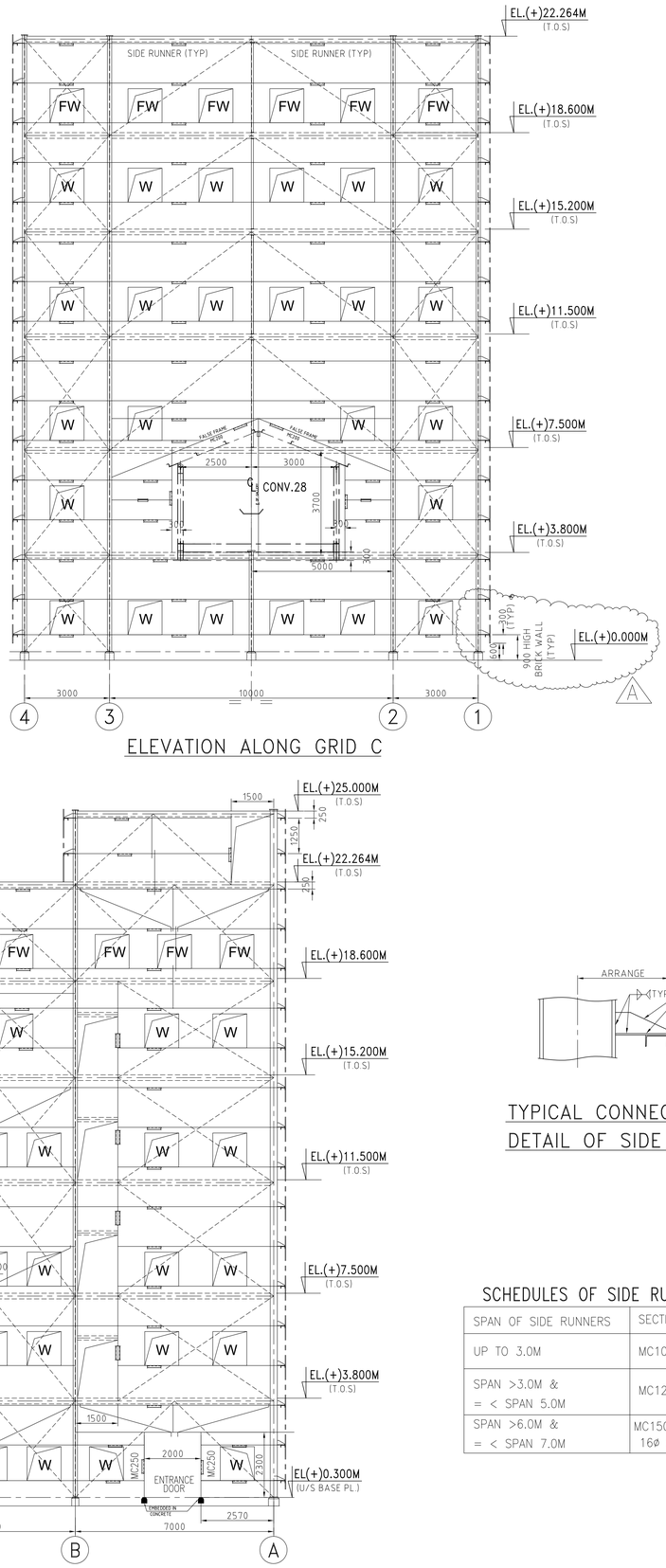
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Dimension | Tolerance

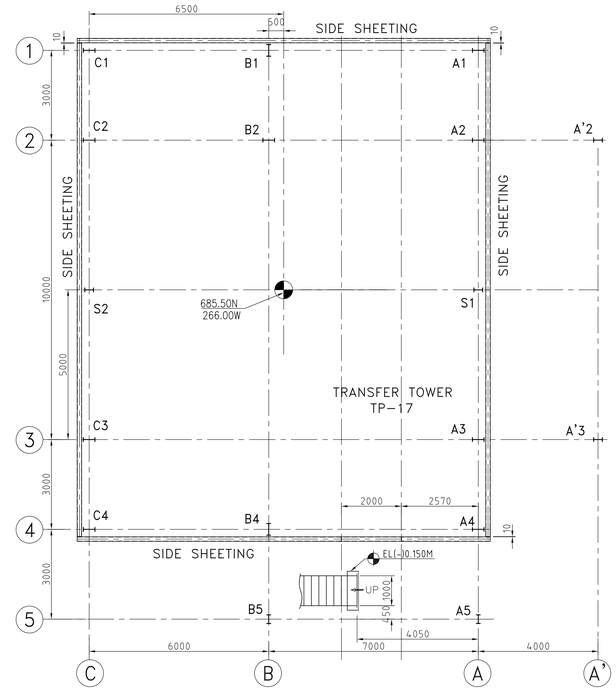
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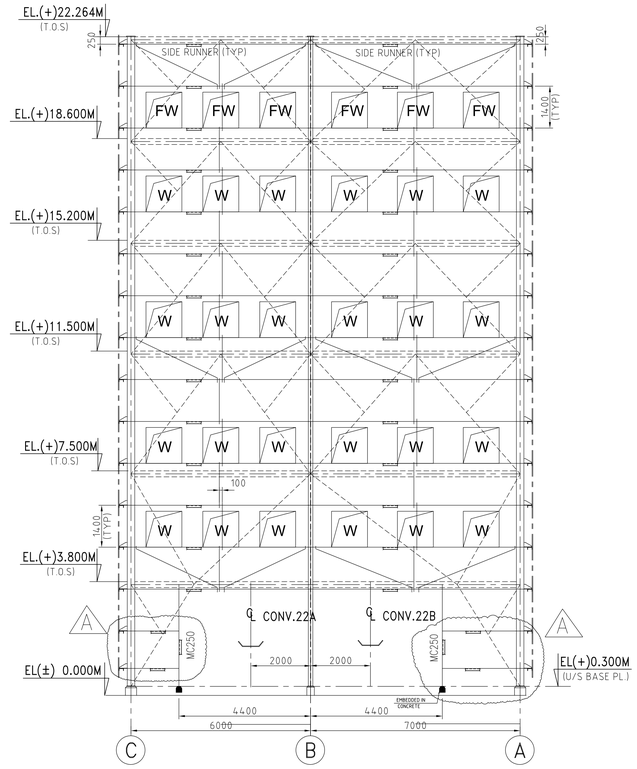
ELEVATION ALONG GRID A



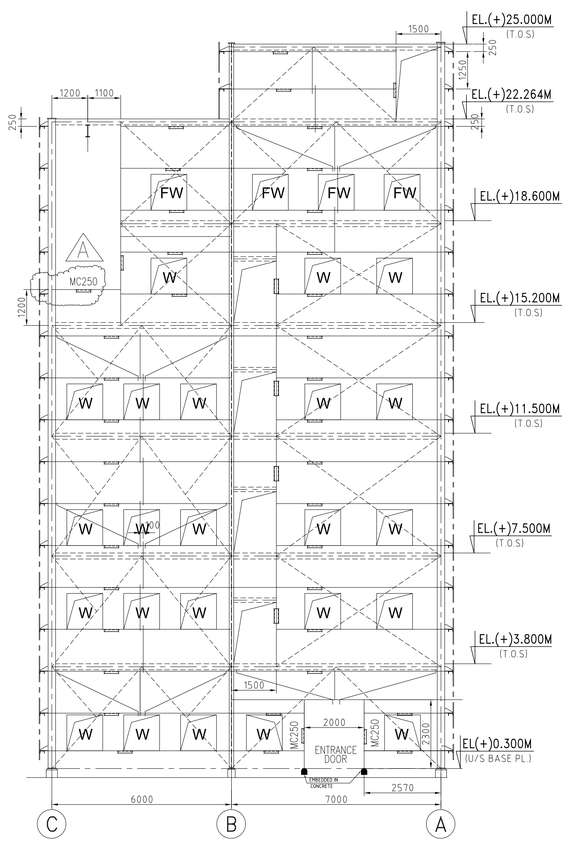
ELEVATION ALONG GRID C



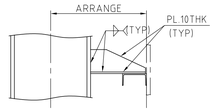
KEY PLAN OF SIDE SHEETING



ELEVATION ALONG GRID 1



ELEVATION ALONG GRID 4



TYPICAL CONNECTION DETAIL OF SIDE RUNNER

SCHEDULES OF WINDOWS

MKD.	TYPE	SIZE
FW	FIXED WINDOW	1200x1200
W	OPENABLE OUTSIDE	1200x1200

SCHEDULES OF SIDE RUNNERS

SPAN OF SIDE RUNNERS	SECTION SIZE
UP TO 3.0M	MC100
SPAN >3.0M & = < SPAN 5.0M	MC125
SPAN >6.0M & = < SPAN 7.0M	MC150 WITH ONE 16ø SAG ROD

NOTES :-

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METRES UNLESS NOTED OTHERWISE

2) THIS DRAWING IS BASED ON DRAWING NO.M070 H17 000 0001-1(SH.1 OF 2)REV-E

NTPC DRG. NO : 9545-156-PVC-B-172

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)

PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B	NTPC COMMENTS INCOR.	01/12/2006	DEEPAK/SYP
A	NTPC COMMENTS INCOR.	16/6/2005	DEEPAK/SYP

Surface Texture as per IS 10719 | Castings as per | General Tolerances for Welded Construction as per / Machined Components as per: for linear / for angular

Scale 1:100

	Date	Name
Drawn	02.04.2005	LAL BIHARI
Checked	02.04.2005	SYP
Approved		B. VENU

Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: GENERAL ARRANGEMENT OF TRANSFER TOWER TP-17 (SIDE SHEETING)

M070 H17 6004

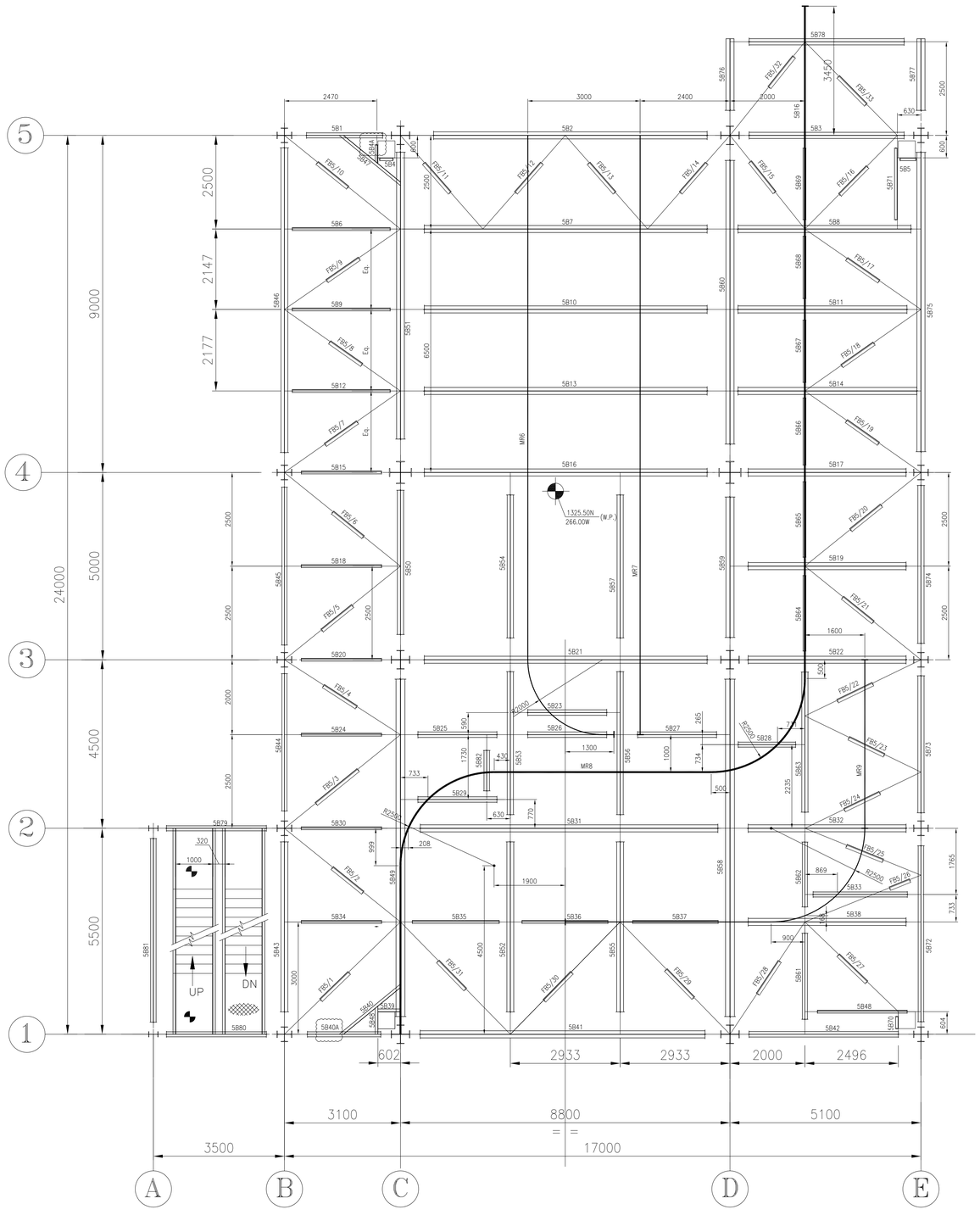
Ø A B

Sheet No. 1 | Total Sheets 1 | A1

Dimension | Tolerance | Dig. Size | Revision ID. Number | Drawing Number

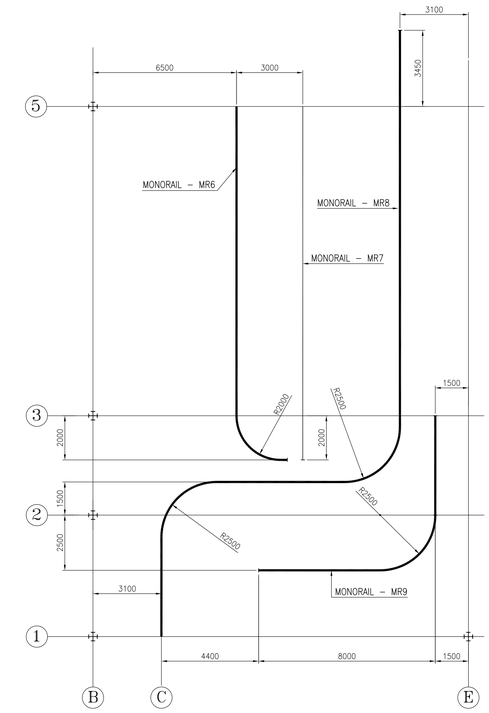
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COMPUTER GENERATED DRAWING

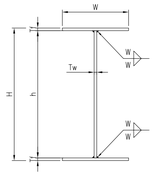


BEAM MKD.	SECTION
5B1,5B6,5B28,5B33,5B40A, 5B44,5B45,5B47,5B61,5B62 5B79,5B80	UB 203x133x25
5B25,5B26,5B23,5B27,5B29, 5B72,5B81,5B82 & MR9	UB 254x146x37
5B3,5B42,5B50,5B54, 5B57,5B63,5B73, MR6,MR7 & MR8	UB 305x165x46
5B2,5B41,5B43,5B46,5B51 5B52,5B53,5B55,5B56,&5B78	IPE 400
5B8,5B11,5B14,5B17,5B19 5B22,5B32,5B38, 5B59 & 5B74	IPE 450
5B76 & 5B77	IPE 500
5B7,5B10,5B13, & 5B16	IPE 600
5B4,5B5,5B39 & 5B70 5B4A	MC 150
5B6,5B9,5B12,5B15,5B18 5B20,5B24,5B30,5B34,5B35 5B36,5B37,5B48,5B40 5B64,5B65,5B66,5B67,5B68, B69,5B71 & 5B83	MC 200
FB5/1 TO FB5/33	L 110x110x10

monorail routing shall match with final approved mechanical drawing.



LAYOUTOF MONORAILS BELOW ROOF



TYPICAL SECTION OF PLATE GIRDER

S.NO	BEAM MARK	H	FLANGE PLATE		WEB PLATE		WELD SIZE – W
			W	Tf	h	Tw	
1.	5B51,5B60,5B31,5B21	850	350	25	800	16	8
2.	5B49,5B58	1000	350	25	950	12	8
3.	5B75	640	250	20	600	12	8

NOTES

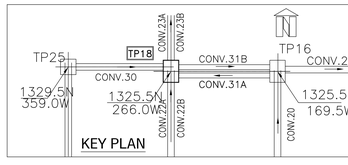
1) ALL DIMENSIONS ARE IN MM & LEVELS IN METER.
2) EL.+ 0.00 CORRESSPONDS TO RL + 282.5
3) GRADED GROUND LEVEL = (–) 0.500
4) ALL OPENING IN RCC FLOORS TO HAVE 100X100 CURB ALL AROUND OPENING EXCEPT AS NOTED ELSEWHERE.
5) ALL ENTRY DOORS 1200 MM WIDE x 2100 MM HIGH.
6) OPENING FOR DOWN COMERS & UTILITIES CAN BE SHIFTED CLOSE TO THE WALL DEPENDING UPON THE BEAM FLANGE WIDTH.
7) CHUTE LOADS WITH CLOGGED CONDITION.
8) SLOPE OF FLOOR AS PER TECH.SPEC.STIPULATION AND FFL SHALL BE MIN. 200 MM

REFERENCE DRAWINGS:

GENERAL ARRANGEMENT OF TRANSFER TOWER– TP–18
M070 HI8 000 0001–0
SHEET 1 OF 5
SHEET 2 OF 5
SHEET 3 OF 5
SHEET 4 OF 5
SHEET 5 OF 5

FLOOR BEAM LAYOUT AT ROOF Lvl.(T.O.S)

(EL (+) 25.312M T.O.S)



NTPC DRG. NO : 9545–156–PVC–B–173

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
A	NTPC COMMENTS INCORPORATED	9.12.07	SBS/AKA

	Date	Name
Drawn	19/08/05	MKK
Checked	20/08/05	SYP
Approved	21/08/05	B.VENU

Scale 1:75

Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: STRL G.A. OF ROOF PLAN AT EL (+)25.312M (TP–18)

M070 H18 6002

Sheet No. 1 Total Sheets 5

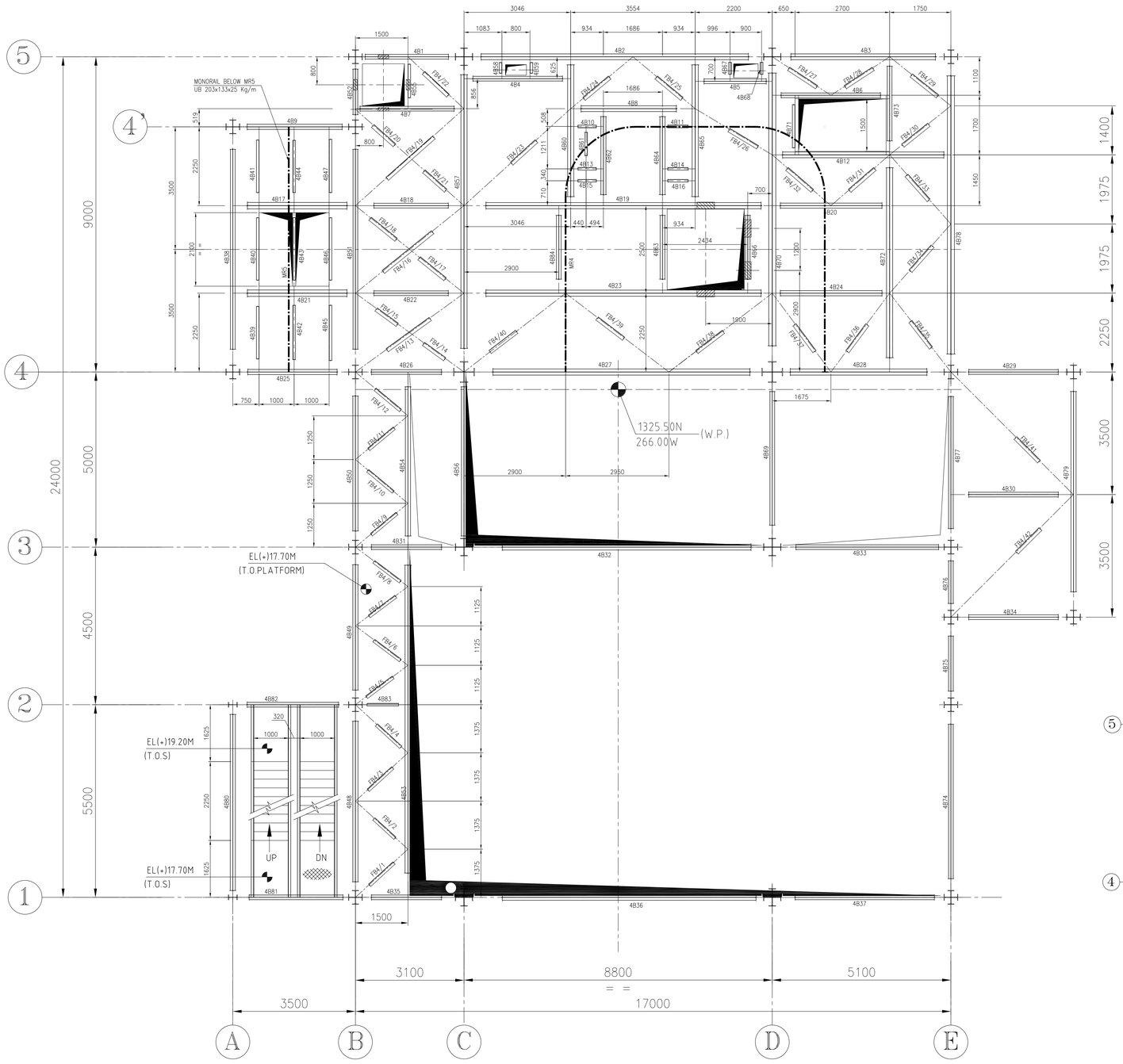
Rev. Number 0

Drawing Number

Surface Texture as per IS 10719 | Castings as per IS-4897-1A | General Tolerances for Welded Construction as per ISO 13920 B for linear F for angular | Machined Components as per ISO 2768 m for linear k for angular | Dimension | Tolerance

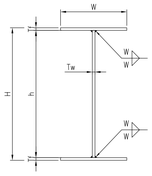
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COMPUTER GENERATED DRAWING



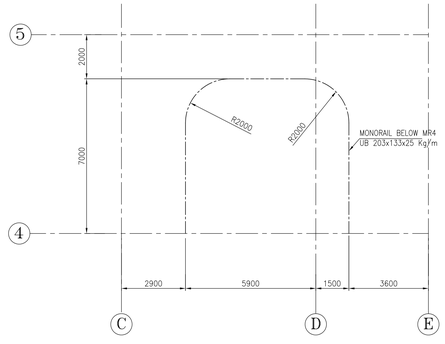
FLOOR BEAM LAYOUT AT EL(+)17.70(T.O.S)

BEAM MKD.	SECTION
4B1,4B4,4B5,4B6,4B7,4B18, 4B22,4B25,4B26,4B29,4B30, 4B33,4B34,4B37,4B44,4B48, 4B49,4B50,4B54,4B56,4B63, 4B66,4B69,4B73,4B74 4B77,4B80,4B81, 4B82, MR4 & MR5	UB 203x133x25
4B9,4B20,4B24,4B25, 4B75,4B76,4B79,4B80	UB 254x146x37
4B3,4B8,4B32,4B31,4B36 4B53,4B71	UB 305x165x46
4B2,4B17,4B21,4B27,4B28 4B35,4B52,4B60, 4B65,4B72	IPE 400
4B12	IPE 450
4B78	IPE 500
4B38,4B51	IPE 600
4B10,4B11,4B13,4B14 4B15,4B16,4B39,4B40, 4B41,4B42,4B43, 4B45,4B46,4B47,4B55,4B58 4B59,4B61,4B67,4B68,	MC 150
4B83	MC 200
FB4/1 TO FB4/12	L 75x75x6
FB4/13 TO FB4/42	L 100x100x8



TYPICAL SECTION OF PLATE GIRDER

S.NO	BEAM MARK	H	FLANGE PLATE		WEB PLATE		WELD SIZE – W
			W	Tf	h	Tw	
1.	4B57,4B70,4B19	850	350	25	800	16	8
2	4B23	640	250	20	600	12	8



MONORAIL MR4 DETAILS

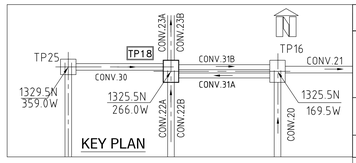
monorail routing shall match with final approved mechanical drawing.

NOTES

1) ALL DIMENSIONS ARE IN MM & LEVELS IN METER.
2) EL + 0.00 CORRESSPONDS TO RL + 282.5
3) GRADED GROUND LEVEL = (–) 0.500
4) ALL OPENING IN RCC FLOORS TO HAVE 100X100 CURB ALL AROUND OPENING EXCEPT AS NOTED ELSEWHERE.
5) ALL ENTRY DOORS 1200 MM WIDE x 2100 MM HIGH.
6) OPENING FOR DOWN COMERS & UTILITIES CAN BE SHIFTED CLOSE TO THE WALL DEPENDING UPON THE BEAM FLANGE WIDTH.
7) CHUTE LOADS WITH CLOGGED CONDITION.
8) SLOPE OF FLOOR AS PER TECH.SPEC.STIPULATION AND FFL SHALL BE MIN. 200 MM

REFERENCE DRAWINGS:

GENERAL ARRANGEMENT OF TRANSFER TOWER- TP-18
M070 HI8 000 0001-0
SHEET 1 OF 5
SHEET 2 OF 5
SHEET 3 OF 5
SHEET 4 OF 5
SHEET 5 OF 5



NTPC DRG. NO : 9545–156–PVC–B–173

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)
PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	9.12.07	SBS/AKA

Critical dimensions.

Scale		Date	Name
1:50	Drawn	19/07/05	MKK
	Checked	20/07/05	SYP
	Approved	20/07/05	B.VENU

Title: STRL G.A. OF FLOOR PLAN AT EL (+)17.7M (TP–18)

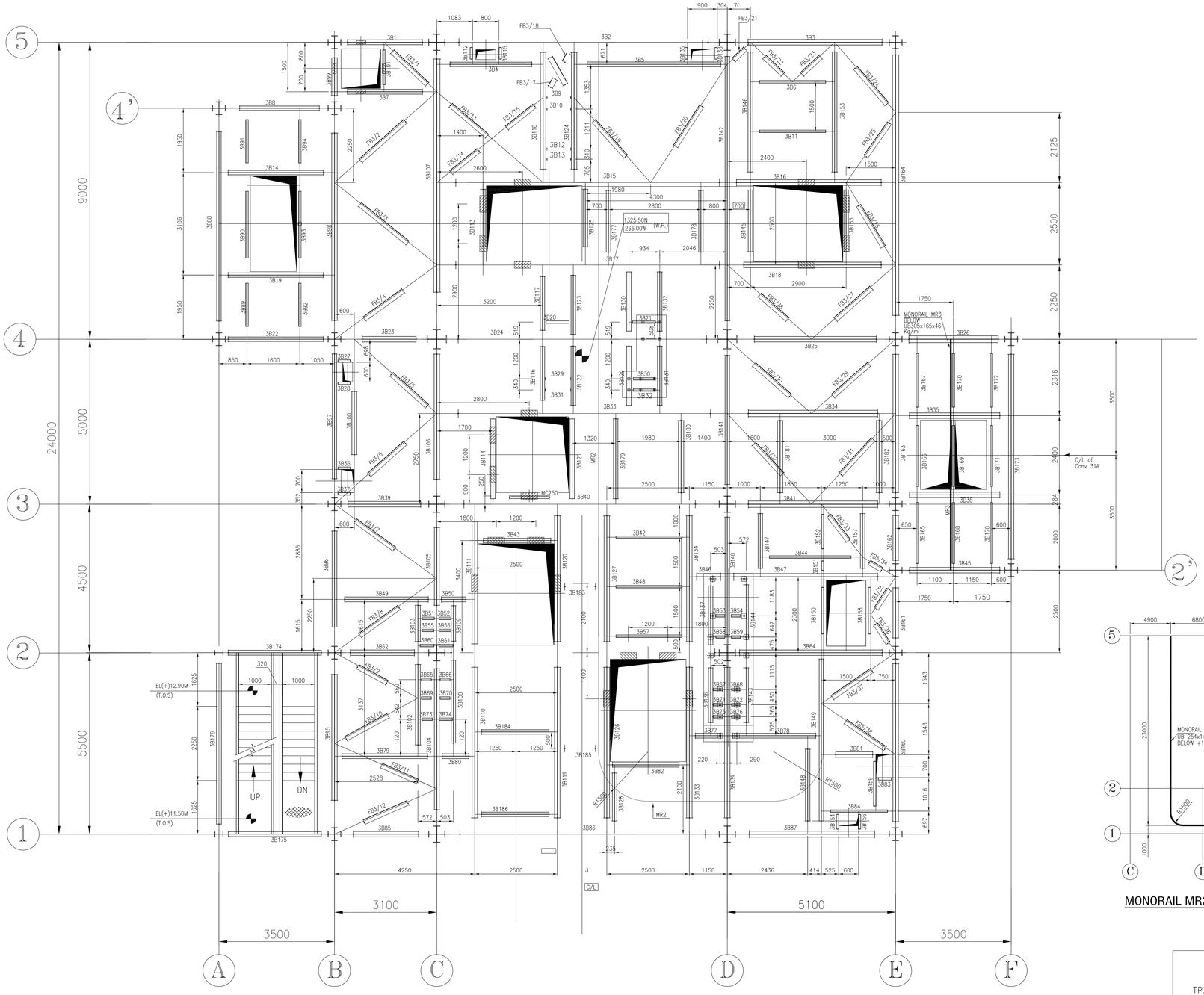
ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

M070 H18 6002

Sheet No. 2 Total Sheets 5

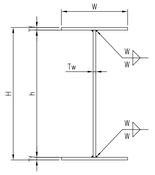
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COMPUTER GENERATED DRAWING



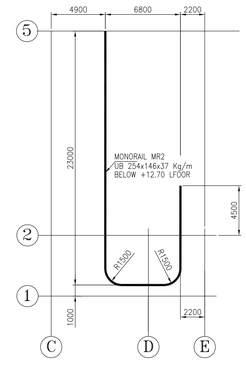
FLOOR PLAN AT EL(+)12.70 (T.O.S)

BEAM MKD.	SECTION
3B4,3B8,3B14,3B19,3B22, 3B43,3B77,3B81,3B82,3B85, 3B88,3B97,3B108,3B109, 3B113,3B114,3B116,3B117, 3B122,3B123,3B125,3B128 3B129,3B130,3B131,3B132 3B136,3B137,3B143,3B144 3B145,3B147,3B148,3B155 3B157,3B184,3B186	UB 203x133x25
3B1,3B5,3B7,3B49,3B78, 3B79,3B96,3B100,3B102, 3B103,3B146,3B153,1B174 3B175,3B176 & MR2	UB 254x146x37
3B3,3B25,3B62,3B95,3B118, 3B124,3B160 & MR3,MR3 3B177,3B178,3B180,3B181 3B182,3B183,3B185	UB 305x165x46
3B2,3B46,3B47,3B50,3B87, 3B105,3B127,3B134,3B140	IPE 400
3B23,3B39, 3B121,3B179	IPE 450
3B16,3B18,3B26,3B34,3B35 3B38,3B41,3B45,3B64,3B80, 3B98,3B99,3B104,3B110, 3B111,3B119,3B120,3B126, 3B133,3B139,3B149,3B161, 3B162	IPE 500
3B163, 3B164,3B173	IPE 600
3B9,3B10,3B12,3B13,3B20, 3B21,3B27,3B28,3B29,3B30, 3B31,3B32,3B36,3B37,3B51 3B52,3B53,3B54,3B55,3B56, 3B58,3B59,3B60,3B61,3B65 3B66,3B67,3B68,3B69,3B70 3B71,3B72,3B73,3B74,3B75 3B76,3B89,3B91,3B92,3B94, 3B101,3B112,3B115,3B135, 3B138,3B151,3B152,3B154, 3B156	MC 150
3B6,3B11,3B42,3B44,3B48, 3B57,3B83,3B84,3B90,3B93 3B150,3B158,3B159,3B165 3B166,3B167,3B168,3B169, 3B170,3B171, 3B172	MC 200
FB3/1 TO FB3/38	L 130x130x10



TYPICAL SECTION OF PLATE GIRDER

S.NO	BEAM MARK	H	FLANGE PLATE		WEB PLATE		WELD SIZE – W
			W	Tf	h	Tw	
1.	3B107,3B142,3B15	850	350	25	800	16	8
2.	3B17,3B40,3B63	800	350	25	750	16	8
3.	3B24,3B33,3B141, 3B106	750	300	25	700	12	8
4.	3B86	640	250	20	600	12	8



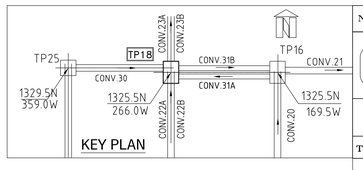
MONORAIL MR2 DETAIL

NOTES

1) ALL DIMENSIONS ARE IN MM & LEVELS IN METER.
2) EL.+ 0.00 CORRESSPONDS TO RL + 282.5
3) GRADED GROUND LEVEL = (–) 0.500
4) ALL OPENING IN RCC FLOORS TO HAVE 100X100 CURB ALL AROUND OPENING EXCEPT AS NOTED ELSEWHERE.
5) ALL ENTRY DOORS 1200 MM WIDE x 2100 MM HIGH.
6) OPENING FOR DOWN COMERS & UTILITIES CAN BE SHIFTED CLOSE TO THE WALL DEPENDING UPON THE BEAM FLANGE WIDTH.
7) CHUTE LOADS WITH CLOGGED CONDITION.
8) SLOPE OF FLOOR AS PER TECH.SPEC.STIPULATION AND FFL SHALL BE MIN. 200 MM

REFERENCE DRAWINGS:

GENERAL ARRANGEMENT OF TRANSFER TOWER- TP-18
M070 H18 000 0001-0
SHEET 1 OF 5
SHEET 2 OF 5
SHEET 3 OF 5
SHEET 4 OF 5
SHEET 5 OF 5



NTPC DRG. NO : 9545–156–PVC–B–173

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	25.8.06	DEEPAK

Surface Textures as per IS 10719 | Codings as per IS-6897-1A | General Tolerances for Welded Construction as per ISO1920 B for linear J for angular | Machined Components as per ISO2768 m for linear k for angular

Critical dimensions.

Scale		Date	Name
1:50	Drawn	19/07/05	MKK
	Checked	20/07/05	SYP
	Approved	20/07/05	B.VENU

Title: STRL G.A. OF FLOOR PLAN AT EL (+)12.7M (TP-18)

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

M070 H18 6002

Ø A

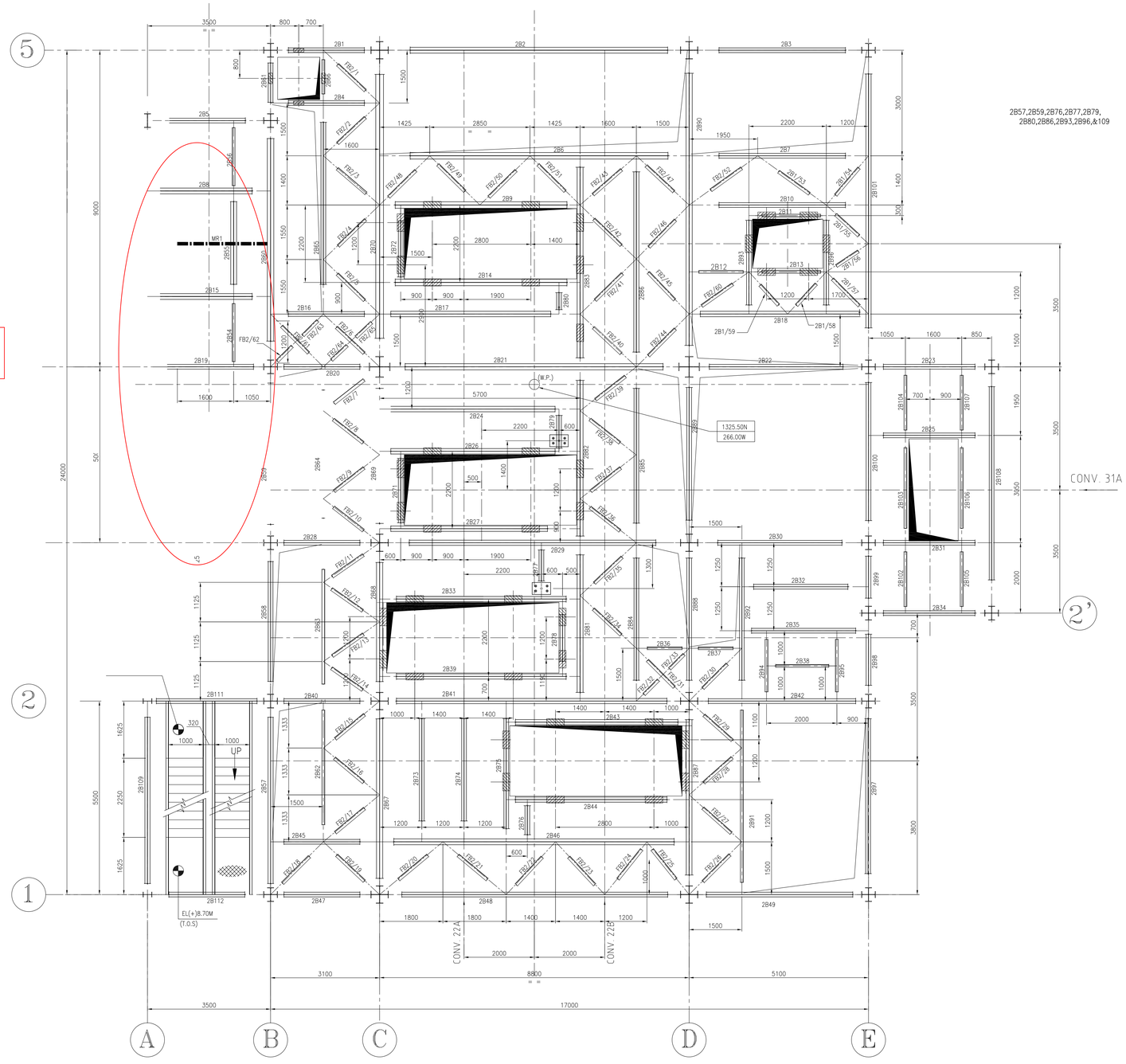
Sheet No. 3 Total Sheets 5

Dimension Tolerance

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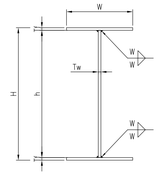
COMPUTER GENERATED DRAWING

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FLOOR PLAN AT EL(+)8.70 (T.O.S)

BEAM MKD.	SECTION
2B1,2B3,2B4,2B5,2B7,2B16 2B19,2B20,2B22,2B23,2B25, 2B28,2B30,2B31,2B32,2B34, 2B35,2B40,2B45,2B47,2B48, 2B49,2B58,2B61,2B65,2B71, 2B72,2B73,2B74,2B78,2B84, 2B85,2B88,2B89,2B92,2B97, 2B98,2B99,2B100,2B108, 2B111 & 2B112	UB 203x133x25
2B17,2B18,2B24,2B42,2B50, 2B57,2B59,2B65,2B76,2B77 2B79,2B80,2B86,2B93,2B96 2B109	UB 254x146x37
2B2,2B8,2B15,2B52,2B55 2B101 & MR1	UB 305x165x46
2B9,2B10,2B14,2B26,2B27, 2B33,2B39,2B43,2B44,2B67, 2B68,2B69,2B75,2B81,2B82	IPE 400
2B60,2B83,2B87	IPE 500
2B6,2B41,2B46 & 2B90	IPE 600
2B12,2B36,2B37,2B38,2B51 2B53,2B54,2B56,2B66,2B102 2B104,2B105 & 2B107	MC 150
2B11,2B13,2B62,2B63,2B64 2B91,2B94,2B95, 2B103 & 2B106	MC 200
FB2/1 TO FB2/60	L 90x90x6



TYPICAL SECTION OF PLATE GIRDER

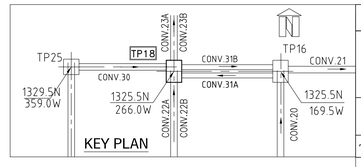
S.NO	BEAM MARK	H	FLANGE PLATE		WEB PLATE		WELD SIZE – W
			W	Tf	h	Tw	
1.	2B21,2B29 & 2B70	750	275	25	700	12	8

NOTES

1) ALL DIMENSIONS ARE IN MM & LEVELS IN METER.
2) EL.+ 0.00 CORRESSPONDS TO RL + 282.5
3) GRADED GROUND LEVEL = (–) 0.500
4) ALL OPENING IN RCC FLOORS TO HAVE 100X100 CURB ALL AROUND OPENING EXCEPT AS NOTED ELSEWHERE.
5) ALL ENTRY DOORS 1200 MM WIDE x 2100 MM HIGH.
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7) CHUTE LOADS WITH CLOGGED CONDITION.
8) SLOPE OF FLOOR AS PER TECH.SPEC.STIPULATION AND FFL SHALL BE MIN. 200 MM

REFERENCE DRAWINGS:

GENERAL ARRANGEMENT OF TRANSFER TOWER- TP-18
M070 HI8 000 0001-0
SHEET 1 OF 5
SHEET 2 OF 5
SHEET 3 OF 5
SHEET 4 OF 5
SHEET 5 OF 5



NTPC DRG. NO : 9545–156–PVC–B–173

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)
PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	9.12.05	SBS/AKA

Scale 1:50

	Date	Name
Drawn	19/07/05	MKK
Checked	20/07/05	SYP
Approved	20/07/05	B.VENU

Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

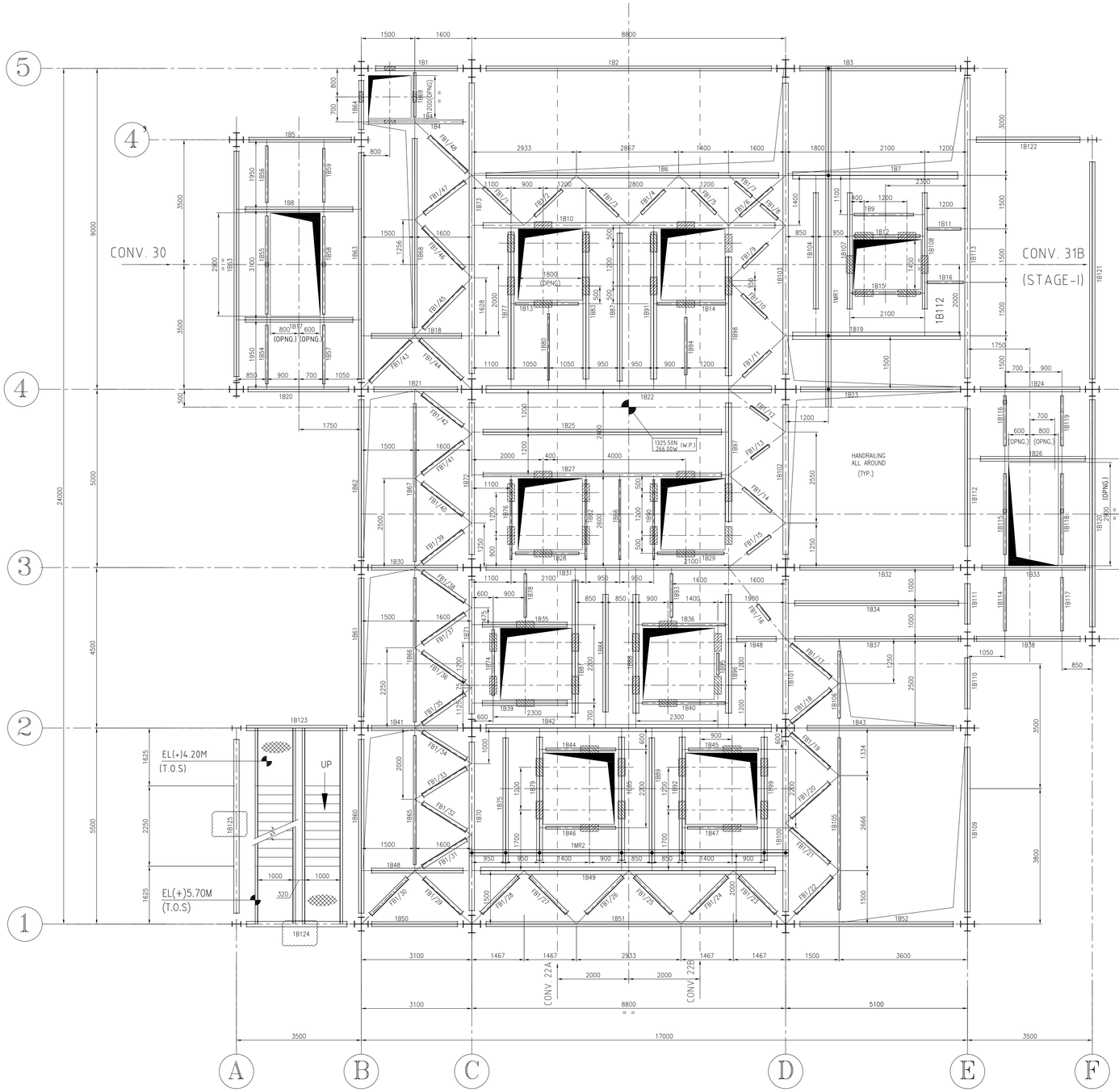
Title: STRL G.A. OF FLOOR PLAN AT EL (+)8.7 M (TP-18)

M070 H18 6002

Sheet No. 4 Total Sheets 5 | Rev. | Revision Id. Number | Drawing Number | 0 | A

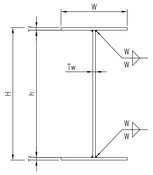
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COMPUTER GENERATED DRAWING



FLOOR PLAN AT EL(+)5.70 (T.O.S)

BEAM MKD.	SECTION
1B1,1B4,1B5,1B8,1B17 1B18,1B20,1B21,1B24, 1B26,1B30,1B32,1B33,1B34, 1B35,1B37,1B38,1B39,1B41, 1B43,1B48,1B50,1B51,1B52, 1B53,1B55,1B58,1B61,1B62 1B64,1B68,1B84,1B87,1B104, 1B110,1B111,1B115,1B118, & 1B122,1B123	UB 203x133x25
1B6,1B60,1B63,1B75,1B89,1B101, 1B102,1B109,1B112,1B125 1MR1,1B124	UB 254x146x37
1B2,1B3,1B14,1B23,1B25,1B77 1B79,1B81,1B83,1B85,1B88,1B91 1B92,1B96,1B98,1B99 & 1B121	UB 305x165x46
1MR2	UB 356x171x57
1B12,1B13,1B14,1B15,1B28 1B29,1B36,1B40,1B44,1B45, 1B46,1B47,1B65,1B66,1B67, 1B74,1B76,1B78,1B82,1B86, 1B90,1B105	MC 200
1B9,1B11,1B16,1B54,1B56, 1B57,1B59,1B69,1B80,1B93, 1B94,1B106,1B114,1B116, 1B117 & 1B119	MC 150
1B70,1B71,1B100, 1B107,1B108 & 1B120	IPE 400
1B72,1B97 & 1B113	IPE 500
1B7,1B10,1B19,1B22,1B27,&1B31	IPE 600
FB1/1 TO F46	L 75x75x6



TYPICAL SECTION OF PLATE GIRDER

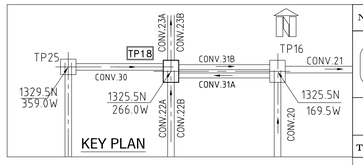
S.NO	BEAM MARK	H	FLANGE PLATE		WEB PLATE		WELD SIZE – W
			W	Tf	h	Tw	
1.	1B42,1B49,1B73 & 1B103	750	275	25	700	12	8

NOTES

1) ALL DIMENSIONS ARE IN MM & LEVELS IN METER.
2) EL + 0.00 CORRESSPONDS TO RL + 282.5
3) GRADED GROUND LEVEL = (–) 0.500
4) ALL OPENING IN RCC FLOORS TO HAVE 100X100 CURB ALL AROUND OPENING EXCEPT AS NOTED ELSEWHERE.
5) ALL ENTRY DOORS 1200 MM WIDE x 2100 MM HIGH.
6) OPENING FOR DOWN COMERS & UTILITIES CAN BE SHIFTED CLOSE TO THE WALL DEPENDING UPON THE BEAM FLANGE WIDTH.
7) CHUTE LOADS WITH CLOGGED CONDITION.
8) SLOPE OF FLOOR AS PER TECH.SPEC.STIPULATION AND FFL SHALL BE MIN. 200 MM

REFERENCE DRAWINGS:

GENERAL ARRANGEMENT OF TRANSFER TOWER- TP-18
M070 HI8 000 0001-0
SHEET 1 OF 5
SHEET 2 OF 5
SHEET 3 OF 5
SHEET 4 OF 5
SHEET 5 OF 5



NTPC DRG. NO : 9545–156–PVC–B–173

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT STAGE–II (2x500MW)
PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	9.12.07	SBS/AKA

Surface Texture as per IS 10719 | Codings as per IS-696?-1A | General Tolerances for Welded Construction as per ISO1920 B for linear J for angular | Machined Components as per ISO2768 m for linear k for angular

Critical dimensions.

Scale		Date	Name
1:50	Drawn	19/08/05	MKK
	Checked	20/08/05	SYP
	Approved	21/08/05	B.VENU

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: STRL G.A. OF FLOOR PLAN AT EL (+)5.7 M (TP-18)

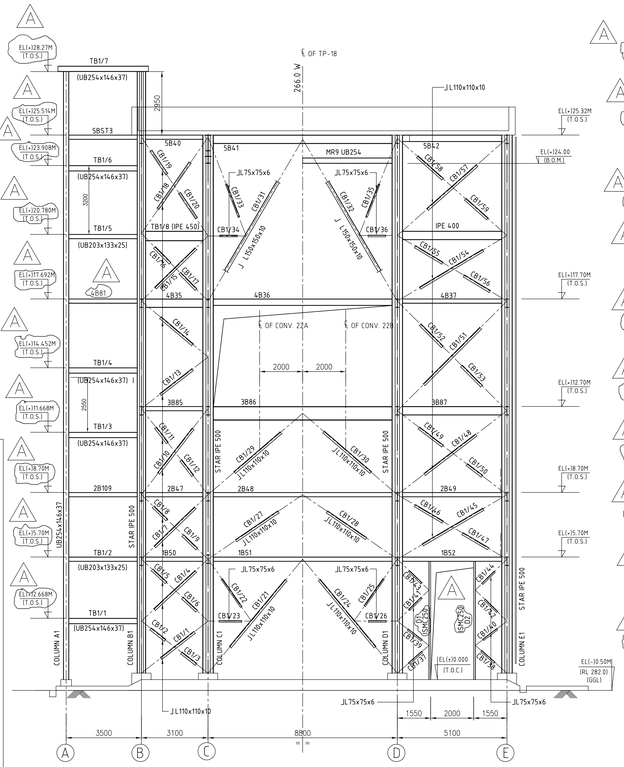
M070 H18 6002

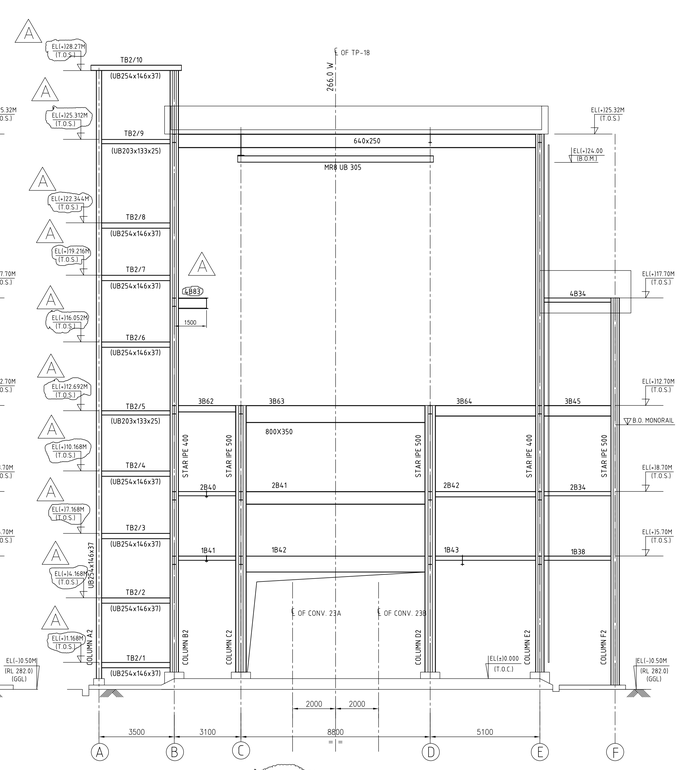
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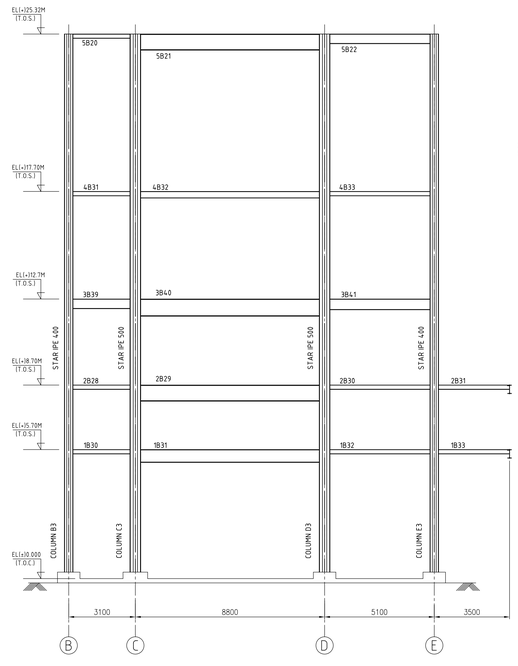
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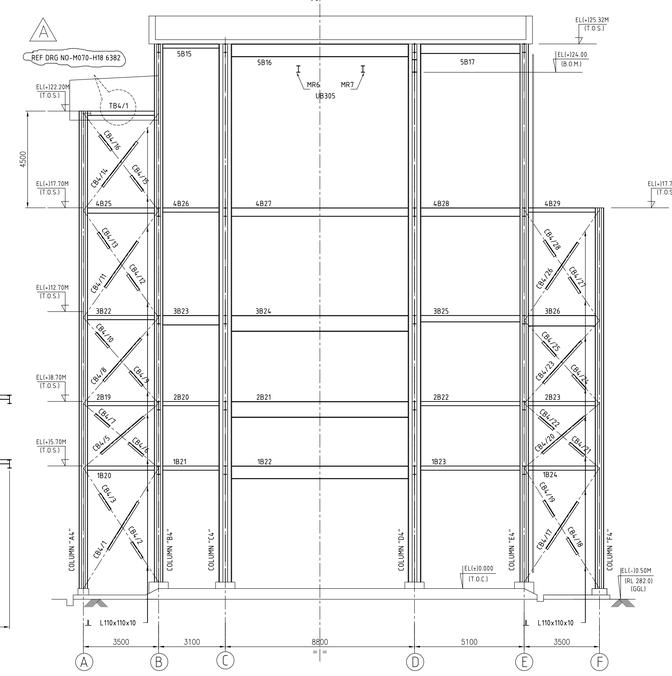
Dimension Tolerance

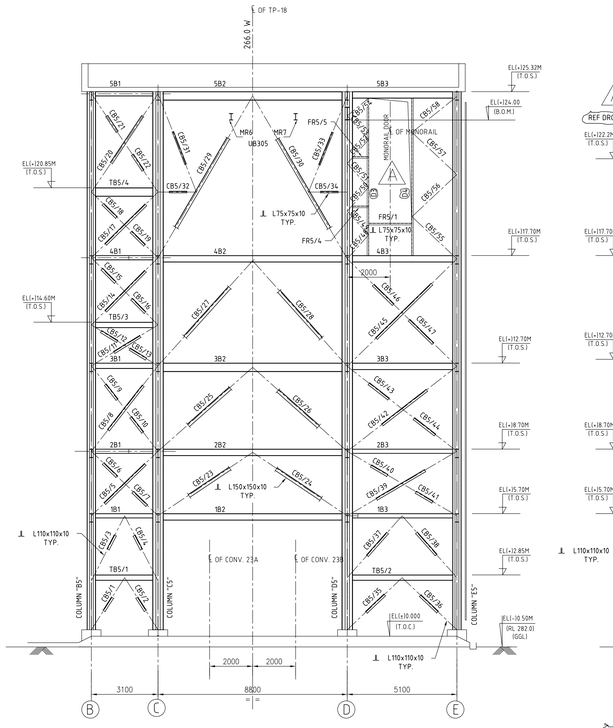
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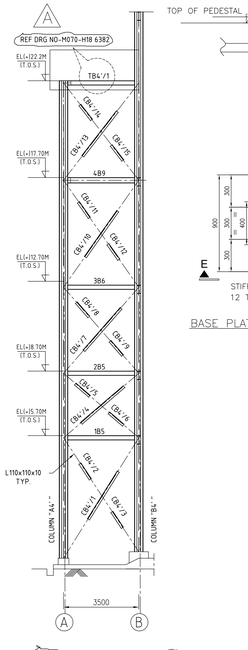


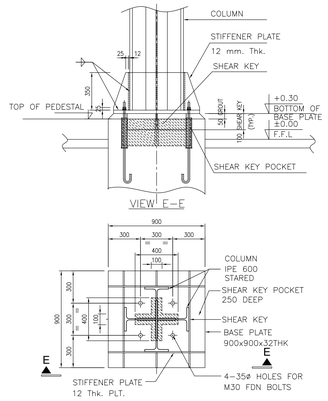


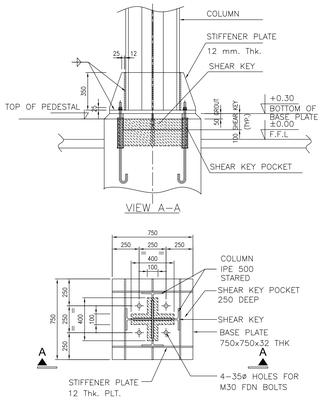


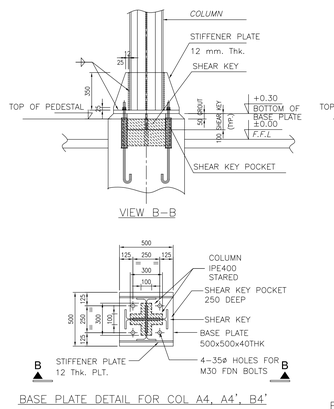


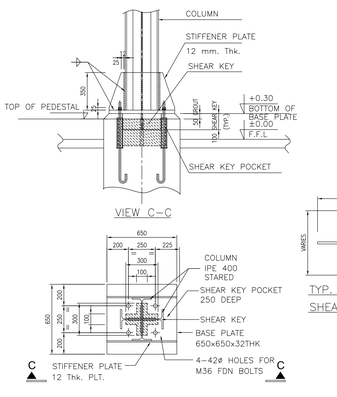


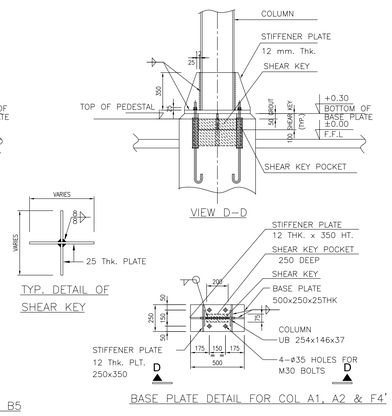












NOTES

1) ALL DIMENSION ARE IN MM & ALL LEVELS ARE IN MTRS.
2) ALL FOUNDATION BOLTS ARE CAST IN SITU BOLTS.
3) SEISMIC/WIND LOADS DOES NOT OCCURE SIMULTANEOUSLY IN X & Y DIRECTION
4) THIS DRG. IS BASED ON National Thermal Power Corporation Ltd. DRG. NO. M070 H18 000 0001 – 0
5) READ THIS DRG. IN CONJUCTION WITH DRG. No. M070–H18–6002

NTPC DRG. NO : 9545–156–PVC–B–174

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)
PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	9.12.07	SBS/AKA

Surface Texture as per IS 10719 — Coatings as per — General Tolerances for Welded Construction as per — Machined Components as per — Tol. Grade for shafts — Tol. Grade for holes

Scale		Date	Name
1:100	Drawn	20.08.05	KRS
	Checked	20.08.05	RS
	Approved	22–08–05	B.VENU

Critical dimensions.

Title: STRL. G.A OF ELEVATION (TP–18)

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

M070–H18–6003

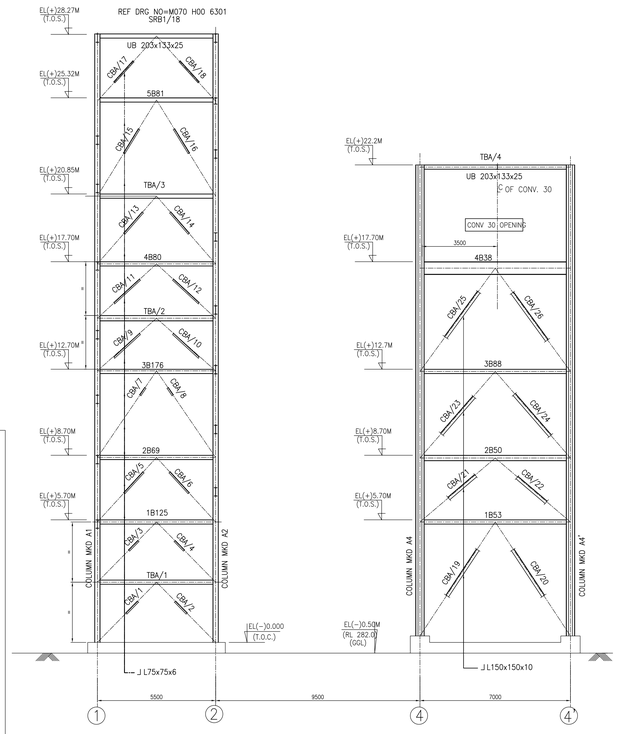
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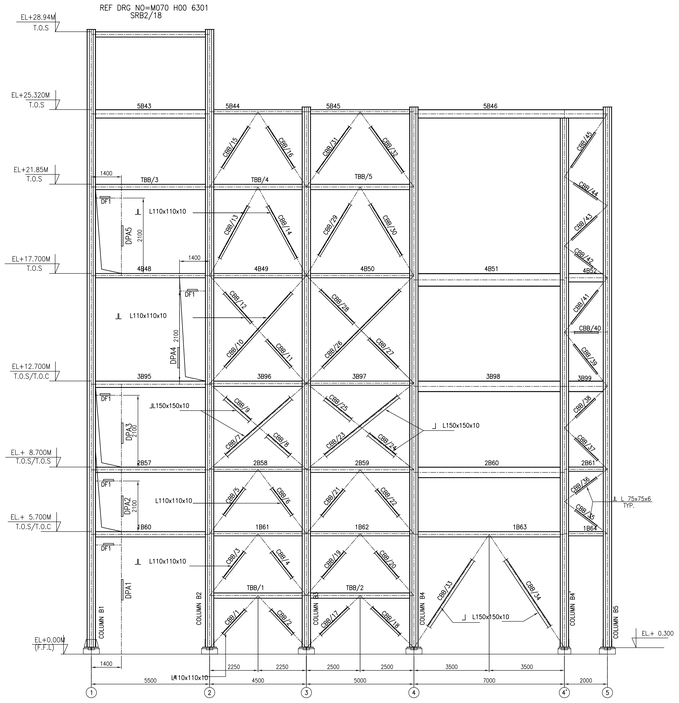
Dimension Tolerance

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COMPUTER GENERATED DRAWING

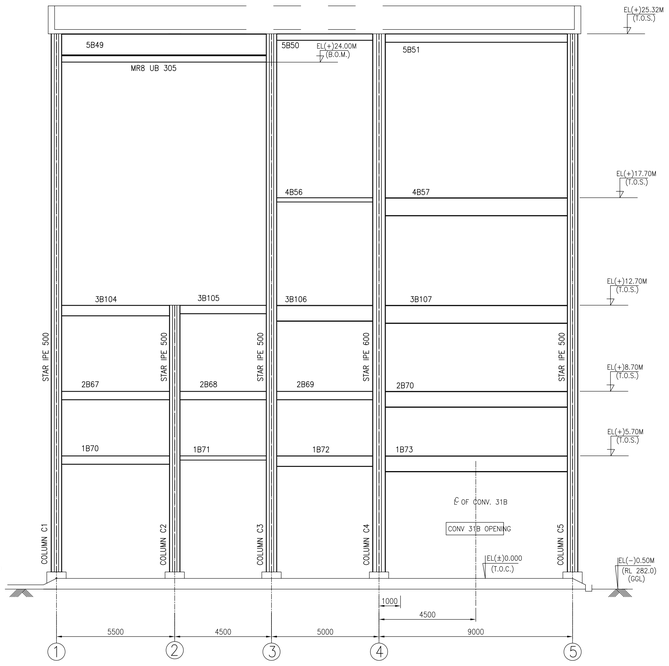


FRAME ALONG AXIS – A

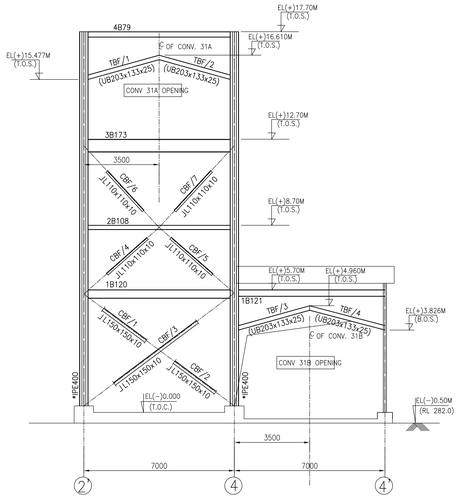


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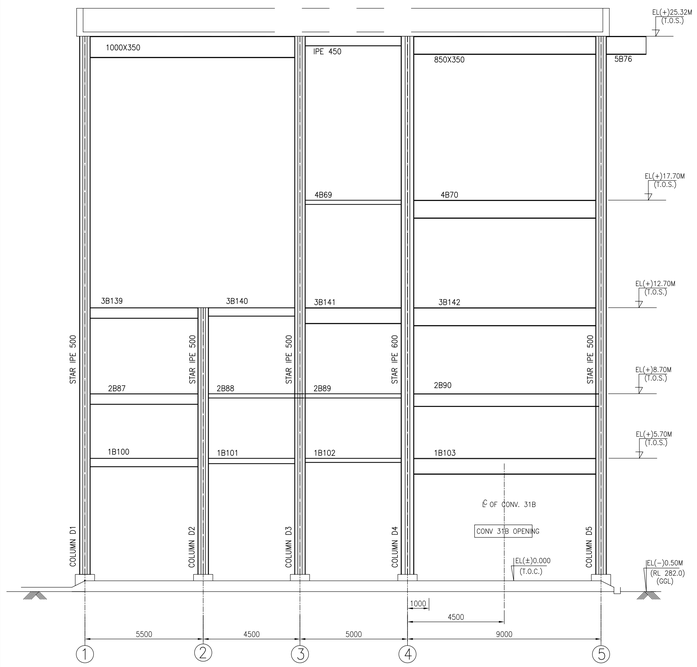
B



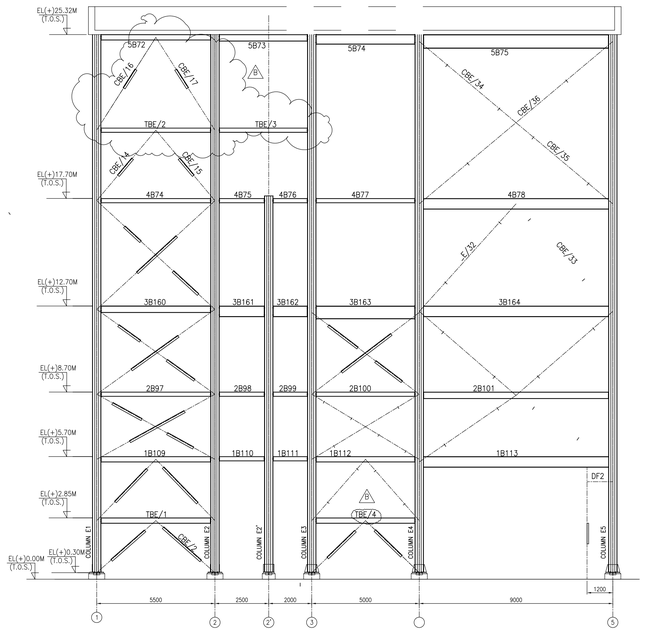
FRAME ALONG AXIS – C



FRAME ALONG AXIS – F



FRAME ALONG AXIS – D



FRAME ALONG AXIS – E

B

NOTES

1) ALL DIMENSION ARE IN MM & ALL LEVELS ARE IN MTRS.
2) ALL FOUNDATION BOLTS ARE CAST IN SITU BOLTS.
3) SEISMIC/WIND LOADS DOES NOT OCCURE SIMULTANEOUSLY IN X & Y DIRECTION
4) THIS DRG. IS BASED ON National Thermal Power Corporation Ltd. DRG. NO. M070 H18 000 0001 – 0
5). READ THIS DRG. IN CONJUCTION WITH DRG. No. M070–H18–6002

NTPC DRG. NO : 9545–156–PVC–B–174

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)
PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B	NTPC COMMENTS INCORPORATED	9.12.07	SBS/GKA
A	GENRAL REVISION	07.08.06	MAHESH

Surface Texture as per IS 10719 — General Tolerances for Welded Construction as per Castings as per Machined Components as per — No Grade for Welded — No Grade for Machined

Scale 1:100

	Date	Name
Drawn	22–08–06	KRS
Checked	22–08–06	RS
Approved	22–08–06	B.VENU

Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: STRL. G.A OF ELEVATION (TP–18)

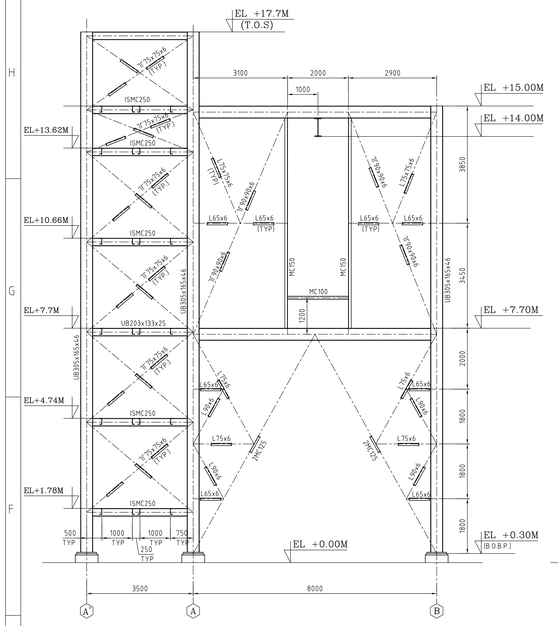
M070–H18–6003

Q.A B

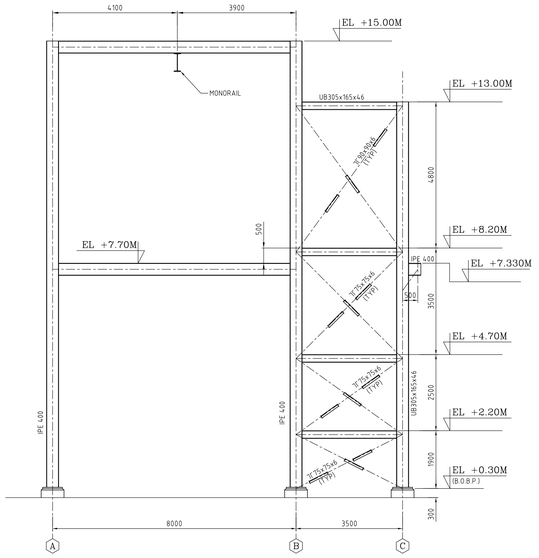
2 Total Sheets 2 2

Dimension Tolerance

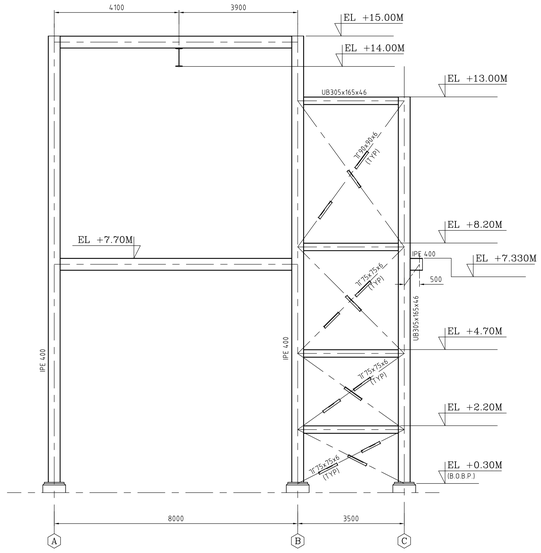
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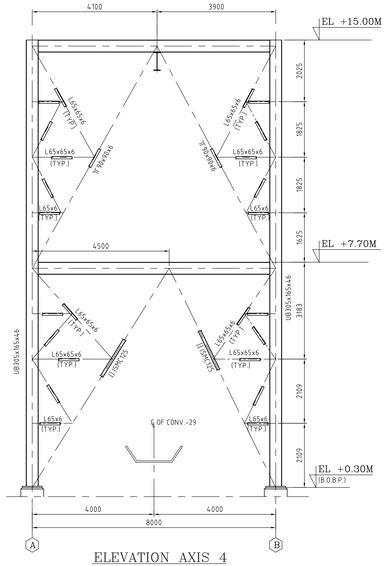
ELEVATION AXIS 1



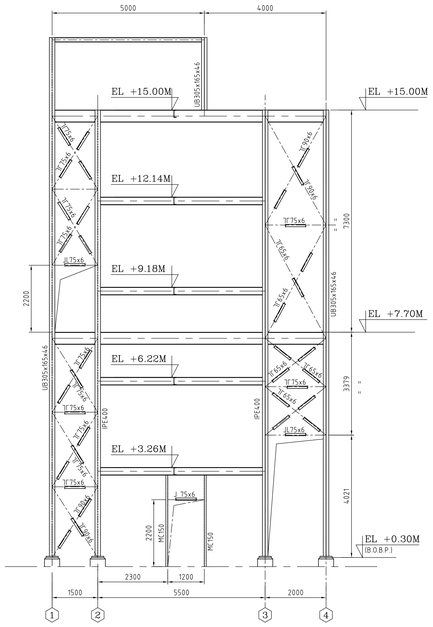
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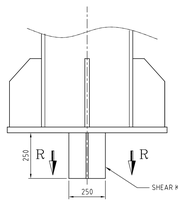
ELEVATION AXIS 3



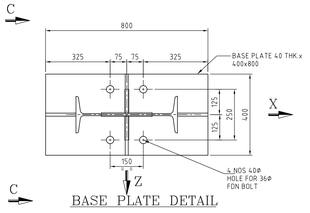
ELEVATION AXIS 4



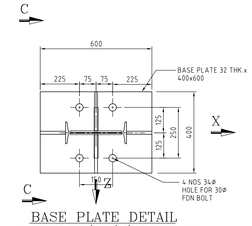
ELEVATION AXIS A



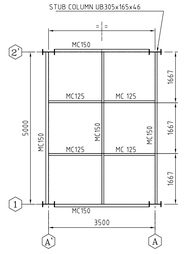
VIEW C–C



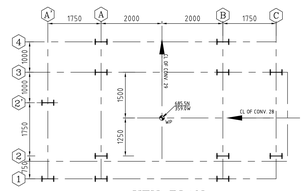
BASE PLATE DETAIL
FOR COL A1,A2,A3,A4
FOR COL B1,B2,B3,B4



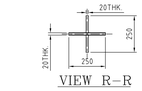
BASE PLATE DETAIL
FOR COL A'1,A'2',C2 & C3



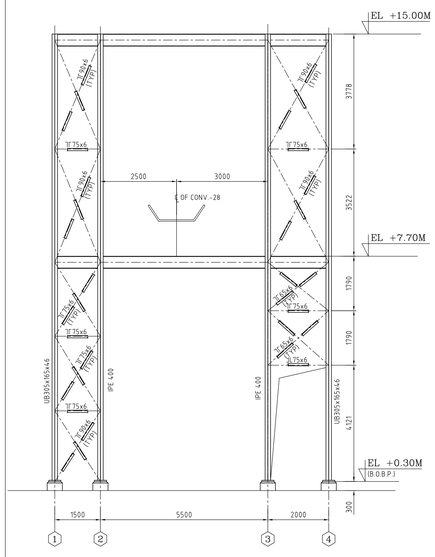
VIEW P–P
(ROOF PLAN OVER STAIR)



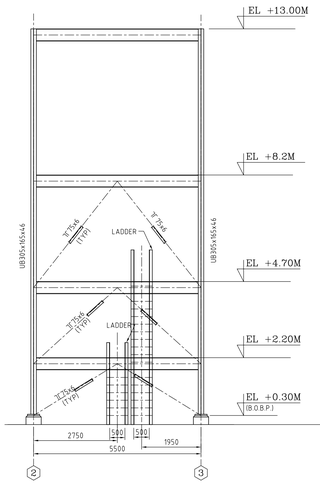
KEY PLAN



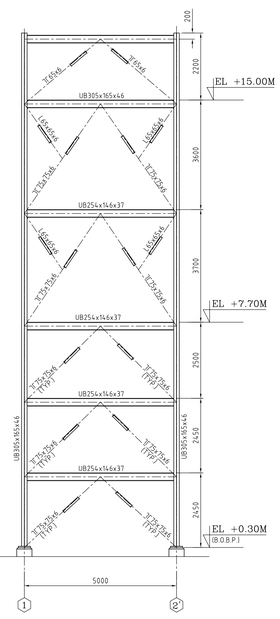
VIEW R–R



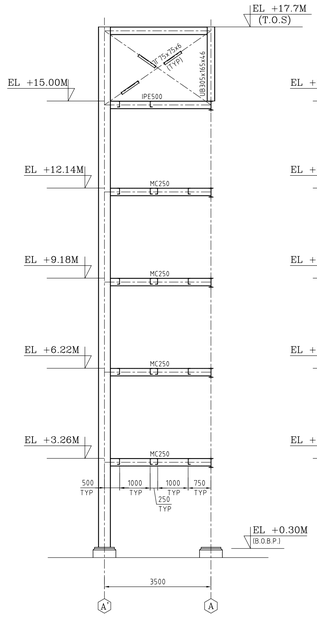
ELEVATION AXIS B



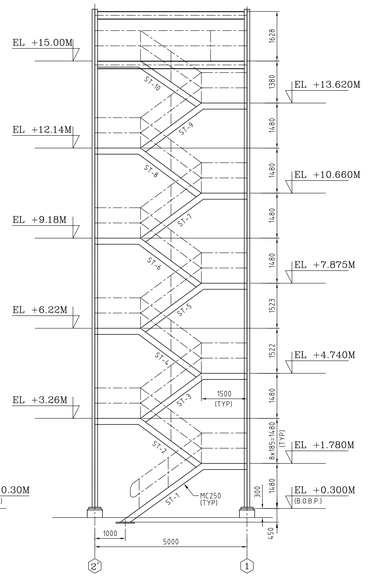
ELEVATION AXIS C



ELEVATION AXIS A'



VIEW A–A



STAIRCASE ELEVATION
VIEW B–B

NOTES :

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS
2. TOP OF STEEL IS CONSIDERED AS 200MM BELOW TOP OF CONCRETE
3. LEVEL 0.0M CORRESPONDS TO FINISH FLOOR LEVEL AT GROUND
4. ALL GUSSET PLATE SHOULD BE 8mm. THK.
5. CHQD. PLATE SHOULD BE 6mm THK. O/P
6. HAND RAIL SHOULD BE 32NB PIPE MEDIUM DUTY
7. STAIR TREAD AND LANDING SHOULD BE M.S. GRATING

REFERENCE DRAWINGS

M070 H24 000 0001-0 G.A. OF TP-24

NTPC DRG. NO : 9545-156-PVC-B-180

एन टी पी सी
NTPC

नेशनल थर्मल पावर कारपोरेशन लि .
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)
PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	19/7/2005	DEEPAK/PKO

Surface Texture as per IS 3073 — Castings as per — General Tolerances for Welded Construction as per ___ for linear ___ for angular — Machined Components as per ___ for linear ___ for angular

Scale 1:100

	Date	Name
Drawn	21.6.2005	Manu
Checked	22.6.2005	PKO
Approved	22.6.2005	B. Venu

Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title
STRUCTURAL G.A. OF ELEVATION
TP–24

M070 H24 6003

Ø A

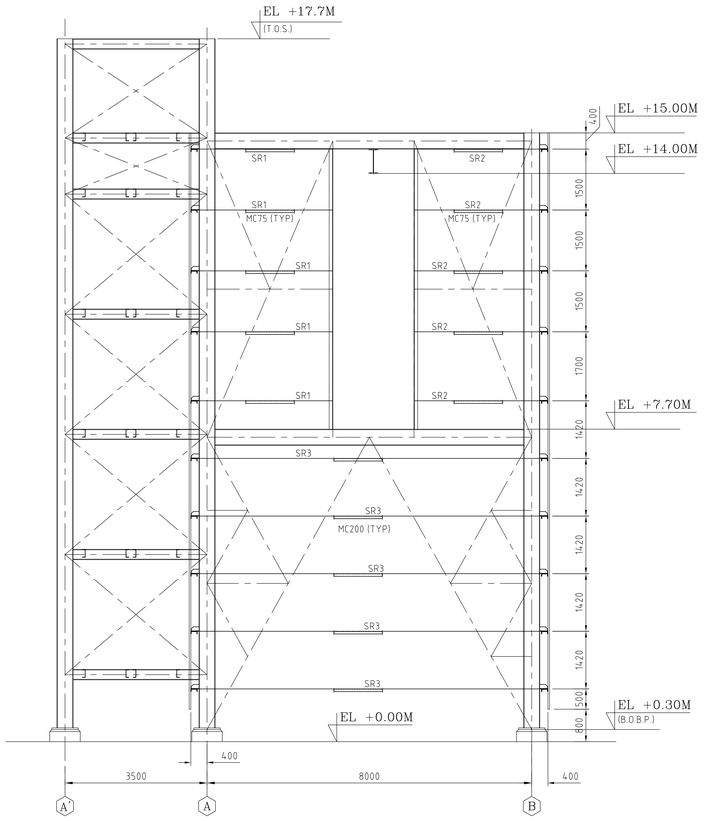
Sheet No. — Total Sheets 1 — 1

As Built Revision ID Number Drawing Number

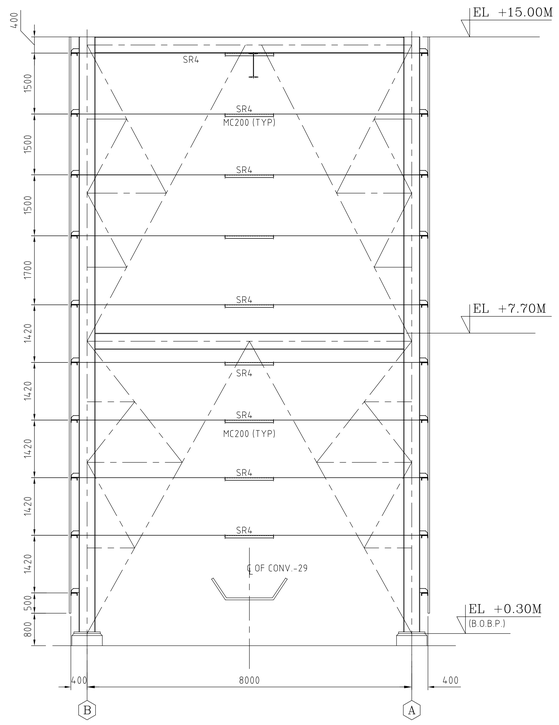
Dimension Tolerance

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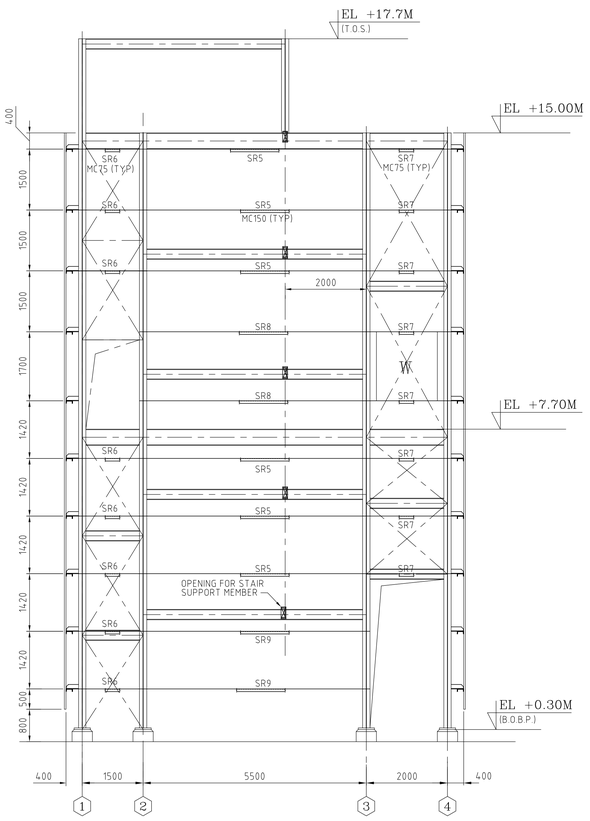
COMPUTER GENERATED DRAWING



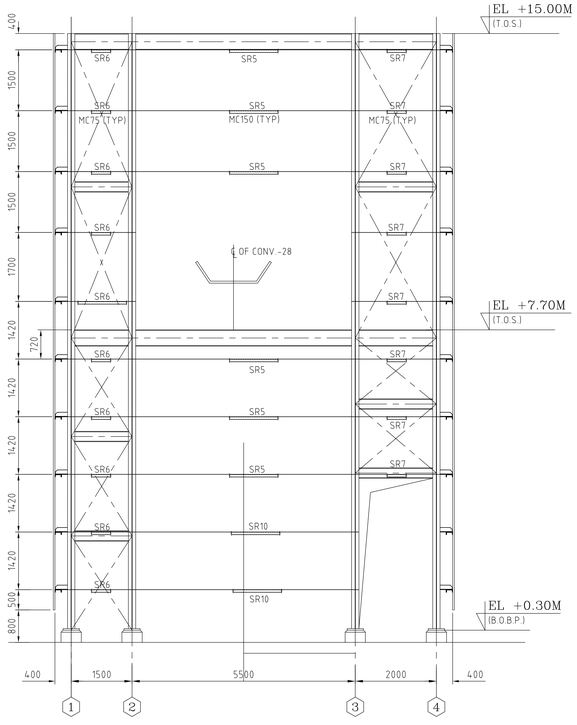
ELEVATION AXIS 1



ELEVATION AXIS 4



ELEVATION AXIS A



ELEVATION AXIS B

NOTES :

1. ALL DIMENSIONS ARE IN MM & LEVELS ARE IN METERS
2. TOP OF STEEL IS CONSIDERED AS 200MM BELOW TOP OF CONCRETE
3. LEVEL 0.0M CORRESPONDS TO FINISH FLOOR LEVEL AT GROUND
4. ALL GUSSET PLATE SHOULD BE 8mm. THK.
5. CHQD. PLATE SHOULD BE 6mm THK. O/P
6. HAND RAIL SHOULD BE 32NB PIPE MEDIUM DUTY
7. STAIR TREAD AND LANDING SHOULD BE M.S. GRATING

REFERENCE DRAWINGS

M070 H24 000 0001-0 G.A. OF TP-24

NTPC DRG. NO : 9545-156-PVC-B-181

एन टी पी सी
NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)

PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	19/7/2005	DEEPAK/PKO

Surface Texture as per IS 10719 | Castings as per | General Tolerances for Welded Construction as per | Machined Components as per | ___ for linear, ___ for angular | ___ for linear, ___ for angular

Critical dimensions.

Scale		Date	Name
1:75	Drawn	21.6.2005	Manu
	Checked	22.6.2005	PKO
	Approved	22.6.2005	B. Venu

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: STRUCTURAL G.A. OF SIDE RUNNER TP-24

Drawing Number: M070 H24 6004

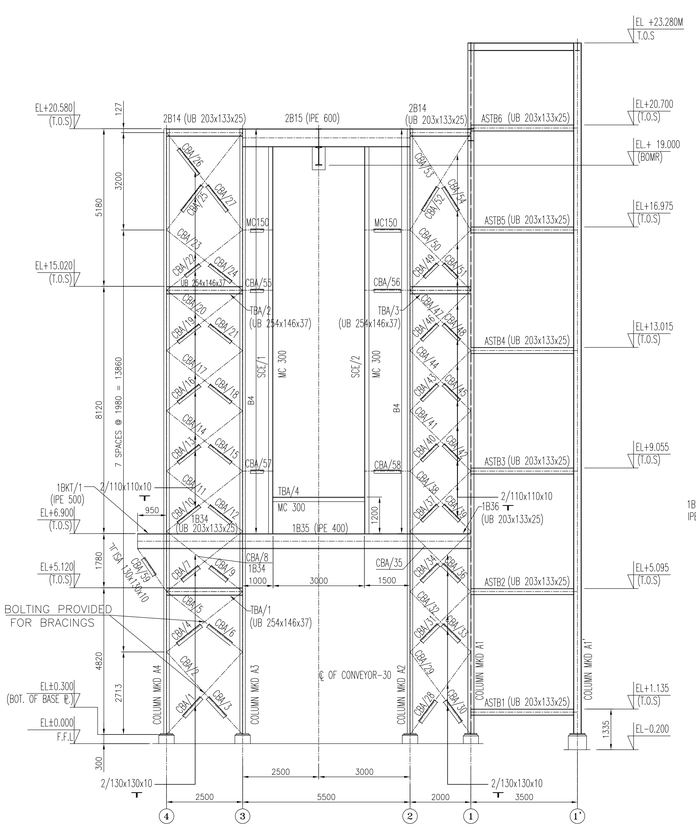
Revision Id Number: Ø A

Sheet No. | Total Sheets 1 | 1

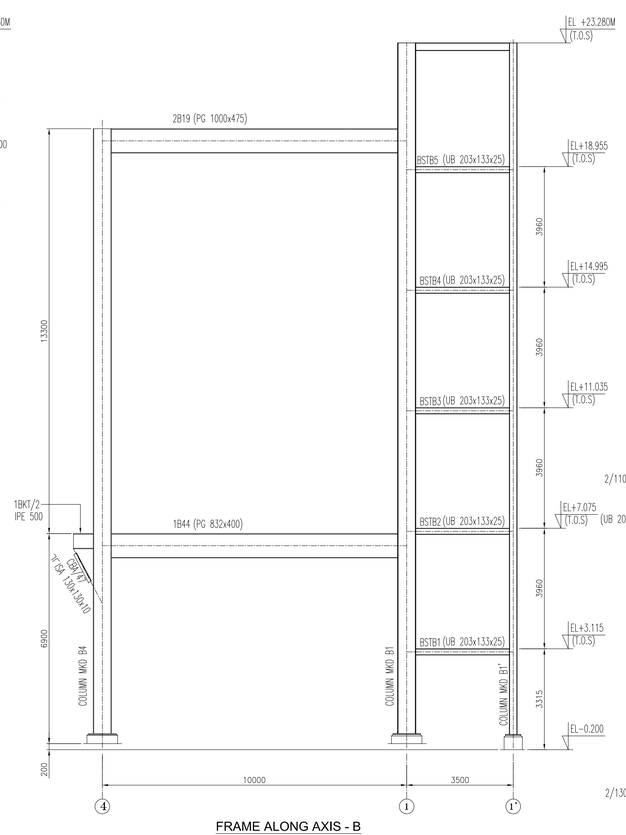
Dimension | Tolerance

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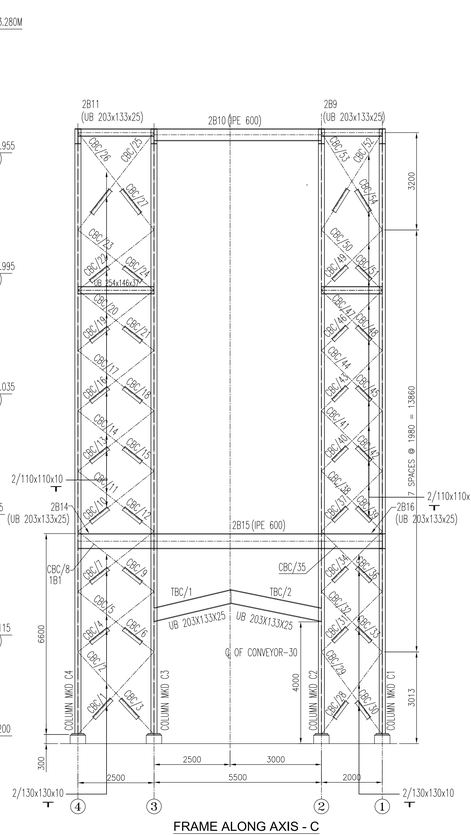
COMPUTER GENERATED DRAWING



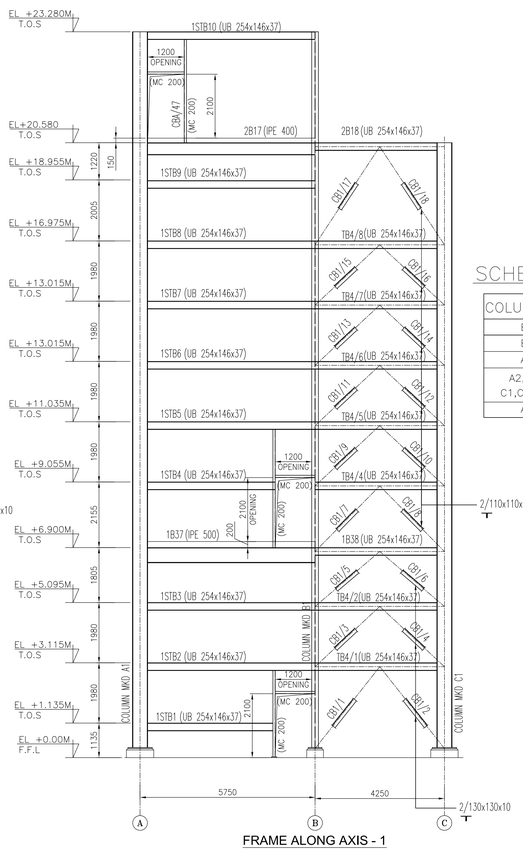
FRAME ALONG AXIS - A



FRAME ALONG AXIS - B



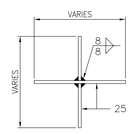
FRAME ALONG AXIS - C



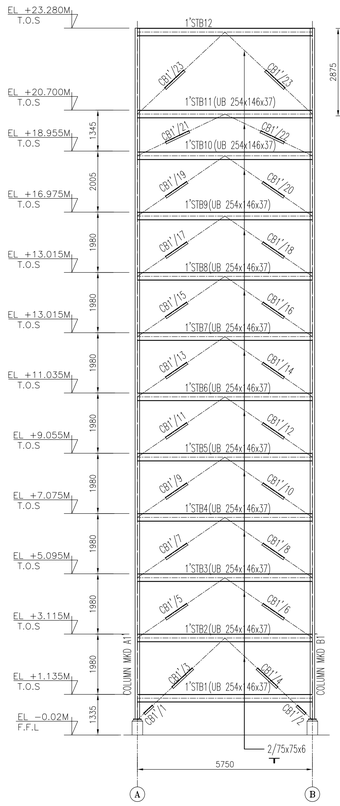
FRAME ALONG AXIS - 1

SCHEDULE OF COLUMNS

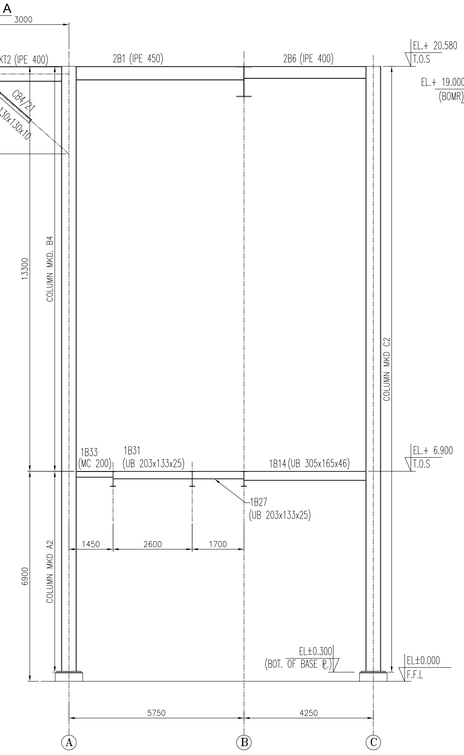
COLUMN MKD	SECTION
B1	IPE 600x220x122.4
B4	IPE 600x220x122.4
A1	IPE 500x200x90.7
A2,A3,A4 C1,C2,C3,C4	IPE 500x200x90.7
A1', B1'	UB 254x146x37



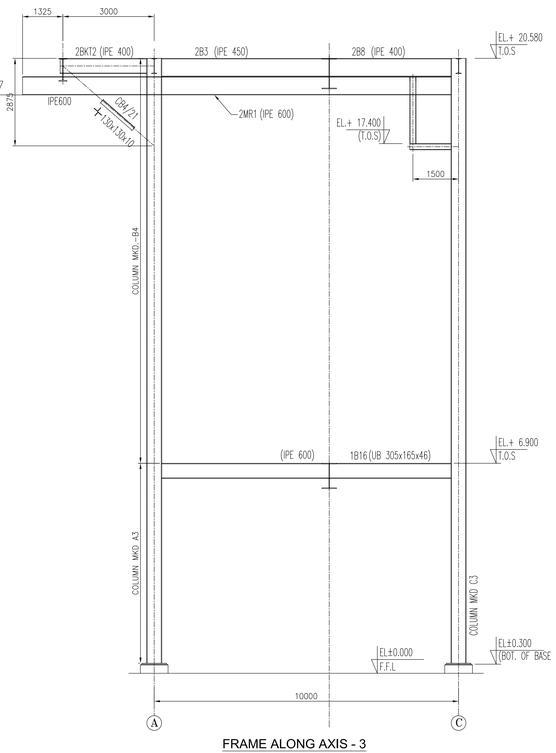
TYP. DETAIL OF SHEAR KEY



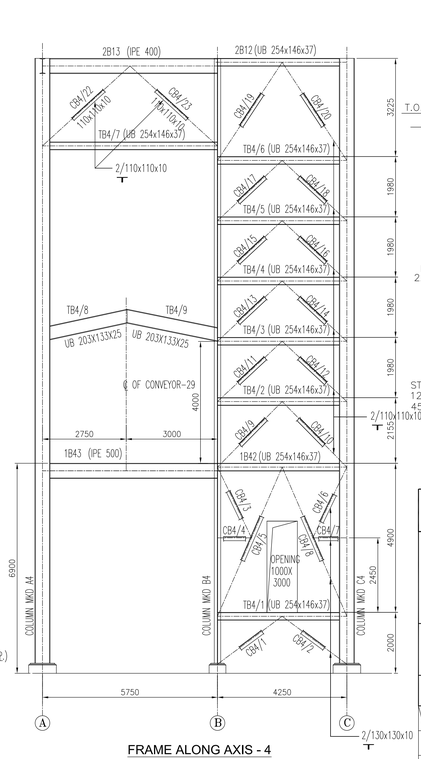
G A OF STAIRCASE ALONG GRID 1'



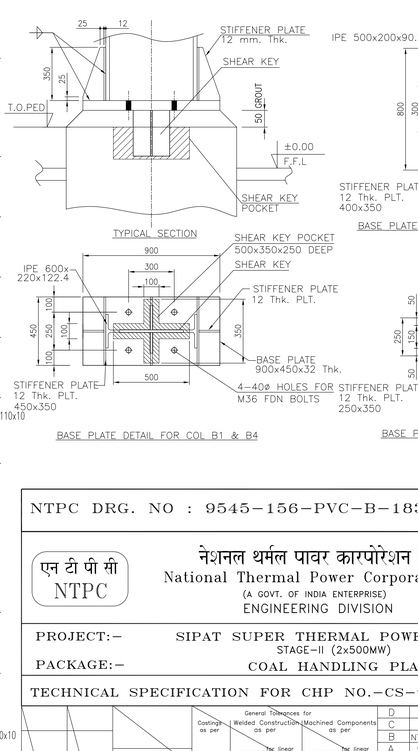
FRAME ALONG AXIS - 2



FRAME ALONG AXIS - 3



FRAME ALONG AXIS - 4



LEGEND:

F.F.L	–	FINISHED FLOOR LEVEL
T.O.S	–	TOP OF STEEL
BOMR	–	BOTTOM OF MONORAIL
B	–	FLOOR BEAM
CB	–	COLUMN BRACING
TB	–	TIE BEAM
SC	–	STUB COLUMN

NOTES:

1) ALL DIMENSIONS ARE IN MM & LEVELS ARE IN MTRS.
2) ALL HOLES ARE OF 22 ø FOR M20 BOLTS OF CLASS 4.6 U N O
3) ALL GUSSET PLATES ARE OF 10 MM THK U N O
   REFERENCE DRGS: 1) G.A & LOAD DATA OF TRANSFER POINT 25
   2) FOUNDATION LOAD DATA OF TRANSFER POINT 25
   3) G.A OF SIDE CLADDING & STAIRCASE
   4) G.A OF FLOOR BEAM & EL.+ 6.900 M. & EL.+ 20.200Lvl.

NTPC DRG. NO : 9545-156-PVC-B-183

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)
PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B	NTPC COMMENTS INCORPORATED	19/7/2005	DEEPAK/SYP
A	GENERALLY REVISED	7/7/2005	DEEPAK/SYP

Surface Texture as per IS 10719. General Tolerances for Castings as per ____ for linear ____ for angular; Welded Construction as per ____ for linear ____ for angular; Machined Components as per ____. Critical dimensions.

	Date	Name
Drawn	01-07-05	Mani
Checked	02-07-05	SYP
Approved	02-07-05	B. VENU

Scale 1:100

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title
TRANSFER TOWER - TP25
GENERAL ARRANGEMENT OF FRAMING ELEVATION

M070 H25 6003

Revision & Number: Ø A B
Drawing Number
Sheet No. 1 | Total Sheets 1 | 1 | Size A1

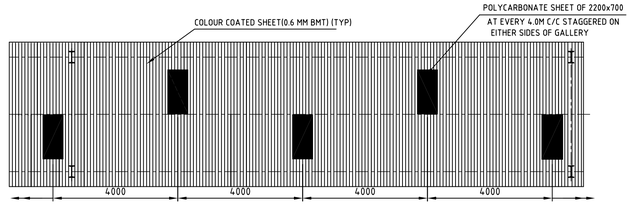
Dimension | Tolerance

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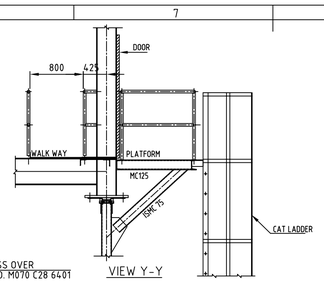
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FAR SIDE WINDOW

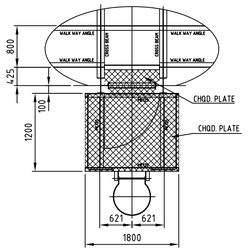
NEAR SIDE WINDOW



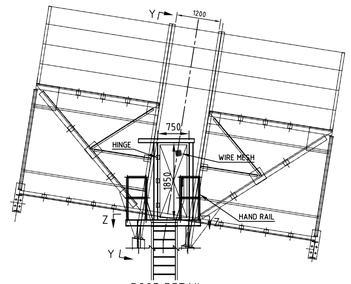
ROOF PLAN SHOWING TYPICAL SHEETING ARRANGMENT



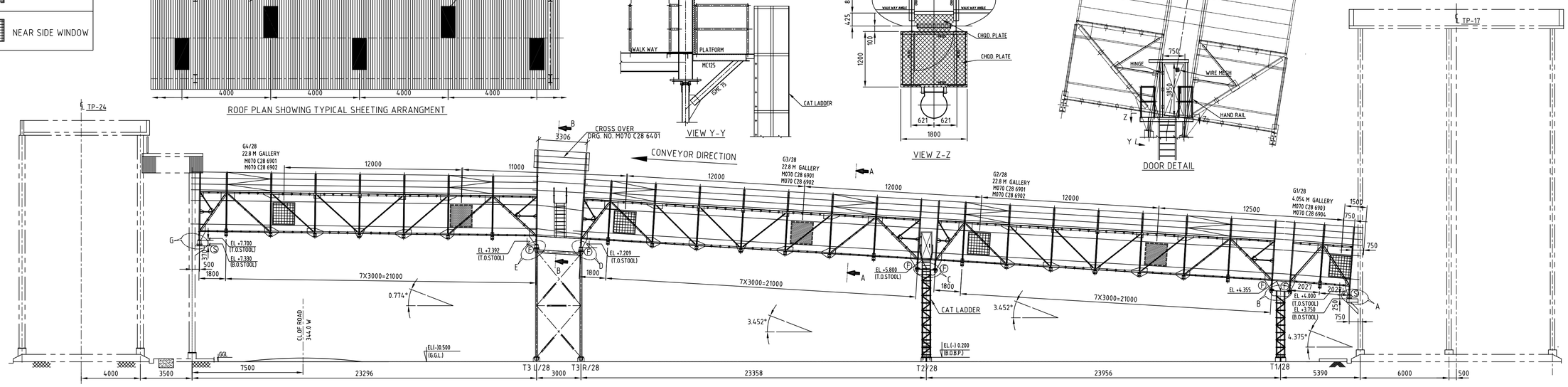
VIEW Y-Y



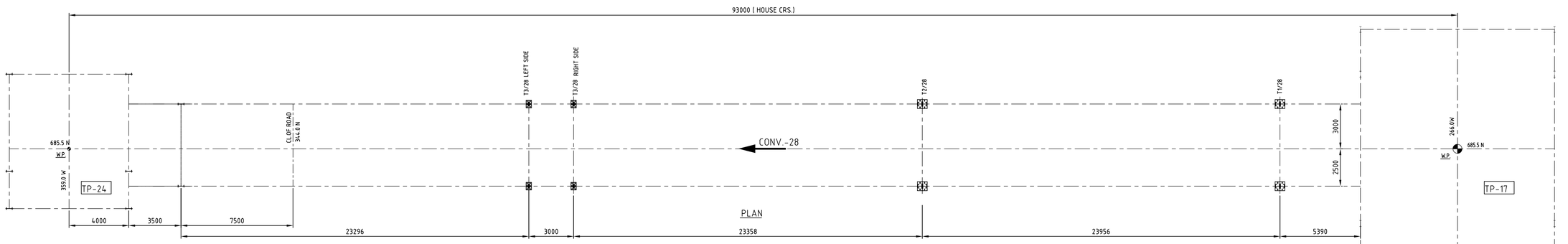
VIEW Z-Z



DOOR DETAIL



ELEVATION

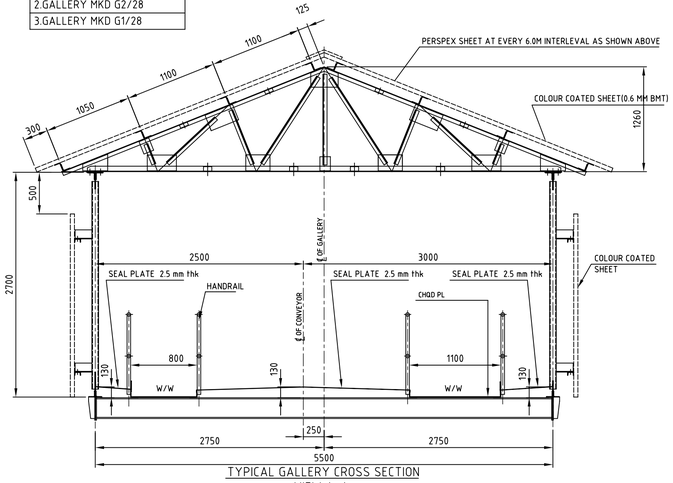


PLAN

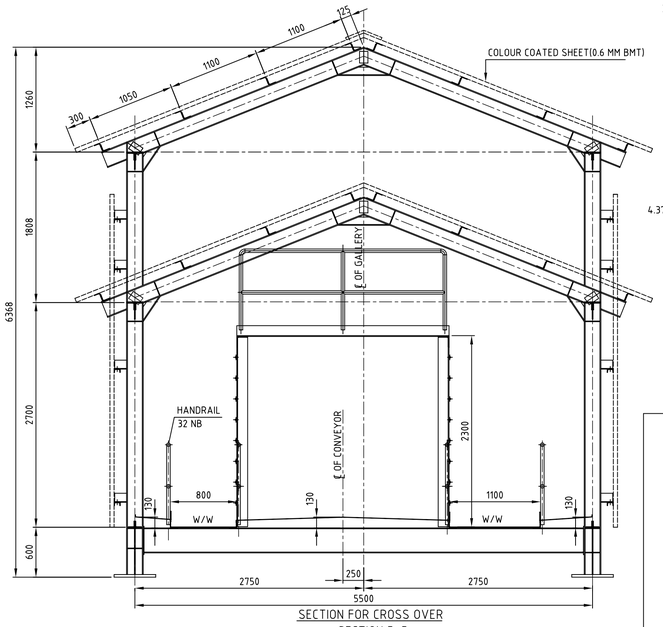
ERECTION SEQUENCE

GROUP 1
1. TRESTLE MKD T3/28
2.GALLERY MKD G4/28
GROUP 2
1. TRESTLE MKD T2/28
2.GALLERY MKD G3/28
GROUP 3
1. TRESTLE MKD T1/28
2.GALLERY MKD G2/28
3.GALLERY MKD G1/28

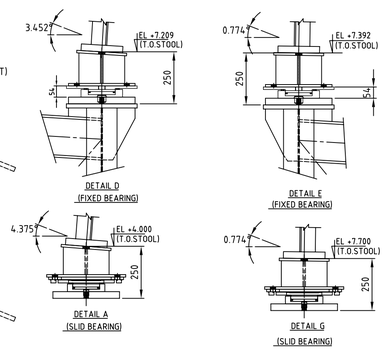
LOCATION OF GALLERY		GALLERY MKD.	STD. GALLERY REFRENCE	BEARING TYPE	
START	END			START	END
TP-17	T1/28	G1/28	24.0M	SLIDE	FIXED
T1/28	T2/28	G2/28	24.0M	FIXED	FIXED
T2/28	T3/28(R)	G3/28	24.0M	FIXED	FIXED
T3/28(L)	TP-24	G4/28	24.0M	FIXED	SLIDE

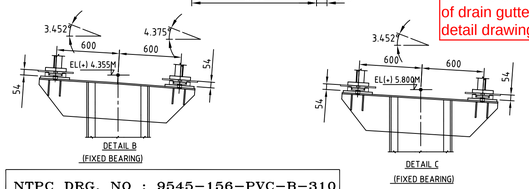


TYPICAL GALLERY CROSS SECTION
VIEW A-A



SECTION FOR CROSS OVER
SECTION B-B





Show reference of drain gutter detail drawing.

NOTES:-
1. ALL DIMENSIONS ARE IN mm & LEVELS ARE IN metres
2. Ⓕ - FIXED END PROVIDED WITH ELASTOMER BEARING
3. Ⓢ - SLIDING BEARING
4. B.O.B.P. = BOTTOM OF BASE PLATE
5. T1/28, T2/28..ETC. ARE TRESTLE MARKS & G1/28, G2/28...ETC. ARE GALLERY MARKS
6. STEPPED WALKWAY TO BE PROVIDED FOR MORE THAN 10° SLOP OF GALLERY
7. CONTINOUS WELDING TO BE PROVIDED AT EDGES OF SEAL PLATE AND CHQD. PLATE TO ENSURE THAT THE GALLERY FLOOR IS COMPLETELY LEAK PROOF

REFERENCES:-
1. FOR MECH. DRG. OF CONV. 28 REFER DRG. NO. M070 C28 000 0001 (REV.-B)
2. FOR FOUNDATION LOAD OF CONV. 28 REFER DRG. NO. M070 C28 6001 (REV.-A)
3. FOR STR. G. A. OF TRESTLE OF CONV. 28 REFER DRG. NO. M070 C28 6002
4. FOR DETAIL OF CROSS OVER REFER DRG. NO. M070 C28 6401
5. SAME SECTION AS 24.0M SPAN ARE PROVIDED FOR GALLERY MKD. G1/28, G2/28, G3/28 & G4/28 REF. DRG. NO. M070 C00 6004

NTPC DRG. NO : 9545-156-PVC-B-310

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि .
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)

PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B	NTPC COMMENTS INCORPORATED	10/4/2006	DEEPAK
A	REVISED AS PER NTPC COMMENTS	29/9/2005	DEEPAK

Surface Texture as per IS 10719 — Castings as per — General Tolerances for Welded Construction as per — Machined Components as per — for linear — for angular — for linear — for angular

Critical dimensions.

Scale	2005	Date	Name
1 : 150	Drawn	11.08.2005	DEEPAK
	Checked	20.08.2005	PKO
	Approved	22.08.2005	BV

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: STRUCTURAL G.A. OF CONV-28

M070 C28 6003

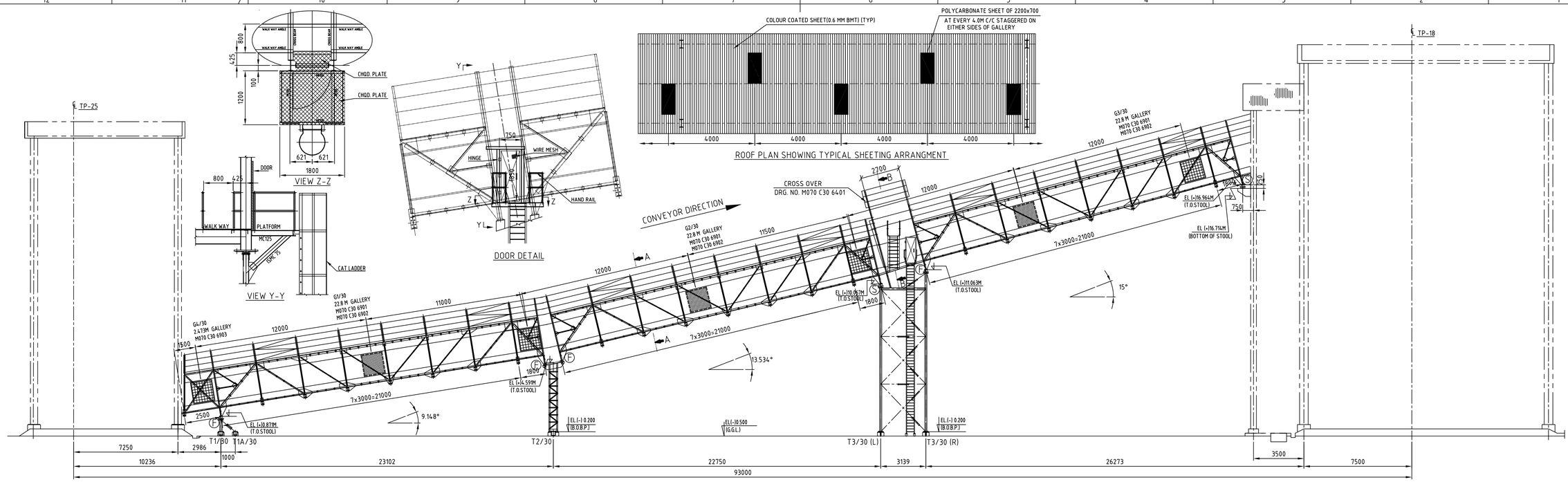
Revision: Ø | Drawing Number: AB

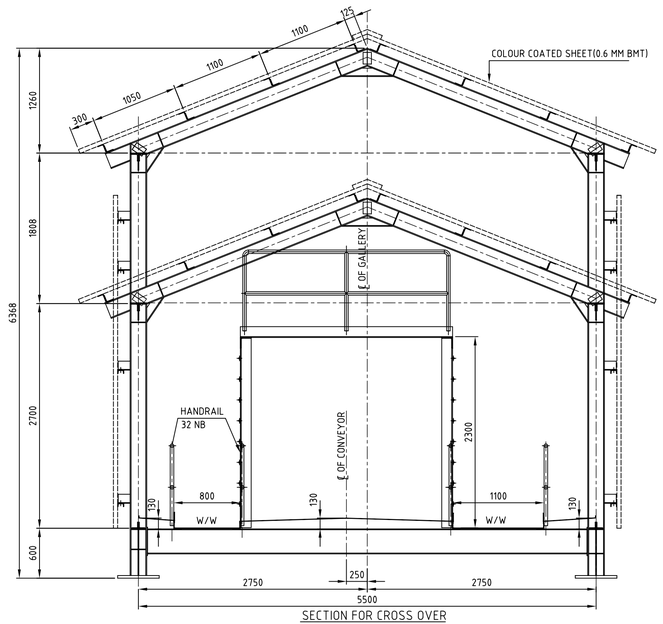
Sheet No. | Total Sheets: 1 | Qty per Set

Dimension | Tolerance

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COMPUTER GENERATED DRAWING



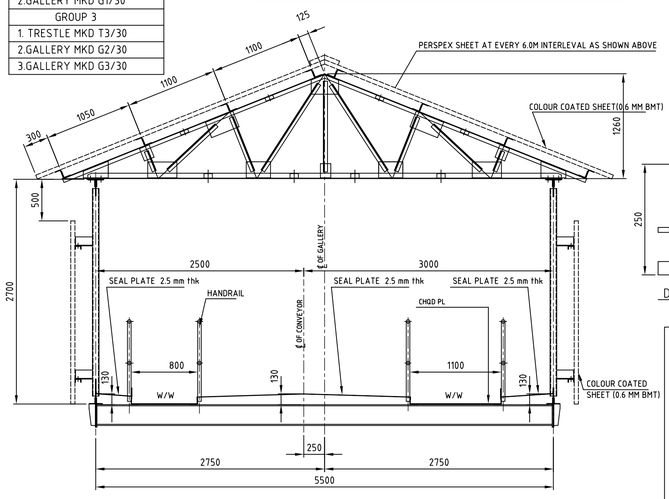


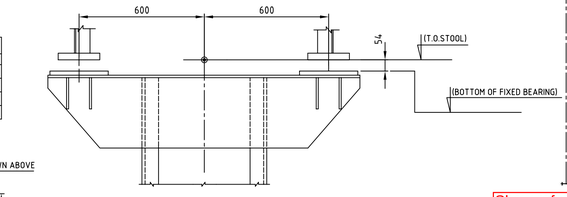
ERECTION SEQUENCE

GROUP 1
1. TRESTLE MKD T1/30
2.GALLERY MKD G4/30
GROUP 2
1. TRESTLE MKD T2/30
2.GALLERY MKD G1/30
GROUP 3
1. TRESTLE MKD T3/30
2.GALLERY MKD G2/30
3.GALLERY MKD G3/30

PLAN

LOCATION OF GALLERY		GALLERY MKD.	STD. GALLERY REFRENCE	BEARING TYPE	
START	END			START	END
TP-25	T1/30	G4/30	24.0M	–	FIXED
T1/30	T2/30	G1/30	24.0M	FIXED	FIXED
T2/30	T3/30(L)	G2/30	24.0M	FIXED	SLIDE
T3/30(R)	TP-18	G3/30	24.0M	FIXED	SLIDE





NOTES:-
1. ALL DIMENSIONS ARE IN mm & LEVELS ARE IN metres
2. Ⓕ - FIXED END PROVIDED WITH ELASTOMER BEARING
3. Ⓢ - SLIDING BEARING
4. B.O.B.P. = BOTTOM OF BASE PLATE
5. T1/30, T2/30..ETC. ARE TRESTLE MARKS & G1/30, G2/30....ETC. ARE GALLERY MARKS
6. STEPPED WALKWAY TO BE PROVIDED FOR MORE THAN 10° SLOP OF GALLERY
7. CONTINOUS WELDING TO BE PROVIDED AT EDGES OF SEAL PLATE AND CHQD. PLATE TO ENSURE THAT THE GALLERY FLOOR IN COMPLETELY LEAK PROOF

REFERENCES:-
1. FOR MECH. DRG OF CONV. 30 REFER DRG. NO. M070 C30 000 0001(REV-B)
2. FOR FOUNDATION LOAD OF CONV. 30 REFER DRG. NO. M070 C30 6001(REV-A)
3. FOR STR. G. A. OF TRESTLE OF CONV. 30 REFER DRG. NO. M070 C30 6002
3. FOR DETAIL OF CROSS OVER REFER DRG. NO. M070 C30 6401
6. SAME SECTION AS 24.0M SPAN ARE PROVIDED FOR GALLERY MKD. G1/30, G2/30, G3/30 & G4/30 REF. DRG. NO. M070 C00 6004

Show reference of drain gutter detail drawing.

FAR SIDE WINDOW
NEAR SIDE WINDOW

NTPC DRG. NO : 9545-156-PVC-B-312

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)
PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	10/4/2006	DEEPAK

Surface Texture as per IS 10719 | Castings as per | General Tolerances for Welded Construction as per | Machined Components as per

Scale 1 : 150 | 2005 | Date | Name
Drawn 11.08.2005 DEEPAK
Checked 20.08.2005 PKO
Approved 22.08.2005 BV

Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: STRUCTURAL G.A. OF CONV-30

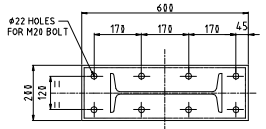
M070 C30 6003

Dimension | Tolerance

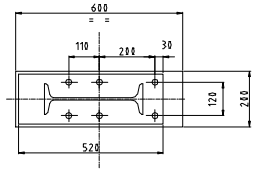
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Sheet No. | Total Sheets 1 | Dg. Revision | ID. Number | Drawing Number

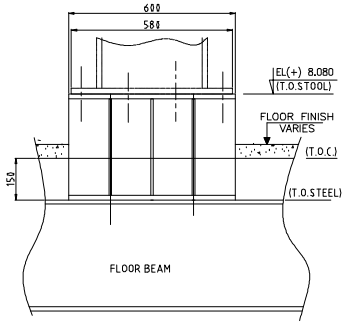
COMPUTER GENERATED DRAWING



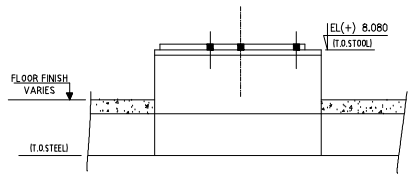
TOP VIEW OF P1



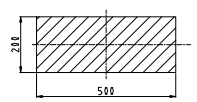
TOP VIEW OF P2



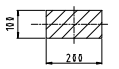
DETAIL OF P1



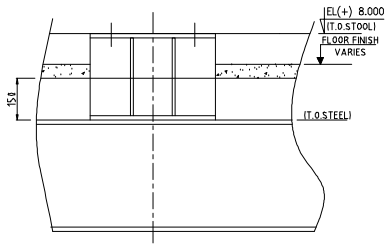
DETAIL OF P2



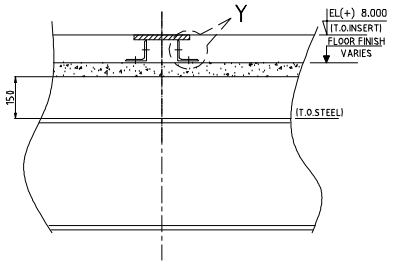
TOP VIEW OF P3



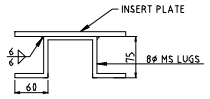
TOP VIEW OF P7



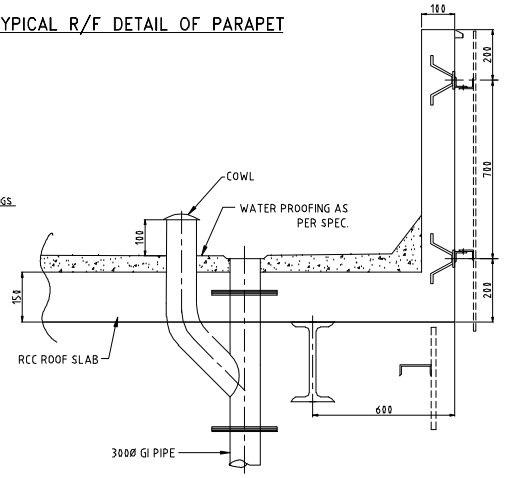
DETAIL OF P3



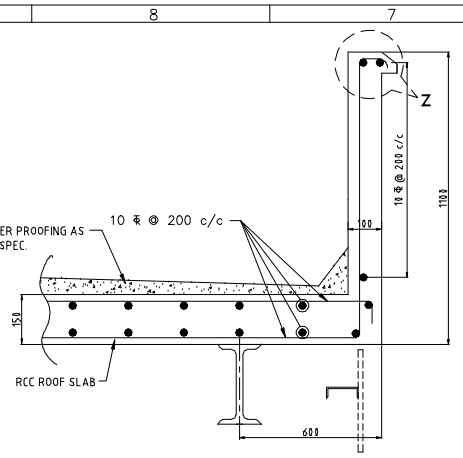
DETAIL OF P7



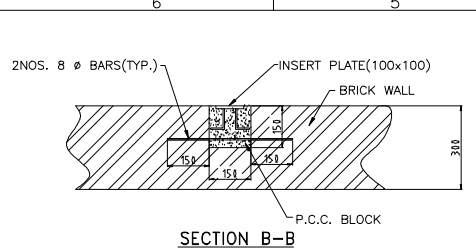
DETAIL – Y



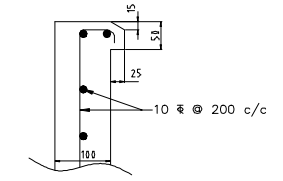
TYPICAL DETAIL OF DRAIN



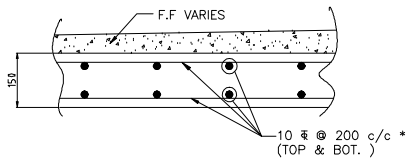
TYPICAL R/F DETAIL OF PARAPET



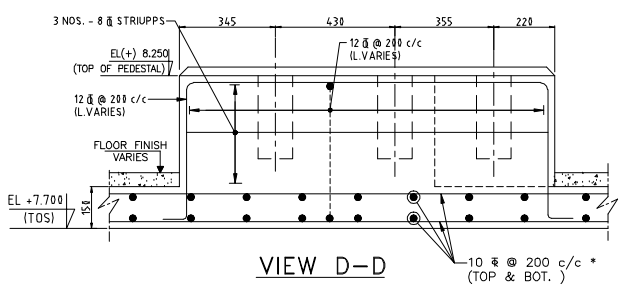
SECTION B–B
TYP. DETAILS OF INSERT FOR HAND RAIL



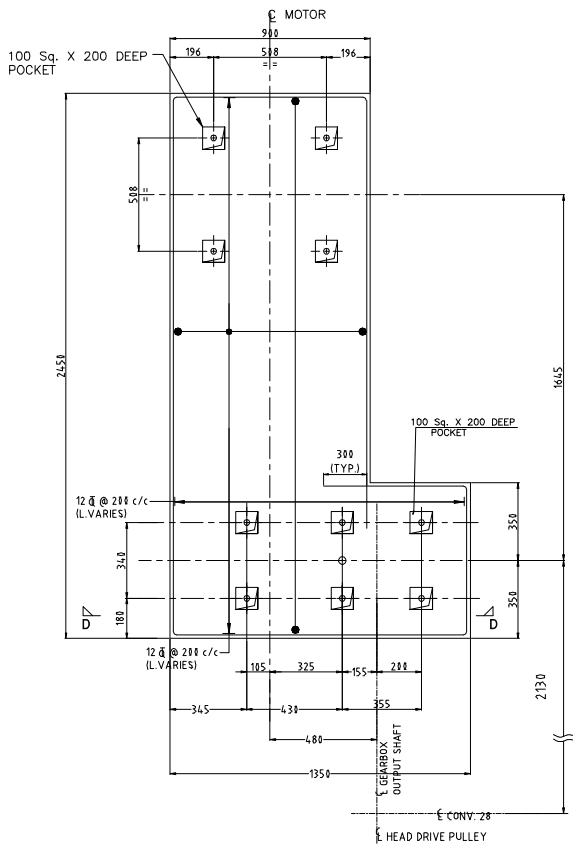
DETAIL – Z



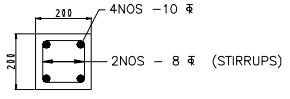
TYPICAL R/F DETAILS OF SLAB



VIEW D–D



DETAIL OF PEDESTAL P4

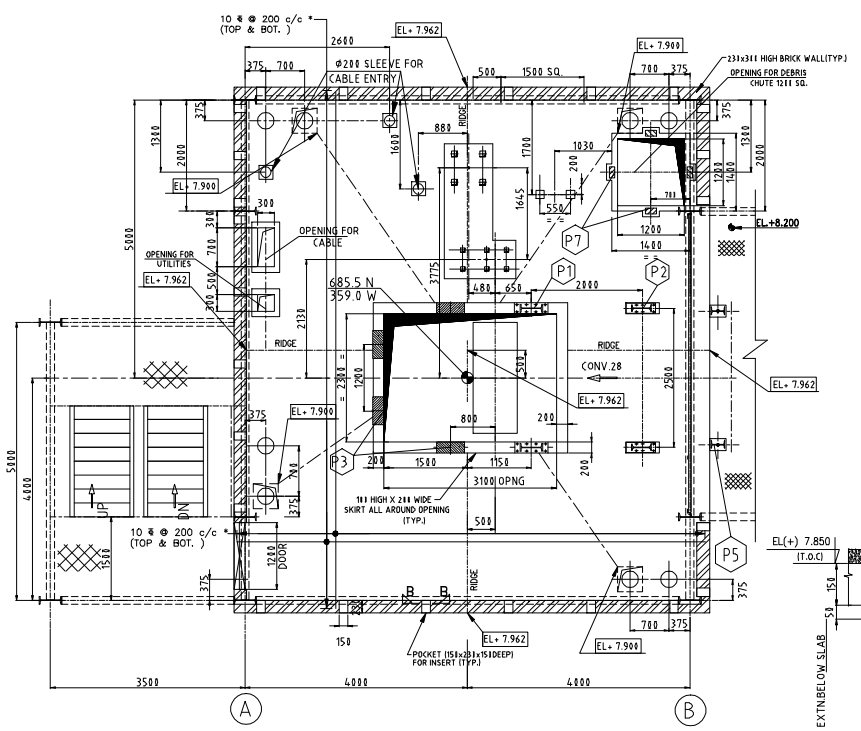


TYPICAL PEDESTAL DETAIL FOR PVC WATER TANK (200x200x200 HIGH)

R/F DETAILS OF TANK SLAB

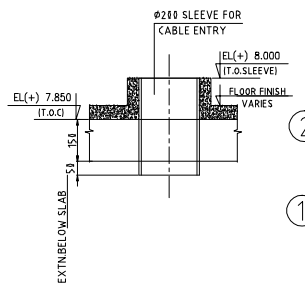
NOTES & SPECIFICATIONS :

1. THIS DRAWING IS BASED ON DRG. NO. M070 H24 000 0001–0 (REV C)(SHEET 1 OF 1).
2. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
3. F.F.L. (±) 0.00 M CORRESPONDS TO RL (+) 282.50 M.
4. GRADE OF CONCRETE SHALL BE M–25.
5. ALL REINFORCEMENT BARS (TOR STEEL) SHALL BE HIGH YEILD STRENGTH DEFORMED BARS CONFORMING TO IS:1786 (Gr. Fe 415) AND WILL BE SHOWN IN THIS DRAWING AS T .
6. CLEAR COVER TO MAIN REINFORCEMENT (INCLUDING LINKS) SHALL BE :–
   a) SLAB–– 20mm b) PEDESTAL –– 40mm.
7. FOR ALL OTHER NOTES REFER DRG. NO. M070 CVL GENL 002.
8. DRAWING IS NOT TO BE SCALED. READ FIGURED DIMENSIONS ONLY.
9. THIS DRAWING IS TO BE READ IN CONJUCTION WITH M070 CVL TP24 002 (SHT 1 OF 2 & 2 OF 2).
10. ARCHITECTURAL DRAWING REF. 9545–156–PVC–C–207 _ R0

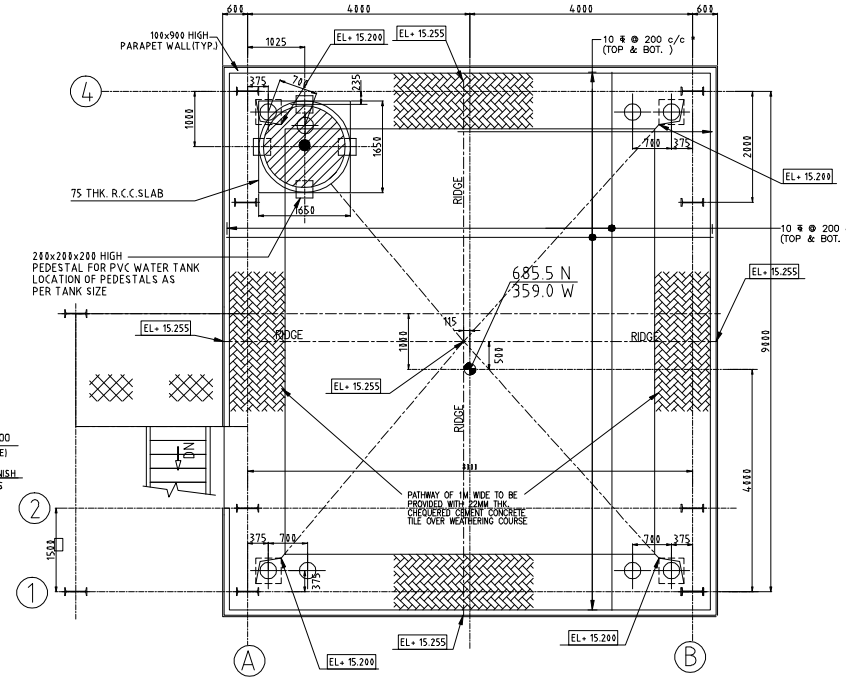


PLAN AT EL + 7.700 (T.O.S)
(SLAB THICKNESS = 150mm U.O.N)

* – PROVIDE 10 ϕ–200 c/c (ALTH) TOP & BOTTOM BOTH WAYS BARS TO BE CUT AND BEND SUITABLY AT OPENING

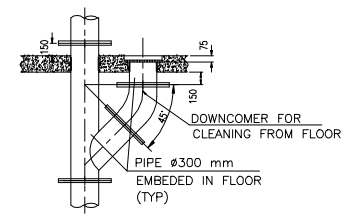


TYP DETAIL OF PIPE SLEEVE FOR CABLE

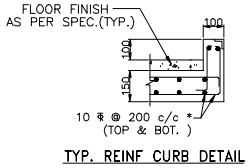


PLAN AT ROOF EL + 15.000 (T.O.S)
(SLAB THICKNESS = 150mm U.O.N)

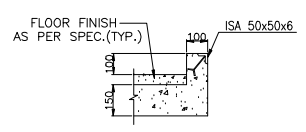
* – PROVIDE 10 ϕ–200 c/c (ALTH) TOP & BOTTOM BOTH WAYS BARS TO BE CUT AND BEND SUITABLY AT OPENING



ARGT. OF DOWNCOMER & FLOOR WASHING



TYP. REINF CURB DETAIL



TYP. CURB DETAIL

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
2	14.09.09	REVISED AS BUILT & HANDED OVER	PRASHANT	A.B.	S.K. Bose
1	25.01.06	REVISED AS PER NTPC COMMENTS	AMIT	MRIDUL	S.K. Bose
0	19.12.05	SUBMITTED FOR APPROVAL	KAPIL	MRIDUL	S.K. Bose

NTPC DRG. NO : 9545–156–PVC–C–053

ena TI Pal sal naoSanala qama–la Paavar karPaaroS

NTPC — National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

CHECKED FOR CO-ORDINATION			
STRUCTURAL	B.V	CIVIL	A.B
ELECTRICAL	R.D.A	MECH	S.M

Index	Description	Date	Name
A	Critical dimensions.		

Scales: 1 : 10, 1 : 25
Drawn: Date 19.12.05, KAPIL
Checked: B.K.B
Approved: B. HARIHARA

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

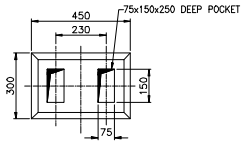
Title: GA & RF DETAIL OF FLOORS FOR TP–24

M070 CVL TP24 002

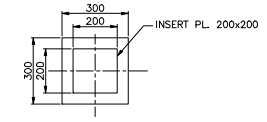
Sheet No. 1 Total Sheets 2 A1

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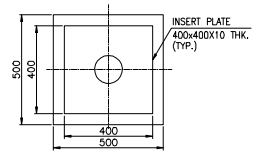
FILE : D:\PRASHANT\PROJECT\SIPAT II (AS BUILT DRG.)\



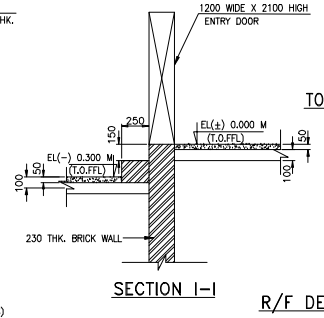
TOP PLAN OF PEDESTAL P11



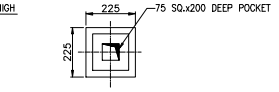
TOP PLAN OF PEDESTAL P12 & P16



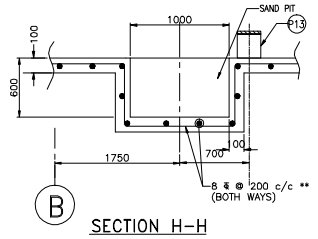
TOP PLAN OF PEDESTAL P13



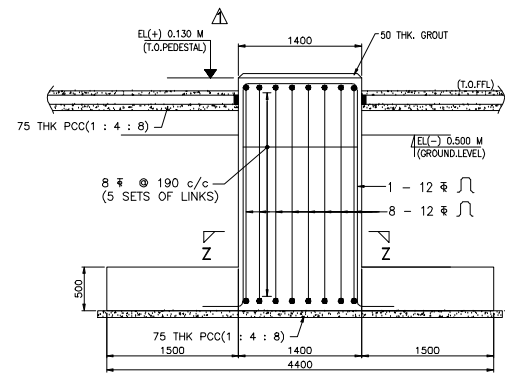
SECTION I-I



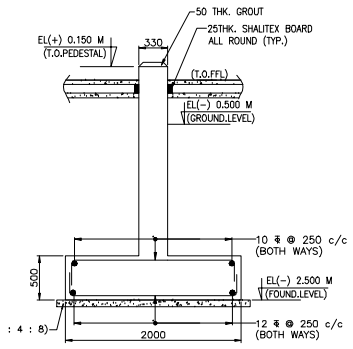
TOP PLAN OF PEDESTAL P14



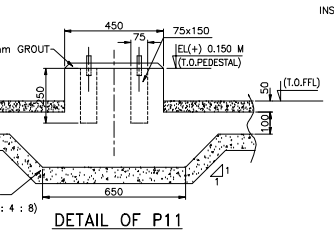
SECTION H-H



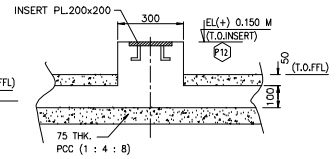
SECTION Y-Y ⚠
SHOWING R/F DETAIL OF PEDESTAL P9 & P10



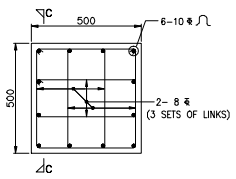
SECTION X-X
SHOWING R/F DETAIL OF FOOTING F1



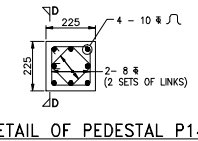
DETAIL OF P11



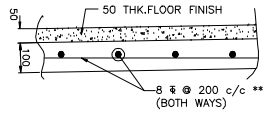
DETAIL OF P12



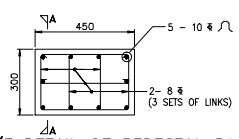
R/F DETAIL OF PEDESTAL P13



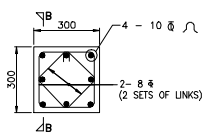
R/F DETAIL OF PEDESTAL P14



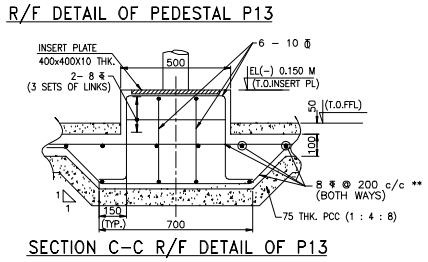
TYPICAL R/F DETAILS OF GRADE SLAB



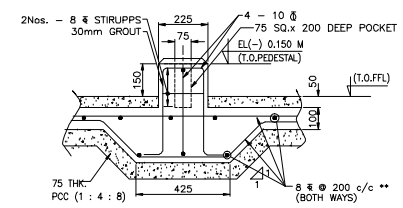
R/F DETAIL OF PEDESTAL P11



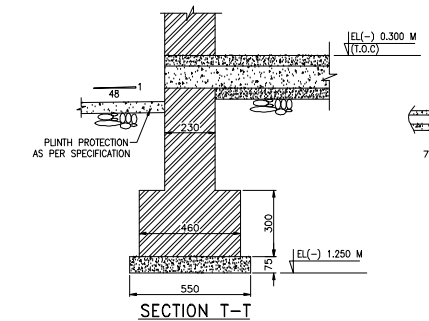
R/F DETAIL OF PEDESTAL P12



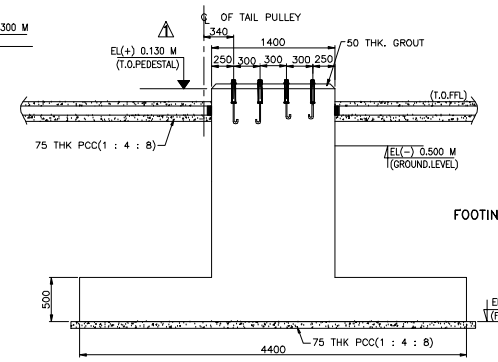
SECTION C-C R/F DETAIL OF P13



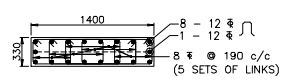
SECTION D-D
SHOWING R/F DETAIL OF PEDESTAL P14



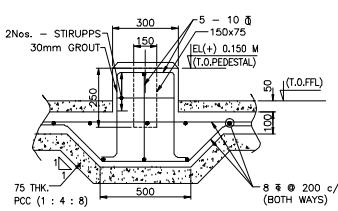
SECTION T-T
SHOWING BRICK WALL FOUNDATION WHERE GRADE BEAM IS NOT AVAILABLE (TYP.)



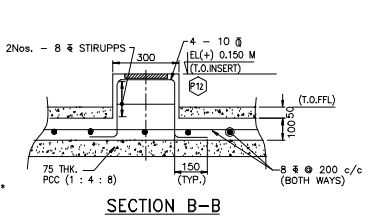
SECTION Y-Y ⚠
SHOWING DETAIL OF PEDESTAL P9 & P10



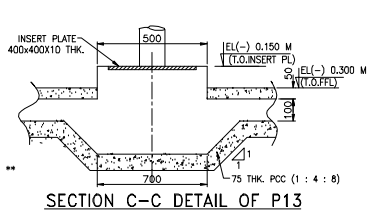
SECTION Z-Z



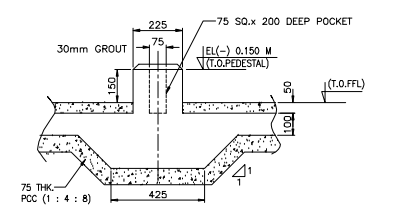
SECTION A-A
SHOWING R/F DETAIL OF PEDESTAL P11



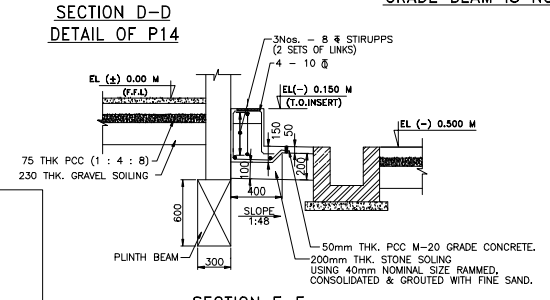
SECTION B-B



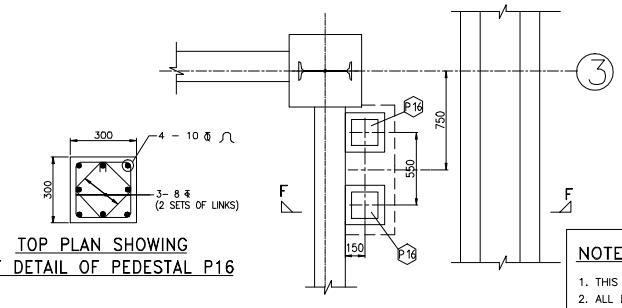
SECTION C-C DETAIL OF P13



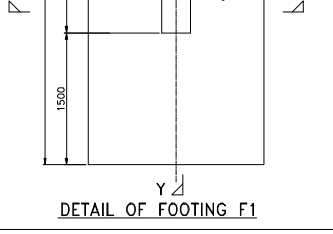
SECTION D-D
DETAIL OF P14



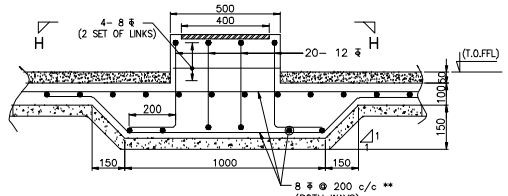
SECTION F-F
SHOWING R/F DETAIL OF PEDESTAL P16



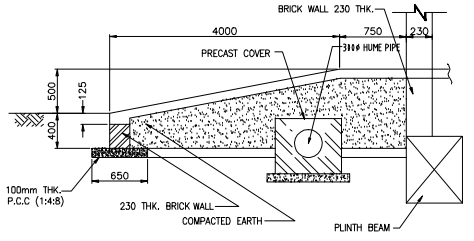
TOP PLAN SHOWING
R/F DETAIL OF PEDESTAL P16



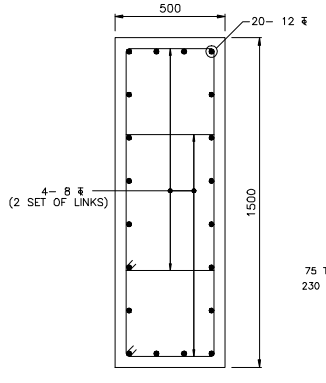
DETAIL OF FOOTING F1



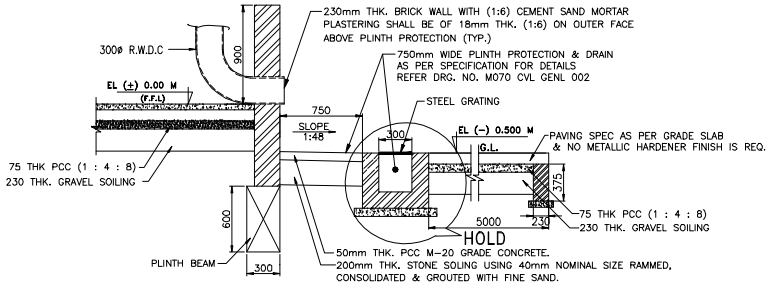
DETAIL-G
R/F DETAIL OF STAIR FOUNDATION
POSITION,HEIGHT & INSERT PL. SHALL BE CONFIRM FROM TKI



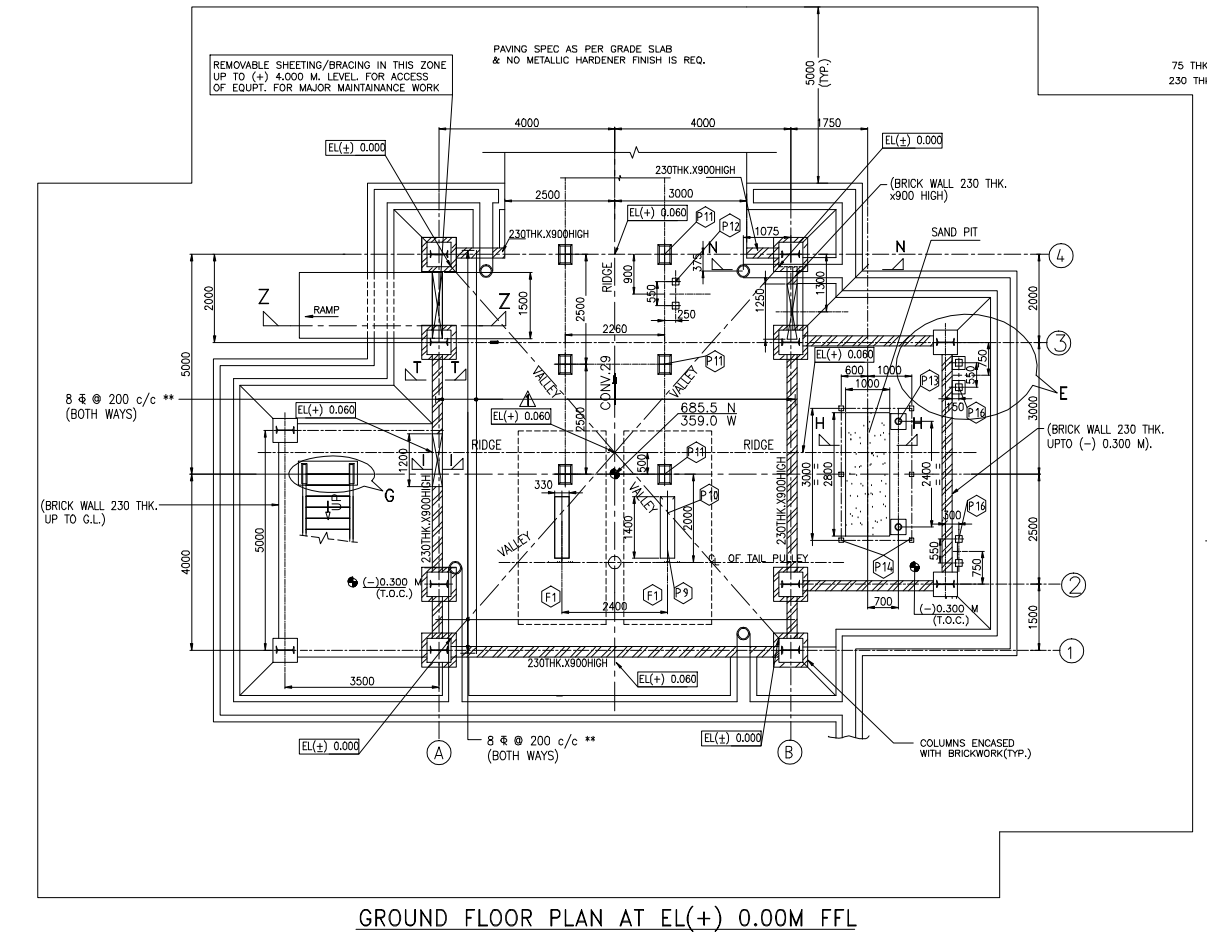
SECTION Z-Z ⚠



SECTION H-H



SECTION N-N ⚠



GROUND FLOOR PLAN AT EL(+) 0.00M FFL
(SLAB THICKNESS = 100mm U.O.N) ⚠
** - PROVIDE 8 ϕ@200 c/c (ALTH) BOTH WAYS
BARS TO BE CUT AND BEND SUITABLY AT OPENING

NOTES & SPECIFICATIONS :

1. THIS DRAWING IS BASED ON DRG. NO. M070 H24 000 0001-0 (REV C)(SHEET 1 OF 1).
2. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
3. F.F.L. (±) 0.00 M CORRESPONDS TO RL (+) 282.50 M.
4. GRADE OF CONCRETE SHALL BE –
   a) M20 – FOR GRADE SLAB , DRAIN & PLINTH PROTECTION.
   b) M25 – FOR ROOF SLAB & OTHER STR.
5. ALL REINFORCEMENT BARS (TOR STEEL) SHALL BE HIGH YEILD STRENGTH DEFORMED BARS CONFORMING TO IS:1786 (Gr. Fe 415) AND WILL BE SHOWN IN THIS DRAWING AS ϕ .
6. CLEAR COVER TO MAIN REINFORCEMENT (INCLUDING LINKS) SHALL BE :-
   a) SLAB-- 20mm b) PEDESTAL -- 40mm.
7. FOR ALL OTHER NOTES REFER DRG. NO. M070 CVL GENL 002.
8. DRAWING IS NOT TO BE SCALED. READ FIGURED DIMENSIONS ONLY.
9. THIS DRAWING IS TO BE READ IN CONJUCTION WITH M070 CVL TP24 002 (SHT 1 OF 2).
10. DRAIN SHALL REMAIN HOLD UNTIL FINAL DRAINAGE NETWORK FOR C.H.P. FINALISED

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
2	14.09.09	REVISED AS BUILT & HANDED OVER	PRASHANT	A.B.	S.K. Bose
1	29.05.08	REVISED AS PER NTPC COMMENTS	AMIT	A.B.	S.K. Bose
0	14.03.06	SUBMITTED FOR APPROVAL	KAPIL	MRIDUL	S.K. Bose

NTPC DRG. NO : 9545-156-PVC-C-053

ena TI Pal sal naoSanala qama-la Paavar karPaaroS
NTPC National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)

PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Scales	Drawn	Checked	Approved
1 : 10	Dkmodi	14.03.06	KAPIL
1 : 25	Checked		B.K.B
	Approved		S. HARIHARA

Title: GA & RF DETAIL OF GRADE SLAB FOR TP-24

M070 CVL TP24 002

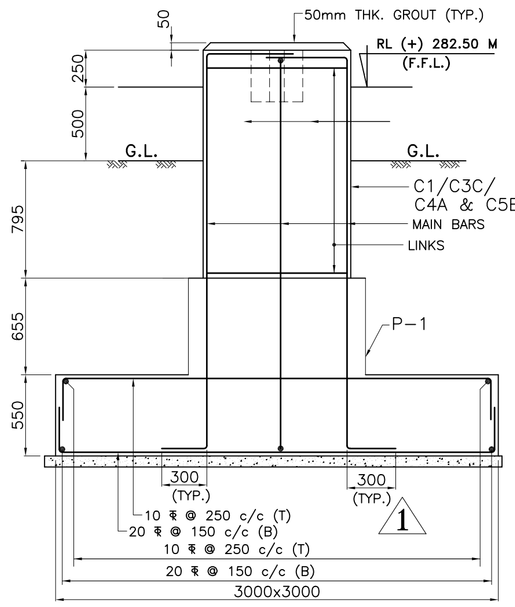
Sheet No. 2 Total Sheets 2 A1

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

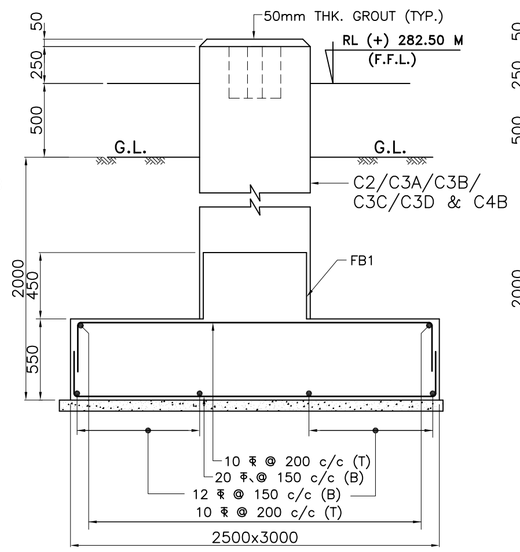
Index	Description	Date	Name
D			
C			
B			
A			

Critical dimensions.

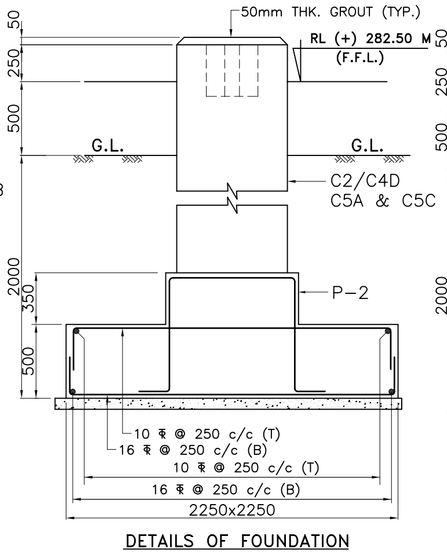
FILE : D:\PRASHANT\PROJECT\SIPAT II (AS BUILT DRG.)\



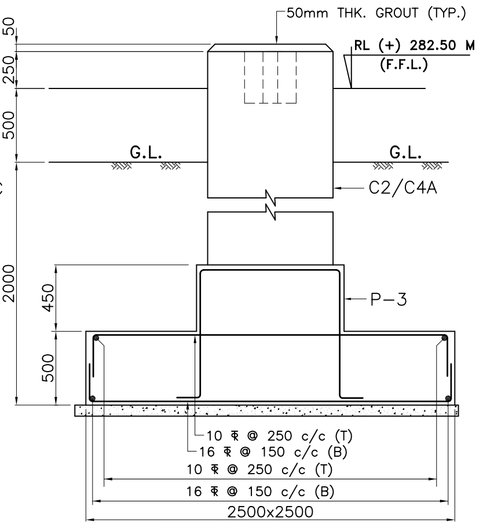
DETAILS OF FOUNDATION
MKD. F1 (3000x3000)



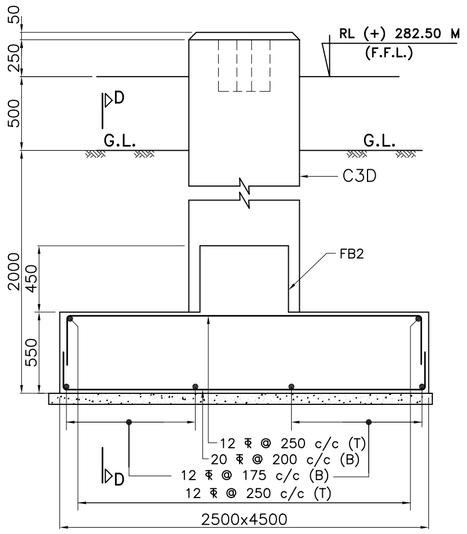
DETAILS OF FOUNDATION
MKD. F2 (2500x3000)



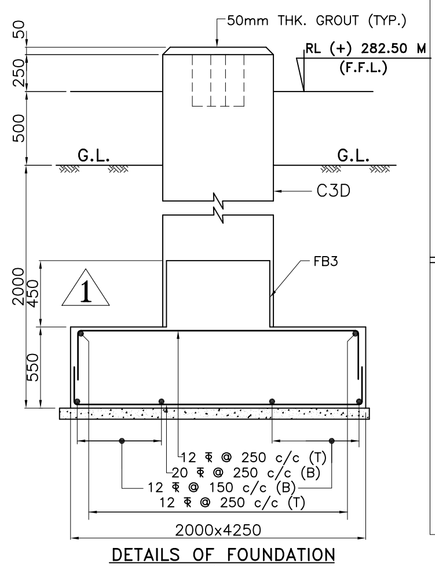
DETAILS OF FOUNDATION
MKD. F3 (2250x2250)



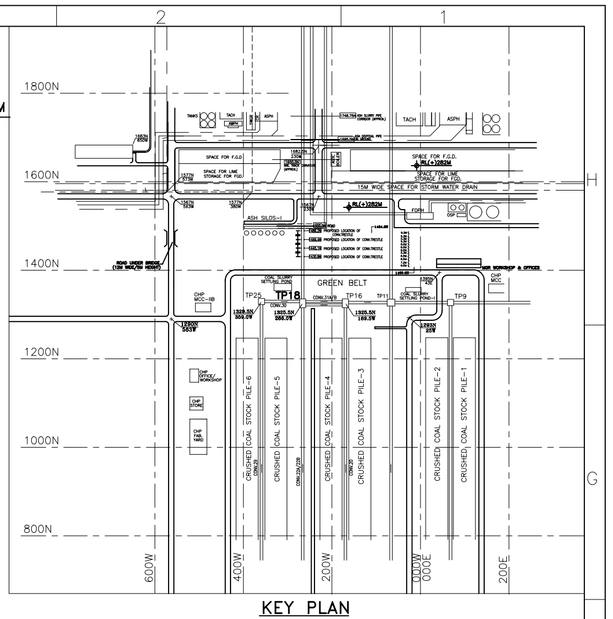
DETAILS OF FOUNDATION
MKD. F4 (2500x2500)



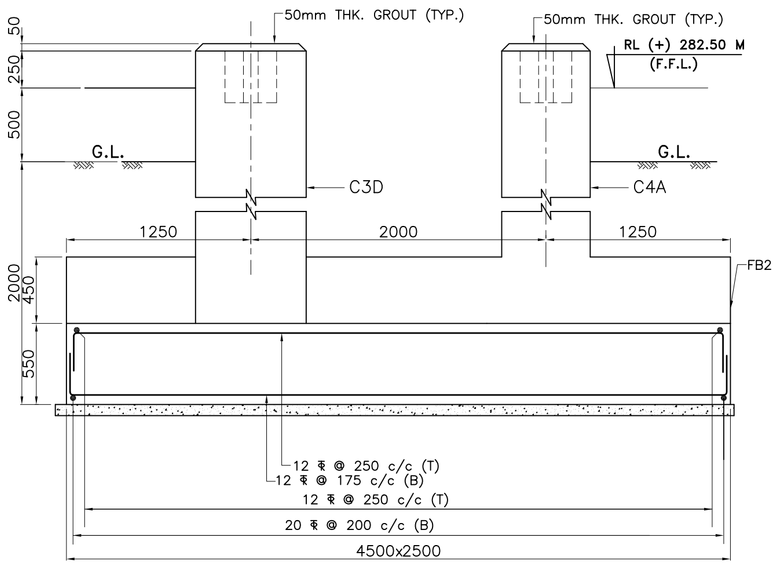
DETAILS OF FOUNDATION
MKD. F5 (2500x4500)



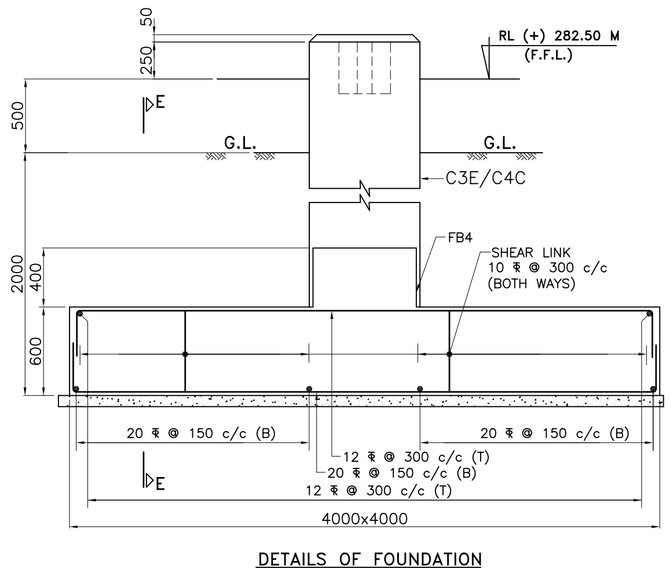
DETAILS OF FOUNDATION
MKD. F6 (2000x4250)



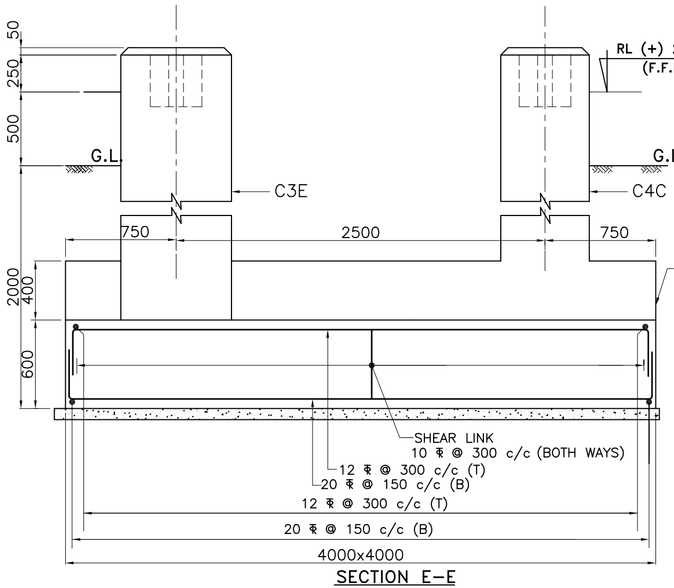
KEY PLAN



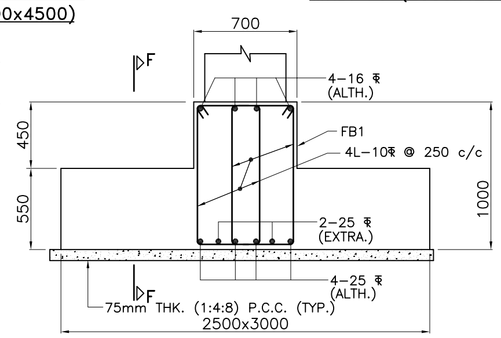
SECTION D–D



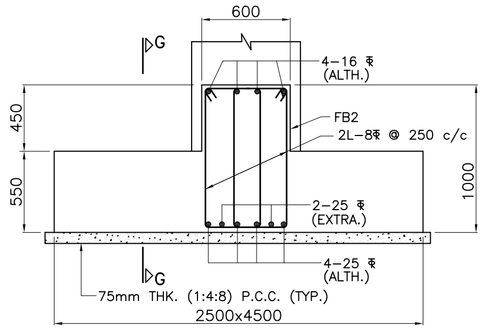
DETAILS OF FOUNDATION
MKD. F7 (4000x4000)



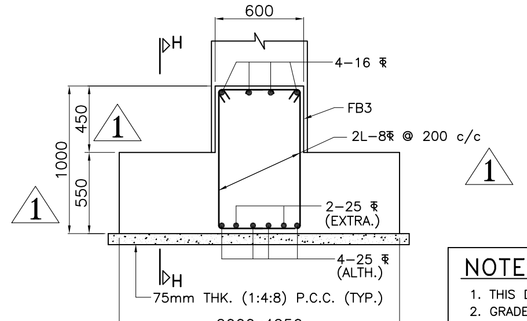
SECTION E–E



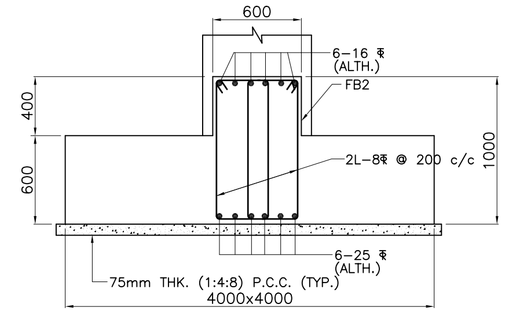
DETAILS OF BEAM
MKD. FB1 (700x1000)



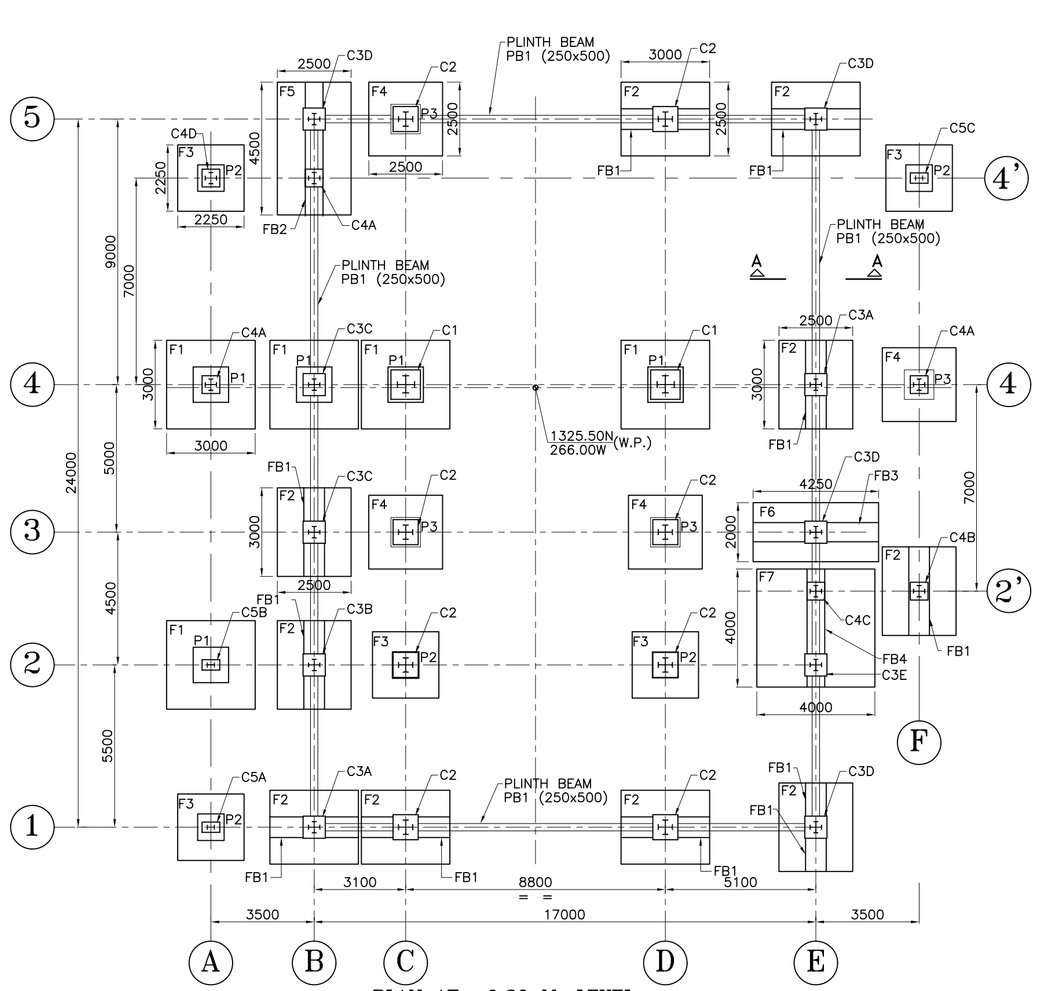
DETAILS OF BEAM
MKD. FB2 (600x1000)



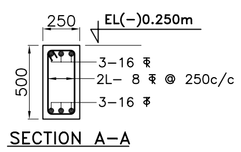
DETAILS OF BEAM
MKD. FB3 (600x1000)



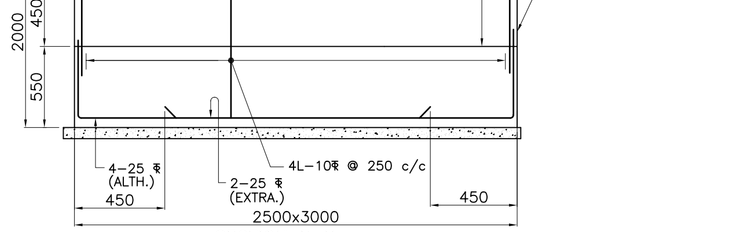
DETAILS OF BEAM
MKD. FB4 (600x1000)



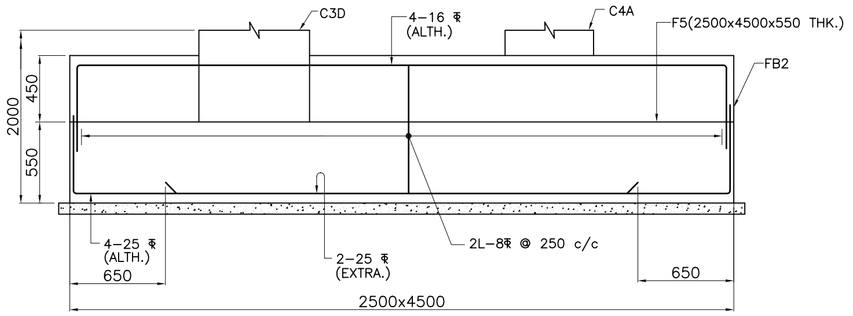
PLAN AT +0.30 M. LEVEL
(BOTTOM OF BASE PLATE)



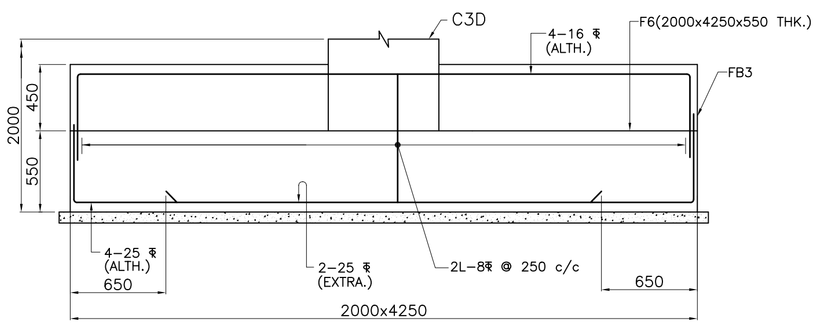
SECTION A–A



SECTION F–F



SECTION G–G



SECTION H–H

NOTES & SPECIFICATIONS :

1. THIS DRAWING IS BASED ON DRG. NO. M070 H18 6001 REV.–A.
2. GRADE OF CONCRETE SHALL BE M–25 U.O.N
3. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
4. F.F.L. (±) 0.00 M CORRESPONDS TO RL (+) 282.50 M.
5. DRAWING IS NOT TO BE SCALED. READ FIGURED DIMENSIONS ONLY.
6. FOR ALL OTHER NOTES AND STANDARD DETAILS LIKE GRADE SLAB, PLINTH PROTECTION WITH DRAIN ETC. REFER DRG. NO. M070 CVL GENL 002.
7. P.C.C. SHALL BE 75mm THK. (1:4:8).
8. IF ROCK IS ENCOUNTERED BEFORE THE FOUNDATION DEPTHS SHOWN, FOUNDATION SHALL REST ON 500mm INSIDE ROCK. INCASE ROCK IS NOT ENCOUNTERED AT THE FOUNDING LEVEL EXCAVATION SHALL BE CARRIED OUT LOCALLY UPTO 0.5M INSIDE THE ROCK AND BUILD IT UP TO THE FOUNDING LEVEL WITH P.C.C. (1:4:8).

LEGEND:–

SNO.	MARKING
F1	3000x3000x550 THK.
F2	2500x3000x550 THK.
F3	2250x2250x500 THK.
F4	2500x2500x500 THK.
F5	2500x4500x550 THK.
F6	2000x4250x550 THK.
F7	4000x4000x600 THK.
FB1	700x1000 THK.
FB2	600x1000 THK.
FB3	600x1000 THK.
FB4	600x1000 THK.
C1	1000x1000 THK.
C2	850x850 THK.
C3A,C3B,C3C, C3D & C3E	750x750 THK.
C4A,C4B,C4C & C4D	600x600 THK.
C5A,C5B & C5C	350x600 THK.
P1	1200x1200x655 THK.
P2	900x900x355 THK.
P3	1000x1000x450 THK.

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
1	29.10.05	REVISED AS PER NTPC COMMENTS	KAPIL	RAJIV	S.K.BOSE
0	12.09.05	SUBMITTED FOR APPROVAL	KAPIL	RAJIV	S.K.BOSE

NTPC DRG. NO : 9545–156–PVC–C–074

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Surface Texture as per IS 10719 | Castings as per | General Tolerances for Welded Construction as per ____for linear ____for angular | Machined Components as per ____for linear ____for angular

Index	Description	Date	Name
	Critical dimensions.		

Scale 1 : 150 / 1 : 30

	Date	Name
Drawn	12.09.05	KAPIL
Checked		RAJIV
Approved		B.HARIHARA

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: GA & RF DETAIL OF FOUNDATION FOR TP–18

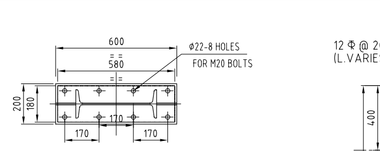
M070 CVL TP18 001 | 0 | 1

Sheet No. 1 | Total Sheets 2 | A1

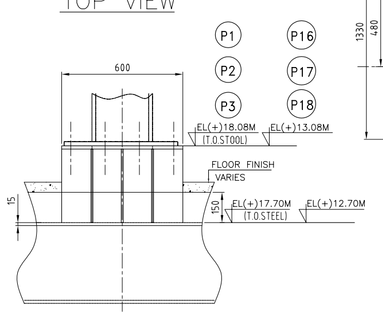
Dimension | Tolerance | Fits (Holes: Bi, Shafts: Ai) | Drawing Number

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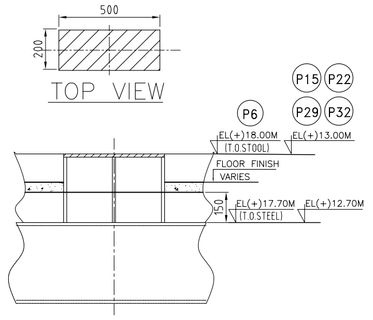
FILE : D:\KAPIL\SIPAT CHP II\foundation detail–TP– 18



TOP VIEW

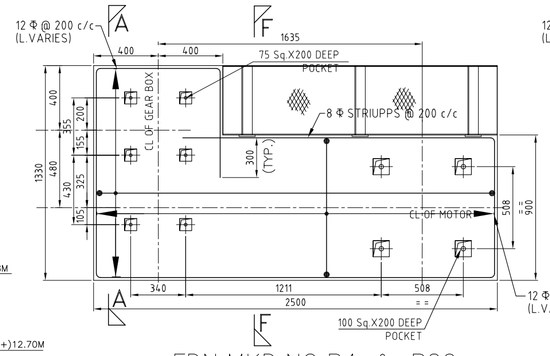


DETAIL OF P1,P2
P3,P16,P17&P18

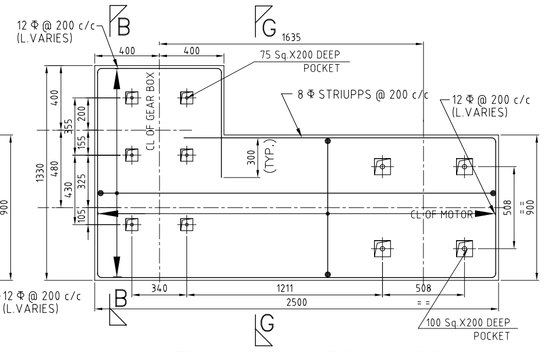


TOP VIEW

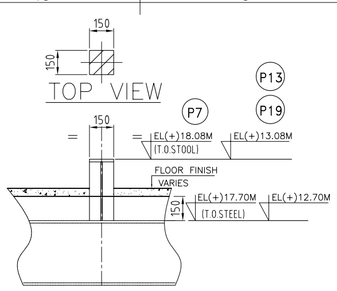
DETAIL OF P6,P15
P22,P29&P32



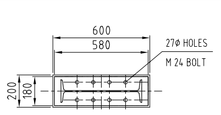
FDN.MKD.NO.P4 & P20



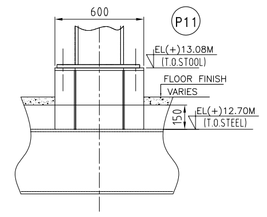
FDN.MKD.NO.P5 & P21



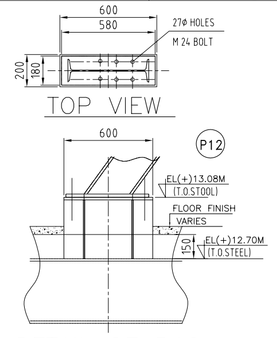
DETAIL OF P7,P13&P19



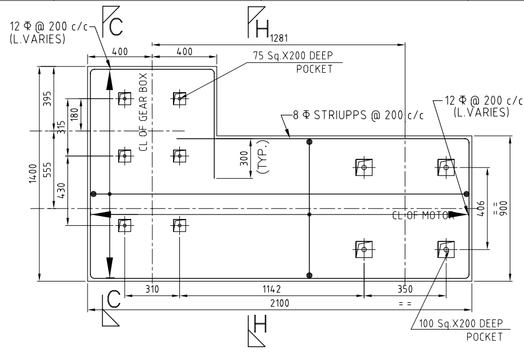
TOP VIEW



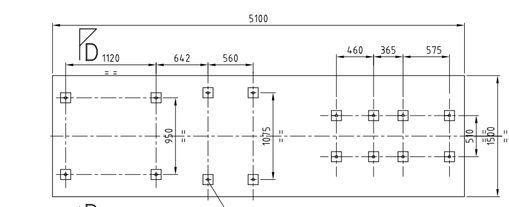
DETAIL OF P11



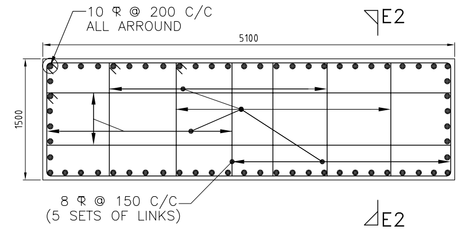
DETAIL OF P12



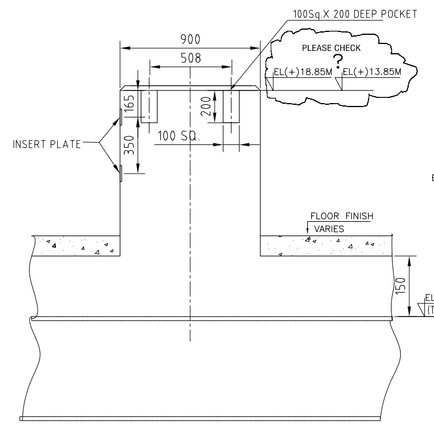
FDN.MKD.NO.P28



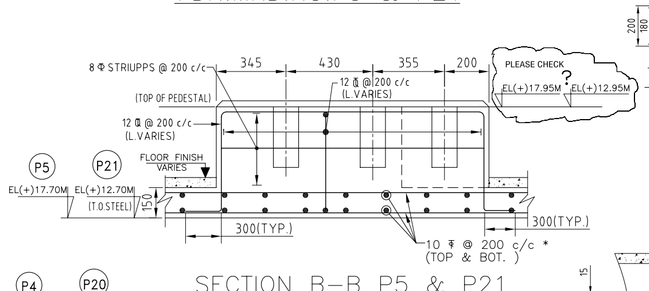
FDN.TYPE P14



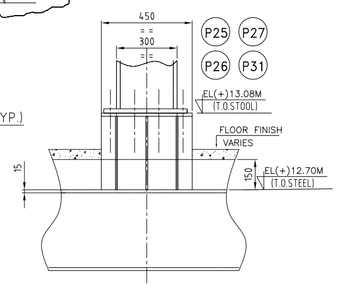
R/F DETAIL OF PEDESTAL P14



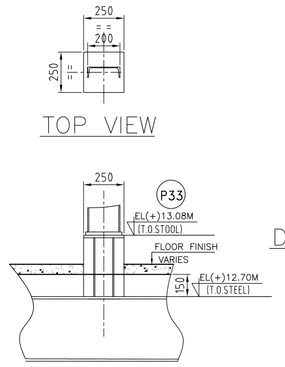
SECTION P4 & P20 F–F



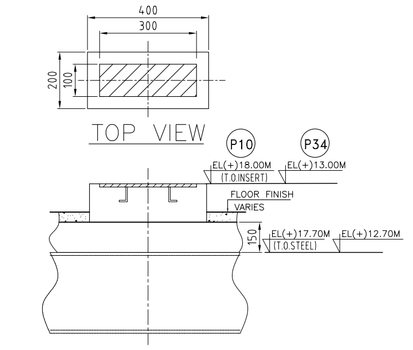
SECTION B–B P5 & P21



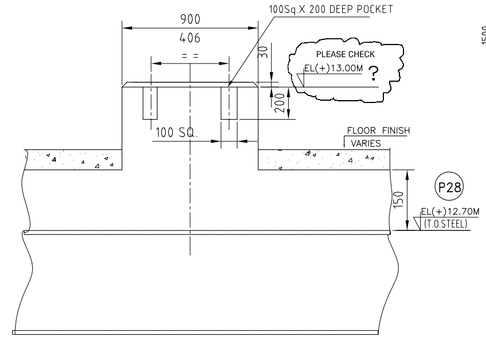
DETAIL OF P25,P26,P27&P31



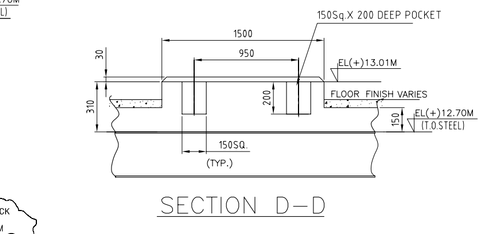
DETAIL OF P33



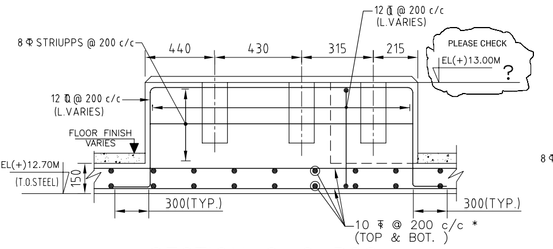
DETAIL OF P10 & P34



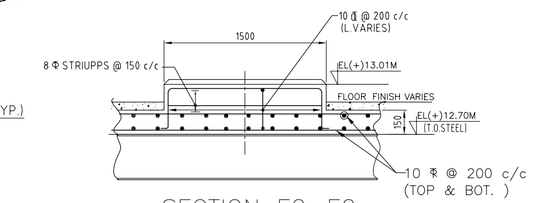
SECTION P28 H–H



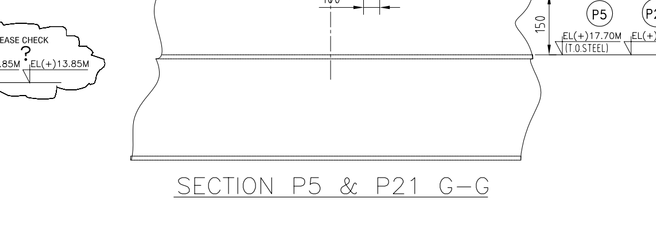
SECTION D–D



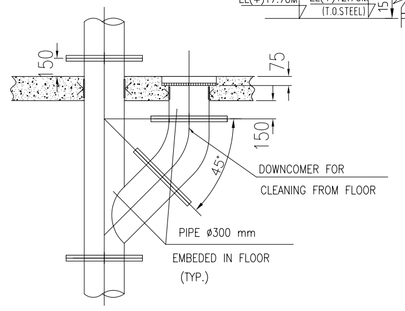
SECTION C–C P28



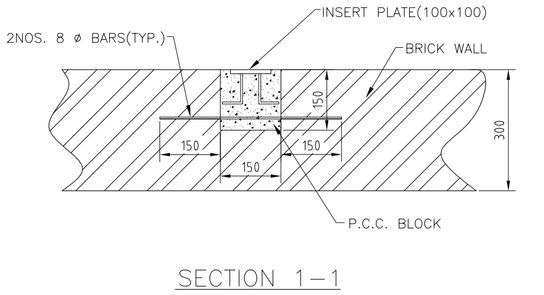
SECTION E2–E2



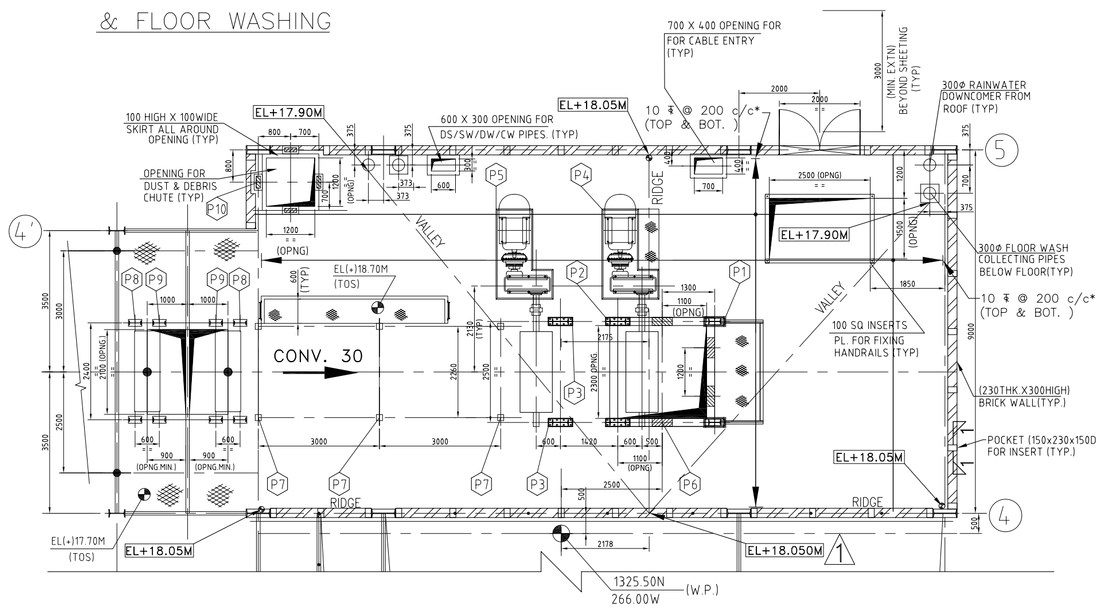
SECTION A–A P4 & P20



ARGT. OF DOWNCOMER
& FLOOR WASHING

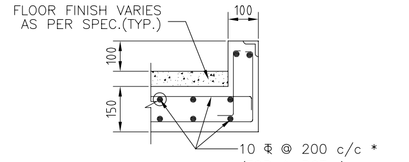


SECTION 1–1
TYP. DETAILS OF INSERT FOR HAND RAIL

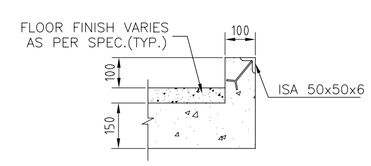


FLOOR PLAN AT EL(+)17.85 (T.O.C)
(SLAB THICKNESS=150mm U.O.N) 1

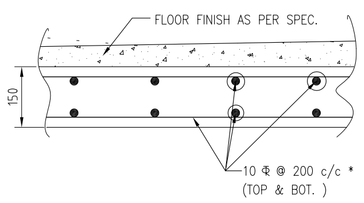
* – PROVIDE 10 ϕ–200 c/c (ALTH) TOP & BOTTOM BOTH WAYS
BARS TO BE CUT AND BEND SUITABLY AT OPENING



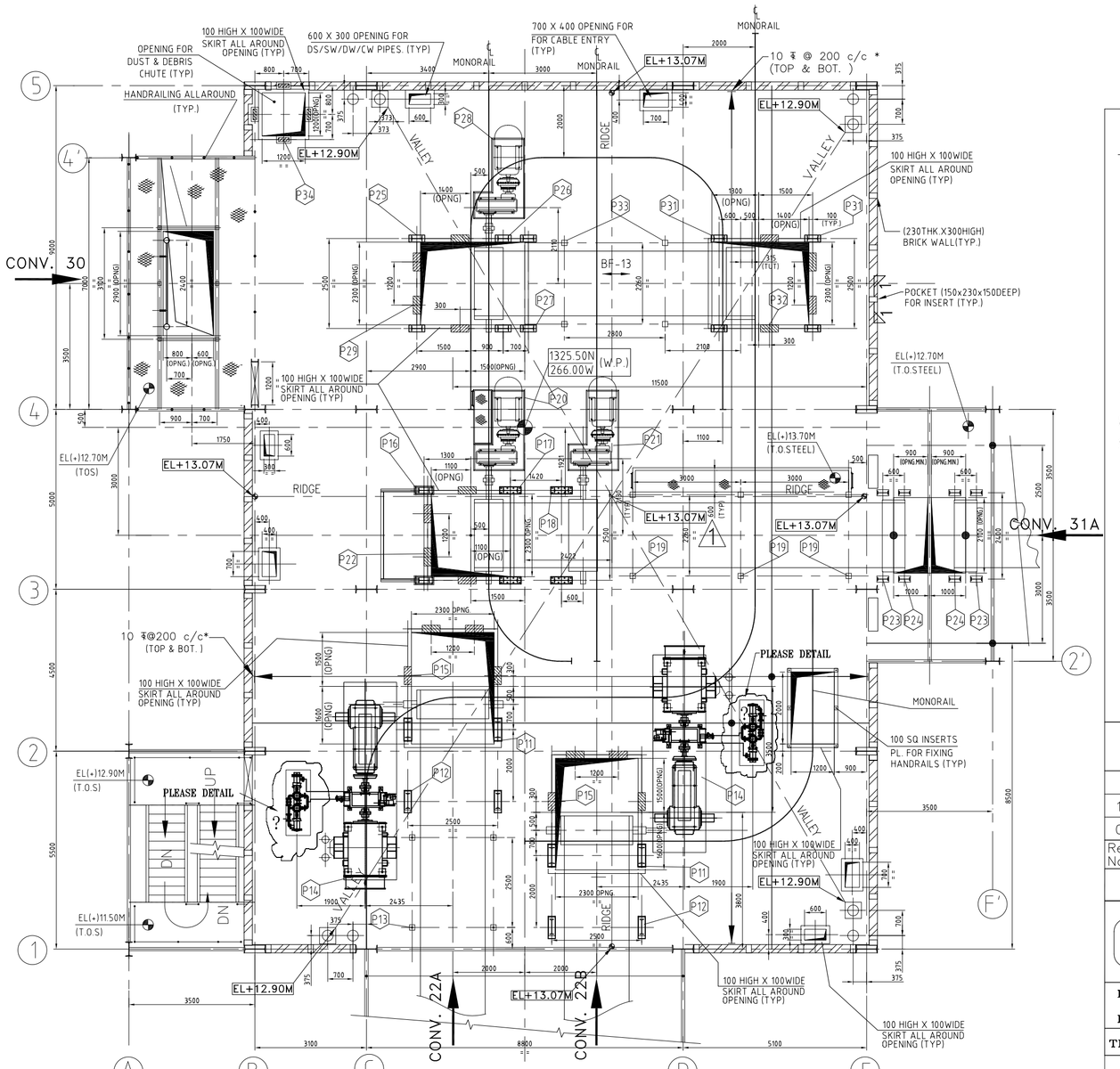
TYP. REINF CURB DETAIL



TYP. CURB DETAIL



TYP. R.C DETAIL OF FLOOR



FLOOR PLAN AT EL(+)12.85 (T.O.C) 1
(SLAB THICKNESS=150mm U.O.N)

* – PROVIDE 10 ϕ–200 c/c (ALTH) TOP & BOTTOM BOTH WAYS
BARS TO BE CUT AND BEND SUITABLY AT OPENING

NOTES & SPECIFICATIONS :

1. THIS DRAWING IS BASED ON DRG. NO. M070 H18 000 0001–0 (REV B) (SHEET 3 OF 5 & 4 OF 5).
2. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
3. F.F.L. (±) 0.00 M CORRESPONDS TO RL (+) 282.50 M.
4. GRADE OF CONCRETE SHALL BE M–25.
5. ALL REINFORCEMENT BARS (TOR STEEL) SHALL BE HIGH YEILD STRENGTH DEFORMED BARS CONFORMING TO IS:1786 (Gr. Fe 415) AND WILL BE SHOWN IN THIS DRAWING AS ϕ .
6. CLEAR COVER TO MAIN REINFORCEMENT (INCLUDING LINKS) SHALL BE :–
   a) SLAB–– 20mm b) PEDESTAL–– 40mm
7. FOR ALL OTHER NOTES REFER DRG. NO. M070 CVL GENL 002.
8. DRAWING IS NOT TO BE SCALED. READ FIGURED DIMENSIONS ONLY.
9. THIS DRAWING IS TO BE READ IN CONJUCTION WITH M070 CVL TP18 002 (SHT 2 OF 2).

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
1	28.05.08	REVISED AS PER NTPC COMMENTS	AMIT	A.B.	S.K. Bose
0	29.12.05	SUBMITTED FOR APPROVAL	AMIT	MRIDUL	S.K. Bose

NTPC DRG. NO : 9545–156–PVC–C–075

एन टी पी सी NTPC
नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2×500MW)
PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Surface finish as per IS 10711 | Castings as per | General Tolerances for Without individual tol. as per | Machined Components as per

Scale | Drawn 29.12.05 AMIT | Checked S.K.B | Approved B. HARIHARA

Index | Description | Date | Name
D
C
B
A
Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune – 411 018

Title: G.A & RF DETAIL OF FLOORS FOR TP–18

M070 CVL TP18 002

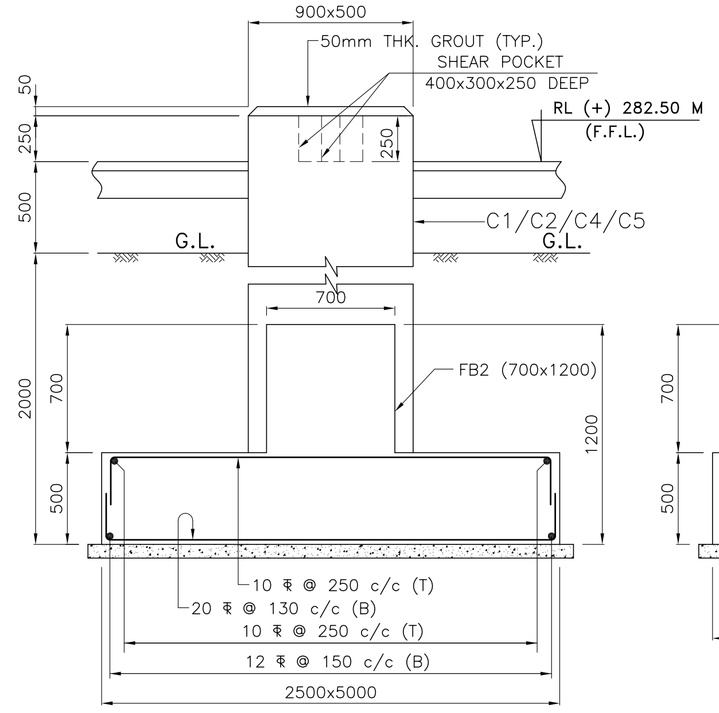
R 1

Sheet No. 1 | Total Sheets 3 | A1

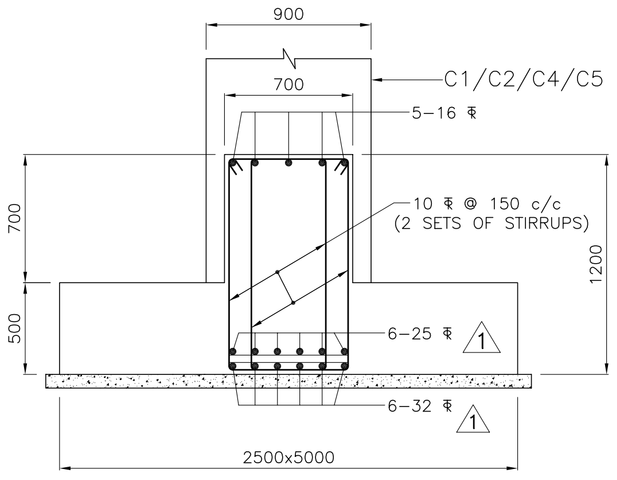
Dimension | Tolerance

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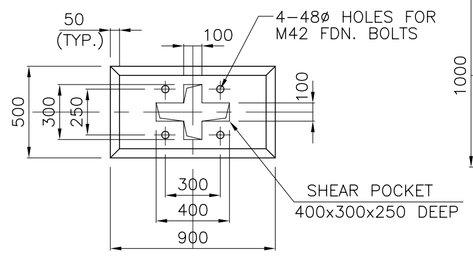
Prepared | Checked | Approved | Quality Assurance



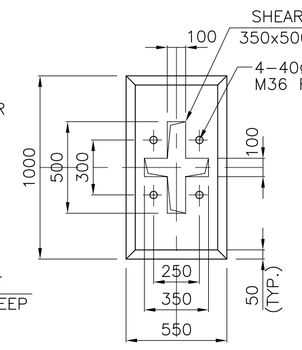
DETAILS OF FOUNDATION
MKD. F4 (2500x5000)



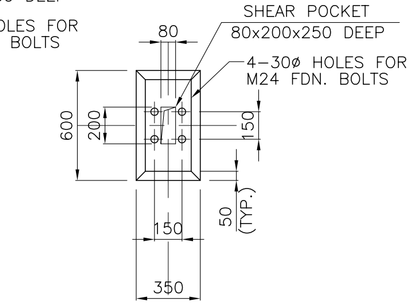
DETAILS OF FOUNDATION BEAM
MKD. FB2 (700x1200)



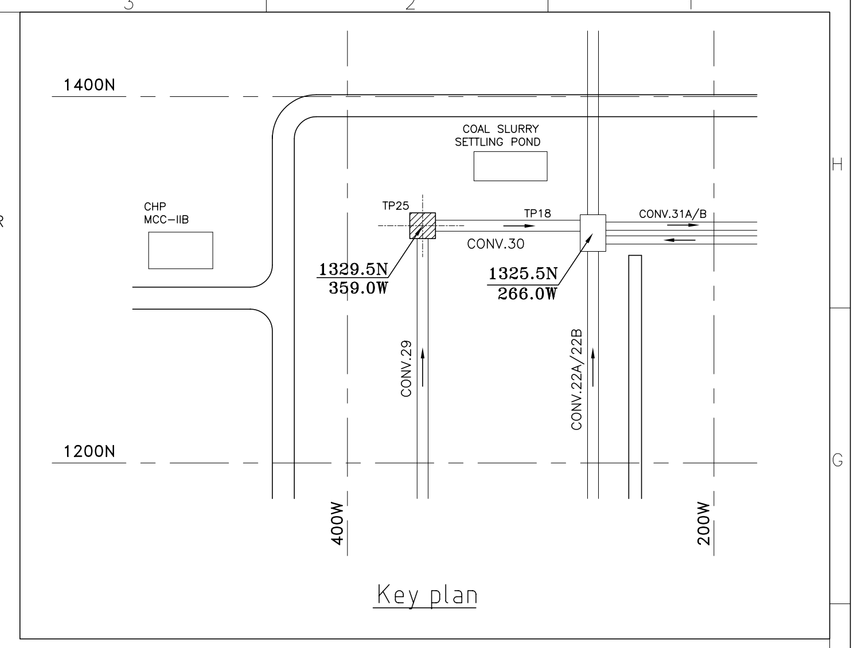
TOP PLAN OF COLUMN
MKD. C1, C2, C4 & C5 (900x500)



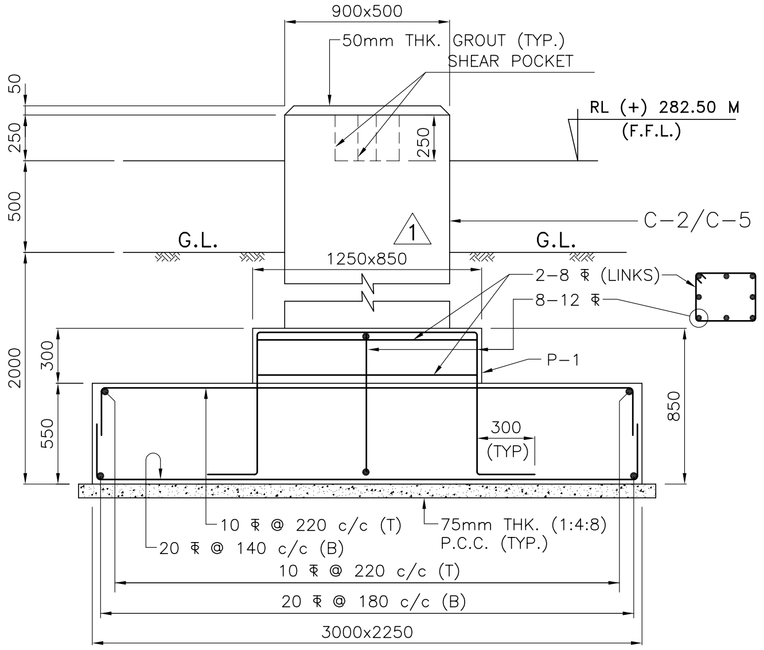
TOP PLAN OF COLUMN
MKD. C3 (550x1000)



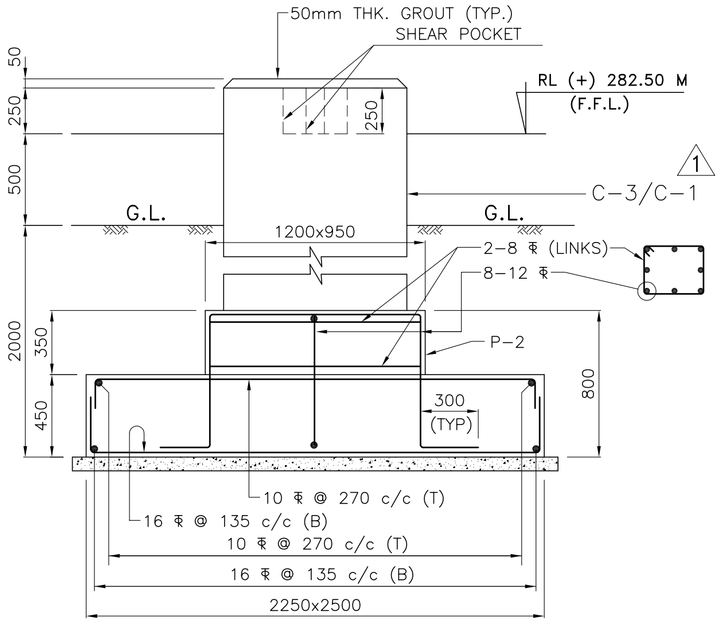
TOP PLAN OF COLUMN
MKD. C6 (350x600)



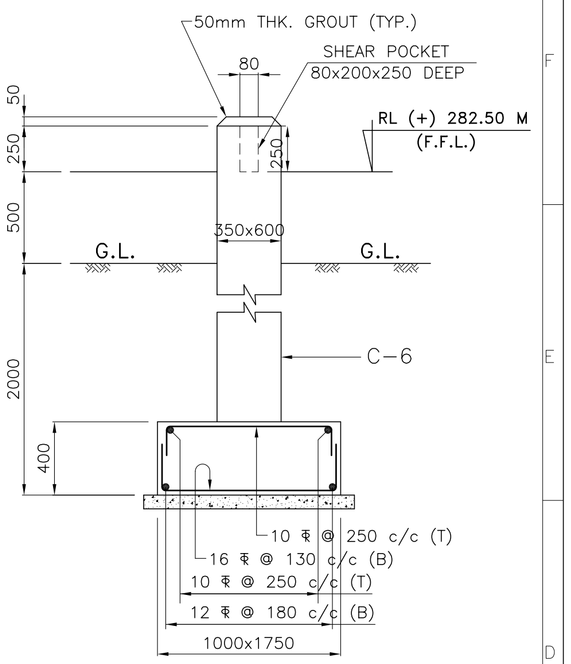
Key plan



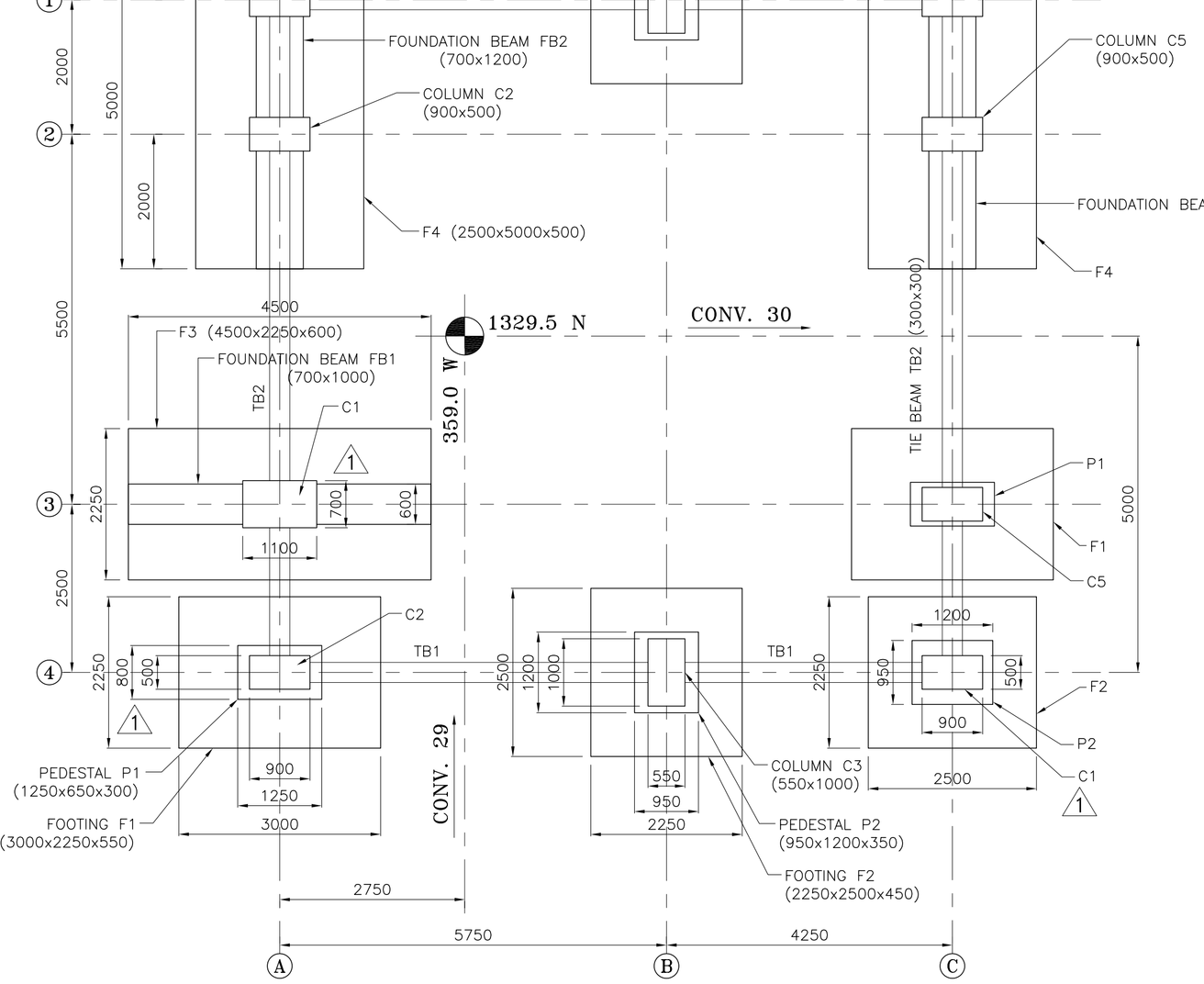
DETAILS OF FOUNDATION
MKD. F1 (3000x2250)



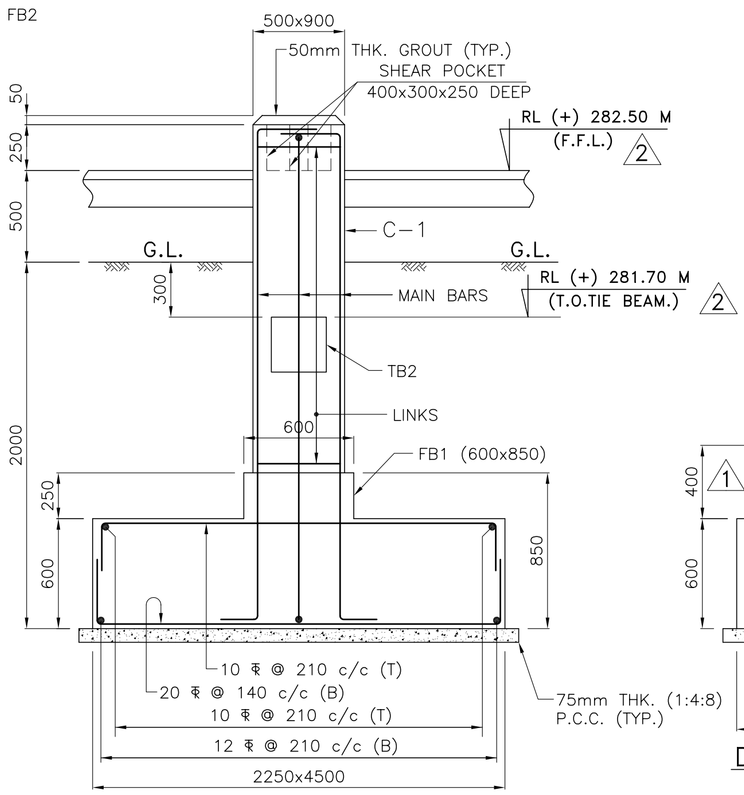
DETAILS OF FOUNDATION
MKD. F2 (2250x2500)



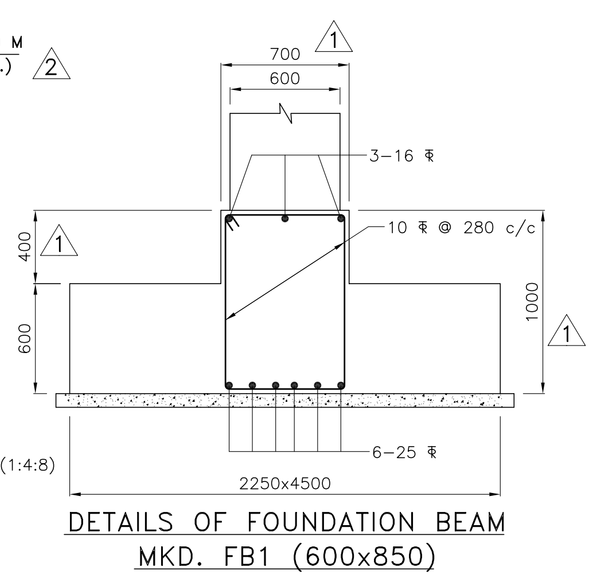
DETAILS OF FOUNDATION
MKD. F5 (1000x1750)



FOUNDATION PLAN



DETAILS OF FOUNDATION
MKD. F3 (2250x4500)



DETAILS OF FOUNDATION BEAM
MKD. FB1 (600x850)

NOTES & SPECIFICATIONS :

1. THIS DRAWING IS BASED ON DRG. NO. M070 H25 6001 REV.-B
2. GRADE OF CONCRETE SHALL BE M-25 U.O.N
3. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
4. F.F.L. (±) 0.00 M CORRESPONDS TO RL (+) 282.50 M.
5. DRAWING IS NOT TO BE SCALED. READ FIGURED DIMENSIONS ONLY.
6. FOR ALL OTHER NOTES AND STANDARD DETAILS LIKE GRADE SLAB, PLINTH PROTECTION WITH DRAIN ETC. REFER DRG. NO. M070 CVL GENL 002.
7. P.C.C. SHALL BE 75mm THK. (1:4:8).
8. IF ROCK IS ENCOUNTERED BEFORE THE FOUNDATION DEPTHS SHOWN, FOUNDATION SHALL REST ON 500mm INSIDE ROCK. INCASE ROCK IS NOT ENCOUNTERED AT THE FOUNDING LEVEL EXCAVATION SHALL BE CARRIED OUT LOCALLY UPTO 0.5M INSIDE THE ROCK AND BUILD IT UP TO THE FOUNDING LEVEL WITH P.C.C. (1:4:8).
9. FOR ALL OTHER DETAILS REFER DRG. NO. M070 CVL TP25 001 (SHEET 2 OF 2).

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
2	06.06.06	DRAWING SUBMITTED FOR FINAL APPROVAL WITHOUT ANY MODIFICATION	KAPIL	A. BHATTACHARYA	S.K. Bose
1	31.10.05	REVISED AS PER NTPC COMMENTS	KAPIL	A. BHATTACHARYA	S.K. Bose
0	17-08-05	SUBMITTED FOR APPROVAL	A.P. Sarkar	A. BHATTACHARYA	S.K. Bose

NTPC DRG. NO : 9545-156-PVC-C-076

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:-
COAL HANDLING PLANT
SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B			
A			

Critical dimensions.

Surface Texture as per IS 10719 | Castings as per | General Tolerances for Welded Construction as per (for linear / for angular) | Machined Components as per (for linear / for angular)

Scale	2004	Date	Name
1 : 25	Drawn	11.08.05	A.P. SARKAR
1 : 10	Checked		S.K.B
	Approved		B. H

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: G.A. & R/F DETAILS OF FOUNDATIONS FOR TP-25

M070 CVL TP25 001 (SHEET 1 OF 2)

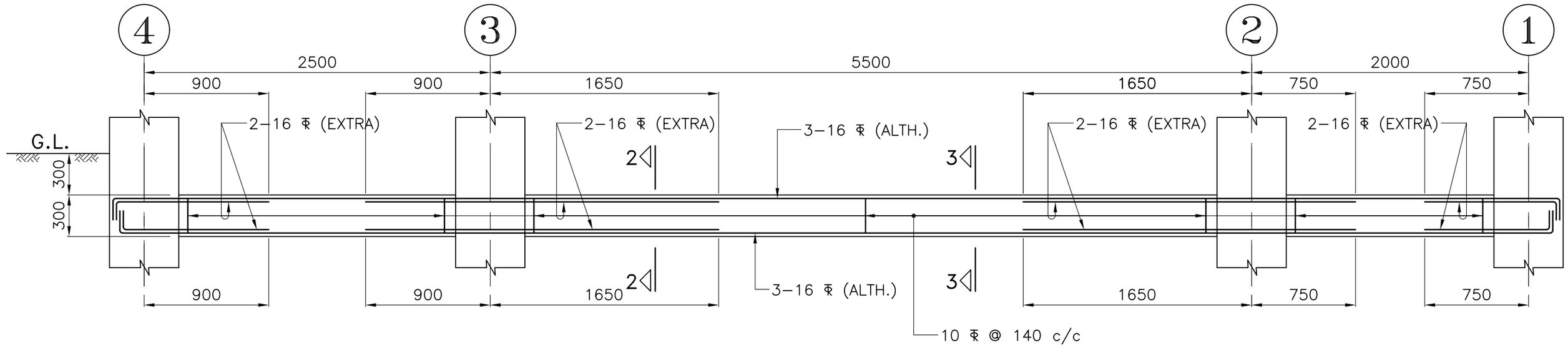
B | X | 2

Sheet No. 1 | Total Sheets 2 | A1

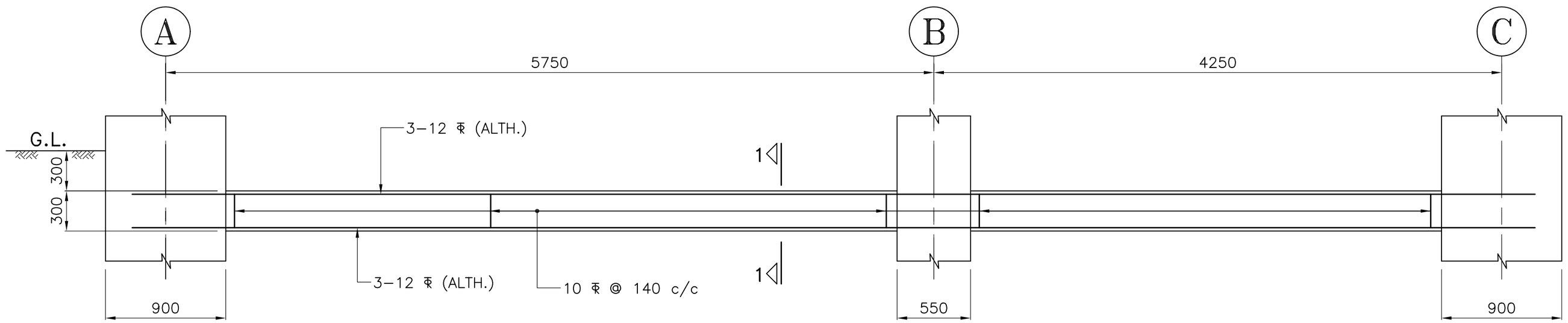
Dimension | Tolerance

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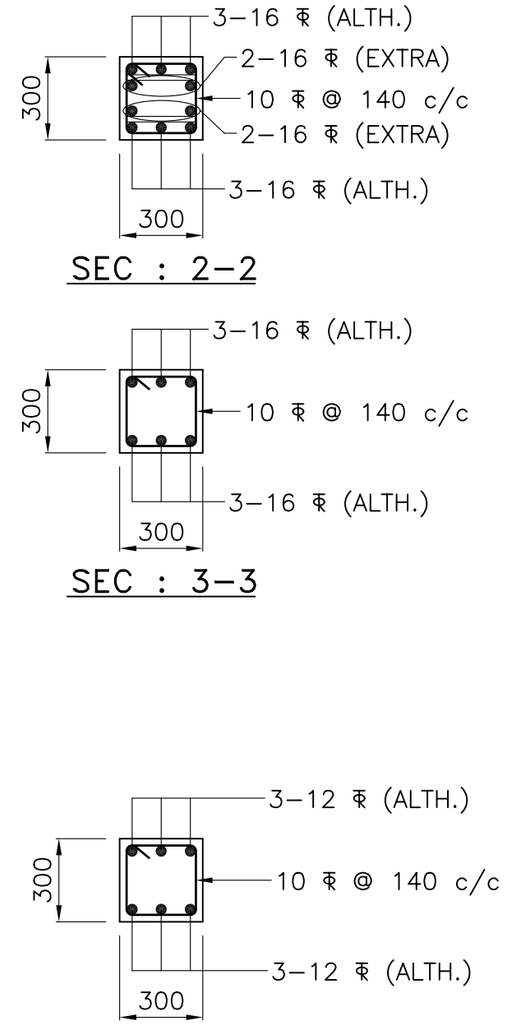
FILE : D:\SIPAT CHP STAGE-II\LATEST\FOUNDATION DETAILS FOR TP-25

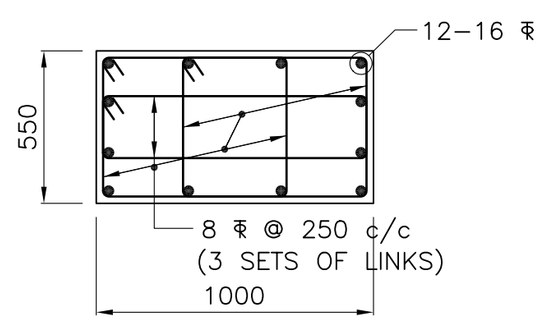


DETAILS OF TIE BEAM TB–2 (300x300)

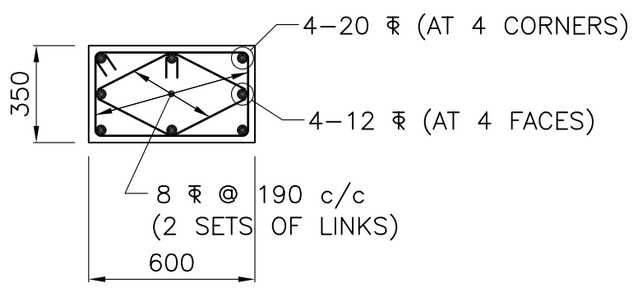


DETAILS OF TIE BEAM TB–1 (300x300)

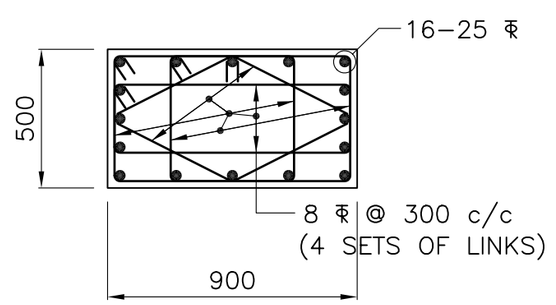




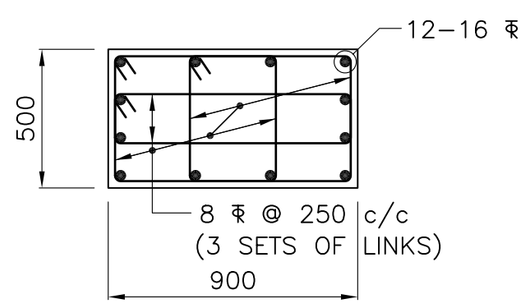
R/F DETAILS OF COLUMN MKD. C3 (1000x550)



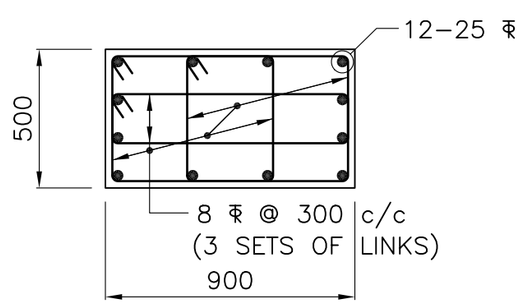
R/F DETAILS OF COLUMN MKD. C6 (600x350)



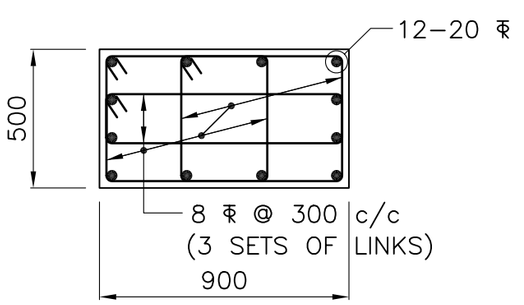
R/F DETAILS OF COLUMN MKD. C1 (900x500)



R/F DETAILS OF COLUMN MKD. C2 (900x500)



R/F DETAILS OF COLUMN MKD. C4 (900x500)



R/F DETAILS OF COLUMN MKD. C5 (900x500)

NOTES & SPECIFICATIONS :

1. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRG. NO. M070 CVL TP25 001 (SHT 1 OF 2).
2. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
3. FOR ALL OTHER NOTES REF. DRG. NO. M070 CVL TP25 001 (SHT 1 OF 2).

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
1	31.10.05	PCC BELOW PLINTH BEAM DELETED	A.P. SARKAR	A. BHATTACHARYA	S.K. Bose
0	17.08.05	SUBMITTED FOR APPROVAL	A.P. SARKAR	A. BHATTACHARYA	S.K. Bose

NTPC DRG. NO : 9545–156–PVC–C–052

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
	Critical dimensions.		

Surface Texture as per IS 10719 | Castings as per | General Tolerances for Welded Construction as per ____for linear ____for angular | Machined Components as per ____for linear ____for angular

Scale	2004	Date	Name
1 : 25	Drawn	16.08.05	A.P. SARKAR
1 : 10	Checked		S.K.B
	Approved		B.H

ThyssenKrupp Industries India Pvt. Ltd.
Plmprl Pune - 411 018

Title: G.A. & R/F DETAILS OF FOUNDATIONS FOR TP–25

M070 CVL TP25 001 (SHEET 2 OF 2)

Rev. 1

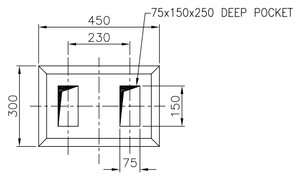
Sheet No. 2 | Total Sheets 2 | A2

Dimension | Tolerance

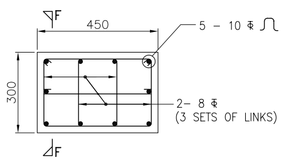
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Drawing Number | Revision | Dr. Number | Dig. Sys.

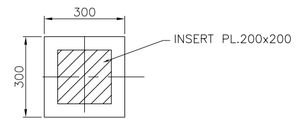
FILE : D:\SIPAT CHP STAGE–II\LATEST\FOUNDATION DETAILS FOR TP–25



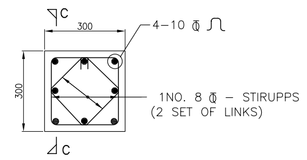
TOP PLAN OF PEDESTAL P13



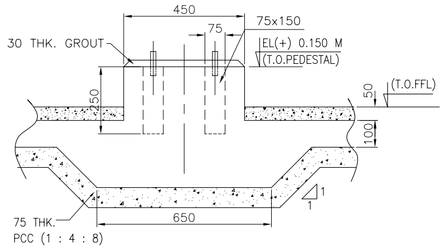
R/F DETAIL OF PEDESTAL P13



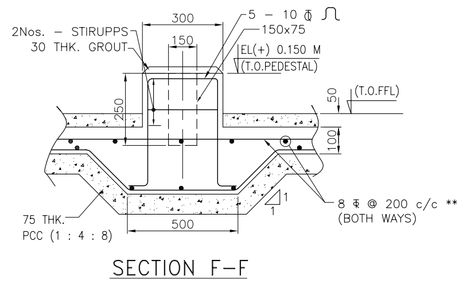
TOP PLAN OF PEDESTAL P14



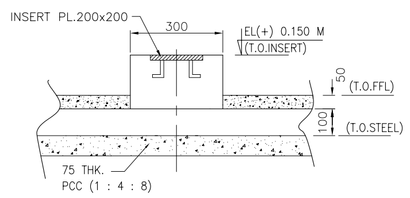
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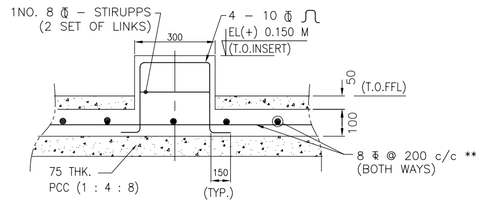
DETAIL OF PEDESTAL P13



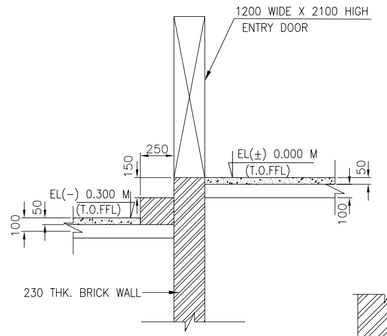
SECTION F–F
SHOWING R/F DETAIL OF PEDESTAL P13



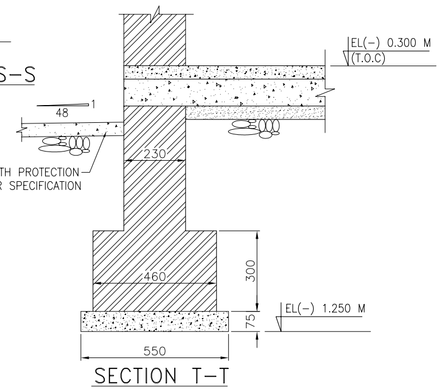
DETAIL OF PEDESTAL P14



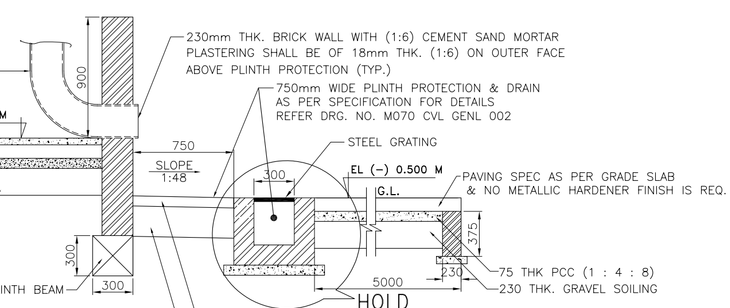
SECTION C–C
SHOWING R/F DETAIL OF PEDESTAL P14



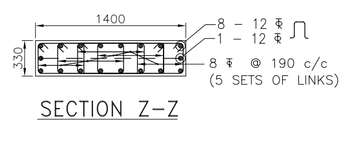
SECTION S–S



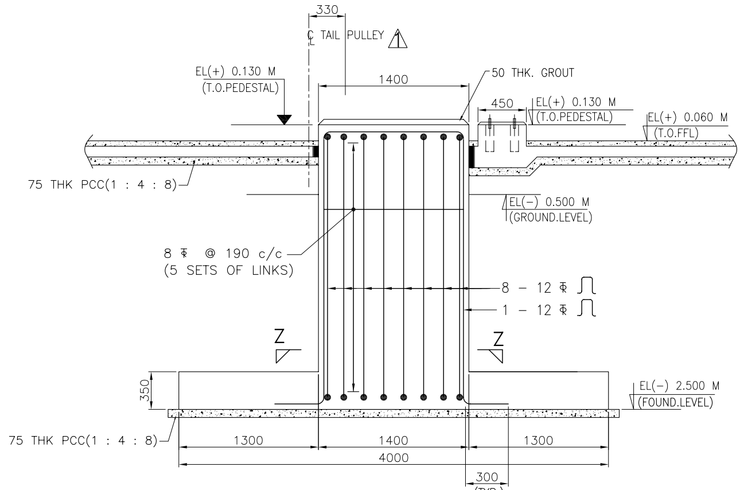
SECTION T–T
SHOWING BRICK WALL FOUNDATION WHERE
GRADE BEAM IS NOT AVAILABLE (TYP.)



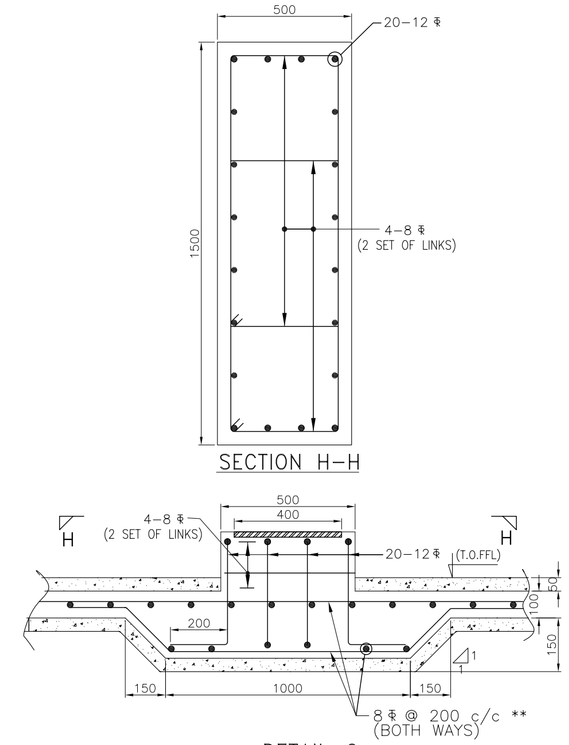
SECTION G–G



SECTION Z–Z

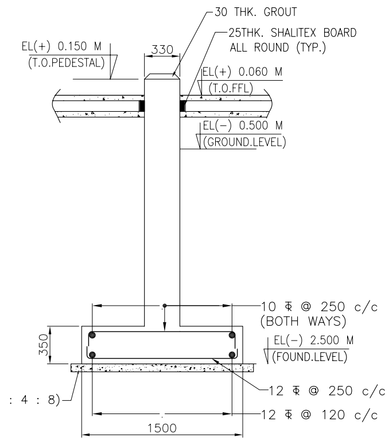


SECTION Y–Y
SHOWING R/F DETAIL OF PEDESTAL P11 & P12

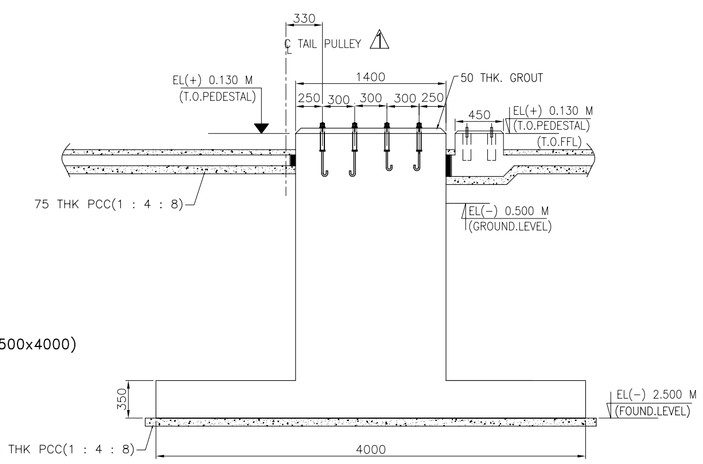


SECTION H–H

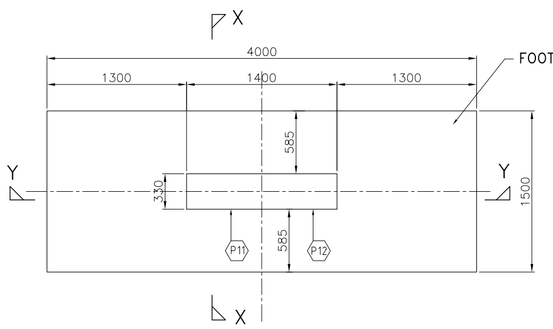
DETAIL–Q
R/F DETAIL OF STAIR FOUNDATION
POSITION,HEIGHT & INSERT PL. SHALL BE CONFIRM FROM TKI



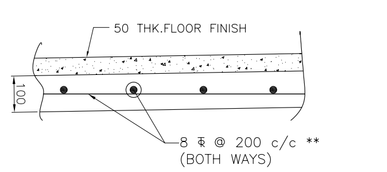
SECTION X–X
SHOWING R/F DETAIL OF FOOTING F1



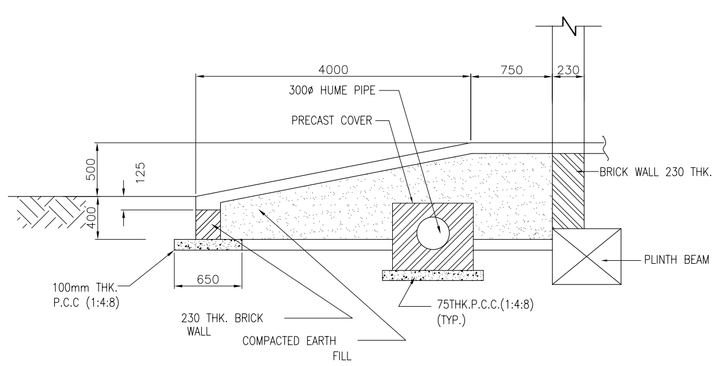
SECTION Y–Y
SHOWING DETAIL OF PEDESTAL P11 & P12



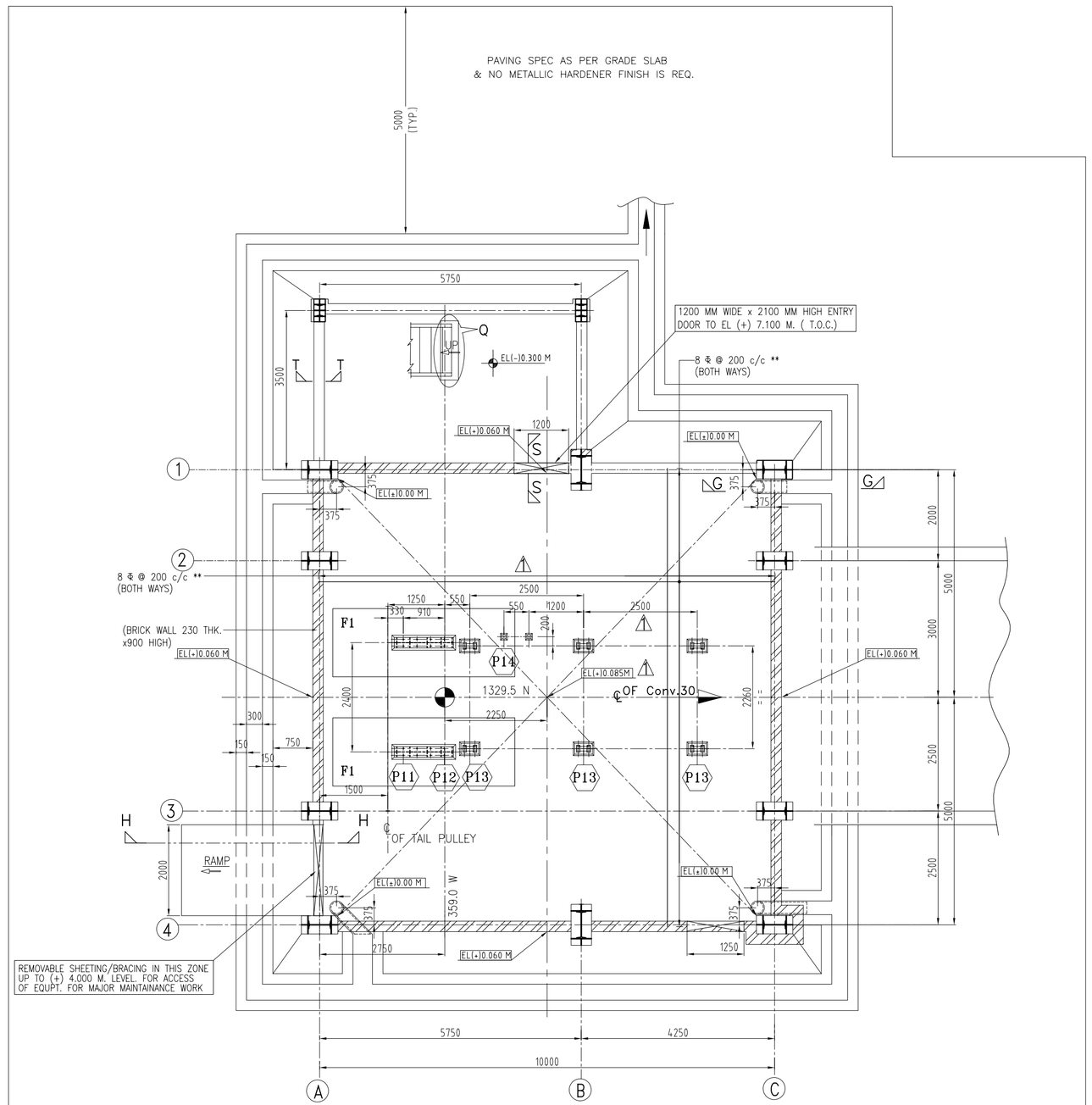
DETAIL OF FOOTING F1



TYPICAL R/F DETAILS OF GRADE SLAB



SECTION H–H



FLOOR PLAN AT EL(+) 0.060M FFL
(SLAB THICKNESS = 100mm U.O.N) ⚠
** – PROVIDE 8 ϕ –200 c/c (ALTH) BOTH WAYS
BARS TO BE CUT AND BEND SUITABLY AT OPENING

NOTES & SPECIFICATIONS :

1. THIS DRAWING IS BASED ON DRG. NO.M070 H25 000 0001–0 (REV B) (SHEET 1 OF 1).
2. THIS DRAWING IS TO BE READ IN CONJUNCTION WITH DRG. NO. M070 CVL TP25 002 (SHEET 1 OF 3 & SHEET 2 OF 3).
3. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
4. FOR ALL OTHER NOTES REFER DRG. NO. M070 CVL GENL 002.
5. DRAIN SHALL REMAIN HOLD UNTIL DRAINAGE NETWORK FOR CHP FINALISED.
6. GRADE OF CONCRETE FOR GRADE SLAB SHALL BE M–20 & REST IS M–25.

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
1	28.05.08	REVISED AS PER NTPC COMMENTS	AMIT	A.B.	S.K. Bose
0	17.03.06	SUBMITTED FOR APPROVAL	AMIT	MRIDUL	S.K. Bose

NTPC DRG. NO : 9545–156–PVC–C–077

एन टी पी सी NTPC
नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)

PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Index	Description	Date	Name
D			
C			
B			
A			

Castings as per | General Tolerances for Welded Construction as per (for linear / for angular) | Machined Components as per (for linear / for angular) | Surface Texture as per IS 10719

Scale N.T.S. | Drawn 17.03.06 AMIT | Checked S.K.B | Approved B. HARIHARA | Date | Name

Critical dimensions.

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: GA & RF DETAIL OF GRADE SLAB FOR TP–25

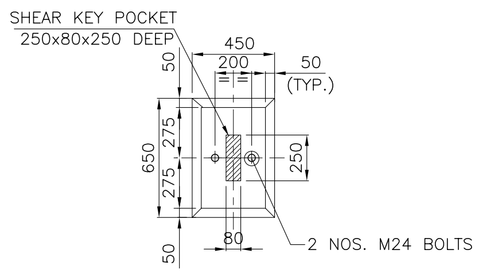
M070 CVL TP25 002

Sheet No. 3 | Total Sheets 3 | A1

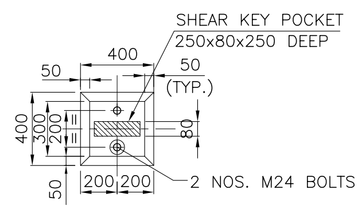
Dimension | Tolerance | No. of Sheets / Sheet No. / Drawing Number

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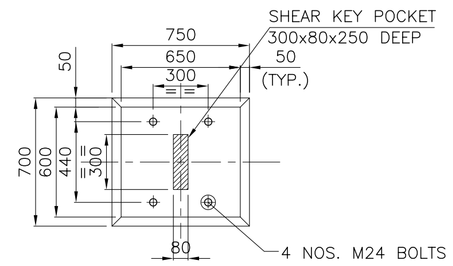
FILE : D:\AMIT\SIPAT STAGE II\RF DETAIL OF TP–25 FLOOR PLAN



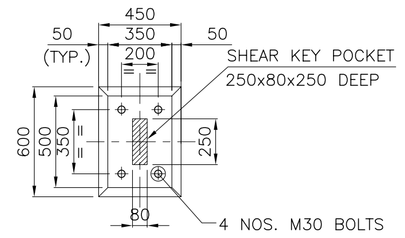
DETAILS OF COL.
FOR T1/30 (450x650)



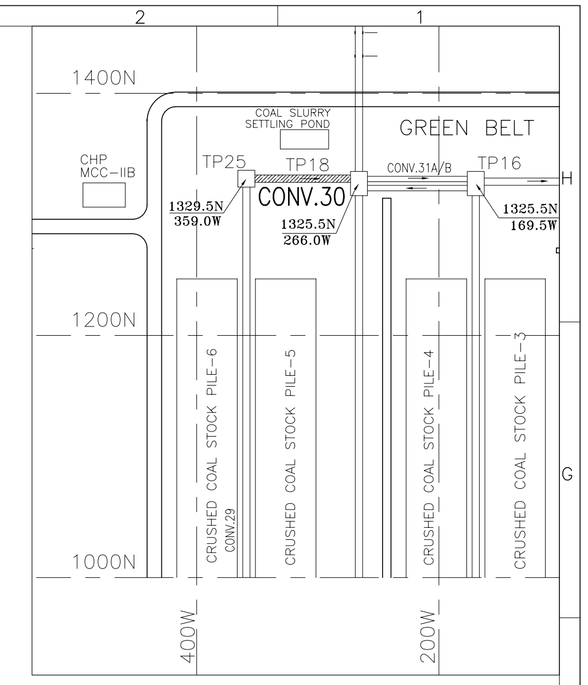
DETAILS OF COL.
T1A/30 (400x400)



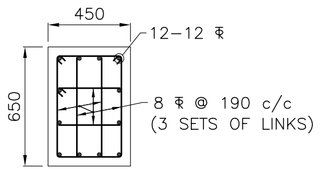
DETAILS OF COL.
FOR T2/30 (750x700)



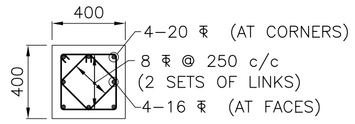
DETAILS OF COL.
FOR T3/30 (L) & T3/30(R)
(450x600)



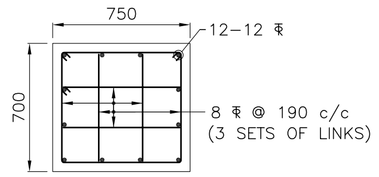
KEY PLAN



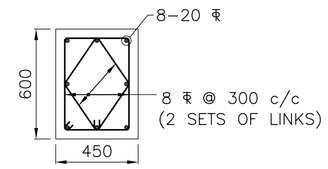
R/F DETAIL OF COL.
T1/30 (450x650)



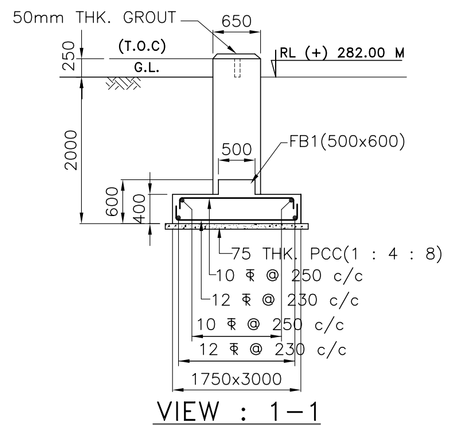
R/F DETAIL OF COL.
T1A/30 (400x400)



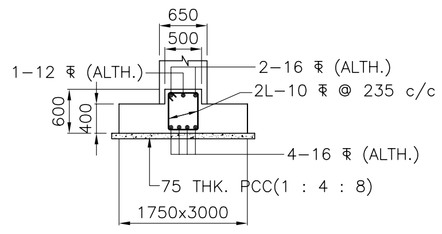
R/F DETAIL OF COL.
T2/30 (750x700)



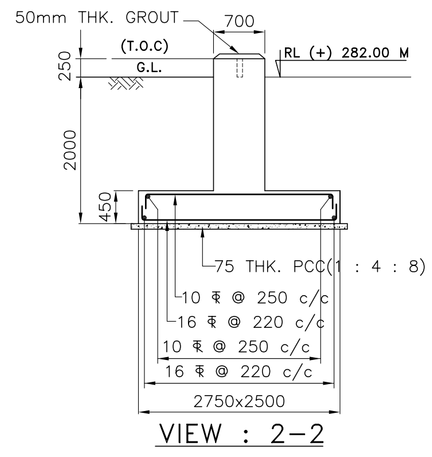
R/F DETAIL OF COL.
T3/30 (L) & T3/30(R)
(450x600)



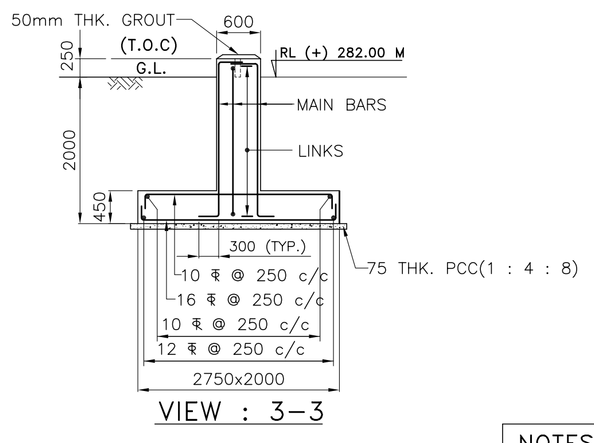
VIEW : 1-1



DETAILS OF BEAM
MKD. FB1



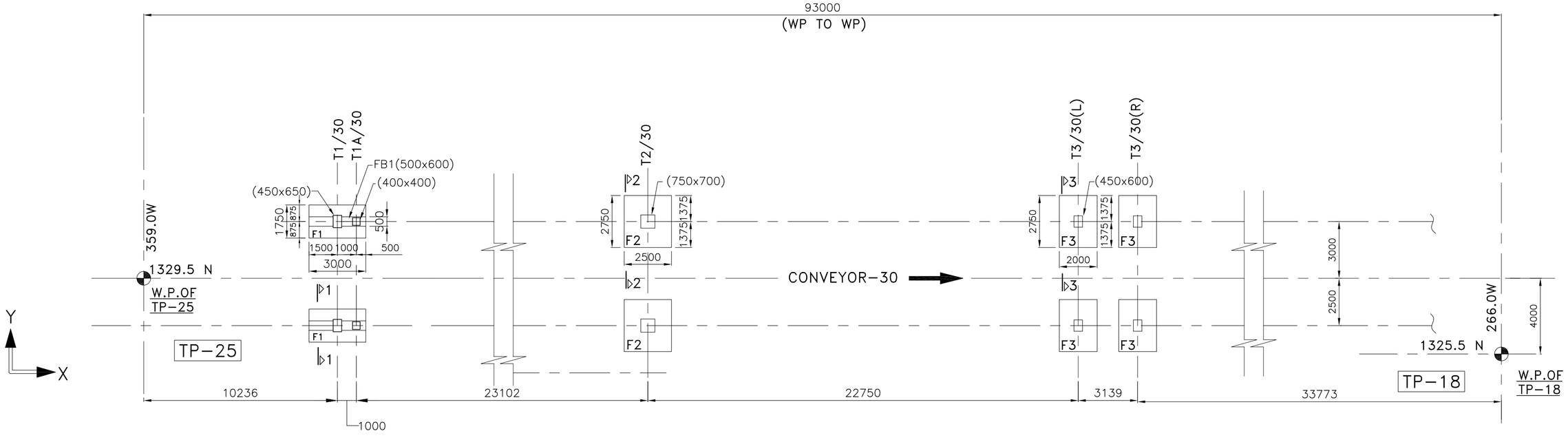
VIEW : 2-2



VIEW : 3-3

NOTES & SPECIFICATIONS :

1. THIS DRAWING IS BASED ON DRG. NO. M070 C30 6001 REV.A
2. ALL DIMENSIONS ARE IN MM AND LEVELS ARE IN METRES.
3. DRAWING IS NOT TO BE SCALED. READ FIGURED DIMENSIONS ONLY.
4. GRADE OF CONCRETE M25 U.O.N.
5. IF ROCK IS ENCOUNTERED BEFORE THE FOUNDATION DEPTHS SHOWN, FOUNDATION SHALL REST ON 500mm INSIDE ROCK. INCASE ROCK IS NOT ENCOUNTERED AT THE FOUNDING LEVEL EXCAVATION SHALL BE CARRIED OUT LOCALLY UPTO 0.5M INSIDE THE ROCK AND BUILD IT UP TO THE FOUNDING LEVEL WITH P.C.C. (1:4:8).



FOUNDATION PLAN

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
1	03.06.06	DRAWING SUBMITTED FOR FINAL APPROVAL WITHOUT ANY REVISION	KAPIL	MRIDUL	S.K. Bose
0	03.10.05	SUBMITTED FOR APPROVAL	KAPIL	MRIDUL	S.K. Bose

NTPC DRG. NO : 9545-156-PVC-C-078

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)

PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B			
A			

Castings as per | General Tolerances for Welded Construction as per (for linear, for angular) | Machined Components as per (for linear, for angular) | Surface Texture as per IS 10719

Critical dimensions.

Scale	2004	Date	Name
1 : 25	Drawn	03.10.05	KAPIL
1 : 10	Checked		S.K.B
	Approved		B. H

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title G.A. & R/F DETAILS OF TRESTLE FOUNDATIONS FOR CONVEYOR - 30

M070 CVL CN30 001

B 1

Sheet No. 1 | Total Sheets 1 | A1

Dimension | Tolerance

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FILE : D:\SIPAT CHP STAGE-II\LATEST\FDN OF TRESTLES FOR CONV - 30

"SIPAT2 - CHP" "STATUS OF PENDING DRAWINGS " as on November 18, 2009 (Wednesday) 20.11.2009

S.NO.	NTPC_DRG_NO	VENDOR_DRG_NO	DETAIL	DRG_TITLE	REV	AREA	PURPOSE	SUB_DT	APPD_DT	SUB-SYSTEM	SCH_SUB_DATE	CAT	PENDING TIME	REMARKS
1	9545-156-PVC-C-127-SH8OF15	M070 CVL TBLK 006	null	DRAINAGE NETWORK WITH ACCESS ROAD FOR MR-1	2	null	A	17-Sep-09	20-Oct-09	CHP	27-May-05	II	>3wks	NTPC comments can not be incorporated. This area is congested with rail lines.There is no space for access road on other side. There is no NTPC road on other side of MH.Drg to be approved
2	9545-156-PVC-C-118B-SH2OF3	null	null	ARCHITECTURAL DETAILS FOR PUMP HOUSE-B-SHEET2	3	null	A	6-Oct-09	20-Oct-09	CHP	27-May-05	II	>3wks	(1) NTPC comment on colour scheme is covered in Sh 3 of 3. (2) Since area of windows is 16% of the floor area which is greatwer than 10% (As per Tech Spec-Section VI-Part B- Cl 10.01.11- Page 24 of 38), no more ventilators required. Drg to be approved.
3	9545-156-PVC-C-118B-SH1OF3	null	null	ARCHITECTURAL DETAILS FOR PUMP HOUSE-B-SHEET1	3	null	A	6-Oct-09	20-Oct-09	CHP	27-May-05	II	>3wks	
4	9545-156-PVC-C-127-SH12OF15	M070 CVL TBLK 006	null	ACCESS ROAD FOR MCC-IIA	2	null	A	17-Sep-09	20-Oct-09	CHP	27-May-05	II	>3wks	NTPC comment on culvert can not be incorporated. There is no NTPC drain available. Please refer Drg 9545-156-PVC-C-127 (3 of 15). Drg to be approved
5	9545-156-PVC-C-123	M070 CVL TBLK 002	null	TOILET DETAILS FOR MCC-IIB	2	null	A	17-Sep-09	13-Oct-09	CHP	27-May-05	II	>3wks	Plant handed over.New comments can not be incorporated. Drg shall be approved
6	9545-156-PVC-C-118B-SH3OF3	null	null	ARCHITECTURAL DETAILS FOR PUMP HOUSE-B-SHEET3	3	null	A	6-Oct-09	20-Oct-09	CHP	27-May-05	II	>3wks	(1) NTPC comment on colour scheme is covered in Sh 3 of 3. (2) Since area of windows is 16% of the floor area which is greatwer than 10% (As per Tech Spec-Section VI-Part B- Cl 10.01.11- Page 24 of 38), no more ventilators required. Drg to be approved.
7	9545-156-PVC-C-127-SH10OF15	M070 CVL TBLK 006	null	ACCESS ROAD FOR PUMP HOUSE-A	2	null	A	22-Sep-09	20-Oct-09	CHP	27-May-05	II	>3wks	NTPC comment on culvert can not be incorporated. There is no NTPC drain available in this direction. Drg to be approved
8	9545-156-PVC-C-127-SH11OF15	M070 CVL TBLK 006	null	DRAINAGE NETWORK WITH ACCESS ROAD FOR PENT HOUSE-II	1	null	A	17-Sep-09	20-Oct-09	CHP	27-May-05	II	>3wks	As it is only approach road, Steel Grating has been provided above the drain. Drg to be approved.
9	9545-156-PVC-C-118C-SH1OF3	M070 CVL DSYS 003C	null	ARCHITECTURAL DETAILS FOR PUMP HOUSE-C	2	null	A	16-Sep-09	13-Oct-09	CHP	27-May-05	II	>3wks	1) Exterior colour scheme is shown in Drg 9545-156-PVC-C-118C Sh 3 of 3 (2) Since area of windows is 18% of the floor area which is greatwer than 10% (As per Tech Spec-Section VI-Part B- Cl 10.01.11- Page 24 of 38), no more ventilators required. Drg to
10	9545-156-PVC-B-309	M070 C20 6003	null	STRUCTURAL G.A. OF CONVEYOR -20	2	null	A	1-Sep-08	4-Sep-08	CHP	22-Oct-04	II	>3wks	Pl arrange to forward NTPC comments of 04 Sep'08
11	9545-156-PVC-B-311	M070 C29 6003	null	STRUCTURAL G.A. OF CONVEYOR -29	2	null	A	1-Sep-08	4-Sep-08	CHP	22-Oct-04	II	>3wks	Shall resubmit by 30.11.09
12	9545-156-PVC-U-237	1605 C 228	null	STRUCTURAL DESIGN CALCULATION FOR 24M SPAN DOUBLE CONVEYOR GALLERY OF 10M AND GA OF DOUBLE CONVEYOR GALLERY(24X10X27M HT)	2	null	A	1-Sep-08	4-Sep-08	CHP	11-Jan-05	II	>3wks	Pl arrange to forward NTPC commented drg
13	9545-156-PVC-C-206-SH2OF2	M070 H19 6002	null	ARCHITECTURAL GA OF TP-19	2	null	A	10-Sep-08	14-Oct-08	CHP	18-Mar-05	II	>3wks	Shall be resubmitted on 20.11.09
14	9545-156-PVC-C-206-SH1OF2	M070 H19 6002	null	ARCHITECTURAL GA OF TP-19	2	null	A	10-Sep-08	14-Oct-08	CHP	18-Mar-05	II	>3wks	Shall be resubmitted on 20.11.09

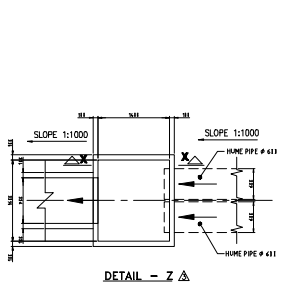
15	9545-156-PVC-B-043-SH1OF6	M070 CVL CRHS 006	null	GA AND R/F DETAILS OF FLOOR FOR CRUSHER HOUSE CH-II AT EL(+) 14.413(FFL)	1	null	A	24-Mar-09	18-Jun-09	CHP	14-Jan-05	II	>3wks	Pl arrange to forward NTPC commented drg
16	9545-156-PVC-C-036-SH2OF2	M070 CVL CN13 005	null	ARCHITECTURE OF PENT HOUSE PH-2	1	null	A	16-Sep-09	6-Oct-09	CHP	22-Oct-04	II	>3wks	1) Exterior finish and Steel door are provided as per Tech Spec. (2) New comments can not be incorporated after handing over.
17	9545-156-PVC-C-118C-SH2OF3	M070 CVL DSYS 003C	null	ARCHITECTURAL DETAILS FOR PUMP HOUSE-C	2	null	A	16-Sep-09	13-Oct-09	CHP	27-May-05	II	>3wks	Since area of windows is 15% of the floor area which is greater than 10% (As per Tech Spec Section VI-Part B - Clause 10.01.11- Page 24 of 38), no more ventilators needed. Drg to be approved.
18	9545-156-PVC-C-101B-SH3OF3	M070 CVL MCCA 005B	null	ARCHITECTURAL DETAILS OF PRESSURE VENTILATION BUILDING FOR MCC-IIA	1	null	A	16-Sep-09	13-Oct-09	CHP	14-Jan-05	II	>3wks	Since area of windows is 15% of the floor area which is greater than 10% (As per Tech Spec Section VI-Part B - Clause 10.01.11- Page 24 of 38), no more ventilators needed. Drg to be approved.
19	9545-156-PVC-C-193-sh1of3	M070 C23 6010	null	ARCHITECTURAL DRG. OF CONV.-23A/B	0	null	A	4-Apr-06	15-May-06	CHP	22-Apr-05	II	>3wks	Shall be resubmitted on 20.11.09
20	9545-156-PVC-B-081	M070 Q10 000 0019-0	null	CIVIL ASSIGNMENT FOR MAIN PUMP HOUSE-B(NEAR -TH-II)	0	null	A	4-May-06	5-May-06	CHP	19-Nov-04	II	>3wks	Drg referred is void as Drg 9545-156-PVM-B-081(Rev A) approved in Cat IV during TCM dt 25.07.06 to 28.07.06
21	9545-156-PVC-B-082	M070 Q10 000 0020-1	null	CIVIL ASSIGNMENT FOR MAIN PUMP HOUSE-C(NEAR -TP-19)	0	null	A	4-May-06	5-May-06	CHP	19-Nov-04	II	>3wks	Drg referred is void as Drg 9545-156-PVM-B-082(Rev A) approved in Cat IV during TCM dt 25.07.06 to 28.07.06
22	9545-156-PVC-B-080	M070 Q10 000 0018-0	null	CIVIL ASSIGNMENT OF PIPING AND EQUIPMENT FOR MAIN PUMP HOUSE-A(NEAR -TP-24)	0	null	A	4-May-06	5-May-06	CHP	19-Nov-04	II	>3wks	Drg referred is void as Drg 9545-156-PVM-B-080(Rev A- 2 sheets) approved in Cat IV during TCM dt 25.07.06 to 28.07.06
23	9545-156-PVC-C-061	M070 CVL SR20 006	null	GA OF STOCK PILE DRAINAGE	1	null	A	5-May-06	17-May-06	CHP	27-May-05	II	>3wks	Drg is superceded
24	9545-156-PVC-C-194-sh1of2	M070 C24 6010	null	ARCHITECTURAL DRG. OF CONV.-24A/B	0	null	A	4-Apr-06	15-May-06	CHP	22-Apr-05	II	>3wks	Shall be resubmitted on 20.11.09
25	9545-156-PVC-U-275	M070CVL PM-B DC32.0	null	DESIGN CALCULATION FOR PUMP HOUSE-B	0	null	A	1-Jun-06	27-Jun-06	CHP	29-Apr-05	II	>3wks	Drg in Cat I. Refer Drg 9545-156-PVC-C-116B (Tr.12613 dt 13.11.06) ; Drg 9545-156-PVC-C-117B Sh 1,2&3(Tr.12280 dt 09.10.06,12612 dt 13.11.06)
26	9545-156-PVC-U-241	M070CVLCH01DC6.0	null	DESIGN CALCULATION OF FOUNDATION FOR CRUSHER HOUSE	3	null	I	20-Jul-06	27-Jul-06	CHP	17-Mar-05	IVR	>3wks	Doc referred is reduntant. Relevant Drgs approved in Cat I. Refer Drg 9545-156-PVC-C-038 (Tr 11398 dt 27.07.06) Drg 9545-156-PVC-C-039 Sh 1&2(Tr 3107 dt 03.05.05&3131 dt 04.05.05) Drg 9545-156-PVC-C-043 Sh 2&4 of 6 (Tr 15881 dt 18.06.09)
27	9545-156-PVM-B-237	M070 Z00 000 0008-0	null	CABLE GALLERY LAYOUT BETWEEN TP-19 AND TP-20	0	null	A	4-Aug-06	23-Aug-06	CHP	19-Nov-04	II	>3wks	Drg referred is void as details are covered in other approved Cable Routing drawing
28	9545-156-PVC-W-001	M070CVLGENL 001	null	DESIGN CRITERIA FOR CIVIL EORKS	0	null	A	2-Aug-04	17-Aug-04	CHP	1-Aug-04	II	>3wks	Shall be resubmitted by 23.11.09
29	9545-156-PVC-F-001-SH1OF2	M070CVLSUR001SHEET1OF2	null	COAL HANDLING PLANT SITE SURVEY SHEET 1OF2	0P	null	I	3-Sep-04	4-Oct-04	CHP	30-Jul-04	IVR	>3wks	The drawing Rev 0P was approved on 04.10.2004. The drawing is reduntant at this stage as work is already completed by incorporating the details in relevant drgs
30	9545-156-PVC-F-001-SH2OF2	M070CVLSUR001SHEET2OF2	null	COAL HANDLING PLANT SITE SURVEY SHEET 2 OF2	0P	null	I	3-Sep-04	4-Oct-04	CHP	30-Jul-04	IVR	>3wks	
31	9545-156-PVC-U-243	M070CVLTN01DC4.0	null	DESIGN CALCULATION OF TUNNEL (SEC 1&2)	1	null	I	25-Mar-05	25-Mar-05	CHP	17-Mar-05	II	>3wks	Doc is reduntant as relevant drg is approved in Cat I. Refer Drg No 9545-156 PVC-C-032 Sh 1&2(Tr 11639 dt 17.08.06); Drg 9545-156-PVC-C-033,Sh 1,2&3 (Tr 11640 & 11642 dt 17.08.06)

32	9545-156-PVC-U-242	M070CVLMH01DC5.0	null	DESIGN CALCULATION OF MACHINARY HATCH(MR-1&2)	1	null	I	25-Mar-05	1-Apr-05	CHP	17-Mar-05	II	>3wks	Document is reduntant as relevant drg is already approved in Cat I . Please refer Drg 9545-156-PVC-C-015 Sh 1,2&3(Tr 12196 & 12192 dt 03.10.06); Drg 9545-156-PVC-C-016 -Sh 1,2&3 (Tr 12195 & 12197 dt 03.10.06) ; Drg 9545-156-PVC-C-023 Sh 1,2&3(Tr 12187
33	9545-156-PVM-B-102	MD.16.45.21080.02	null	ROLLER BEARING SLEWING RING (SLEW BEARING)(M/S ROTHE ERDE)	0	null	A	13-Apr-05	27-Apr-05	CHP	13-Apr-05	II	>3wks	This drg is not identifed in drg list. However, we shall arrange to resubmit the drg for information on 23.11.09
34	9545-156-PVM-B-501-SH1OF2	MD160002070SHEET1	null	STOCKPILE LAYOUT FOR STACKER CUM RECLAIMER	7	null	A	11-May-05	7-Jul-05	CHP	30-Jul-04	II	>3wks	Drg is reduntant. Details are covered in Drg 9545-156-PVM-F-163 approved in Cat IV on 01.08.05. Please also refer 9545-156-PVM-B-501A
35	9545-156-PVM-B-501-SH2OF2	MD160002070SH2OF2	null	STOCKPILE LAYOUT FOR STACKER CUM RECLAIMER	7	null	A	11-May-05	7-Jul-05	CHP	30-Jul-04	II	>3wks	
36	9545-156-PVC-U-252	M070CVLMCCIIA DC15.0	null	DESIGN CALCULATION FOR MCC ROOM -IIA	0	null	I	16-Jun-05	24-Jun-05	CHP	15-Jun-05	II	>3wks	Doc is reduntant . Relevant Drg approved. Refer Drg 9545-156-PVC-C-098,Sh 1&2 (Tr 15703 dt 10.04.09) Drg 9545-156-PVC-C-099(Tr 16164 dt 06.10.09) & 9545-156-PVC-C-101 (Tr 15888 dt 19.06.09)
37	9545-156-PVC-U-253	M070CVLMCCIIB DC16.0	null	DESIGN CALCULATION FOR MCC ROOM -IIB	0	null	I	21-Jun-05	24-Jun-05	CHP	21-Jun-05	II	>3wks	Doc is reduntant. Relevant Drg 9545-156-PVC-C-105 (Tr 10157 dt 17.05.06) is approved in Cat I
38	9545-156-PVC-C-016-SH3OF3	M070 CVL MR01 002(SH3OF3)	null	R/F DETAILS OF MR-1(SH3OF3)	1	null	A	29-Sep-05	4-Oct-05	CHP	31-May-05	II	>3wks	Rev 2 Approved in Cat I vide Tr 12197 dt 03.10.06
39	9545-156-PVM-U-225	7303-C-359	null	DYNAMIC AND STRUCTURAL ANALYSIS FOR RING GRANNULATOR FOUNDATION BLOCK	0	null	A	28-Nov-05	27-Dec-05	CHP	19-Nov-04	II	>3wks	Doc referred is reduntant as relevant documents are already approved. Please refer 9545-156-PVM-B-201 approved in Cat IV on 23.03.06; 9545-156-PVM-B-222 approved in Cat I on 23.02.06; 9545-156-PVC-V-128 approved in Cat IV on 26.03.05; 9545-156-PVM-B-016
40	9545-156-PVC-U-262	M070CVL CN22 DC28	null	DESIGN CALCULATION FOR FOUNDATION OF TAKE UP ARRANGEMENT AND RCC WALL FOR CONV 22A/B	0	null	A	30-Nov-05	27-Dec-05	CHP	29-Apr-05	II	>3wks	Doc referred is reduntant.Relevant drg approved in Cat I. Please refer Drg 9545-156-PVC-C-119 Sh 1&2 approved in Cat I (Tr 16166 dt 06.10.09 & 11497 dt 04.08.06)
41	9545-156-PVC-C-016-SH2OF3	M070 CVL MR01 002(SH2OF3)	null	R/F DETAILS OF MR-1(SH2OF3)	2	null	A	8-Feb-06	16-Feb-06	CHP	31-May-05	II	>3wks	Rev 3 Approved in Cat I vide Tr 12195 dt 03.10.06
42	9545-156-PVC-C-016-SH1OF3	M070 CVL MR01 002(SH1OF3)	null	R/F DETAILS OF MR-1(SH1OF3)	2	null	A	8-Feb-06	16-Feb-06	CHP	31-May-05	II	>3wks	Rev 3 Approved in Cat I vide Tr 12195 dt 03.10.06
43	9545-156-PVM-B-004-SH3OF3	M070C220000001(SH3 OF3)	null	GA OF CONVEYOR 22A/B	3	null	A	28-Feb-06	10-Mar-06	CHP	20-Aug-04	II	>3wks	Pl forward NTPC comented drg of 10 March'06
44	9545-156-PVE-F-505	EL-00M070-0017	null	TYPICAL EARTHING LAYOUT FOR CONVEYORS AND TRANSFER POINTS	1	null	I	29-Aug-06	1-Sep-06	CHP	22-Oct-04	IVR	>3wks	Doc referred is reduntant.Relevant drg approved . Please refer Drg 9545-156-PVE-F-507 approved in Cat IV dt 07.12.05; 9545-156-PVE-F-510 approved in Cat I dt 07.12.05
45	9545-156-PVC-C-203-SH2OF2	M070 H16 6002	null	ARCHITECTURAL DRG. OF TP#16	2	null	A	16-Apr-07	28-May-07	CHP	14-Jan-05	II	>3wks	Shall be resubmitted on 20.11.09
46	9545-156-PVC-C-200-SH1OF2	M070 G02 6010	null	ARCHITECTURAL DRG. OF CRUSHER HOUSE-II	1	null	A	16-Apr-07	28-May-07	CHP	14-Jan-05	II	>3wks	Shall be resubmitted on 20.11.09
47	9545-156-PVC-C-200-SH2OF2	M070 G02 6010	null	ARCHITECTURAL DRG. OF CRUSHER HOUSE-II	1	null	A	16-Apr-07	28-May-07	CHP	14-Jan-05	II	>3wks	Shall be resubmitted on 20.11.09
48	9545-156-PVC-C-203-SH1OF2	M070 H16 6002	null	ARCHITECTURAL DRG. OF TP#16	2	null	A	16-Apr-07	28-May-07	CHP	14-Jan-05	II	>3wks	Shall be resubmitted on 20.11.09
49	9545-156-PVC-B-176-SH1OF2	M070 H19 6002	null	STRUCT. G.A. OF TP19 - PLAN	3	null	A	4-Mar-08	9-Apr-08	CHP	19-Nov-04	II	>3wks	Please forward NTPC commented drg

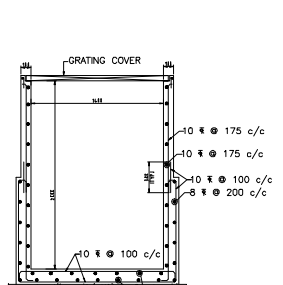
50	9545-156-PVC-B-160-SH4OF7	M070 G02 6002(SH NO4)	null	ARRANGEMENT OF FLOOR BEAMS AT +21.8M LVL TOS(CH-2)	6	null	A	4-Mar-08	26-Mar-08	CHP	19-Nov-04	II	>3wks	Shall be re-submitted by 30.11.09
51	9545-156-PVC-B-306	M070 C22 6004	null	STRUCTURAL G.A. OF CONVEYOR -22A/B	2	null	A	1-Sep-08	4-Sep-08	CHP	22-Oct-04	II	>3wks	Shall be re-submitted by 30.11.09
52	9545-156-PVC-C-127-SH9OF15	M070 CVL TBLK 006	null	DRAINAGE NETWORK WITH ACCESS ROAD FOR MR-2	2	null	A	17-Sep-09	20-Oct-09	CHP	27-May-05	II	>3wks	Please forward Drg 9545-156-PVC-C-129 which is referred in comment
53	9545-156-PVC-C-118A-SH3OF3	M070 CVL DSYS 003A	null	ARCHITECTURAL DETAILS FOR PUMP HOUSE-A-SHEET3	3	null	A	22-Sep-09	13-Oct-09	CHP	27-May-05	II	>3wks	Since area of windows is 14% of the floor area which is greater than 10% (As per Tech Spec Section VI-Part B - Clause 10.01.11- Page 24 of 38), no more ventilators needed. Drg to be approved.
54	9545-156-PVC-C-118C-SH3OF3	M070 CVL DSYS 003C	null	ARCHITECTURAL DETAILS FOR PUMP HOUSE-C	2	null	A	17-Sep-09	13-Oct-09	CHP	27-May-05	II	>3wks	Since area of windows is 15% of the floor area which is greater than 10% (As per Tech Spec Section VI-Part B - Clause 10.01.11- Page 24 of 38), no more ventilators needed. Drg to be approved.
55	9545-156-PVC-C-101B-SH1OF3	M070 CVL MCCA 005B	null	ARCHITECTURAL DETAILS OF PRESSURE VENTILATION BUILDING FOR MCC-IIA	2	null	A	16-Sep-09	13-Oct-09	CHP	14-Jan-05	II	>3wks	Area of window is already greater than 10% as per Cl 10.01.11 of Tech Spec, so no need of more ventilators. Plant is already taken over and hence other comments can not be incorporated.Drg to be approved.
56	9545-156-PVC-C-127-SH7OF15	M070 CVL TBLK 006	null	DRAINAGE NETWORK WITH ACCESS ROAD FOR TP-25	3	null	A	17-Sep-09	20-Oct-09	CHP	27-May-05	II	>3wks	Comments can not be incorporated. Culvert has been provided as per Tech Spec.Drg to be approved
57	9545-156-PVC-C-126-SH1OF2	M070 CVL TBLK 005	null	DRAINAGE NETWORK	4	null	A	17-Sep-09	28-Oct-09	CHP	27-May-05	II	2-3wks	The comments can not be incorporated as there is no NTPC drain available for providing drain crossing.
58	9545-156-PVC-C-129A	M070CVLTBLK007	null	DETAILS OF ACCESS ROAD	2	null	A	17-Sep-09	28-Oct-09	CHP	27-May-05	II	2-3wks	The comments can not be incorporated as the area is congested with rail lines. There is no space for access road on other side and there is no road of NTPC on other side of MH

Provide details

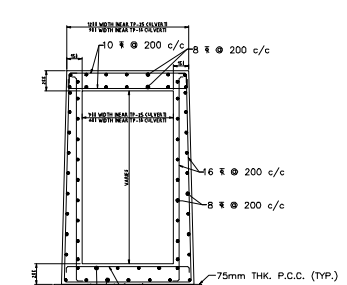
SCHEDULE OF DRAIN					
S.No.	ZONE MKD.	APPX. LENGTH (m)	STARTING DEPTH 'D'(mm)	ENDING DEPTH 'D'(mm)	WIDTH 'W'(mm)
1	1	595	300	895	350
2	2	190	895	1085	350
3	3	180	1085	1265	400
4	3'	110	300	410	400
5	4	550	300	850	600
6	4'	55	1000	1055	600
7	4A	610	410	1020	800
8	5	550	300	850	600
9	5'	105	1650	1755	900
10	5A	102	1650	1752	900
11	6	510	480	990	500
12	7	500	1265	1765	500
13	7'	130	1765	1895	600
14	8	60	1755	1815	900
15	8'	125	500	625	350
16	8*	105	1755	1860	1000
17	10	50	300	350	300
⚠ 18	11	105	1895	2000	1000



DETAIL – Z ⚠



SECTION : X–X
1400x1600x2000 DEEP ⚠



DETAIL OF CULVERT NEAR TP–25 (1200x5000) ⚠
& CULVERT NEAR TP–18 (900x8500)

CHECKED FOR CO-ORDINATION	
MECHANICAL	S.M.
CIVIL	A.B.
ELECTRICAL	R.D.A
STRUCTURAL	B.V

NOTES & SPECIFICATIONS :

1. DEPTH OF THE DRAIN AT THE ENTRY POINT OF CSP IS 2000mm .
2. GRADE OF CONCRETE IS M20 & STEEL Fe415 .
3. HUME PIPE IS TO BE PROVIDED WHERE DRAIN IS CROSSING THE ROAD.
4. SLOPE OF THE DRAIN 1V/1000H
5. SUMP PIT SHALL BE PROVIDED ONE No. FOR EACH TP'S, CRUSHER HOUSE, MCC BUILDINGS, PUMP HOUSE SO THAT BUILDING PERIPHERIAL DRAIN WATER SHALL OVERFLOW THROUGH PIT IN TO MAIN DRAINAGE SYSTEM.
6. SUMP PIT SHALL BE PROVIDED AT TRESTLE LEGS OF OVERHEAD COVEYOR BEFORE ENTERING WATER IN MAIN DRAIN.
7. ALL OPEN DRAINS SHALL HAVE REMOVABLE STEEL GRATING – 12mm THK. HOWEVER AT ENTRY OR ROAD CROSSING POINTS GRATING SHALL BE 40mm THK.
8. DRAINS IN COAL STOCK YARD AREA SHALL HAVE PRECAST RCC COVER.
9. FOR DRAIN SECTION DETAILS REFER DRG. NO. 9545–156–PVC–C–126 SHEET 2 OF 3.
10. DRAINS SHOULD BE LOCALLY DIRVERTED WHERE FOUNDATIONS OR OTHER STRUCTURES ARE ENCOUNTERED AS SUITABLE AT SITE.
11. THIS DRAWING IS SUPERSEDED OF DRAWING NO. 9545–156–PVC–C–61

Rev. No.	Date	REVISIONS	Drawn	Checked	Approved
4	14.09.09	REVISED AS BUILT & HANDED OVER	P.B.	A. Bhattacharya	S.K. Bose
3	21.05.08	REVISED AS PER SITE CONDITION	AMIT	A. Bhattacharya	S.K. Bose
2	21.11.07	REVISED AS PER SITE CONDITION	AMIT	MRIDUL	S.K. Bose
1	18.10.06	REVISED AS PER NTPC COMMENTS	AMIT	RAJEEV	S.K. Bose
0	19.04.06	SUBMITTED FOR APPROVAL	KAPIL	MRIDUL	S.K. Bose

NTPC DRG. NO : 9545–156–PVC–C–126

ena Ti Pal sal — naoSanala qama–la Paavar karPaaroSana ila.

NTPC

National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:– SIPAT SUPER THERMAL POWER PROJECT
STAGE–II (2x500MW)
PACKAGE:– COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.–CS–9545–156–2

Scale	1:1000	Date	Name
Drawn		19.04.06	AMIT
Checked			R.K.D
Approved			K. Mukherjee

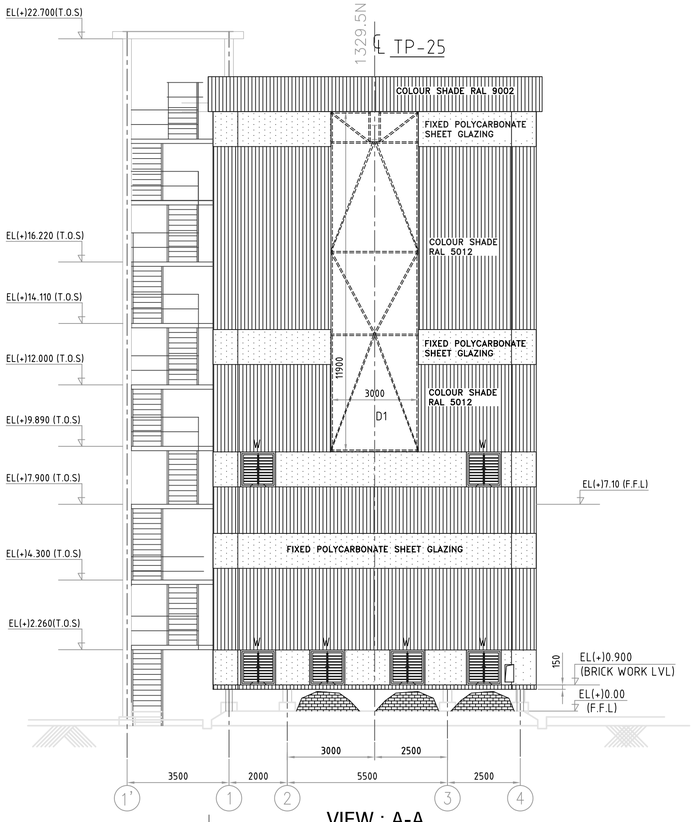
ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune – 411 018

Title: DRAINAGE NETWORK

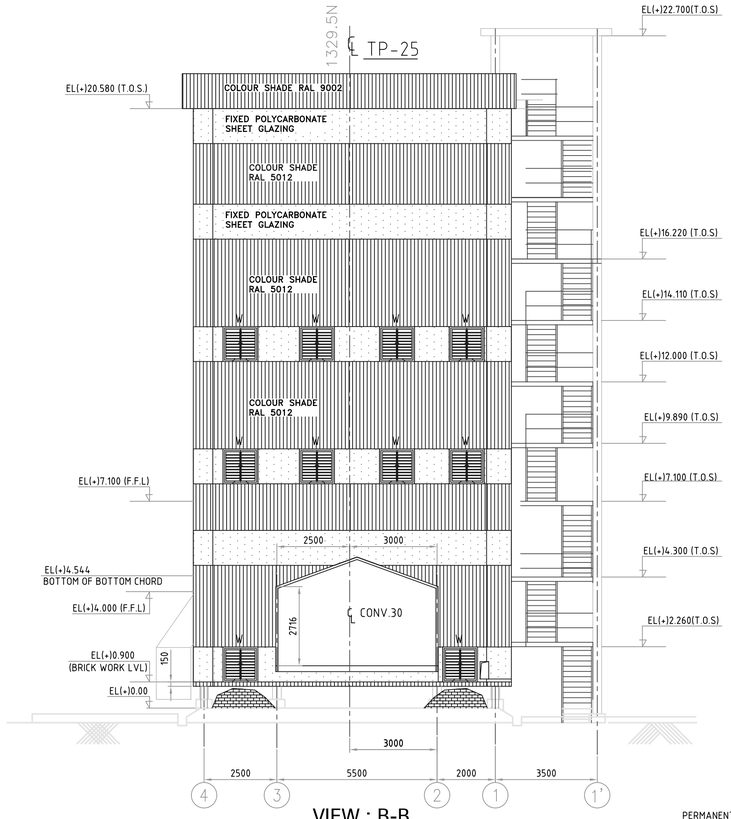
M070 CVL TBLK 005

Sheet No. 1 Total Sheets 2 A0

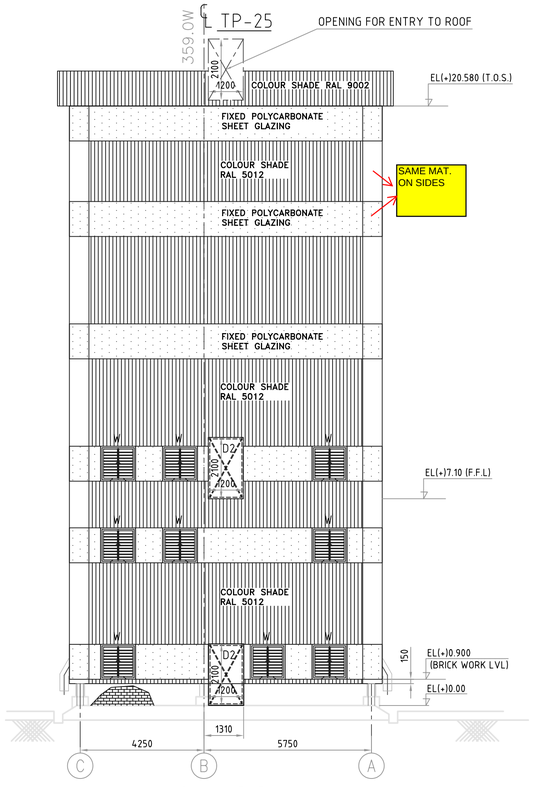
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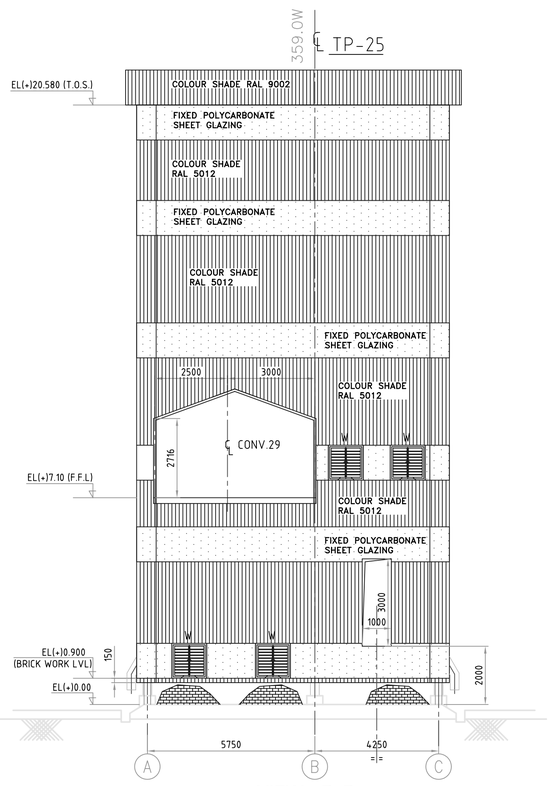
VIEW : A-A



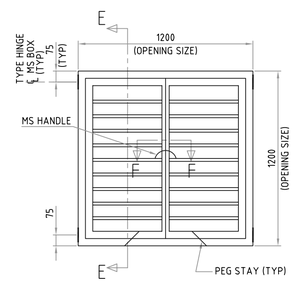
VIEW : B-B



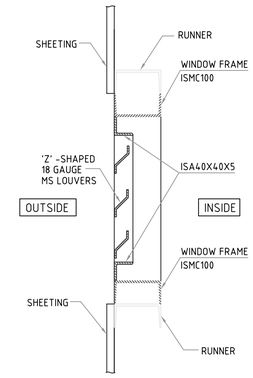
VIEW : C-C



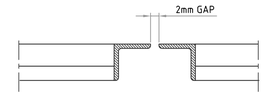
VIEW : D-D



ELEVATION OF OPENABLE WINDOW (W)
(OPENABLE OUTSIDE)



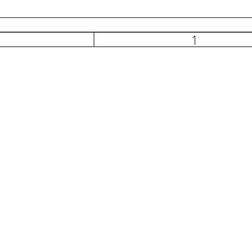
SECTION E-E



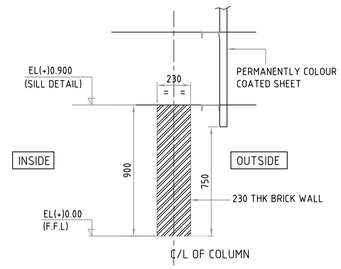
SECTION F-F



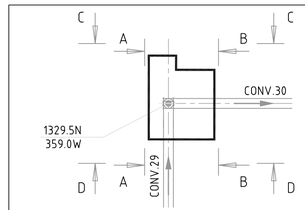
CORNER PIECE



TYP. SECTION OF PARAPET



DETAIL



KEY PLAN

NOTES

1) ALL DIMENSIONS ARE IN MILIMETERS AND LEVELS IN METER UNLESS NOTED OTHERWISE.
2) THIS DRAWING IS MADE BASED ON MECHANICAL DRAWING NO. MO70 H25 000 0001-0 REV-'C' AND STRUCTURAL DRAWING NO. MO70 H25 6004. REV-'A'

NTPC DRG. NO : 9545-156-PVC-C-208

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)
PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	20.3.08	M.R.A

General Tolerances for: Castings as per; Welded Construction as per; Machined Components as per; Surface Texture as per IS 10719; for linear; for angular; for linear; for angular

	Date	Name
Drawn	25/11/2005	SaiCAD
Checked		SK
Approved		BV

Scale 1:100 — Critical dimensions,

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: ARCHITECTURAL G.A. OF TP-25

Drawing Number: M070 H25 6002-1

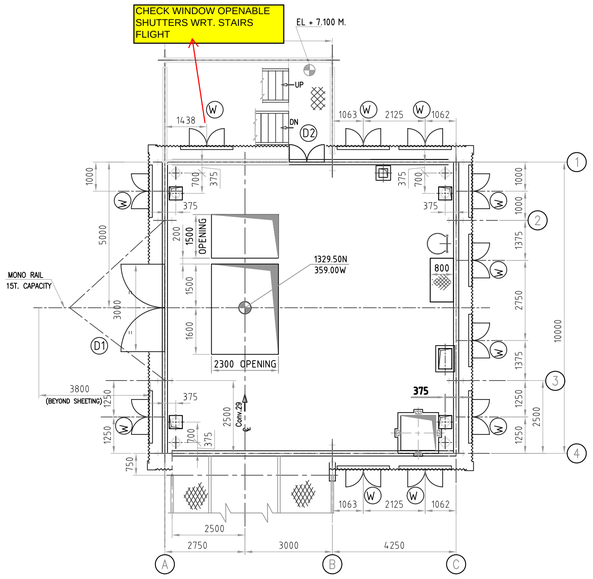
Revision: A

Sheet No. 1 Total Sheets 2 A1

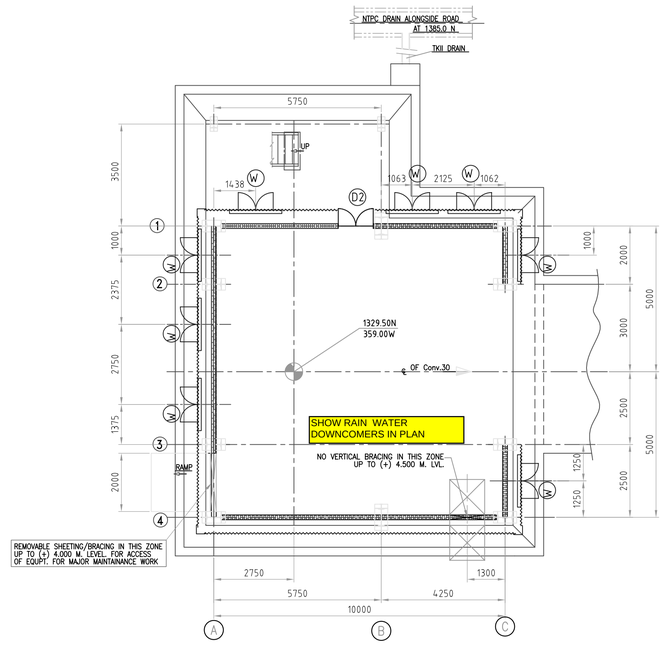
Dimension | Tolerance

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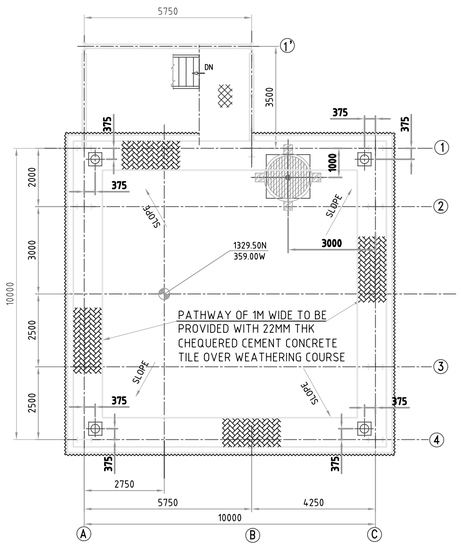
COMPUTER GENERATED DRAWING



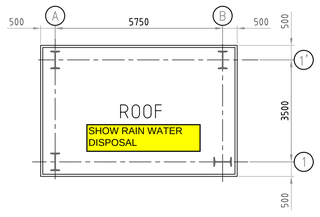
FLOOR PLAN AT EL(+)7.100 (F.F.L)



FLOOR PLAN AT EL.(+) 0.000 M.



ROOF PLAN



PLAN AT LEVEL EL(+)25.00

A

SCHEDULE OF FINISH			
SR. NO.	ITEM	DESCRIPTION	REMARKS
1	FLOOR FINISH	50 THK FLOOR FINISH INCLUDING 12 THK IRONITE TOPPING	AS PER NTPC TECHNICAL SPECIFICATION CL. NO. 7.00.00 TO 9.00.00 OF CVL. SPCN. DOC. NO. CS-9545-156-2
2	ROOF FINISH	ROOF WATER PROOFING BY MASTIC LAYER ELASTOMETRIC MEMBRANE & PCC WEARING COURSE	

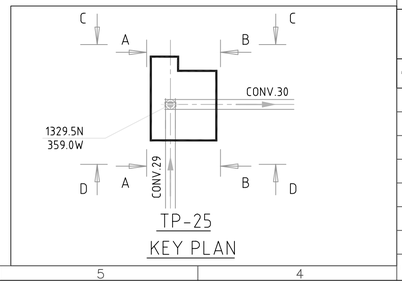
SCHEDULE OF DOORS AND WINDOWS					
MKD	OPENING SIZE		NOS.	DESCRIPTION	REMARKS
	WIDTH	HEIGHT			
W	1200	1200	29	M.S. LOUVERED DOUBLE LEAF OPENABLE WINDOW AS PER SPECIFICATION	OPENABLE OUTSIDE
D1	3000	11900	1	M.S. DOUBLE LEAF STEEL DOOR AS PER SPECIFICATION	OPENABLE OUTSIDE
D2	1200	2100	2	M.S. DOUBLE LEAF STEEL DOOR AS PER SPECIFICATION	OPENABLE OUTSIDE

NOTES

1) ALL DIMENSIONS ARE IN MILIMETERS AND LEVELS IN METER UNLESS NOTED OTHERWISE.
2) THIS DRAWING IS MADE BASED ON MECHANICAL DRAWING NO. M070 H25 000 0001-0 REV-'C' AND STRUCTURAL DRAWING NO. M070 H25 6004. REV-'A'

3) FOR WATER TAP POINTS REFER DRG.NO.-M070 Q10 H25 0301-0
   NTPC DRG. NO.-9545-156-PVM-B-078E
4) RAIN WATER DOWNCOMER LOCATION ARE TO BE ADJUSTED TO AVOID CLASHING WITH WINDOWS OPENING

A



KEY PLAN

NTPC DRG. NO : 9545-156-PVC-C-208

एन टी पी सी NTPC

नेशनल थर्मल पावर कारपोरेशन लि.
National Thermal Power Corporation Ltd.
(A GOVT. OF INDIA ENTERPRISE)
ENGINEERING DIVISION

PROJECT:- SIPAT SUPER THERMAL POWER PROJECT
STAGE-II (2x500MW)
PACKAGE:- COAL HANDLING PLANT

TECHNICAL SPECIFICATION FOR CHP NO.-CS-9545-156-2

Index	Description	Date	Name
D			
C			
B			
A	NTPC COMMENTS INCORPORATED	20.3.08	M.R.A

Surface Texture as per IS 10719. General Tolerances for Castings as per, Welded Construction as per ____for linear ____for angular, Machined Components as per ____for linear ____for angular. Critical dimensions.

Scale		Date	Name
1:100	Drawn	25/11/2005	SaiCAD
	Checked		SK
	Approved		BV

ThyssenKrupp Industries India Pvt. Ltd.
Pimpri Pune - 411 018

Title: ARCHITECTURAL G.A. OF TP-25

M070 H25 6002-1

Sheet No. 2 | Total Sheets 2 | A1 | Rev. Index | Drawing Number

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Dimension | Tolerance

COMPUTER GENERATED DRAWING

STRUCTURAL DESIGN CALCULATIONS

FOR

Approved CAT-I

TRANSFER POINT TP-25

OF

COAL HANDLING PLANT

OF

SIPAT SUPER THERMAL POWER PROJECT

STAGE – II (2X500 MW)

NATIONAL THERMAL POWER CORPORATION LTD.

TKII DOC NO : 1605 C 216 1

NTPC DOC NO : 9545-156-PVC-U-233

RECORD OF REVISIONS

Rev.	Date	Description	Approved by
0	04-04-2005	NEW ISSUE	B Venu
A	09.07.05	GENERALLY REVISED	R.S.Jogalekar

PREP. BY: Sagar Y. Patole.

Contents

1. Design Basis Report ..... Page 1-2
2. Loading Calculations ..... Page 3-23
3. STAAD Input Files ..... Page 24-100
4. STAAD Analysis Output of Critical Members ..... Page 101-106
5. Design of Columns..... Page 107
6. Design of Base Plates and HD Bolts..... Page 108-115
7. Design of Floor Beams..... Page 116-118
8. Design of Roof Beams..... Page 119-120
9. Design of Staircase Beams..... Page 121
10. Design of Bracings..... Page 122-124
11. Design of Hoist Maintenance Platform Members ..... Page 125-128
12. Design of Purlins ..... Page 129-131
13. Design of Siderails..... Page 132-139
14. Design of Monorails..... Page 140-152

Design Basis

Designed by : ThyssenKrupp Industries India

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJ. NTPC. Stage – II (2X500XMW)	D0C NO : 1605 C 216 A SHEET NO : PAGE 1 REVISION : A

DESIGN BASIS REPORT

I. GENERAL:

This Design Basis covers the design requirements that have been followed for the design of Transfer Point TP-25.

II. REFERENCES:

The Transfer Point TP-25 house is designed according to the Technical Specifications and Design Criteria for Structural work Doc: No: 1605 S 186 C.

III. DESIGN PHILOSOPHY

- The transfer point structure has been designed as a steel framed structure with permanently colour coated Steel Sheets as side cladding and RCC floor and roofs over structural beam.
- All the columns have been considered to be hinged at the base.
- All the beams have been modelled as simply supported beams and designed as non composite beam. Allowable stresses have been assumed as 165Mpa, as the slab provides continuous lateral restraint to the compression flange.
- Adequate plan bracing have been provided at floor & roof levels to transfer lateral forces to the braced vertical frames.
- Holding Down foundation both are designed for uplift forces only. The horizontal forces are transferred through shear key to the foundation.

IV. LOADING:

The Transfer Point TP-25 has been designed for the following loads. These loads have been considered as given in the above specifications.

1. Dead load due to self weight of Steel work, RCC slabs, Floor finishes, weathering course on terrace.
2. Equipment loads as given in Drg. No. M070 H25 000 001-0 (Rev B), including load from Belt tension etc.
3. A Live load of 150 kg/m^2 on Roof Slab and Live load of 500 kg/m^2 on all Floor Slab and Staircase and A live load of 400kg/m^2 on floors covered with Chequered Plates has been considered in the design.
4. A Dust load of 150kg/m^2 has been considered on the roof.
5. Wind load of 150kg/m^2 is considered for Structural Design purpose.
6. Earthquake loads as per clause 4.1.1 of IS 1893-2002, and Criteria for Earthquake: Annexure A and Annexure -1 in the design with 50% of Live load excluding the roof live load has been considered
7. Load from Monorails as per G.A drawings.

V. LOAD COMBINATIONS: (Ref: NTPC Technical Specifications: Doc: No: 1605 S 186 C)

All the structural members are designed for the following load combinations.

1. DL + LL + Equip. Load.
2. DL + LL + Wind Load + Equip. Load.
3. DL + 0.5LL + EQL + EQUIP. LOAD.
4. DL + WL/EQL (Without Materials)
5. 0.8DL + WL/EQL (For Maximum Uplift) + Equip Ld.

VI. ANALYSIS

A Computer analysis has been carried out on the 3D model of TP-25 using STAAD Pro 2004.

Dynamic analysis for obtaining the design seismic forces has been carried out using response spectrum method of STAAD Pro 2004.

The Seismic Analysis with manual calculation using the approximate fundamental period as per IS 1893 Part-I. The final Seismic Analysis has been done based on the recommendation given in NTPC Technical Specification and using site specific acceleration spectra. Both the results were compared applying the corrections.

VII. DESIGN DEFLECTION & SWAY

The structural elements have been proportioned in such a way that maximum deflection/sway shall not exceed the following limits.

Transverse deflection of Transfer Tower Columns (where conveyor gallery meets)	Height/1000
Transfer Tower Columns in other areas	Height/500
Beams Supporting Drives/Hoppers	Span/500
Other Beams	Span/325
Monorail	Span/500
Purlin and Side Runners	Span/250

VIII. STAIRS & HAND RAILS

Proper Staircase/Ladder of minimum clear width as specified in NTPC Specification has been provided for access to floors of the Transfer Point.

Hand Rails with 32 NB (M) MS Pipe railing and uprights have been provided to all the access floors and stairs as per Specification.

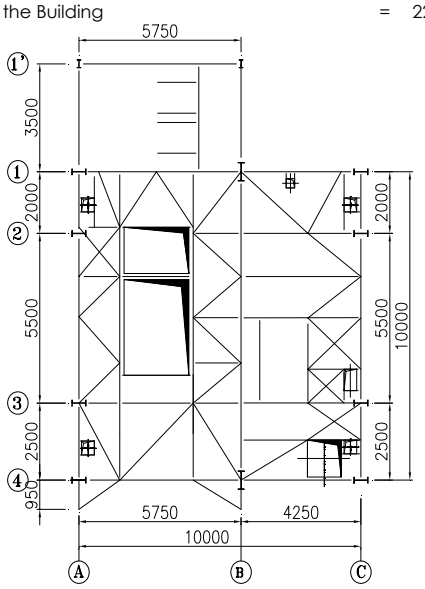
Loading Calculations



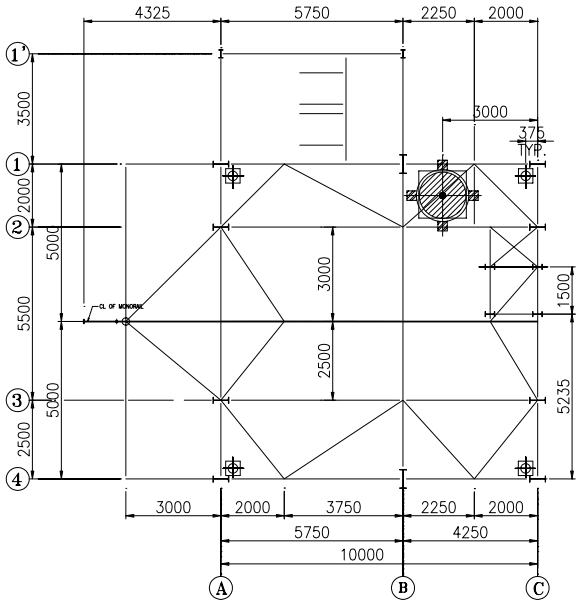
Designed by : ThyssenKrupp Industries India

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW)	DOC NO : 1605 C 216 A SHEET NO : Page 3 REVISION : A
Loading Calculations	

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE
1.0	**DESIGN DATA**	
1.1	**Dimensional Data**	
	Length of the Building = 13.50 m Width of the Building = 10.00 m Height of the Building = 22.50 m	Ref. Drawing M070 H25 6002



PLAN AT + 6.900M (T.O.S) EL+ 7.100M (T.O.C)



PLAN AT EL+ 20.000M (T.O.S) EL+ 20.200M (T.O.C)

(BOTTOM OF MONORAIL EL+ 19.000 M.)

DESIGN CALCULATION FOR STRUCTURAL WORK OF SIPAT SUPER THERMAL POWER PROJECT NTPC Stage - II (2X500XMW)	DOC NO : 1605 C 216 A SHEET NO : Page 4 REVISION : A
Loading Calculations	

CLAUSE NO	DESIGN CALCULATIONS			REFERENCE
1.2	**Material Properties**			
	Unit Weight of Concrete	=	2500 kg/m^3	
	Unit Weight of Brickwork	=	2000 kg/m^3	
	Unit Weight of Floor Finish	=	2000 kg/m^3	
	Unit Weight of Weathering Course	=	1920 kg/m^3	
	Unit Weight of Pressed Tiles	=	70 kg/m^2	
2.0	**LOADS**			
2.1	**Dead Load (Load Case 3 in STAAD)**			
2.1.1	**Dead Load From Floor slab**			
	Self Weight of Concrete (200mm Thk.)	=	500 kg/m^2	
	Floor Finish (50mm Thk.)	=	100 kg/m^2	
		Σ =	600 kg/m^2	
2.1.2	**Dead Load From Stairs & Landing Grating Floor**			
	Self Weight of Grating 6/8mm Thk. Floor	=	50 kg/m^2	
		Σ =	50 kg/m^2	
2.1.3	**Dead Load for Side Cladding & Runners**	=	32 kg/m^2	
2.1.4	**Dead Load from Roof Slab**			
	Self Weight of Concrete (150mm Thk.)	=	375 kg/m^2	
	Self Weight of Weathering Course + Pressed Tiles (125mm Thk.)	=	310 kg/m^2	
		Σ =	685 kg/m^2	
2.2	**Live Loads :**			
	Refer :Technical Specifications and Design Criteria for Structural Work Sipat Super Thermal Power Project of NTPC Stage II (2 X 500 MW)			DOC NO. 1605 S 186 C Rev. C
	Live Load on RC Floor / staircase (Load Case 4)	=	500 kg/m^2	Cl. 4.1 c
	Live Load on Cheqd. Plate Floor (Load Case 4)	=	400 kg/m^3	Cl. 4.1 d
	Live Load on accessible Roof (Load Case 5)	=	150 kg/m^2	Cl. 4.1 a
	Live Load on non-accessible Roof (Load Case 5)	=	75 kg/m^3	Cl. 4.1 b
2.3	**Dust Load**			DOC NO. 1605 S 186 C Rev. C
	Dust Load on Roof	=	150 kg/m^2	Cl.4.2

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

2.4 **Equipment Load** Refer :Drg. No. M070 H25 000 001 - 0

GA & LOAD DATA OF TRANFER POINT 25.

DOC NO. 1605 S 186 C
Rev. C
Cl.4.3

Sl: No	Levels (c/c)	MARK	No OF LD	Equipment Load					
				LC 22	LC 23	LC 24		LC 25	LC 26
				(+)PX (kg)	(-)PX (kg)	(+)PY (kg)	(-)PY (kg)	(+)PZ (kg)	(-)PZ (kg)
1	L + 0.150	P11	2		2500	3500		500	500
2	L + 0.150	P12	2		2500		4500	500	500
3	L + 0.150	P13	6	225	225		2225	225	225
4	L + 0.150	P14	2				100		
5	L + 4500	P10	4				2500		
6	L + 7.200	P4	4				3000		
7	L + 7.200	P7	3				1000.00		
8	L + 7.200	P8	4				750.00		
9	L + 7.210	P6	1				15000.00		
10	L + 7.280	P1	2	1000	1000		4500	750	750
11	L + 7.280	P2	2	7500		8000		1000	1000
12	L + 7.280	P3	2	3000			9000	1000	1000
13	L + 7.280	P5	2	150.00	150.00		1500.00	150.00	150.00
14	L + 7.300	P9	1				200.00		

Total Equipment Load at each Levels

Sl:No	Levels (c/c)	HEIGHT (m)	Equipment Load					
			(+)PX (kg)	(-)PX (kg)	(+)PY (kg)	(-)PY (kg)	(+)PZ (kg)	(-)PZ (kg)
1	L +0.00	0.00	1350.00	11350.00	7000.00	22550.00	3350.00	3350.00
2	L +1.16	1.16	-	-	-	-	-	-
3	L +3.14	1.98	-	-	-	-	-	-
4	L +5.12	1.98	-	-	-	-	-	-
5	L +7.10	1.98	23300.00	2300.00	16000.00	73200.00	5800.00	5800.00
6	L +9.33	2.23	-	-	-	-	-	-
7	L +11.31	1.98	-	-	-	-	-	-
8	L +13.29	1.98	-	-	-	-	-	-
9	L +15.27	1.98	-	-	-	-	-	-
10	L +17.25	1.98	-	-	-	-	-	-
11	L +19.23	1.98	-	-	-	-	-	-
12	L +20.35	1.12	-	-	-	-	-	-
13	L +22.50	2.15	-	-	-	-	-	-

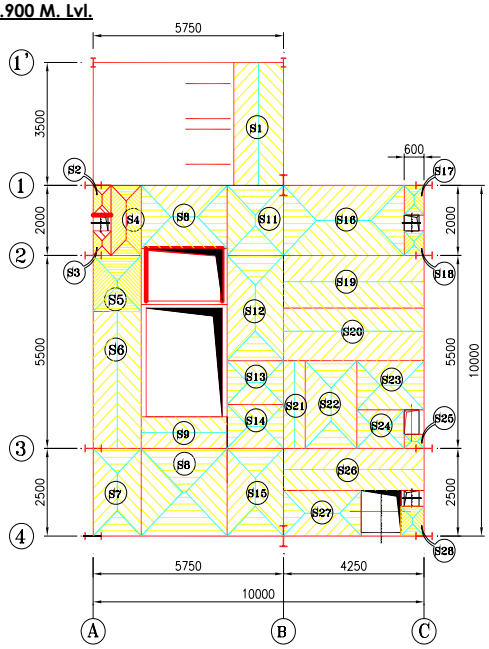
Monorail Load(Included in Load Case 24)

At Level 4.500m = 1.50 t

Monorail Load(Included in Load Case 24)

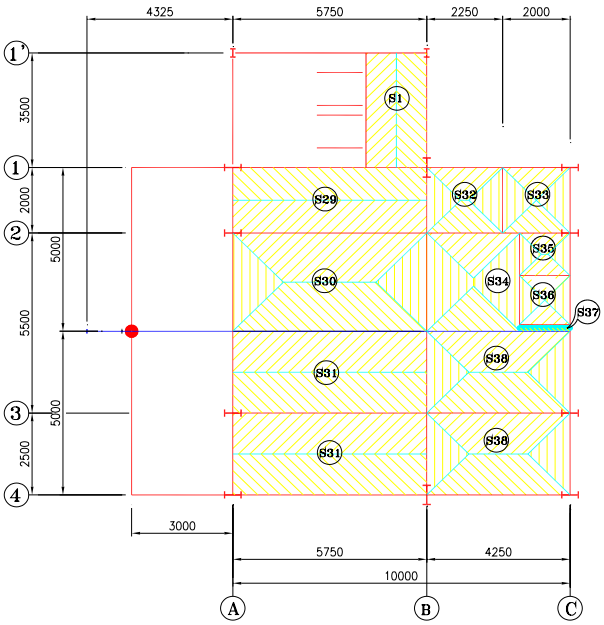
At Level 19.000m = 15.0 t

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE
2.5	**Load Distribution on beams**	
2.5.1	**Beams at +6.900 M. Lvl.**	Table 4 Page 22 & 23 For Loading On Beam



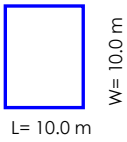
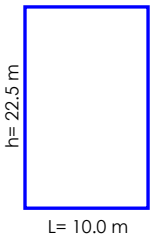
PLAN AT + 6.900M (T.O.S) EL+ 7.100M (T.O.C)

2.5.2	**Beams at +20.000 M. Lvl.**	Table 5 Page 24 For Loading On Beam

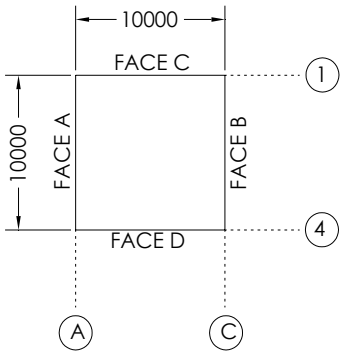


PLAN AT EL+ 20.000M (T.O.S) EL+ 20.200M (T.O.C

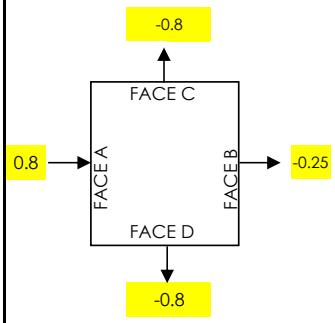
(BOTTOM OF MONORAIL EL+ 19.000 M.)

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE
2.6	**Wind Load**	DOC NO. 1605 S 186 C
	Calculation of wind loads are in accordance with P2 of 2, annex-II, sub-sec-IIID-01 Releavant clauses are shown in the Reference Column	
	Building Dimensions	
	 **PLAN**  **ELEVATION**	
2.6.1	**Stage 1 Basic Wind speed :**	
	Basic Wind Speed, Vb = 45 m/sec	Cl.3.a
2.6.2	**Stage 2 Calculation of Design Wind:**	
	Risk Factor : (k1)	Cl.3.b
	a) Assuming Design llife of 100 years, For general building and structure category Risk coefficient k1 = 1.07	
	Terrain, Height & Structure Size Factor (k2)	Rev-C
	b) Assuming a terrain type as category 2, structure class C Height as , 22.50 m , factor k2 from Table - 2 = 1.01	
	Topography Factor (k3)	Cl. 3.d
	c) It is assumed that upwind slope is < 3^{o} hence topography is not significant Therefore k3 is taken as = 1.00	
	Design wind speed Vz	
	d) $V_z = k_1 k_2 k_3 V_b$ = 48.6 m/sec	
	Design wind pressure "pz" = **144.69** kg/m^2	
	However Minimum of Pz has been considered for structural design purpose = **150.00** kg/m^2	

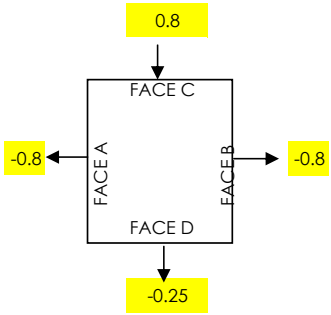
CLAUSE NO	DESIGN CALCULATIONS	REFERENCE
2.6.3	**Stage 3 External Pressure Coefficient : C_{pe}** Building height ratio = h/w = 2.250 Building plan ratio = l/w = 1.350	IS 875(Part-3)-1987 Table - 4 Cl. 6.2.2.1

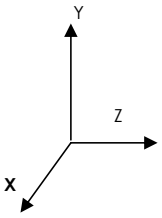


a) 0° WIND (in +ve X- Direction)



b) 90° WIND (in +ve Z- Direction)

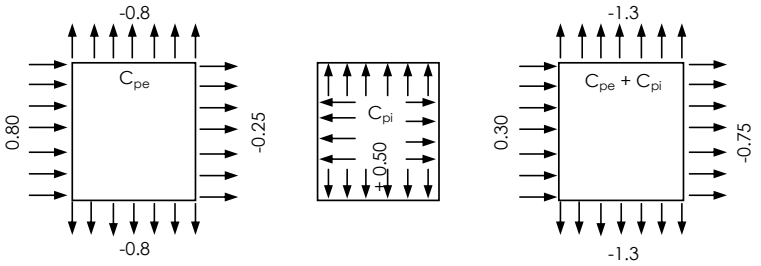




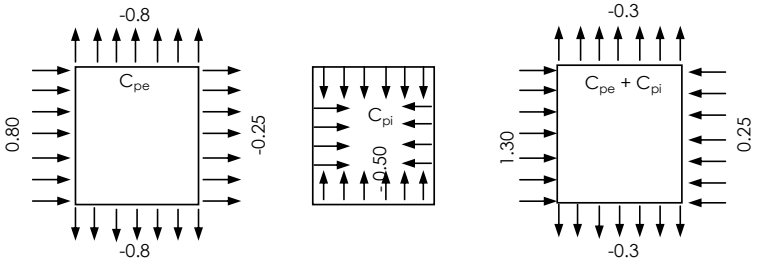
2.6.4	**Stage 4 Internal Pressure Coefficient : Cpi** Building with medium opening(openings between 5% to 20%) of wall area) is considered. = C_{pi} = ± 0.5	IS 875(Part-3)-1987 Cl. 6.2.3.2

2.6.5 **Stage 5 Total Pressure Coefficient : (C_{pe} + C_{pi})**

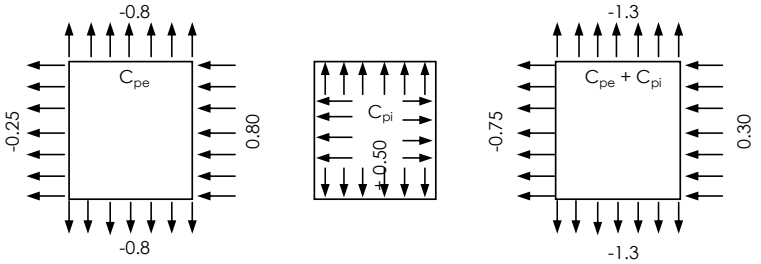
2.6.5.1 **WL1 Load Case 6 (Wind in +ve X Direction with Internal +ve Pressure)**



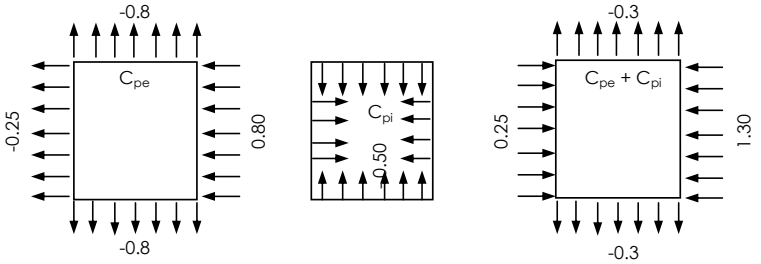
2.6.5.2 **WL2 Load Case 7 (Wind in +ve X Direction with Internal -ve Pressure)**



2.6.5.3 **WL3 Load Case 8 (Wind in -ve X Direction with Internal +ve Pressure)**

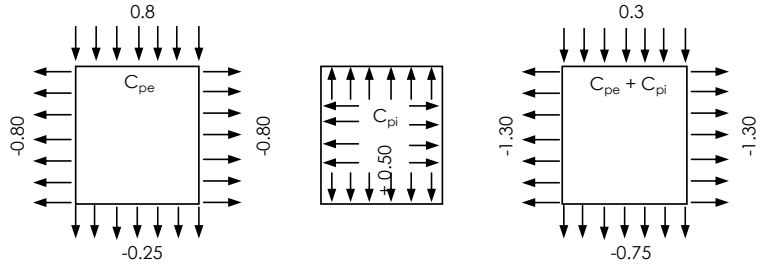


2.6.5.4 **WL4 Load Case 9 (Wind in -ve X Direction with Internal -ve Pressure)**

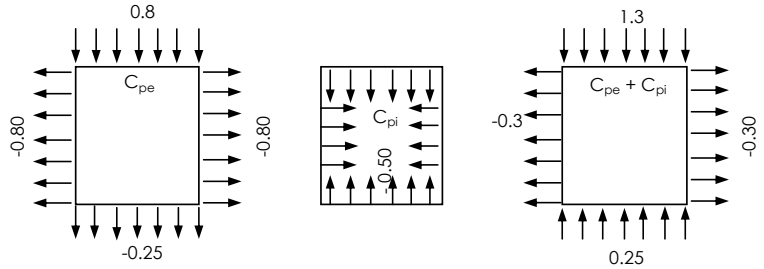


CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

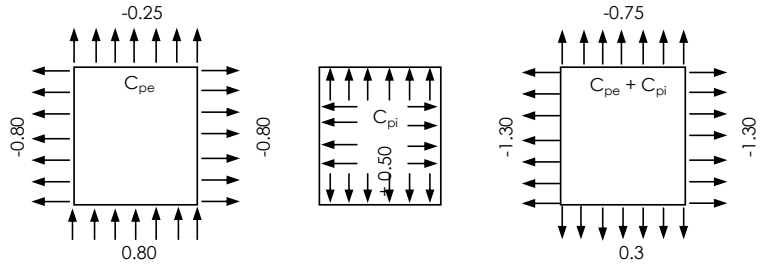
2.6.5.6 **WL5 Load Case 10 (Wind in +ve Z Direction with Internal +ve Pressure)**



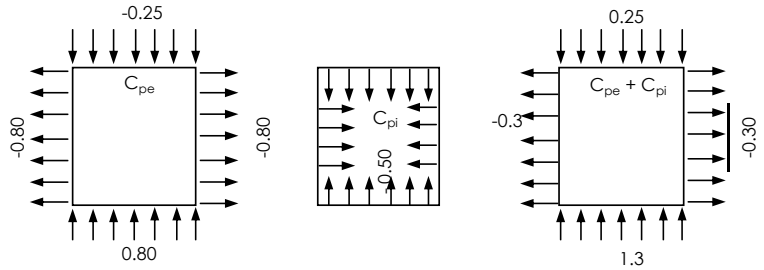
2.6.5.6 **WL6 Load Case 11 (Wind in +ve Z Direction with Internal -ve Pressure)**



2.6.5.7 **WL7 Load Case 12 (Wind in -ve Z Direction with Internal +ve Pressure)**



2.6.5.8 **WL8 Load Case 13 (Wind in -ve Z Direction with Internal -ve Pressure)**



CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

2.6.6 **Stage 6 Distribution of the Wind Load**

2.6.6.1 **Wind load Acting in 0° and 90°**

a) **WL1 (Wind Load θ =0° (+ve X Direction with Int. +ve Pressure))**

Wind Load on Face A UDL on Columns A1&A4 = 225.00 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = -562.50 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -975.00 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -975.00 kg/m ↓

b) **WL2 (Wind Load θ =0° (+ve X Direction with Int. -ve Pressure))**

Wind Load on Face A UDL on Columns A1&A4 = 975.00 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = 187.50 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -225.00 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -225.00 kg/m ↓

c) **WL3 (Wind Load θ =180° (-ve X Direction with Int. +ve Pressure))**

Wind Load on Face A UDL on Columns A1&A4 = -562.50 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = 225.00 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -975.00 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -975.00 kg/m ↓

d) **WL4 (Wind Load θ =180° (-ve X Direction with Int. -ve Pressure))**

Wind Load on Face A UDL on Columns A1&A4 = 187.50 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = 975.00 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -225.00 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -225.00 kg/m ↓

e) **WL5 (Wind Load θ =90° (+ve Z Direction with Int. +ve Pressure))**

Wind Load on Face A UDL on Columns A1&A4 = -975.00 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -975.00 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 225.00 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = -562.50 kg/m ↓

f) **WL6 (Wind Load θ =90° (+ve Z Direction with Int. -ve Pressure))**

Wind Load on Face A UDL on Columns A1&A4 = -225.00 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -225.00 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 975.00 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = 187.50 kg/m ↑

g) **WL7 (Wind Load θ =270° (-ve Z Direction with Int. +ve Pressure))**

Wind Load on Face A UDL on Columns A1&A4 = -975.00 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -975.00 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -562.50 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = 225.00 kg/m ↑

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

h) **WL7 (Wind Load θ =270° (-ve Z Direction with Int. -ve Pressure))**

Wind Load on Face A UDL on Columns A1&A4 = -225.00 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -225.00 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 187.50 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = 975.00 kg/m ↑

2.6.6.2 **Wind load Acting in Diagonal**

a) **WL9 (Diagonal Wind Load θ = 315° (+ve 0.707X & -0.707Z with Int. +ve Pressure))**

Wind Load in +ve 0.707X

Wind Load on Face A UDL on Columns A1&A4 = 159.075 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = -397.688 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -689.325 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -689.325 kg/m ↓

Wind Load in -ve 0.707Z

Wind Load on Face A UDL on Columns A1&A4 = -689.325 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -689.325 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -397.688 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = 159.075 kg/m ↑

Diagonal Wind Load θ = 315° (+ve 0.707X & -0.707Z with Int. +ve Pressure))

Wind Load on Face A UDL on Columns A1&A4 = -530.25 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -1087.01 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -1087.01 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -530.25 kg/m ↓

b) **WL10 (Diagonal Wind Load θ = 315° (+ve 0.707X & -0.707Z with Int. -ve Pressure))**

Wind Load in +ve 0.707X

Wind Load on Face A UDL on Columns A1&A4 = 689.325 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = 132.563 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -159.075 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -159.075 kg/m ↓

Wind Load in -ve 0.707Z

Wind Load on Face A UDL on Columns A1&A4 = -159.075 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -159.075 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 132.563 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = 689.325 kg/m ↑

Diagonal Wind Load θ = 315° (+ve 0.707X & -0.707Z with Int. -ve Pressure))

Wind Load on Face A UDL on Columns A1&A4 = 530.25 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = -26.51 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -26.51 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = 530.25 kg/m ↑

c) **WL11 (Diagonal Wind Load θ = 225° (-ve 0.707X & -0.707Z with Int. +ve Pressure))**

Wind Load in -ve0.707 X

Wind Load on Face A UDL on Columns A1&A4 = -397.688 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = 159.075 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -689.325 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -689.325 kg/m ↓

Wind Load in -ve 0.707Z

Wind Load on Face A UDL on Columns A1&A4 = -689.325 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -689.325 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -397.688 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = 159.075 kg/m ↑

Diagonal Wind Load θ = 225° (-ve 0.707X & -0.707Z with Int. +ve Pressure))

Wind Load on Face A UDL on Columns A1&A4 = -1087.01 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -530.25 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -1087.01 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -530.25 kg/m ↓

d) **WL12 (Diagonal Wind Load θ = 225° (-ve 0.707X & -0.707Z with Int. -ve Pressure))**

Wind Load in -ve 0.707X

Wind Load on Face A UDL on Columns A1&A4 = 132.563 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = 689.325 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -159.075 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = -159.075 kg/m ↓

Wind Load in -ve 0.707Z

Wind Load on Face A UDL on Columns A1&A4 = -159.075 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -159.075 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 132.563 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = 689.325 kg/m ↑

Diagonal Wind Load θ = 225° (-ve 0.707X & -0.707Z with Int. -ve Pressure))

Wind Load on Face A UDL on Columns A1&A4 = -26.5125 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = 530.25 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -26.5125 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = 530.25 kg/m ↑

e) **WL13 (Diagonal Wind Load θ = 45° (+ve 0.707X & +0.707Z with Int. +ve Pressure))**

Wind Load in +ve 0.707X

Wind Load on Face A UDL on Columns A1&A4 = 159.075 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = -397.688 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -689.325 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -689.325 kg/m ↓

Wind Load in +ve 0.707Z

Wind Load on Face A UDL on Columns A1&A4 = -689.325 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -689.325 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 159.075 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = -397.688 kg/m ↓

Diagonal Wind Load $\theta = 45^{\circ}$ (+ve 0.707X & +0.707Z with Int. +ve Pressure))

Wind Load on Face A UDL on Columns A1&A4 = -530.25 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -1087.01 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = -530.25 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -1087.01 kg/m ↓

f) **WL14 (Diagonal Wind Load $\theta = 45^{\circ}$ (+ve 0.707X & +0.707Z with Int. -ve Pressure))**

Wind Load in +ve 0.707X

Wind Load on Face A UDL on Columns A1&A4 = 689.325 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = 132.563 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -159.075 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -159.075 kg/m ↓

Wind Load in +ve 0.707Z

Wind Load on Face A UDL on Columns A1&A4 = -159.075 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -159.075 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 689.325 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = 132.563 kg/m ↑

Diagonal Wind Load $\theta = 45^{\circ}$ (+ve 0.707X & +0.707Z with Int. -ve Pressure))

Wind Load on Face A UDL on Columns A1&A4 = 530.25 kg/m →
Wind Load on Face B UDL on Columns C1&C4 = -26.51 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 530.25 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = -26.51 kg/m ↓

g) **WL15 (Diagonal Wind Load $\theta = 135^{\circ}$ (-ve 0.707X & +0.707Z with Int. +ve Pressure))**

Wind Load in -ve 0.707X

Wind Load on Face A UDL on Columns A1&A4 = -397.688 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = 159.075 kg/m ←
Wind Load on Face C UDL on Columns A1&C1 = -689.325 kg/m ↑
Wind Load on Face D UDL on Columns A4&C4 = -689.325 kg/m ↓

Wind Load in +ve 0.707Z

Wind Load on Face A UDL on Columns A1&A4 = -689.325 kg/m ←
Wind Load on Face B UDL on Columns C1&C4 = -689.325 kg/m →
Wind Load on Face C UDL on Columns A1&C1 = 159.075 kg/m ↓
Wind Load on Face D UDL on Columns A4&C4 = -397.688 kg/m ↓

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE
	Diagonal Wind Load θ = 135° (-ve 0.707X & +0.707Z with Int. +ve Pressure)) Wind Load on Face A UDL on Columns A1&A4 = -1087.01 kg/m ← Wind Load on Face B UDL on Columns C1&C4 = -530.25 kg/m → Wind Load on Face C UDL on Columns A1&C1 = -530.25 kg/m ↑ Wind Load on Face D UDL on Columns A4&C4 = -1087.01 kg/m ↓	
	h) **WL16 (Diagonal Wind Load θ = 135° (-ve 0.707X & +0.707Z with Int. -ve Pressure))** Wind Load in -ve 0.707X Wind Load on Face A UDL on Columns A1&A4 = 132.563 kg/m → Wind Load on Face B UDL on Columns C1&C4 = 689.325 kg/m ← Wind Load on Face C UDL on Columns A1&C1 = -159.075 kg/m ↑ Wind Load on Face D UDL on Columns A4&C4 = -159.075 kg/m ↓	
	Wind Load in +ve 0.707Z Wind Load on Face A UDL on Columns A1&Cl = -159.075 kg/m ← Wind Load on Face B UDL on Columns A4&C4 = -159.075 kg/m → Wind Load on Face C UDL on Columns A1&A4 = 689.325 kg/m ↓ Wind Load on Face D UDL on Columns C1&C4 = 132.563 kg/m ↑	
	Diagonal Wind Load θ = 135° (-ve 0.707X & +0.707Z with Int. -ve Pressure)) Wind Load on Face A UDL on Columns A1&Cl = -26.51 kg/m ← Wind Load on Face B UDL on Columns A4&C4 = 530.25 kg/m ← Wind Load on Face C UDL on Columns A1&A4 = 530.25 kg/m ↓ Wind Load on Face D UDL on Columns C1&C4 = -26.51 kg/m ↓	
2.6.6.4	**Wind load on Staircase Stringers** (On a conservative assumption the Wind Load on Staircase columns,stringers and landing beams is assumed to act over the sheeted area without the Int. Pressure) Wind Load on + ve X Columns A1' & A1 = 210.00 kg/m → Wind Load on -ve X Columns B1' & B1 = 210.00 kg/m ← Wind Load on + ve Z on Columns A1' & B1' = 345.00 kg/m ↓ Wind Load on - ve Z on Columns A1 & B1 = 345.00 kg/m ↑	
2.7	**DESIGN BY RESPONSE SPECTRUM METHOD : IS 1893 (Part 1) : 2002**	
2.7.1	**Basic Data**	
	Seismic Zone = Zone III Length of the Building = 13.50 m Width of the Building = 10.00 m Height of the Building = 22.50 m	IS 1893 (Part 1) : 2002 Fig 1 Page 5

CLAUSE NO	DESIGN CALCULATIONS	REFERENCE

2.7.2 **Calculation of Seismic Load**

Fundamental Natural Period $T_a = 0.085h^{0.75}$ = 0.8781 — Clause 7.6.2

Horizontal Seismic Acceleration Spectral Coefficient For 2% Damping = 1.7246 — Tech. Specifications Annexure-I Sec - vi, Part-B

Multiplying Factor for Braced Steel Frame Designed and Detailed as per IS:800 = 0.037 — NTPC Annexure-I Clause 2.b)

Design Seismic Acceleration Spectral Coefficient A_h = 0.0638

2.7.2.1 **Calculation of Seismic Base Shear**

Base Shear $V_B = A_h \times W$

2.7.2.2 **Calculation of Seismic Weight Of the Building**

Sl.No	Floor Level (c\c)	Height (m)	Floor Area (m^2)	Roof Area (m^2)	Total (DL + 0.5LL + EL)
1	LEVEL + 0.00	0.00	0.00		0.00
2	LEVEL + 1.16	1.16	7.87		5731.28
3	LEVEL + 3.14	1.98	8.64		7196.36
4	LEVEL + 5.12	1.98	8.64		7196.36
5	LEVEL + 7.10	1.98	93.84		225714.41
6	LEVEL + 9.33	2.23	8.72		7556.82
7	LEVEL + 11.31	1.98	8.64		7196.36
8	LEVEL + 13.29	1.98	8.64		7196.36
9	LEVEL + 15.27	1.98	8.64		7196.36
10	LEVEL + 17.25	1.98	8.64		7646.36
11	LEVEL + 19.23	1.98	8.64		7196.36
12	LEVEL + 20.35	1.12	10.57	121.00	126857.29
13	LEVEL + 22.50	2.15		20.58	1029.00

Σ = 417713.3kg

(Detail calculation of Loads)
a)Dead load Table 1 Page 20
b)Live load Table 2 Page 21
c)Seismic Weight Table 3 Page 22

Seismic weight of The Building W = **417713 kg**

Base Shear V_B = **26654.90**

Since the V_B is less than the $\overline{V}_B$ When Seismic Acts Along in X-Direction (Load Case 2) the Ratio 0.037 is Multiplied by the Ratio of $\overline{V}_B/V_B$ and Entered in STAAD Command

Design Base Shear (V_B) obtained from STAAD Model = 26040.5 kg

Design Base Shear ($\overline{V}_B$) obtained manually as per NTPC Specifica = 26654.9 kg

Ratic $= \dfrac{\overline{V}_B}{V_B}$

$= 1.02359$

Mutiplication Factor $= \overline{V}_B / V_B \times 0.037$

$= 0.037872975$

Since the V_B is less than the $\overline{V}_B$ When Seismic Acts Along in Z-Direction (Load Case 2) the Ratio 0.037 is Multiplied by the Ratio of $\overline{V}_B/V_B$ and Entered in STAAD Command

Design Base Shear (V_B) obtained from STAAD Model = 22635.9 kg

Design Base Shear ($\overline{V}_B$) obtained manually as per NTPC Specifica = 26654.9 kg

Ratic $= \dfrac{\overline{V}_B}{V_B}$

$= 1.17755$

Mutiplication Factor $= \overline{V}_B / V_B \times 0.037$

$= 0.043569416$

DETERMINATION OF SEISMIC WEIGHT OF BUILDING

(From the Calculation of Seismic Weight of the Building Self Weight of the Structural Works is taken from the STAAD Output Command name 'TAKEOFF')

(This Self Weight of the Structural Works is used for Seismic Load Calculation only and in STAAD it is Created by Selfweight Command)

Steel TAKE-OFF(from STAAD)

PROFILE	LENGTH(m)	WEIGHT(T)
IPE500	202.8	18427.94
IPE600	63.45	7753.67
UB2 54X146X37	322.3	11916.62
ISA130X130X10	126.55	4968.59
ISA110X110X10	240.7	7941.87
ISA130X130X10	66.78	1310.92
ISA100X100X10	43.13	642.96
UB2 03X133X25	105.63	2647.76
IPE400	15.25	1009.43
PAG832X400	10	1754.68
UB3 05X165X46	56.54	2599.69
ISMC200	49.25	1088.33
PAG982X425	10	2256.02
ISA75X75X6	103.07	1398.34
ISMC150	18.61	304.45
PAG782X300	10	1339.51
ISMC300	26.2	936.69
ISA75X75X6	4.24	28.781
	TOTAL=	**68326kg**

Total Quantity of Structural Works(including Beam,Columns & Bracing) = **68326 kg**

Tatol Area of Structural Works = **285.19** m^2

Average Intensity of Dead Weight of steel work = **239.58** kg/m^2

Loading Calculations

DETERMINATION OF SEISMIC WEIGHT OF BUILDING

Dead Load of Building (Table 1)

Sl:No	Levels (Top of Grating Plate) (c\c)	HEIGHT (m)	Area Supported			Length(m)		Dead load					Other load Water Tank	Other load (Conveyor Gallery & Hoisting Platform)	Other load (Side Cladding & Runners) 32kg/m^2	Total (kg)
			Stairs area (m^2)	Floor area (m^2)	Roof area (m^2)	Brick Wall (m)	RCC Parapet wall (m)	Stair Landing Intensity (kg/m^2)	Floor Intensity (kg/m^2)	Roof Intensity (kg/m^2)	RCC Parapet Wall (kg/m)	Brick Wall (kg/m)				
1	LEVEL + 0.00	0.00	0.000	0.00				289.58	839.6	924.6						0.00
2	LEVEL + 1.16	1.16	7.870	0.00				289.58	839.6	924.6					1484.80	3763.78
3	LEVEL + 3.14	1.98	8.640	0.00				289.58	839.6	924.6					2534.40	5036.36
4	LEVEL + 5.12	1.98	8.640	0.00				289.58	839.6	924.6					2534.40	5036.36
5	LEVEL + 7.10	1.98	8.640	85.20		47.00		289.58	839.6	924.6		138		20000.00	2534.40	103054.41
6	LEVEL + 9.33	2.23	8.715	0.00				289.58	839.6	924.6					2854.40	5378.07
7	LEVEL + 11.31	1.98	8.640	0.00				289.58	839.6	924.6					2534.40	5036.36
8	LEVEL + 13.29	1.98	8.640	0.00				289.58	839.6	924.6					2534.40	5036.36
9	LEVEL + 15.27	1.98	8.640	0.00				289.58	839.6	924.6					2534.40	5036.36
10	LEVEL + 17.25	1.98	8.640	0.00				289.58	839.6	924.6					2534.40	5036.36
11	LEVEL + 19.23	1.98	8.640	0.00				289.58	839.6	924.6					2534.40	5036.36
12	LEVEL + 20.35	1.12	10.569		121.00		40.00	289.58	839.6	924.6	225.0		3000.0	135.0	206.08	124215.04
13	LEVEL + 22.50	2.15			20.58			289.58	839.6	50.0						1029.00
															Σ	**= 272695kg**

Stringers Loads on the Staircase Midlanding Beam(p)

		Dead Load			Live Load		
At Level +1.16m	p	=	Total Stringers Area Loads/4	p	=	Total Stringers Area Loads/4
		=	32.8kg		=	327.5kg
At Level +9.33m	p	=	Total Stringers Area Loads/4	p	=	Total Stringers Area Loads/4
		=	43.3kg		=	433.1kg
At Level +20.35m	p	=	Total Stringers Area Loads/4	p	=	Total Stringers Area Loads/4
		=	11.8kg		=	118.0kg

Loading Calculations

At Other Levels p = Total Stringers Area Loads/4 = 42.4kg

p = Total Stringers Area Loads/4 = 423.8kg

Live Load of Building (Table 2)

Sl:No	Levels (c\c)	HEIGHT (m)	Area Supported			Live Load			Other load (Conveyor Gallery & Hoisting Platform)	Dust Load Intensity (kg/m^2)	Total Load (kg)
			Stairs area (m2)	Floor area (m^2)	Roof area (m^2)	Floor Intensity (kg/m^2)	Roof Intensity (kg/m^2)	Stair Landing Intensity (kg/m2)			
1	LEVEL + 0.00	0.00	0.00			500.00	150.00	500.00			0.000
2	LEVEL + 1.16	1.16	7.87			500.00	150.00	500.00			3935.000
3	LEVEL + 3.14	1.98	8.64			500.00	150.00	500.00			4320.000
4	LEVEL + 5.12	1.98	8.64			500.00	150.00	500.00			4320.000
5	LEVEL + 7.10	1.98	8.64	85.20		500.00	150.00	500.00	40000.00		86920.000
6	LEVEL + 9.33	2.23	8.72			500.00	150.00	500.00			4357.500
7	LEVEL + 11.31	1.98	8.64			500.00	150.00	500.00			4320.000
8	LEVEL + 13.29	1.98	8.64			500.00	150.00	500.00			4320.000
9	LEVEL + 15.27	1.98	8.64			500.00	150.00	500.00			4320.000
10	LEVEL + 17.25	1.98	8.64			500.00	150.00	500.00	900.00		5220.000
11	LEVEL + 19.23	1.98	8.64			500.00	150.00	500.00			4320.000
12	LEVEL + 20.35	1.12	10.57		121.00	500.00	150.00	500.00		150.0	41584.500
13	LEVEL + 22.50	2.15			20.58	500.00	75.00	500.00		150.0	4630.500
									Σ	=	**172568kg**

Loading Calculations

Calculation of Seismic Weight Of the Building (Table 3)

Sl:No	Levels (c\c)	HEIGHT (m)	Area Supported			Dead Load (kg)	No LL 0n Roof & 50% of LL on Floor(kg)	Equipment Load (kg)	Total Load (kg)
			Stairs area (m2)	Floor area (m2)	Roof area (m2)				
1	LEVEL + 0.00	0.00	0.00			0.00	0.00		0.0
2	LEVEL + 1.16	1.16	7.87			3763.78	1967.50		5731.3
3	LEVEL + 3.14	1.98	8.64			5036.36	2160.00		7196.4
4	LEVEL + 5.12	1.98	8.64			5036.36	2160.00		7196.4
5	LEVEL + 7.10	1.98	8.64	85.20		103054.41	43460.00	79200.00	225714.4
6	LEVEL + 9.33	2.23	8.72			5378.07	2178.75		7556.8
7	LEVEL + 11.31	1.98	8.64			5036.36	2160.00		7196.4
8	LEVEL + 13.29	1.98	8.64			5036.36	2160.00		7196.4
9	LEVEL + 15.27	1.98	8.64			5036.36	2160.00		7196.4
10	LEVEL + 17.25	1.98	8.64			5036.36	2610.00		7646.4
11	LEVEL + 19.23	1.98	8.64			5036.36	2160.00		7196.4
12	LEVEL + 20.35	1.12	10.57		121.00	124215.04	2642.25		126857.3
13	LEVEL + 22.50	2.15	0.00		20.58	1029.00	0.00		1029.0

Seismic Weight Of the Building = **417713kg**

DETERMINATION OF UNIFORMLY DISTRIBUTED LOAD ON BEAMS FOR INPUT INTO STAAD MODEL

UNIFORMLY DISTRIBUTED LOADS OF FLOOR BEAMS(Table 4)

SL:NO	REF. MARK	DL (Kg/m^2)	LL (Kg/m^2)	LX (m)	LY (m)	TYPE OF DISTRIBUTION	DL UDL AT LX DIR. (Kg/m)	DL UDL AT LY DIR. (Kg/m)	LL UDL AT LX DIR. (Kg/m)	LL UDL AT LY.BEAM (Kg/m)
1	S1	50	500	1.50	3.50	O.W.D	0.00	37.50	0.00	375.00
2	S2	600	500	0.54	0.85	T.W.D	81.30	110.76	67.75	92.30
3	S3	600	500	0.40	0.54	T.W.D	60.00	75.72	50.00	63.10

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
Stage - II (2X500XMW)

DOC NO : 1605 C 216 A
SHEET NO : Page 22
REVISION : A

Loading Calculations

SL:NO	REF. MARK	DL (Kg/m^2)	LL (Kg/m^2)	LX (m)	LY (m)	TYPE OF DISTRIBUTION	DL UDL AT LX DIR. (Kg/m)	DL UDL AT LY DIR. (Kg/m)	LL UDL AT LX DIR. (Kg/m)	LL UDL AT LY.BEAM (Kg/m)
4	S4	600	500	0.91	1.70	T.W.D	136.20	199.65	113.50	166.38
5	S5	600	500	1.45	1.70	T.W.D	217.50	249.49	181.25	207.90
6	S6	600	500	1.45	4.10	O.W.D	0.00	435.00	0.00	362.50
7	S7	600	500	1.45	2.50	T.W.D	217.50	308.85	181.25	257.38
8	S8	600	500	1.70	2.60	T.W.D	255.00	343.27	212.50	286.06
9	S9	600	500	0.80	2.60	O.W.D	0.00	240.00	0.00	200.00
10	S10	600.00	500.000	2.500	2.600	T.W.D	375.00	389.42	312.50	324.52
11	S11	600.00	500.000	1.700	2.000	T.W.D	255.00	293.25	212.50	244.38
12	S12	600.00	500.000	1.700	2.735	T.W.D	255.00	351.50	212.50	292.92
13	S13	600.00	500.000	1.465	1.700	T.W.D	219.75	250.13	183.13	208.44
14	S14	600.00	500.000	1.300	1.700	T.W.D	195.00	240.88	162.50	200.74
15	S15	600.00	500.000	1.700	2.500	T.W.D	255.00	336.60	212.50	280.50
16	S16	600.00	500.000	2.000	3.650	T.W.D	300.00	435.62	250.00	363.01
17	S17	600.00	500.000	0.600	0.850	T.W.D	90.00	116.47	75.00	97.06
18	S18	600.00	500.000	0.600	0.700	T.W.D	90.00	102.86	75.00	85.71
19	S19	600.00	500.000	1.400	4.250	O.W.D	0.00	420.00	0.00	350.00
20	S20	600.00	500.000	1.335	4.250	O.W.D	0.00	400.50	0.00	333.75
21	S21	600.00	500.000	0.653	2.765	O.W.D	0.00	195.90	0.00	163.25
22	S22	600.00	500.000	1.697	2.765	T.W.D	254.55	352.87	212.13	294.06
23	S23	600.00	500.000	1.665	1.900	T.W.D	249.75	280.64	208.13	233.87
24	S24	600.00	500.000	1.100	1.300	T.W.D	165.00	190.38	137.50	158.65
25	S25	600.00	500.000	0.400	0.600	T.W.D	60.00	80.00	50.00	66.67
26	S26	600.00	500.000	1.100	4.250	O.W.D	0.00	330.00	0.00	275.00
27	S27	600.00	500.000	1.400	2.350	T.W.D	210.00	294.89	175.00	245.74
28	S28	600.00	500.000	0.700	0.850	T.W.D	105.00	123.53	87.50	102.94

DESIGN CALCULATION FOR STRUCTURAL WORK OF
SIPAT SUPER THERMAL POWER PROJECT NTPC
Stage - II (2X500XMW)

DOC NO : 1605 C 216 A
SHEET NO : Page 23
REVISION : A

Loading Calculations

UNIFORMLY DISTRIBUTED LOADS OF ROOF BEAMS(Table 5)

SL:NO	REF. MARK	DL (Kg/m^2)	LL + DUST LD (Kg/m^2)	LX (m)	LY (m)	TYPE OF DISTRIBUTION	DL UDL AT SHORTER DIR. BEAM (Kg/m)	DL UDL AT LONGER DIR. BEAM (Kg/m)	LL UDL AT SHORTER DIR. BEAM (Kg/m)	LL UDL AT LONGER DIR.BEAM (Kg/m)
1	S29	685	300	2.000	5.750	O.W.D	0.00	685.00	0.00	300.00
2	S30	685	300	3.000	5.750	T.W.D	513.75	759.46	225.00	332.61
3	S31	685	300	2.500	5.750	O.W.D	0.00	856.25	0.00	375.00
4	S32	685	300	2.000	2.250	T.W.D	342.50	380.56	150.00	166.67
5	S33	685	300	2.000	2.000	T.W.D	342.50	342.50	150.00	150.00
6	S34	685	300	2.750	3.000	T.W.D	470.94	510.18	206.25	223.44
7	S35	685	300	1.265	1.500	T.W.D	216.63	250.57	94.88	109.74
8	S36	685	300	1.500	1.500	T.W.D	256.88	256.88	112.50	112.50
9	S37	685	300	0.235	1.500	O.W.D	0.00	80.49	0.00	35.25
10	S38	685	300	2.500	4.250	T.W.D	428.13	604.41	187.50	264.71

O.W.D - ONE WAY DISTRIBUTION
T.W.D - TWO WAY DISTRIBUTION

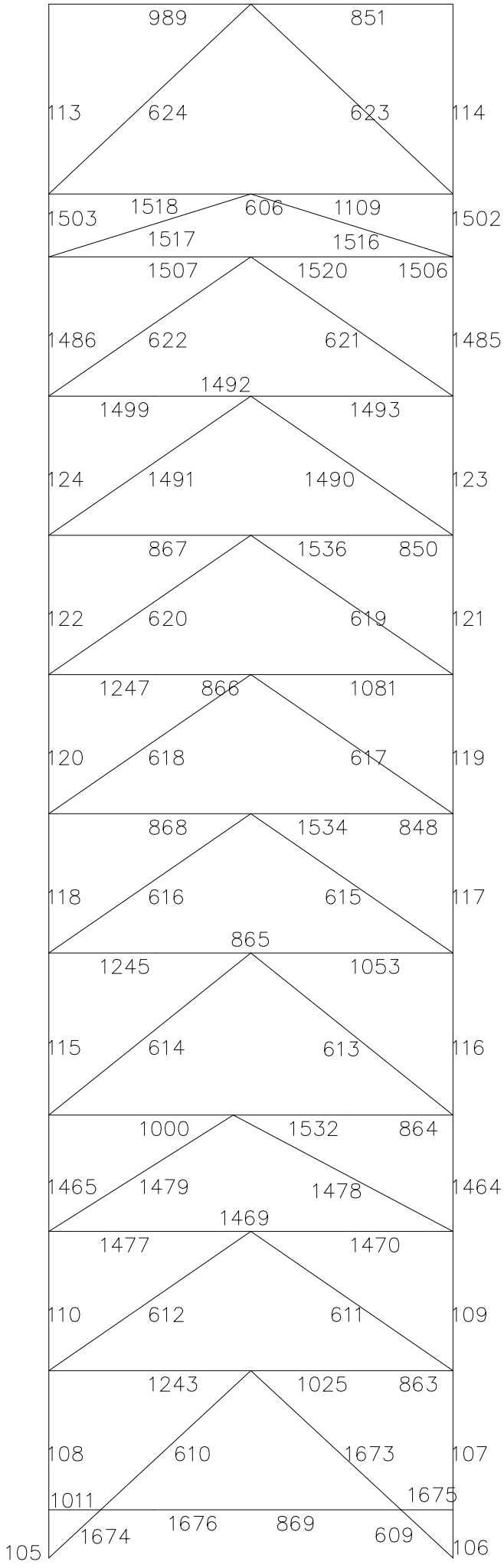
UDL OF HOISTING PLATFORM BEAMS

1	S39	60.00	400.00	1.500	1.500	T.W.D	22.50	22.50	150.00	150.00

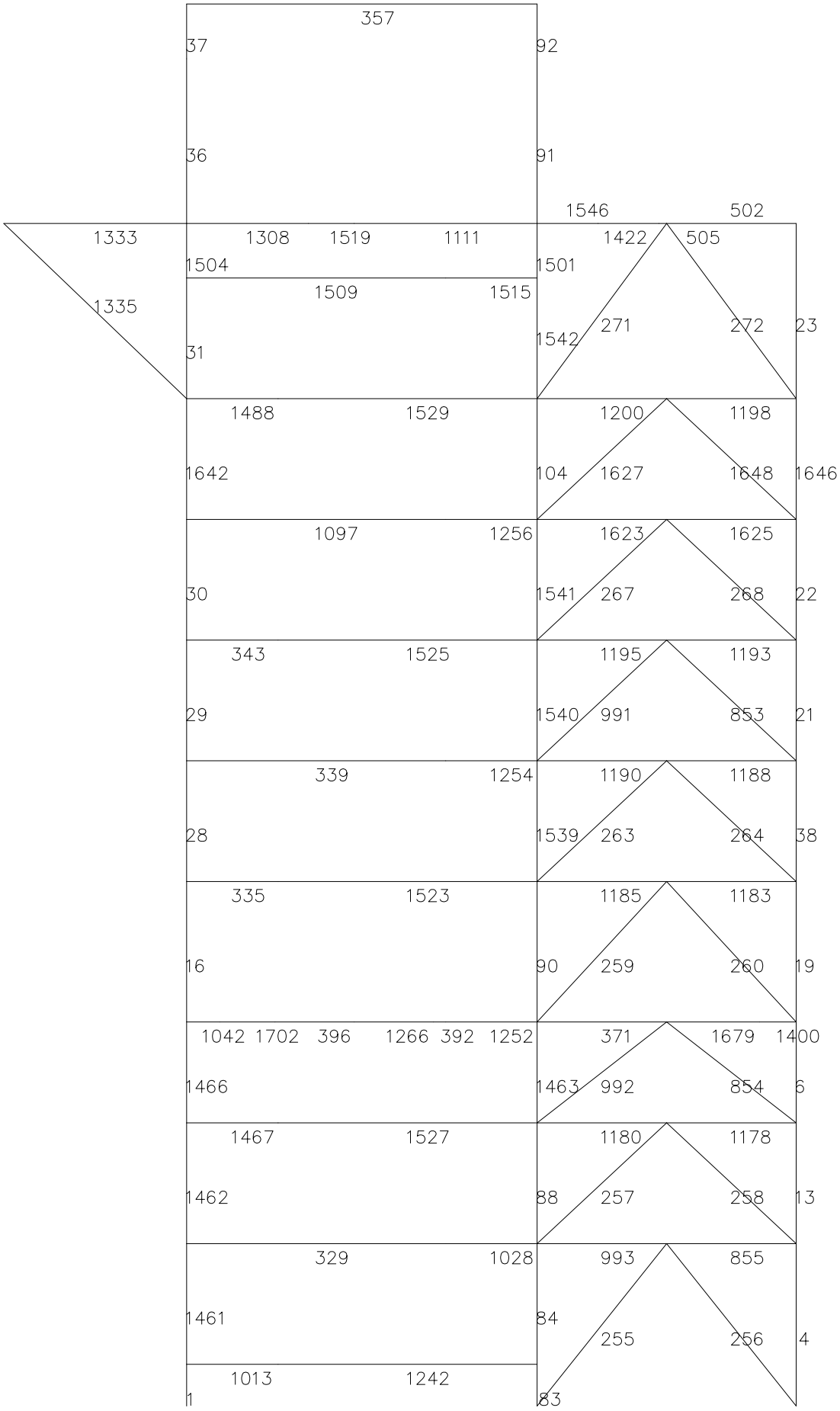
STAAD
Input Files



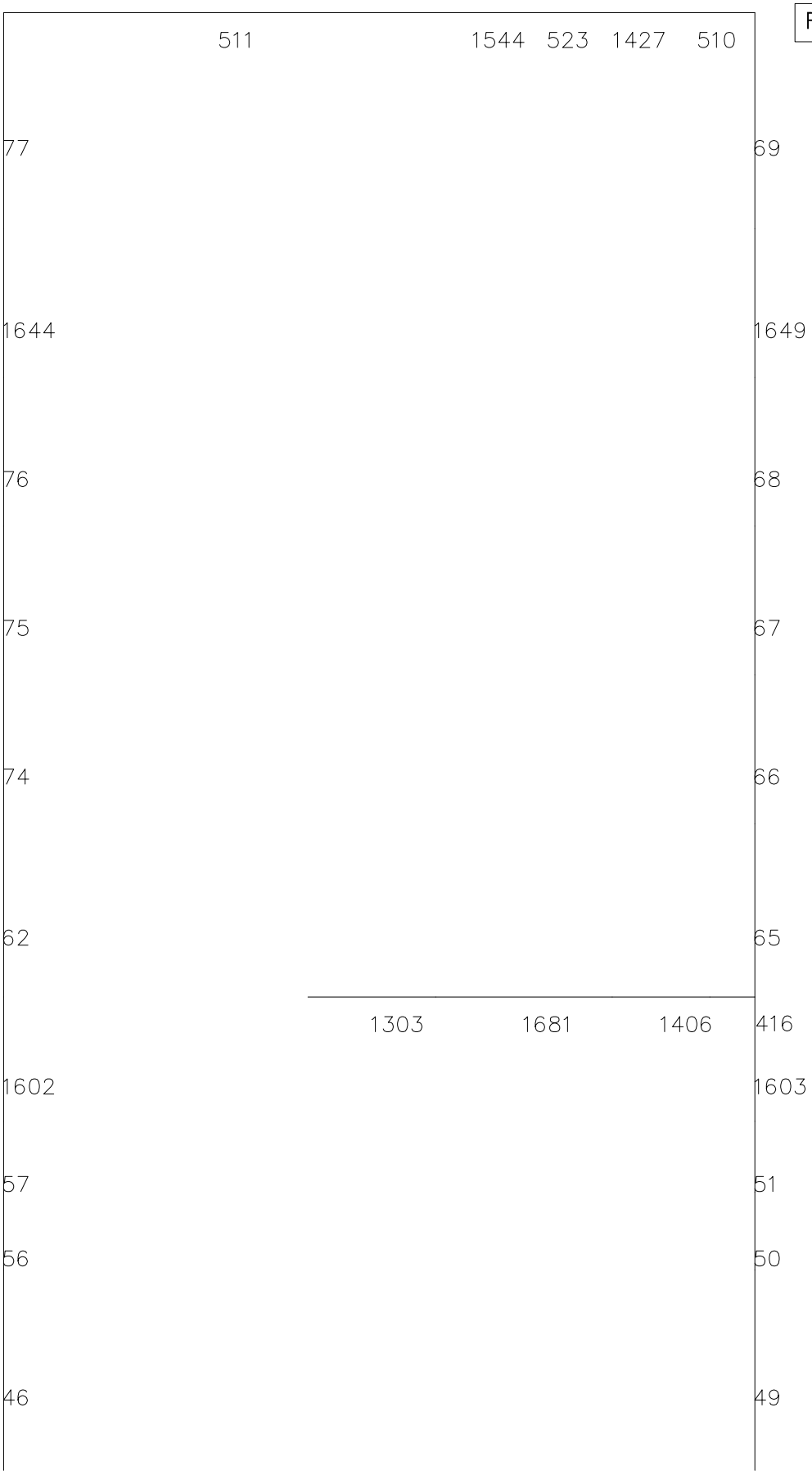
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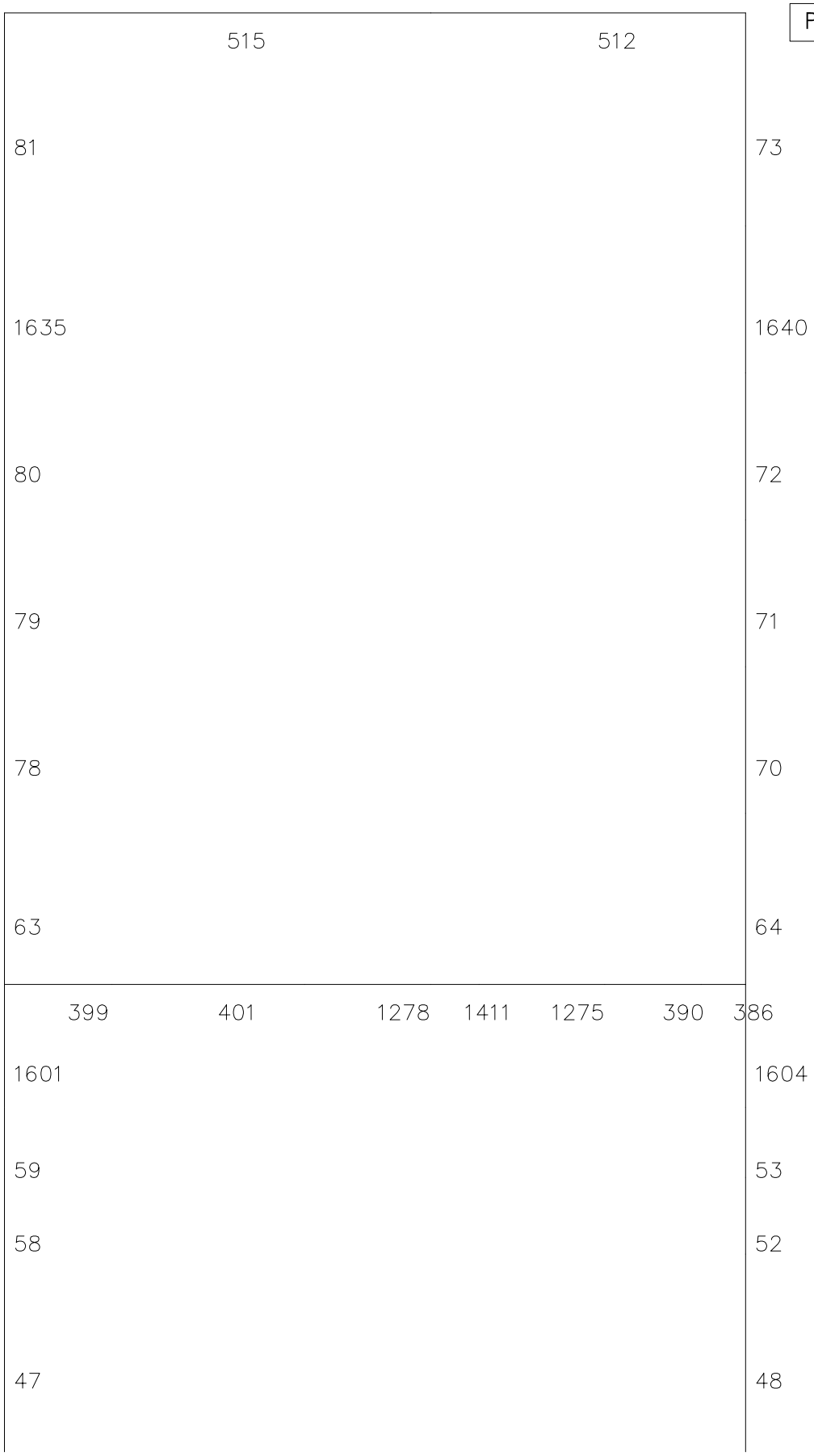
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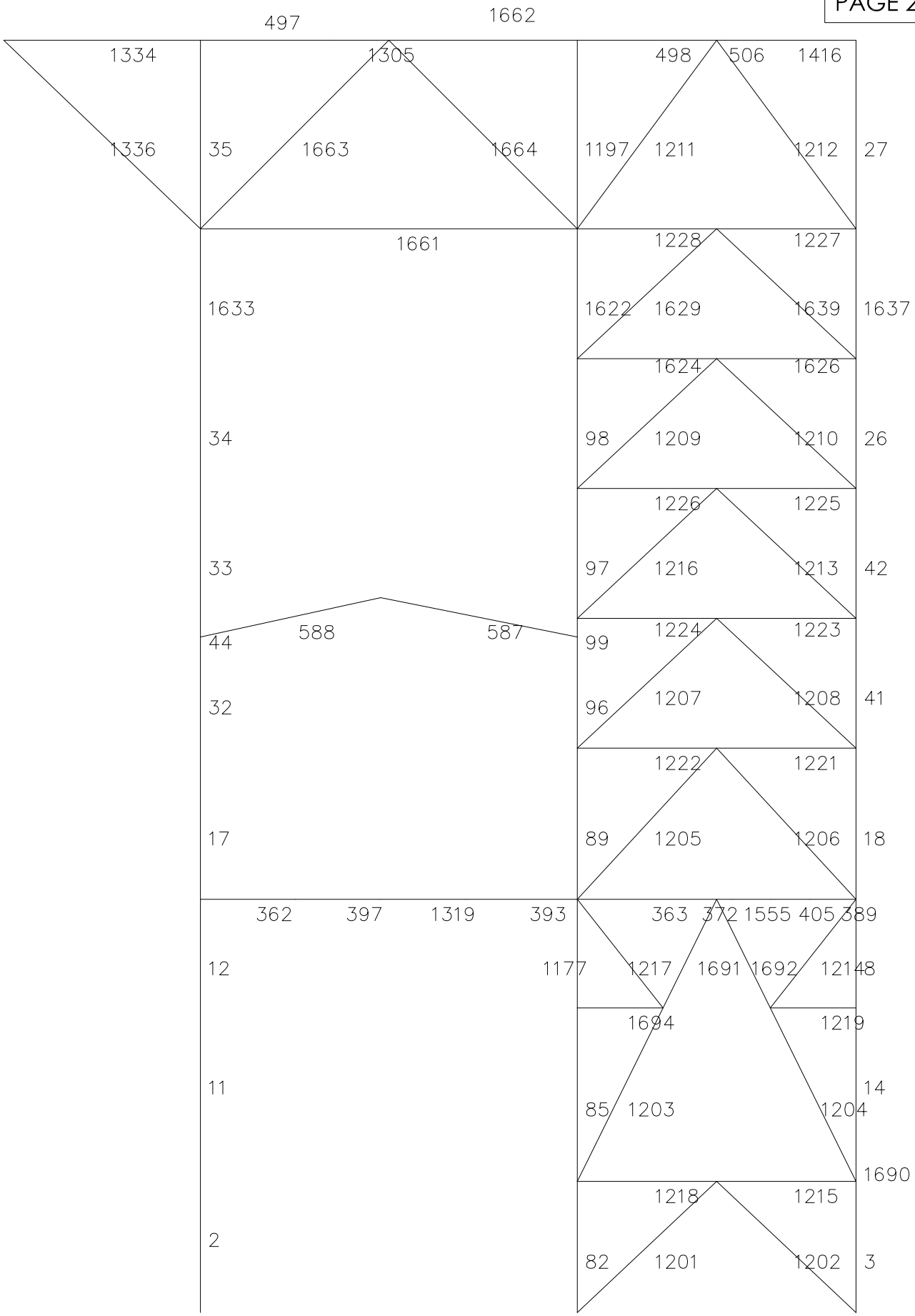
MEMBER NUMBER OF BEAM ALONG GRID - 1



MEMBER NUMBER OF BEAM ALONG GRID - 2



MEMBER NUMBER OF BEAM ALONG GRID - 3



MEMBER NUMBER OF BEAM ALONG GRID - 4