



BHARAT HEAVY ELECTRICALS LIMITED
PROJECT ENGINEERING MANAGEMENT, NOIDA

Date-11-Mar-20

CORRIGENDUM- 03

PROJECT	:	4 x 111 MW VISHNUGAD PIPALKOTI HEP
PACKAGE	:	H.V.A.C
ENQUIRY NO	:	PE/PG/TH1/E-6367/2019 Dt. 28.01.2020
SUBJECT	:	Amendment-1 in technical specification & BOQ + Removal of address of IEMs + Due date extension

Type of Corrigendum			
Technical Corrigendum -	☒	Commercial Corrigendum -	☒

In reference to the above mentioned tender enquiry please note the following.

1. Amendment -1 in technical specification & BOQ.
2. Please ignore the address of IEMs mentioned in cl. No. 31 of NIT.
3. Due Date has been extended from 13.03.2020 to 21.03.2020 till 02:00 PM. Bid Opening shall be done at 03:00 PM on the due date

All the other terms and conditions of the tender enquiry remain unchanged. All the bidders are requested to quote accordingly.

Yours faithfully,

For and on behalf of BHEL

**VINIT
KUMAR
VERMA**

Digitally signed by VINIT
KUMAR VERMA
DN: c=IN, o=BHARAT HEAVY
ELECTRICALS LIMITED,
ou=BHEL / PS-PEM- Noida,
postalCode=201301,
st=Uttar Pradesh,
2.5.4.20=6548fa91156ed58a
b733462e2c216ee861e12e8
b63f30f0dc6527323d5766b2f
, cn=VINIT KUMAR VERMA
Date: 2020.03.11 16:04:59
+05'30'

Vinit Kumar Verma
Dy. Manager

Sl. No.	Section/Clause/ Page No	Statement of the Referred Clause	Bidders Query	BHEL Reply
1			Smoke exhaust centrifugal fans as per sl no 6 of BOQ: Please confirm whether these fans are to be housed inside a double skin cabinet or are to be offered without any cabinet.	Please refer amendment-1
2			Axial flow fans as per SI no 10,11,12,13 & 14 in BOQ : Kindly confirm the location of these fans in power house.	Location shall be decided during detailed engineering.
3	Section -1/ Sub Sec-B/Page No. 6 of 766	Climatic condition: Max. river water temperature (during June) – 27 oC	Raw water temperature need to be check as it is on very higher side & with this temperature it is not possible to reduce the ambient temperature of air	Please refer amendment-1
4	Section -1/ Sub Sec-C 1/Page No. 17 of 766	3.2 ventilation system inside design condition to be maintained shall be as 25-28 oC	It is not possible to maintain a temperature of 28 Deg. C inside the power house using raw water scheme. To maintain the above temperature we have to go for chiller unit	Please refer amendment-1
5	Section -1/ Sub Sec-C 1/Page No. 18 of 766	5.1. Air Conditioning System : Air cooled ductable type	Air cooled type AC is not recommendable for under ground power house due to hot air issue of condensing unit therefore we request you to kindly go for water cooled tunnel.	Bidder to follow specification
6	Section -1/ Sub Sec-C 2A/ 25.38.11/ Page No. 69-766	The bidder shall study the above scheme proposed final scheme as prepared by bidder has to be approved by the purchaser	Please clarify the same	The proposed scheme of Ventilation has already been covered under clause no. 25.38. However the same shall be finalized during detail engineering
7	Section -1/ Sub Sec-C 2A/ 26.5/ Page No. 94 - 766	Electrical work	Please clarify about the location of 2 Nos. feeders provided by BHEL to fulfill the HVAC load requirement	Please refer amendment-1
8			Should sub vendor questionnaire to be submitted along with offer or not	Yes
9	Refer to BOQ under Annexure-I of suggested price format: Sl. No. 2.2, 2.3, 2.6, 2.7	Monsoon Reheating.....	Since we do not know the summer Refrigeration load, so selection of Monsoon Reheating, winter heating is not possible. Kindly provide the same for tender purpose only.	All three season ambient condition and inside condition for AC & ventilation are given in the tender. Bidder to calculated accordingly.
10	Same is above Annexure-I Sl. No. 3.2	Cyclone separation	Cyclone separator can't be design unless quantity and quality of water is not known to us. Please provide the same.	Please refer amendment-1
11	Same is above Annexure-I Sl. No. 3.5	Insulated cooling water piping	Is there any justification to use insulation in the cooling water pipe when normal cooling with ambient temperature are being used in the AHU coil.	Bidder to follow the tender requirement

12	Same is above Annexure-I Sl. No. 10.3	Local Motor starter	Kindly clarify the local motor starter for which item also clarify that all types of cables are in vendor's scope of supply	Local motor starter panel has been envisaged for such axial(supply/exhaust) fans for which only supply feeder shall be considered in MCC. Further All type of cable shall be in bidder's scope as per electrical scope matrix in the technical specification.
13	Referring the list of mandatory spares under annexure-II of your suggestion price list			
(i)	Water cooler		Item is not clear to us	Bidder to follow the tender requirement
(ii)	Clause no 25.1.1 of section – 25 of customer specification	Equipment mentioned Air-washer Unit.....	Please clarify MCC power and control cables cable including cable tray are in vendor's scope. Please clarify.	Bidder to follow the tender requirement as per electrical scope matrix
(iii)	Clause no 25.2.2 of above section		Humidity control in the ventilated area by AHU not possible When cooling media is normal water.	Bidder to follow the tender specification However for water temperature, Refer Amendment-1
(iv)	Clause no 25.6.1.2 of above section		Maximum speed of the centrifugal fans cannot be maintained even larger size of fan being selected with noise limit shall be 85 dBA	Bidder to follow the tender requirement
(v)	Clause no 25.18 & 25.1 of above section		Kindly provide scope matrix of your electrical works	Electrical scope matrix already mentioned in the technical specification under the electrical specification, Bidder to follow the specification
(vi)	Clause no 25.40 (b)		Ventilation system capacities of the power house mentioned in your specification and we will submit our offer accordingly, in that case we will not submit design calculation during DE still you insists on us to provide the same, you have to provide the detail Architectural Drawings including detail internal load of all premises. If there is any difference (higher side) is found after calculation and the price impact in this regard will be borne by you only.	Please refer amendment-1
6.	Clause no 26.4.1 of sub section 25	Civil works	We will not undertake any civil works in our jurisdiction, same will be in customer scope. Pl. confirm	The same shall be as per relevant clause of tender specification

7.	Clause no 26.12 of sub section 25 of page 98 of 766 of your specification	Technical data sheet	Is technical data to be provided along with our technical Bid-pl. confirm	Please refer, The data mentioned 26.12 shall be furnished by successful bidder DDE
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Corrigendum

Sl No	Section/ Clause/ Page No	Staement of the referred Clause	Clarification Required	BHEL Reply
1	TS 1 of 7 /Sec-I-C1/Clause 3.2(b)/ Page 20 of 100 and Clause 25.2.2 Page 32 of 100	Ventilation System : The inside design conditions to be maintained shall be as under:- 25-28°C & RH 65% for Power House & Transformer Cavern etc.	In a ventilation system unlike an air conditioning system either the temperature or the RH can only be maintained within limits and the other parameters become incidental. Kindly confirm if temperature/RH has to be maintained within limits.	Bidder to follow the tender requirement. Please also refer amendment no. 1 w.r.t cooling water temperature.
2	TS 1 of 7 /Sec-I-C1/Clause 5.3(a)/ Page 25 of 100	Aluminium cladding finish	Please confirm the thickness of aluminium sheet cladding	Please refer amendment No.-1
3	TS 1 of 7 /Sec-I-C1/Clause 5.1(i)- Page 22 of 100 , Clause 5.3(a) - Page 25 of 100 and Clause 26.4.2 - Page 97 of 100	The thickness of accoustic insulation material are contradictoryin respect of the clauses mentioned.	Kindly confirm thickness of accoustic insulation material as to 12 mm or 25 mm .	Thickness of acostic insulation shall be 25mm as per clause no. 5.1(i) page no 19 of 766. Please refer amendment No.-1
4	TS 1 of 7 /Sec-I-C1/ Clause 5.3(a) - Page 25 of 100 and Clause 26.4.2 -Page 97 of 100	Material specified for thermal insulation- Mineral wool	Please confirm if we can opt Fibreglass instead of Mineral wool as Fibreglass is generally used for cold surface insulation and Mineral wool for the Hot surface.	Bidder to follow the tender requirement
5	TS 1 of 7 /Sec-I-C1/ Clause 5.3(a) - Page 25 of 100 and Clause 26.4.2 -Page 97 of 100	Thickness of Duct insulation is mentioned as 50 mm in Page 25/100 and 25 mm in page 97/100	Please confirm the thickness of the duct insulation material as 25mm or 50 mm	Please refer amendment No.-1
6	TS 1 of 7 /Sec-I-C1/ Clause 25.10.2 -Page 43 of 100	Ventilation Grilles and Diffusers-The Exhaust registers shall consist of a fixed front plate and motor controlled movable dampers.	The Exhust grilles/registers mounted in ducts will have manual dampers and not Motorized dampers. Kindly note.	Bidder to follow the tender requirement, Please refer amendment No.1
7	TS 1 of 7 /Sec-I-C1/ Clause 25.11.1 -Page 44 of 100	The air dampers shall be fabricated from a 2mm thick steel plate	The air dampers will be out of 16 G (1.6mm thk) steel. Kindly note.	Bidder to follow the tender requirement
8	TS 1 of 7 /Sec-I-C1/ Clause 25.11.1 -Page 44 of 100	The blade of the air damper will be moved manually or with electric drive mounted on the damper.	Theblade of the air damper will be moved manually. Kindly note.	The same shall be decided during detailed engineering
9	TS 1 of 7 /Sec-I-C1/ Clause 25.11.1 -Page 45 of 100	Fire dampersshall be made of 2mm thick steel sheet	The fire dampers will be out of 16 G (1.6mm thk) steel. Kindly note.	Bidder to follow the tender requirement
10	TS 3 of 7 / Clause 2.00.00 -Page 33 of 300	Condenser and Evaporator-Test to be carried out.	This being a standard product , the testing will be in line with the approved manufacturers practice.	Bidder to follow the tender requirement
11	TS 4 of 7 / Page 16 of 160	BOP Vendors list for Electricals provided	The MCC and other panels will be fabricated in line with the specification with the internal switch geat and components of approved makes by our sub vendors. The GA and SLD of the Panels will be submitted for BHEL andon approval of the same, fabrication of the panels will be taken by our sub vendors.Also due testing in line with the specification will be followed on readiness of the panel .	Bidder to follow the tender requirement
12	TS 3 of 7 / Clause 20.7.23.1/Page 123 of 300	Remote Control and Annunciation Panel :Only remote annunciation panel may be provided. No manual control of 415 V switchgears is required from control room. These switchgears shall have remote operation only from CCS. This annunciation panel may be made common for the entire power house where all information of all the units come alongwith the information of 415V switchgear. The manual controls are only from individual MCCs. However, emergency stop command of different feeders of MCCs may be provided on this panel if required.	Our understanding is as follows : The remote control and annunciation panel will be provided in the CCS for status indication / annunciation. Day today operation of the MCC feeders will be only from the respective panels but for the emergency STOP operation from this remote panel. This will be effected by the control wiring/ signals from the feeders of the MCC for effecting trhe various functions detailed in this clause. This will be a dedicated Remote control and annunciation panel for the specified HVAC equipments which are fed from the 1 No MCC to be provided by the HVAC vendor. Kindy confirm.	Kindly note that as per specification clause no. 20.7.23.1 switchgear (incomers and buscouplers only) for HVAC shall have remote operation only from CCS which shall be in BHEL scope other requirements like signal exchange, local control etc as mentioned in specification shall be provided with MCC(in bidder's scope).
13	TS 5 of 7 / MDL submission- SI No 39/Page13 of 40	TDS of PLC with configuration diagram.....PLC Room Layout.	This is not applicable as NO PLC is included in the scope of HVAC Vendor. Kindly confirm.	PLC shall be read as Relay based control system Wherever mentioned in the tender specification. Please refer amendment No.-1
14	TS 6 of 7 / Powerplant plot Layout and Ventilation Scheme of Ventilation system drawings/ Pages10& 11 of 12 and BOQ item No 4	Location of Exhaust Fans at entry of MAT	We persume theExhaust fans are located at theD/S Surge Tank end(M5). This confirmation is required for the location of the Local Control Panel and for Estimation of Cabling between the MCC and the Local Control Panel.	The exhaust fan shall be located at entry of MAT as specified in tender specification. Please refer Amendment-1 for location of electrical feeders.

15	TS 6 of 7 / Powerplant plot Layout and Ventilation Scheme of Ventilation system drawings/ Pages 10 & 11 of 12 and BOQ item No 4	Location of Supply Fresh air Fans at entry of Ventilation Tunnel	We presume the Fresh air fans are located at the Power House end EL 1054 (V7). This confirmation is required for the location of the Local Control Panel and for Estimation of Cabling between the MCC and the Local Control Panel.	The fresh air fan shall be located at entry of Ventilation tunnel as specified in tender specification. Please refer Amendment-1 for location of electrical feeders.
	Other Clarifications required			
16		Location of MCC Panel	We presume the MCC Panel to be provided by the HVAC Vendor will be located in the Power House Control Block at El 1036 ML floor from which cabling will be laid to the Local Control Panels. Kindly confirm.	Please refer amendment No.-1
17	Item No 5.1 of BOQ	Electrical inputs for ventilation fan of the Butterfly chamber	We presume the electrical requirement of this fan will be addressed by BHEL. Kindly confirm. In case the same has to be carried out by HVAC vendor please as to where the input has to be taken from and the relative location from source for estimation of cabling.	Please refer amendment No.-1
18	Item No 6.1 of BOQ	Smoke Exhaust Fan	Kindly confirm the location of these equipment for estimation of cabling from the MCC.	Location shall be decided during detailed engineering.
19	Item No 6.2 of BOQ	Smoke Exhaust Fan		
20	Item No 6.7 of BOQ	Stair case pressurization Fan		
21	Item No 6.8 of BOQ	Stair case pressurization Fan		
22	Item Nos 10 to 13 of BOQ	Electrical system for Axial Flow Fans	We assume we will provide local wall mounted starters for these equipments fixed at operating height of 2.5 ML from FFL and the interconnecting cabling between this starter and the respective Fan motor. BHEL terminate the power at the Starter panel. as the locations of these equipments are not indicated. Kindly confirm.	Scope of cable shall be as per electrical scope matrix (page no. 300 of 769) of tender specification
23	Item B-1.1 & 1.2 of BOQ	Air conditioning system- Ductable split Units and associated auxiliaries (Fresh air fan/Pan Humidifier and Strip Heater)-Electrical system	We presume BHEL will terminate the Power and Earthing at the Local Control Panel to be provided by the HVAC Vendor meant for these equipment. Kindly confirm. If not please confirm the source from where the power has to be drawn.	Scope of cable and earthing shall be as per electrical scope matrix (page no. 300 of 769) of tender specification, For location of feeder, Please refer Amendment-1
24	Item B-1.7 of BOQ	2 TR Split Units-Electrical Input	We presume BHEL will terminate the Power and Earthing at the respective MCBs provided by the HVAC Vendor. Kindly confirm.	Scope of cable and earthing shall be as per electrical scope matrix (page no. 300 of 769) of tender specification
25		Data required for estimation of cabling	Please provide us the data/ information on the routing of cabling for estimation of cabling between the Power House/ Transformer Hall and D/S surge tank for estimation of cabling to be run between the MCC and the Local control Panels.	For location of feeder, Please refer Amendment -1. Cable routing between various equipment shall be finalized During Detailed Engineering.

BOQ S No.	Description	Unit	Qty	Bidders Query	BHEL Reply
A	Ventilation System				
1	Fresh Air Supply System -Machine Hall, Cavern including annex bays floors, Transformer hall and GIS Hall Cavern, Main access tunnel				
1.1	Cabinet type Supply air Centrifugal type fans with motor, Fan capacity 110,000 CMH (minimum) & 150mm SP(minimum) supply air fan to all ventilated areas including as above- Machine Hall, Cavern including annex bays floors, Transformer hall and GIS Hall Cavern	No	2	Item does not indicate any filters. Please clarify as to will there by filters & if yes then the stages included i.e. pre, fine, HEPA filters etc.	Please refer amendment no.-1
2	Air Handling Units				
2.1	Sheet metal cabinet type double skin AIR HANDLING UNITS (3x50%) of 110000 CMH (minimum) & 100mm SP (minimum) capacity consisting of water cooling coil, centrifugal blower, TEFC sq cage induction motor, drive set, filters (pre filter), along with local control panel and other accessories to meet the load of power house building for all floors.	No	3	a) 1100000 CMH is 100% capacity or 50% capacity. 3Nos. AHUs shall be of 55000 CMH each or 110000 CMH each. b) Only pre-filters (50 mm thk.) shall be provided. c) This item says "along with local control panel and other accessories..... "but there is a separate item 2.4 for "Local Control panel along with all accessories for the above system ".Going by it price for this item shall be exclusive of local control panel in our interpretation. Please confirm.	(a) Capacity of each AHU shall be 110000 (Min.) , Bidder to follow the tender specification. (b) Bidder to follow the tender specification. (c) Please refer Amendment No.-1.
2.4	Local control Panel along with all accessories etc. for above system	LOT	1	Item for Local control Panel as stated above	Bidder's understanding is correct
2.5	Sheet metal cabinet type double skin AIR HANDLING UNITS (3x50%) of 105000 CMH (minimum) & 100mm SP (minimum) capacity consisting of water cooling coil, centrifugal blower, TEFC sq cage induction motor, drive set, filters	No	3	a) 1050000 CMH is 100% capacity or 50% capacity. 3Nos. AHUs shall be of 52500 CMH each or 110000 CMH each. b) Only pre-filters (50 mm thk.) shall be provided. c) This item says "alongwith local control panel and other accessories..... "but there is a separate item 2.8 for "Local Control panel along with all accessories for the above system ".Going by it	(a) Capacity of each AHU shall be 105000 (Min.) , Bidder to follow the tender specification. (b) Bidder to follow the tender specification.

	(pre filter), along with local control panel and other accessories to meet the load of transformer cavern and GIS Hall			price for this item shall be exclusive of local control panel in our interpretation. please confirm.	(c) Please refer Amendment No.-1.
2.8	Local control Panel along with all accessories etc. for above system	LOT	1	Item for Local control Panel as stated above.	Bidder's understanding is correct
3	Cooling Water System				
3.1	CENTRIFUGAL PUMPS (2x100%) for circulation water complete with TEFC motor & all accessories as specified, common for all AHUs mentioned at S. No. 2 above.	No	2	We interpret it that there shall be total 2No. Pumps @ 1No. / No. each of 100% capacity in . Please confirm.	2x100% mean (1x100% working + 1x100% Standby
4	Exhaust Air Fans				
4.4	Local control Panel along with all accessories etc. for above system	LOT	1	This being a separate item, the price of items 4.1, 4.2 & 4.3 shall be exclusive of local control panel. Please confirm.	Please refer amendment no. 1

HVACSYSTEM 4X111 MW VISHUGAD HEP		AMMENDMENT-1 DATE: 07.03.2020 Page 1 of 2		AMENDMENT#1 TO EXISTING CLAUSES OF TECHNICAL SPECIFICATION	
SPECIFICATION NO. PE-TS-413-571-11000A-A001					
Sl. No.	Clause	Existing description	To be read as (Amendment)	28Gauge Aluminium shall be provided for cladding finished for AC & Ventilation Duct.	Thickness of Acoustic insulation of first 5M of ducting after discharge 25mm thickness
1.	Clause 5.3(a) (i) & (iii), (iv), (v), (vi), (vii) -Page 22 of 766	Aluminium Cladding			
2.	Clause 5.3(a) (iii) - Page 22 of 766	Thickness of Acoustic insulation of first 5M of ducting after discharge 12mm thickness			
3.	Clause 24.4.2 -Page 94 of 766	The duct shall be insulated with 25 mm thick resin bonded mineral wool conforming to IS: 8183 and covered with insulation wrapped with wire mesh etc.			
4.	Clause 25.10.2- Page 40 of 766	The air supply grills shall consist of adjustable flow deflectors permitting variation of air flow exit within 30° from the horizontal plane and air dynamic controller permitting variation of velocity and temperature coefficient values. The exhaust registers shall consist of a fixed front plate and motor controlled movable dampers.			
5.	SECTION: I SUB-PROJECT INFORMATION	Additional details	Water Quality Report is attached, Bidder's to note that wherever material of construction of any equipment is not mentioned in technical specification, the same shall be selected suiting to water quality report.		
6.	SECTION: I SUB-PROJECT INFORMATION	Additional details	Maximum & Minimum river water temperature shall be 14 Deg C and 4 Deg C respectively for design of cooling water circuit.		
7.	SECTION – II, Sub Section-7 TENDER DRAWINGS	Additional details	Civil drawing and Electrical Scheme are attached as per Annexure-1.		
Amendment w.r.t BOQ					
8.	Sr. no. 6 of BOQ	Exhaust Air Fans (Centrifugal Fans) for Others areas with minimum parameters of the fan, mentioned	Exhaust Air Fans (Centrifugal fans shall be housed inside a double skin cabinet) for Others areas with minimum parameters of the fan, mentioned.		
9.	Sr. no. 6.3* of BOQ	SUPPLY AIR DIFFUSERS / GRILLS with VCD (G.I) complete with fixing frames, nuts, bolts, gaskets, washers etc	SUPPLY AIR DIFFUSERS / GRILLS with manually operated VCD (G.I) complete with fixing frames, nuts, bolts, gaskets, washers etc		
10.	A1.1 of BOQ	Cabinet type Supply air Centrifugal type fans with motor, Fan capacity 110,000 CMH (minimum) & 150mm SP (minimum) supply air fan to all ventilated areas including annex bays floors, Transformer hall and GIS Hall Cavern	Cabinet type Supply air Centrifugal type fans with motor, Filters (pre filters), Fan capacity 110,000 CMH (minimum) & 150mm SP (minimum) supply air fan to all ventilated areas including annex bays floors, Transformer hall and GIS Hall Cavern.		



HVACSYSTEM
4X111 MW VISHUGAD HEP

SPECIFICATION NO. PE-TS-413-571-

11000A-A001

AMMENDMENT-1

DATE: 07.03.2020

Page 2 of 2

11.	A2.1 of BOQ	Sheet metal cabinet type double skin AIR HANDLING UNITS (3x50%) of 110000 CMH (minimum) & 100mm SP (minimum) capacity consisting of water cooling coil, centrifugal blower, TEFC sq cage induction motor, drive set, filters (pre filter), along with local control panel and other accessories to meet the load of power house building for all floors.	Sheet metal cabinet type double skin AIR HANDLING UNITS (3x50%) of 110000 CMH (minimum) & 100mm SP (minimum) capacity consisting of water cooling coil, centrifugal blower, TEFC sq cage induction motor, drive set, filters (pre filter) and other accessories to meet the load of power house building for all floors.
12.	A2.5 of BOQ	Sheet metal cabinet type double skin AIR HANDLING UNITS (3x50%) of 105000 CMH (minimum) & 100mm SP (minimum) capacity consisting of water cooling coil, centrifugal blower, TEFC sq cage induction motor, drive set, filters (pre filter), along with local control panel and other accessories to meet the load of transformer cavern and GIS Hall	Sheet metal cabinet type double skin AIR HANDLING UNITS (3x50%) of 105000 CMH (minimum) & 100mm SP (minimum) capacity consisting of water cooling coil, centrifugal blower, TEFC sq cage induction motor, drive set, filters (pre filter) and other accessories to meet the load of transformer cavern and GIS Hall
13.	A4.1 of BOQ	Cabinet type Exhaust air Centrifugal type fans with motor (200000 CMH (minimum) & 80mm SP (minimum), 2x100%) for exhaust of air from all ventilated areas including House Floors, transformer cavern & MAT.	Cabinet type Exhaust air Centrifugal type fans with motor (200000 CMH (minimum) & 80mm SP (minimum), 2x100%) for exhaust of air from all ventilated areas including Power House Floors, transformer cavern & MAT.
14.	A4.2 of BOQ	Cabinet type Exhaust air Centrifugal type fans with motor and local control panel (55000 CMH (minimum) & 80mm SP (minimum)) for exhaust of air from ventilated areas of Power House Floors and Control Block	Cabinet type Exhaust air Centrifugal type fans with motor (55000 CMH (minimum) & 80mm SP (minimum)) for exhaust of air from ventilated areas of Power House Floors and Control Block
15.	A4.3 of BOQ	Cabinet type Exhaust air Centrifugal type fans with motor and local control panel (55000 CMH (minimum) & 80mm SP (minimum)) for exhaust of air from ventilated areas of, transformer/ GIS cavern & Bus Duct Galleries.	Cabinet type Exhaust air Centrifugal type fans with motor (55000 CMH (minimum) & 80mm SP (minimum)) for exhaust of air from ventilated areas of, transformer/ GIS cavern & Bus Duct Galleries.
16.	General	PLC shall be read as Relay based control system, Wherever mentioned in the tender specification.	



प्रदूषण नियन्त्रण अनुसंधान संस्थान

भारत हेवी इलेक्ट्रिकल्स लिमिटेड, रानीपुर, हरिद्वार (उत्तराखण्ड) - 249403

POLLUTION CONTROL RESEARCH INSTITUTE

(A Govt. of India - UNDP / UNIDO Project)
BHARAT HEAVY ELECTRICALS LIMITED
RANIPUR, HARIDWAR (U.K.) - 249 403

(Approved Lab under Environment (Protection) Act, 1986: EIA Consultancy by NABET, GCI)

TEST REPORT

Lab Reference No: TL160597 Date: 03.10.2016
Indentor: THDC INDIA Ltd., Vishnugad Pipalkoti Hydro Electric Project,
Pipalkoti, Chamoli (Uttarakhand)
Customer's Ref. No.: Letter No. THDCIL/V/PHP/Mech./ WS/1078 Dated 27.08.2016
Work Order No.: 16-0149-O-291
Sample Collected by: PCRI STAFF Collection Date: 24.09.2016
Sample/Job: River Water Sample Between DAM & PH Site, Village Tapovan

PARAMETER	UNIT	OBTAINED VALUE
Alkalinity	mg/L	44
Aluminium (as Al)	mg/L	0.02
Ammonia (as Total Ammonia - N)	mg/L	ND
Arsenic (as As)	mg/L	ND
BOD ₅ at 27°C	mg/L	0.8
Boron (as B)	mg/L	ND
Cadmium (as Cd)	mg/L	ND
Calcium (as Ca)	mg/L	22.4
Chloride (as Cl)	mg/L	8
Chromium Total (as Cr)	mg/L	ND
Colour	Hazen	5
Copper (as Cu)	mg/L	0.01
Dissolved Oxygen	mg/L	8.2
Fluoride (as F)	mg/L	0.30
Hardness (as CaCO ₃)	mg/L	76
Iron (as Fe)	mg/L	0.04
Lead (as Pb)	mg/L	0.01
Magnesium (as Mg)	mg/L	4.9
Manganese (as Mn)	mg/L	0.01
Mercury (as Hg)	mg/L	ND
Mineral Oil	mg/L	ND

Cont..2

Services Offered : Monitoring of Air, Water, Noise & Solid Waste as per requirement of EPA of CPCB & SPCB and providing Test reports, Environmental Impact Assessment, Environmental Audits reports

Remarks :- (1) This report refers only to the particular sample/job submitted for testing.
(2) This report is not to be reproduced wholly or partly and can not be used as an evidence in the court of law and should not be used in any advertising media without our special permission in writing.
(3) Samples will be disposed off after one month from the date of issue of Test Certificate



प्रदूषण नियन्त्रण अनुसंधान संस्थान

भारत रेल्वे इलेक्ट्रिकल्स लिमिटेड, राणीपुर, हरिद्वार (उत्तराखण्ड) - 249403

POLLUTION CONTROL RESEARCH INSTITUTE

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BHARAT HEAVY ELECTRICALS LIMITED
RANIPUR, HARIDWAR (U.K.) - 249 403

(Approved Lab under Environment (Protection) Act, 1986: EIA Consultancy by NABET, GCI)

TEST REPORT

- 2 -

Lab Reference No: TL160597 Date: 03.10.2016

PARAMETER	UNIT	OBTAINED VALUE
Nickel (as Ni)	mg/L	ND
Nitrate (as NO ₃)	mg/L	0.06
Odour	-	Agreeable
pH	-	7.5
Phenolic Compounds (as C ₆ H ₅ OH)	mg/L	ND
Selenium (as Se)	mg/L	ND
Silver (as Ag)	mg/L	ND
Sulphate (as SO ₄)	mg/L	15.6
Sulphide (as S)	mg/L	ND
Taste	-	Agreeable
Total Coliform	MPN/100 mL	18
Total Dissolved Solids	mg/L	414
Total Residual Chlorine	mg/L	ND
Total Suspended Solids	mg/L	56
Turbidity	NTU	18.1
Zinc (as Zn)	mg/L	0.02
ND - Not Detectable		

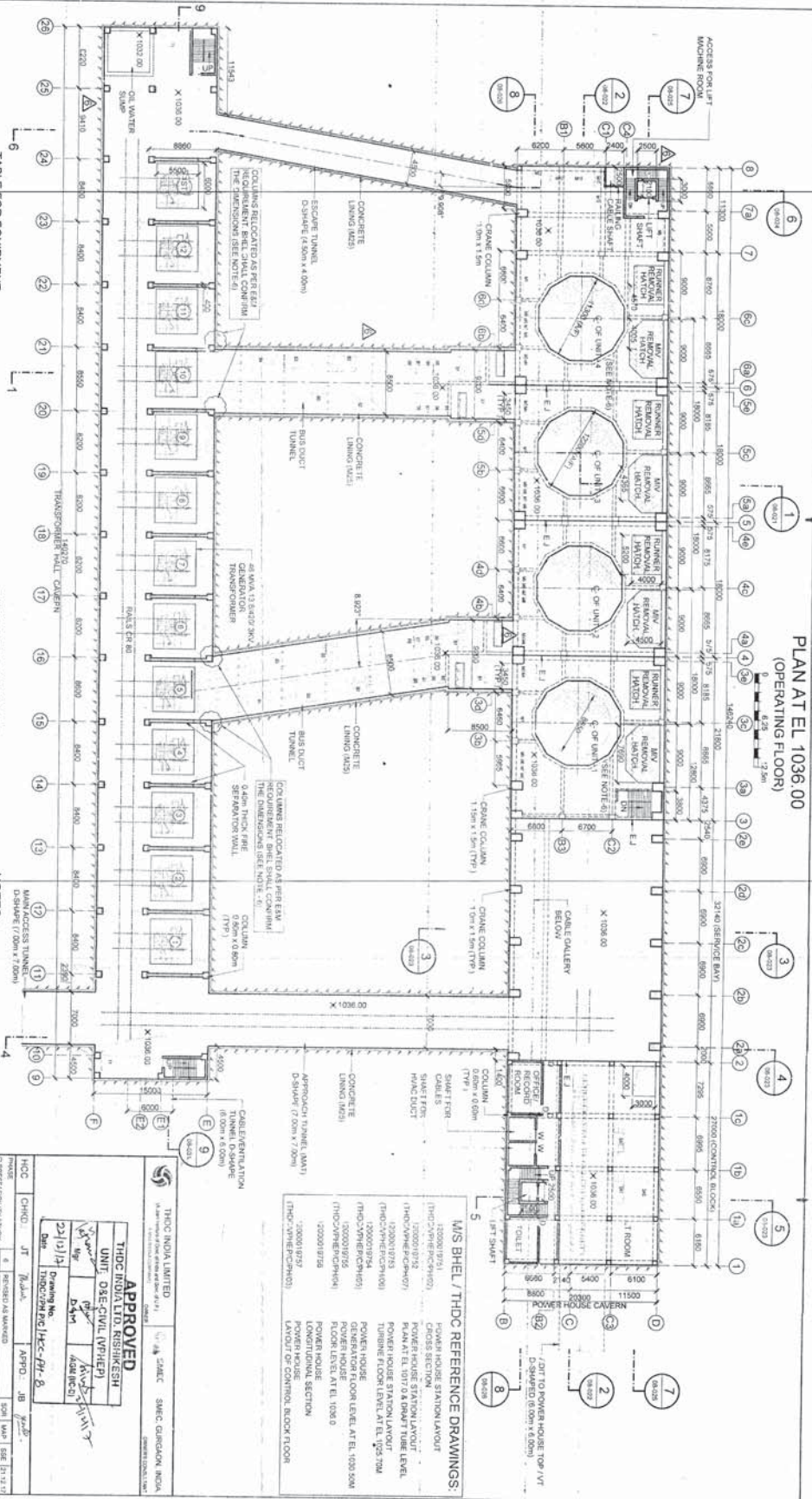
Services Offered : Monitoring of Air, Water, Noise & Solid Waste as per requirement of EP Act of CPCB & SPCB and providing Test reports. Environmental Impact Assessment, Environmental Audits reports

Remarks :- (1) This report refers only to the particular sample/job submitted for testing.
(2) This report is not to be reproduced wholly or partly and can not be used as an evidence in the court of law and should not be used in any advertising media without our special permission in writing.
(3) Samples will be disposed off after one month from the date of issue of Test Certificate

LIST OF CIVIL AND ELECTRICAL DRAWING

SR. NO.	TITLE OF DRAWING	DRAWING NO.
1	Power House Complex General Arrangement	71.2754.08.010
2	Operating Floor Power House Complex General Arrangement Generator Floor	71.2754.08.011
3	Power House Complex General Arrangement Turbine Floor	71.2754.08.012
4	Power House Complex General Arrangement Main Inlet Valve Floor	71.2754.08.014
5	Power House Complex Draft Tube	71.2754.08.015
6	Power House Complex General Arrangement Control Room Building	71.2754.08.016
7	Power House Complex General Arrangement Unit Cross Section	71.2754.08.021
8	Power House Complex General Arrangement Longitudinal Section 2-2	71.2754.08.022
9	Power House Complex General Arrangement Cross Section 3-3, 4-4 & 5-5	71.2754.08.023
10	Power House Complex General Arrangement Cross Section 6-6	71.2754.08.024
11	Power House Complex General Arrangement Longitudinal Section 7-7	71.2754.08.025
12	Power House Complex General Arrangement Longitudinal Section 8-8	71.2754.08.026
13	Power House Complex General Arrangement Transformer & GIS Floor	71.2754.08.031
14	Power House Longitudinal Section	THDC/VPHFP/C/PH/03
15	Electrical Scheme	PE-DG-413-571-11000A-E001

(OPERATING FLOOR)



AT MACHINE ROOM (M), BUSDUCT GALLERY(B) AND SERVICE BAY(S)

NO	DESCRIPTION	APPROX. SIZE (mm)		WEIGHT		QUANTITY	
		LENGTH	WIDTH	(kg)	(mm)	UNIT QUANTITY	TOTAL QUANTITY
M1	UNIT CONTROL BOARD	1800	500	120	-	1	1
M2	CONTROL PANELS FOR BURNING, DEWATERING FLOOD PROTECTIVE PAVING WALL MOUNTED	800	800	246	-	1	1
M3	WET METER FOR AUTO SENSITIVE EQUIP	3145	800	2320	200	1	1
M4	COMMON LAMP CONTROL BOARD	950	800	2320	200	1	1
M5	TEMP MEASUREMENT PANEL	950	800	2320	200	1	1
M7	INTUITION PANEL	950	800	2320	200	1	1
M8	GALDIE PANEL	1000	800	2320	200	1	1
M9	UNIT ALARM PANEL	2600	2000	2980	800	1	1
M10	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B1	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B2	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B3	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B4	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B5	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B6	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B7	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B8	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B9	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B10	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B11	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B12	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B13	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B14	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B15	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B16	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B17	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B18	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B19	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B20	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B21	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B22	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B23	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B24	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B25	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B26	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B27	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B28	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B29	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B30	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B31	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B32	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B33	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B34	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B35	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B36	UNIT ALARM PANEL	2600	2000	2980	800	1	1
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B39	UNIT ALARM PANEL	2600	2000	2980	800	1	1
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B171	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B172	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B173	UNIT ALARM PANEL	2600	2000	2980	800	1	1
B174	UNIT ALARM PANEL	2					

AT MACHINE ROOM (M), BUSDUCT GALLERY(B) AND SERVICE BAY

ITEM	DESCRIPTION	APPROX. SIZE (m ²)	WEIGHT (kg)	QUANTITY	TOTAL		
B1	REINFORCING PANEL	1500	1250	2000	1000	1	4
B6	THRESHOLD PANEL	1500	1250	2000	800	1	4
B7	FIELD FLOORING PANEL	1500	1250	2000	800	1	4
B8	FIELD FLOORING PANEL	1500	1250	2000	800	1	4
AM	UNIT PROTECTION PANEL (GMP)	2000	800	2415	3000	1	4

LEGEND

CONCRETE (FINISH STAGE) M25

BRICK WORK

ROCK SURFACE

EXPANSION JOINT

[illegible]

ISSUED FOR APPROVAL

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APPROVED

71.2754.08.010

9

C1HCC-PH-CB



TABLE FOR EQUIPMENT

ITEM No	DESCRIPTION	APPROX. SIZE (mm)	WEIGHT (kg)	QUANTITY PER UNIT	TOTAL QUANTITY
11	WV HYDRAULIC CONTROL PANEL	800 1000 2350	400	1	4
12	WV ELECTRICAL CONTROL PANEL	700 1000 2350	400	1	4
13	PRESSURE PUMPING SET/AV	2600 2400 2700	4000	1	4
14	PRESSURE ACCUMULATOR/AV	1500 2000 3400	6000	1	4
15	NITROGEN BOTTLE BANK/AV	1800 2800 3500	8000	1	4
16	AV/CH STARTER PANEL	1200 450 1800	500	1	4
17	STARTER PANEL FOR CLEAN COOLING WATER SYSTEM	1800/600 600 1600	-	1	4
18	STARTER PANEL FOR WARM COOLING WATER SYSTEM	1800/600 600 1600	-	1	4
19	RTU/TURBINE FLOOR FOR AUTO SEC. EQUIPMENT	800 600 2465	-	1	4
20	STARTER PANEL FOR HVAC PLUMBS	1200 600 1800	-	1	4
21	BROKE DUST COLLECTION EQUIPT	1100 1200 2500	500	1	4
22	BROKE STARTER CONTROL PANEL	1000 350 1200	-	1	4
23	STARTER PANEL FOR BRIDGE DUST COLLECTION	800 610 1000	-	1	4
24	HS STARTER PANEL UNIT (PORTABLE)	1625 670 600	250	-	1
25	CONTRIBUTION TYPE OIL HANDLING EQUIPMENT SYSTEM	2200 1500 2000	2200	-	1
26	LUBRICATING OIL HANDLING SYSTEM	2800 1300 1500	2000	-	1
27	OIL TANK FOR LUBE HANDLING SYSTEM	3800 1100 1400	5000	-	2
28	IP/AV COMPRESSOR	2500 2500 2000	-	-	2
29	IP/AV RECEIVER	600/500 -	2500	-	2
30	IP/AV COMPRESSOR	1500 1300 2000	-	-	1
31	IP/AV RECEIVER	600/500 -	2500	-	1
32	IP/AV COMPRESSOR	1500 1300 2000	-	-	1
33	IP/AV RECEIVER	600/500 -	2500	-	1
34	MOTORISED POWER PACK (PORTABLE)	1200 1300 1800	-	-	2

LEGEND	
	CONCRETE (FIRST STAGE) M25
	CONCRETE (SECOND STAGE) M25
	BRICK WORK
	ROCK SURFACE
	EXPANSION JOINT

ISSUED FOR APPROVAL

APPROVED: SSG	71.2754.08.012	4
DATE: 09-02-18		

C/HCC-PH-10

1 ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS ARE IN METRES, UNLESS
2 NOTED OTHERWISE
3 F.38 OTHER REFERENCE DRAWINGS REFER DWG. NO. 71 2754 06 010
4 FOR OTHER NOTES REFER DWG. NO. 71 2754 06 010

 THDC INDIA LIMITED (a Joint Venture of Govt. of India and Govt. of U.P.) 10, 11th Floor, 110001, New Delhi	SMEC, GURGAON, INDIA
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APPROVED
TWO INSTANT REPRODUCTION

INDIA LID. RISHIKESH
UNIT:- D&E CIVIL (VPHEP)

May	10/10	10/10
May	10/10	10/10

22/12/12	Drawing No.
Date	THDC/NPH/PC/14/EC-PH-10

HCC	CHKD:	JT	APPD:	JB	gals.
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D. PREFEASIBILITY STUDY	4. REVISED AS MARKED		
	VMS	MAP	SSE
3. FEASIBILITY STUDY	VMS	MAP	SSE

CONCEPT & BASIC DESIGN				
TECHNICAL DESIGN	2	REVISED AS PER MARKED	WVS	MAP
CONSTRUCTION DESIGN				

REV	REVISION DESCRIPTION	WKS	MAP	SSE	DWG
1	REVISED AS PER CLIENT COMMENTS				

	NO.				
* HINDUSTAN CONSTRUCTION COMPANY					

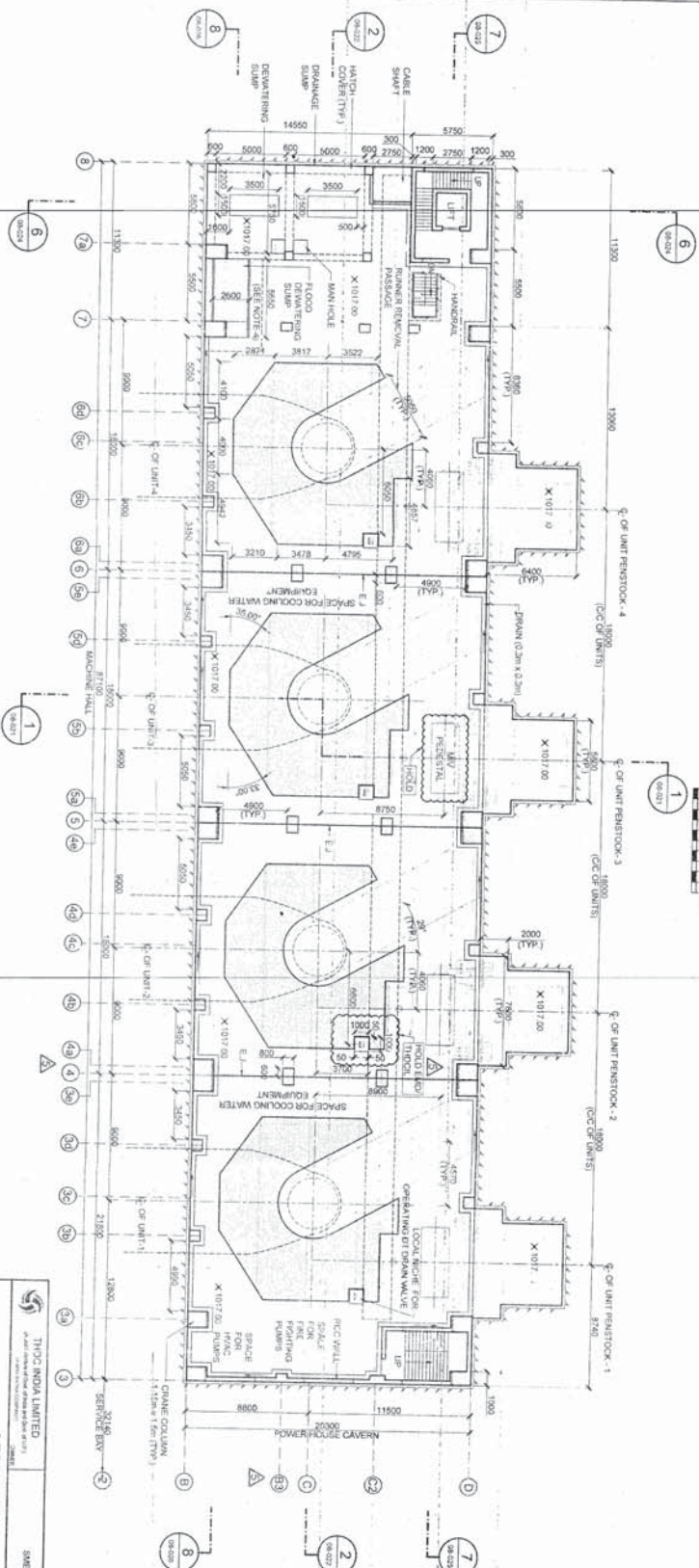
VISHNUGAD PIPALKOTI H.E. PROJECT UTTARAKHAND

GENERAL ARRANGEMENT

10RBINE FLOOR
PLAN AT EL. 1025.70

 AF-Consult	DESIGNED: GHH	SCALE: 1:150	FORMAT: A
	DRAWN: KSB	[1/200]	P

DATE	09/02/18
APPROVED	SSS
CHECKED	CHS
DRAWING NO. 71.2754.08.012	
REV. 4	



ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS ARE IN METRES. UNLESS NOTED OTHERWISE

- ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS, UNLESS NOTED OTHERWISE
2. FOR OTHER REFERENCE DRAWINGS REFER DWG. NO. 71.2754.00.010
3. FOR OTHER NOTES REFER DWG. NO. 71.2754.00.010
4. DIMENSIONS ON THIS VARY FROM E&M DRAWINGS. THIS SAME SHALL BE CONFIRMED & PROVIDED BY E&M VENDOR AS PER CIVIL DRAWINGS

CONSUMER REPORTS

- | | | | | |
|----------------------------|-----------------------------|-----------------------|--------------|-----------------|
| CONCRETE (FIRST STAGE) M20 | CONCRETE (SECOND STAGE) M20 | BACKFILL CONCRETE M10 | ROCK SURFACE | EXPANSION JOINT |
|----------------------------|-----------------------------|-----------------------|--------------|-----------------|

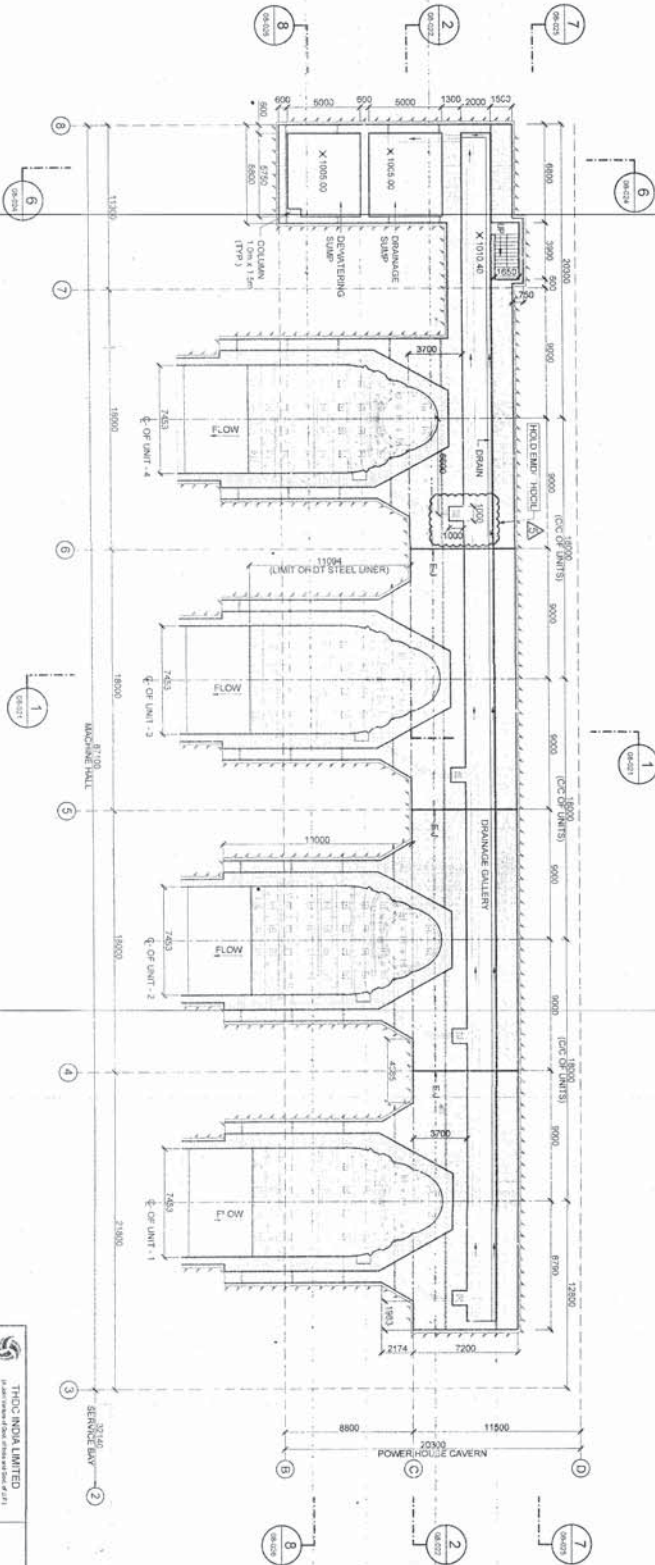
ISSUED FOR APPROVAL



HCC INDIA LIMITED
INCORPORATED IN INDIA
100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 8

PLAN AT EL 1011.849 (DRAFT TUBE INVERT)

0 0.375 0.75m



NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS AND LEVELS ARE IN METERS, UNLESS NOTED OTHERWISE.
2. FOR OTHER REFERENCE DRAWINGS REFER DWG. NO. 71.2794.08.010.
3. FOR OTHER NOTES REFER DWG. NO. 71.2794.08.010.

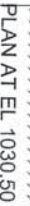
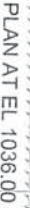
LEGEND

- CONCRETE (FIRST STAGE) W/S
- CONCRETE (SECOND STAGE) W/S
- ROCK SURFACE
- EXPANSION JOINT

ISSUED FOR APPROVAL

THDC INDIA LIMITED UNIT: DSE CIVIL (VP/HEP) DESIGNED BY: <i>[Signature]</i> CHECKED BY: <i>[Signature]</i> DATE: 23/11/17		APPROVED THDC INDIA LTD. RISHIKESH UNIT: DSE CIVIL (VP/HEP) DESIGNED BY: <i>[Signature]</i> CHECKED BY: <i>[Signature]</i> DATE: 23/11/17													
REVISIONS <table border="1"> <thead> <tr> <th>NO.</th> <th>DESCRIPTION</th> <th>DATE</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>REVISION AS PER CLIENT COMMENTS</td> <td>23/11/17</td> </tr> <tr> <td>2</td> <td>REVISION AS PER E&S APPROVAL</td> <td>23/11/17</td> </tr> <tr> <td>3</td> <td>REVISION AS PER E&S APPROVAL</td> <td>23/11/17</td> </tr> </tbody> </table>				NO.	DESCRIPTION	DATE	1	REVISION AS PER CLIENT COMMENTS	23/11/17	2	REVISION AS PER E&S APPROVAL	23/11/17	3	REVISION AS PER E&S APPROVAL	23/11/17
NO.	DESCRIPTION	DATE													
1	REVISION AS PER CLIENT COMMENTS	23/11/17													
2	REVISION AS PER E&S APPROVAL	23/11/17													
3	REVISION AS PER E&S APPROVAL	23/11/17													
PROJECT INFORMATION PROJECT: POWER HOUSE CAVERN CLIENT: HINDUSTAN CONSTRUCTION COMPANY PROJECT LOCATION: VISHUNIGAD PIRAPATTI H.E. PROJECT UTTARAKHAND PROJECT TYPE: DRAFT TUBE PLAN AT EL. 1011.849															
DESIGNED BY: AF-Consult DESIGNED BY: <i>[Signature]</i> DATE: 23/11/17		CHECKED BY: <i>[Signature]</i> DATE: 23/11/17													
SCALE: 1:100		FORMAT: A4													
PROJECT NO: 71.2794.08.015		5													

C:\HCC-PH-15

[illegible]

100V BATTERY BANK	W	D	+ H	
10080	4500	650		2

100

ELECTROCE BAKING OVEN 300X300X460

KEPT IN CABINET

CLIMATIC OUTSIDE MIC. (METER OF RANGE 25 TO 50 MM (WITH ACCESSORIES))

ENTER LATE (WITH ACCESSORIES)	1700X1100X600
	3600X1200X1300

THDC INDIA LIMITED	SNEC GUJRAON INDIA
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CHKO	JT	Thru	APPD:	JB	Yoko
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INDUSIAN CONSTRUCTION COMPANY
VISHNUGAD PIPALKOTI HE PROJECT UTTARAKHAND

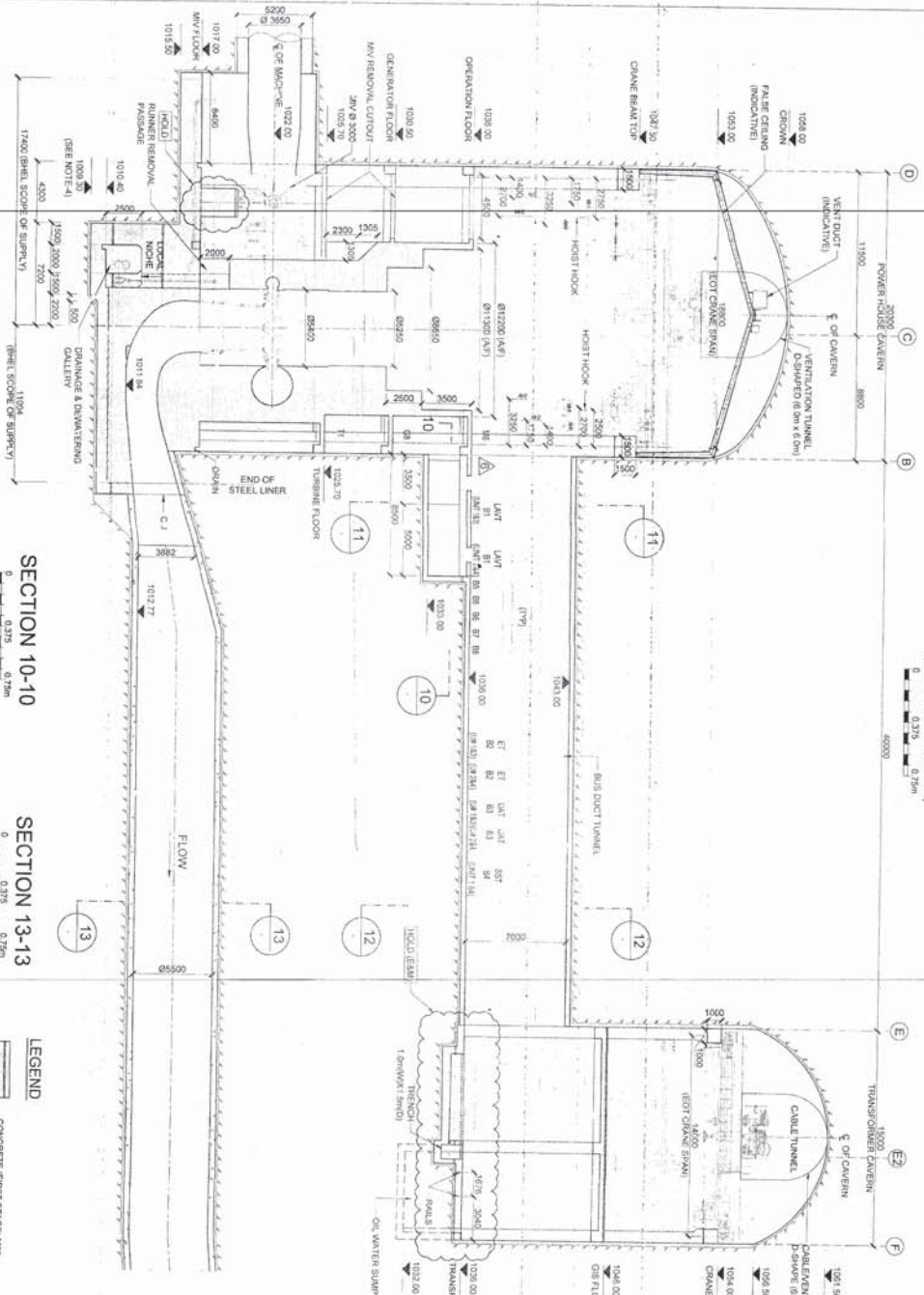
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C/HCC-PH-14

SECTION 1-1

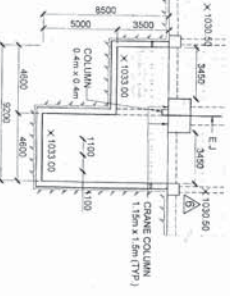
(REFER DRAWING NO. 71254)

0.375 0.75m



SECTION 10-10

0.375 0.75m



SECTION 13-13

0.375 0.75m



LEGEND

- CONCRETE (FIRST STAGE) M25
- CONCRETE (SECOND STAGE) M25
- UNITED CONCRETE
- MASONRY CONCRETE
- ROCK SURFACE

ISSUED FOR APPROVAL

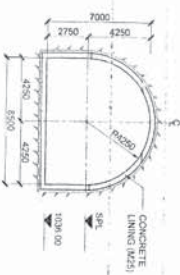
SECTION 11-11

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SECTION 12-12

0.375 0.75m



NOTES

- ALL DIMENSIONS ARE IN MILLIMETRES AND LEVELS ARE IN METRES, UNLESS NOTED OTHERWISE.
- FOR OTHER REFERENCE DRAWINGS REFER DWG NO. 71254-02-016.
- FOR OTHER NOTES REFER DWG NO. 71254-02-016.
- CONSTRUCTIONAL MATERIALS SHALL BE AS PER THE SAME SHALL BE CONFORMED TO THE REQUIREMENTS OF THE DRAWINGS.

THDC INDIA LIMITED

APPROVED

THDC INDIA LTD. RISHIKESH

UNIT - D2-CIVIL (NPHED)

Drawing No. HCC-PH-15

THDC INDIA LTD. RISHIKESH

THDC INDIA LTD. RISHIKESH

THDC INDIA LTD. RISHIKESH

THDC INDIA LTD. RISHIKESH

THDC INDIA LTD. RISHIKESH

THDC INDIA LTD. RISHIKESH

THDC INDIA LTD. RISHIKESH

THDC INDIA LTD. RISHIKESH

THDC INDIA LTD. RISHIKESH



1 ALL DIMENSIONS ARE IN METRES AND LEVELS ARE IN METRES, UNLESS
NOTED OTHERWISE
2. FOR OTHER REFERENCE DRAWINGS REFER, DWG. NO. 71/2754/08/010
3. FOR OTHER NOTES REFER DWG. NO. 71/2754/08/010.

SMCC, GURJAN, INDU

THDC INDIA LTD. RISHIKESH
UNIT - D/E-CIVIL (WPHEP)

[illegible]

Drawing No.	THDCNPH PIC/HCC-PH-1C
Date	2014-11-17

PHASE	5	REVIEWED AND MARKED	APR 18	2008
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4	REVISED AS MAILED	VMS	MAP	SSE	24 01 1
0 READ/DUTY BICYOT					
0 INCEPRT A BASIC PERSON					

2	REVISED AS PER CLIENT COMMENTS	DATE	BY
		02/01/2011	DR

REV	REVISED AS PER ERM VENDOR	MSB	MAN	SSC	28 04 18
-----	---------------------------	-----	-----	-----	----------

NO.	DATE	REMARKS	INITIALS	SIGNATURE
HINDUSTAN CONSTRUCTION COMPANY				

VISHNUGAD PIPALKOTHE PROJECT UTTARAKHAND

GENERAL ARRANGEMENT

SECTION 2.2

AF-Consult	SCALE 1:200	FORMAT A1
PROJECT NO.	114001	DATE
DRAWING NO.		
DATE		

APPROVED BY	71.2754.08.022	5
DATE	08-02-18	

211155-PM-16

Downloaded from <http://ajph.org/> at University of California, San Diego on June 11, 2015

REFER DRAWING 08.010 TO 0111



REFER DRAWING 06.010 TO 014



(C) 82/8



ISSUED FOR APPROVAL

NOTED (C)

- | | |
|--------------------|--------------------|
| THDC INDIA LIMITED | THDC INDIA LIMITED |
|--------------------|--------------------|

Approved: _____ Date: _____

IHDC INDIA LTD. RISHIKESH

試料名	成分	単位
試料 A	成分 A	g/g
試料 B	成分 B	g/g
試料 C	成分 C	g/g
試料 D	成分 D	g/g
試料 E	成分 E	g/g
試料 F	成分 F	g/g
試料 G	成分 G	g/g
試料 H	成分 H	g/g
試料 I	成分 I	g/g
試料 J	成分 J	g/g
試料 K	成分 K	g/g
試料 L	成分 L	g/g
試料 M	成分 M	g/g
試料 N	成分 N	g/g
試料 O	成分 O	g/g
試料 P	成分 P	g/g
試料 Q	成分 Q	g/g
試料 R	成分 R	g/g
試料 S	成分 S	g/g
試料 T	成分 T	g/g
試料 U	成分 U	g/g
試料 V	成分 V	g/g
試料 W	成分 W	g/g
試料 X	成分 X	g/g
試料 Y	成分 Y	g/g
試料 Z	成分 Z	g/g

HCG	CHIKU	IT	7.10.17
		ADPN	10.00.17

□ FEASIBILITY STUDY		
4	PROPOSED AS MAJOR	YES NO SEE

2	REVISED AS PER CLIENT COMMENTS	VMS	MAP	SSE
DAS-BUILT DRAWINGS				

NO.	REVISION	DATE	BY	APP'D

POWER HOUSE COMPLEX

CROSS SECTIONS

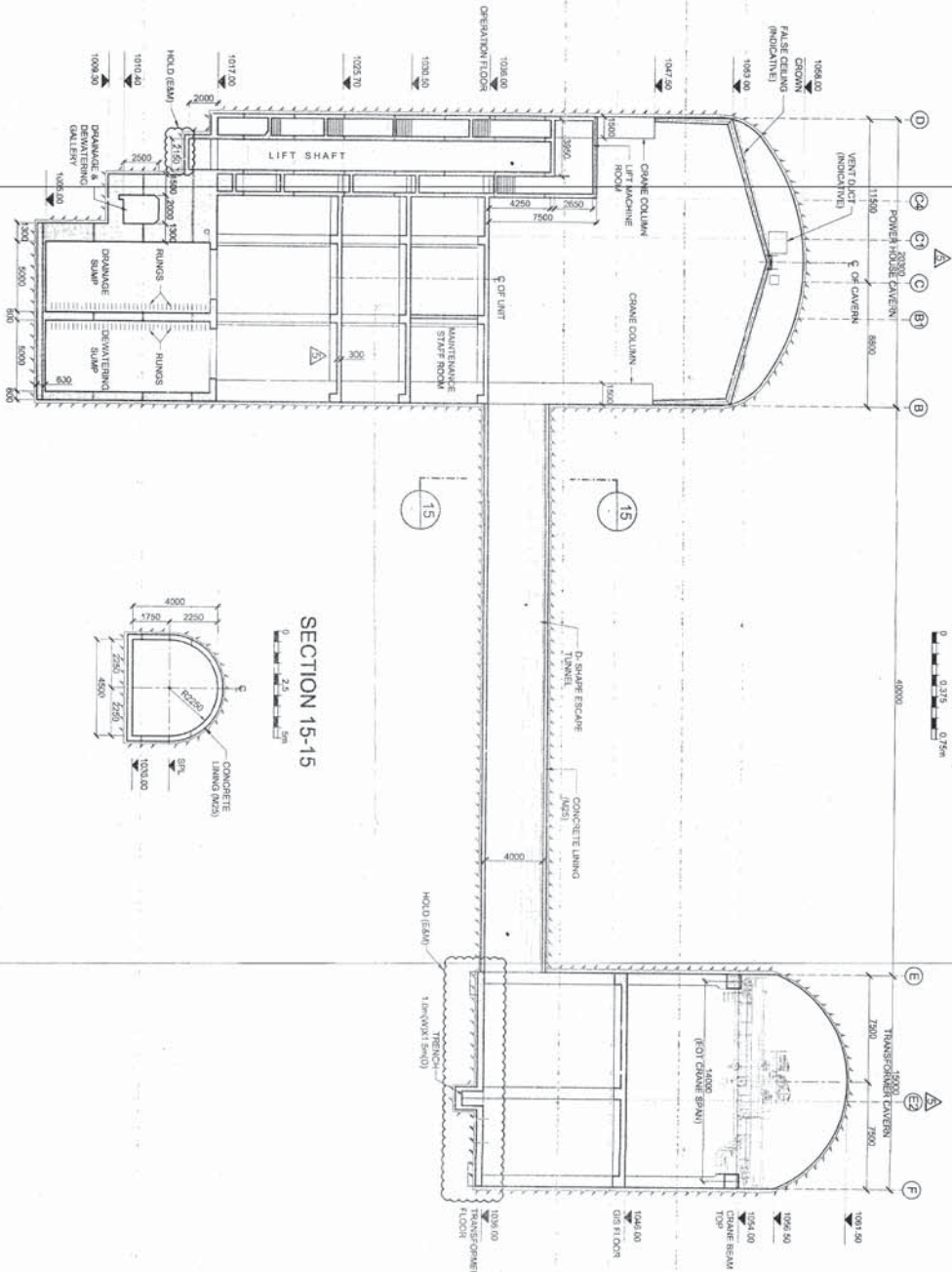
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C/HCC-PH

SECTION 6-6

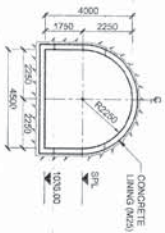
(REFER DRAWING 06.010 TO 015)

0 0.315 0.75m



SECTION 15-15

0 2.5 5m



LEGEND

- CONCRETE (FIRST STAGE) M25
- BRICK WALL
- ROCK SURFACE

NOTES:

- ALL DIMENSIONS ARE IN METRES AND LEVELS ARE IN METRES, UNLESS NOTED OTHERWISE.
- FOR OTHER REFERENCE DRAWINGS REFER DWG. NO. 71.274.08.010.
- FOR OTHER NOTES REFER DWG. NO. 71.274.08.010.

THDC INDIA LIMITED
SANGRHA, INDIA

APPROVED

THDC INDIA LTD. RISHIKESH
UNIT - D&E CIVIL (UPHEP)
23/11/17
Drawing No. HCC-PH-18

REV.	DESCRIPTION	DATE
1	ISSUED AS MARKED	NOV 16/17
2	REVIEWED AS MARKED	NOV 16/17
3	REVIEWED AS PER MARKED	NOV 16/17
4	REVIEWED AS PER CLIENT COMMENTS	NOV 16/17
5	REVIEWED AS PER TEAM VERSION	NOV 16/17
6	REVISION RESUBMISSION	NOV 16/17

VISHNUJAD PIPRAKOTI H.E. PROJECT UTTARAKHAND

POWER HOUSE COMPLEX
GENERAL ARRANGEMENT
CROSS SECTION

SECTION 6-6

AF-Consult
B-9/97, Sector-17, Gurgaon, Haryana
C-20, Sector-17, Gurgaon, Haryana

DESIGNED: DMN
CHECKED: CHS
APPROVED: SSK

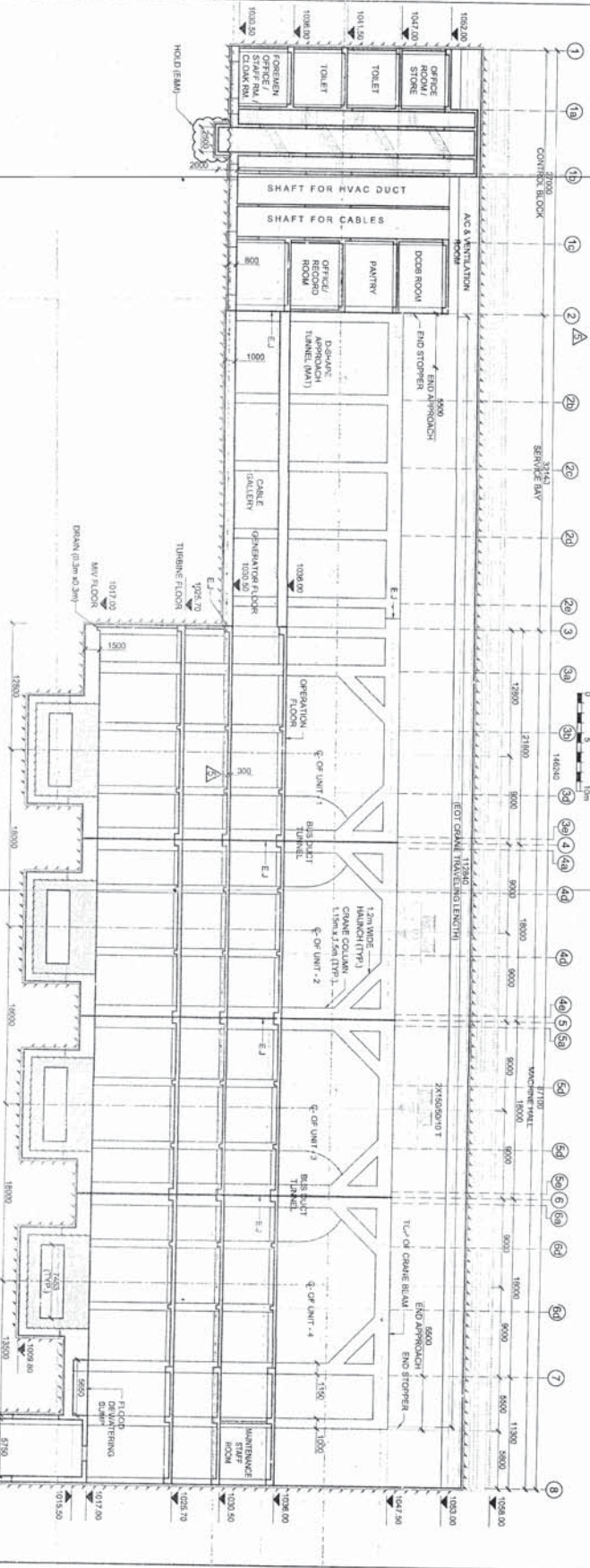
SCALE: 1:100, 1:200
DRAWING NO.: 71.274.08.024
REV: 5

FORMAT: A1
SHEET: 1/1
DATE: 11/11/17

ISSUED FOR APPROVAL

C/HCC-PH-18

(REFER DRAWING 06.010 TO 015)



LEGEND

CONCRETE (FIRST STAGE) M25

CONCRETE (SECOND STAGE) M25

BRICK WORK

MOON SPRING

3

NOTES:

2. **FOR OTHER**

3. FOR OTHER

ISSUED FOR APPROVAL

AF-Consult



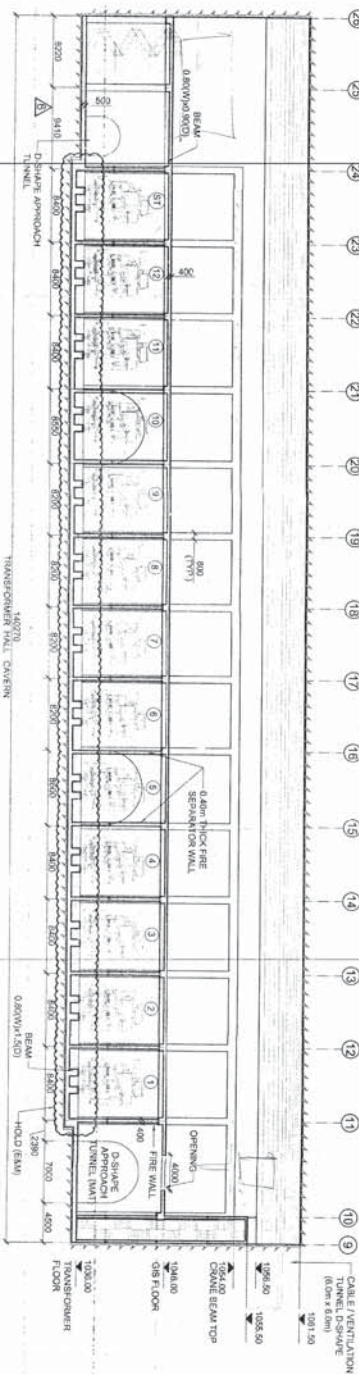
69124 D.F. Trossen 1, Datteln 11 Pk.
C-265 Datteln 62, Tel. 77-17024

DATE	08.02.16	71.2754.08.026	5
APPROVED	SSK		
CHECKED	CHS		
DESIGNED	4SR		
DATE	11.02		
SCALE	1:200		
FORMAT	A1		
REV. NO.			
DRAWING NO.			

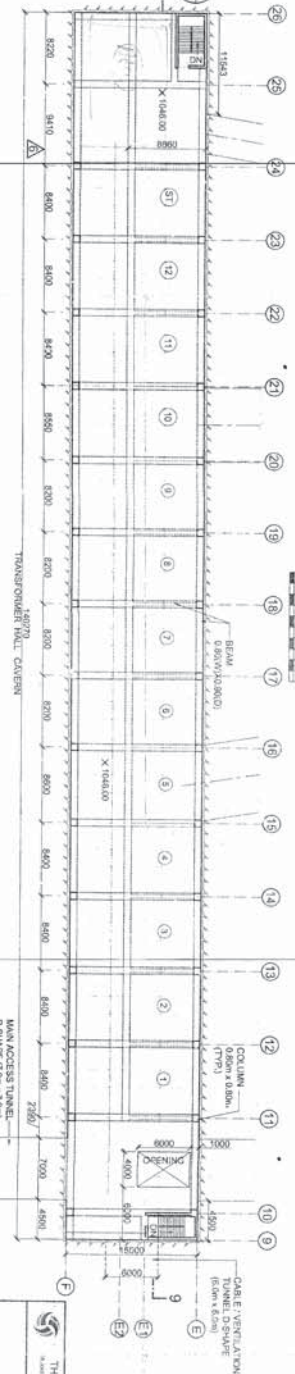
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SECTION 9-9

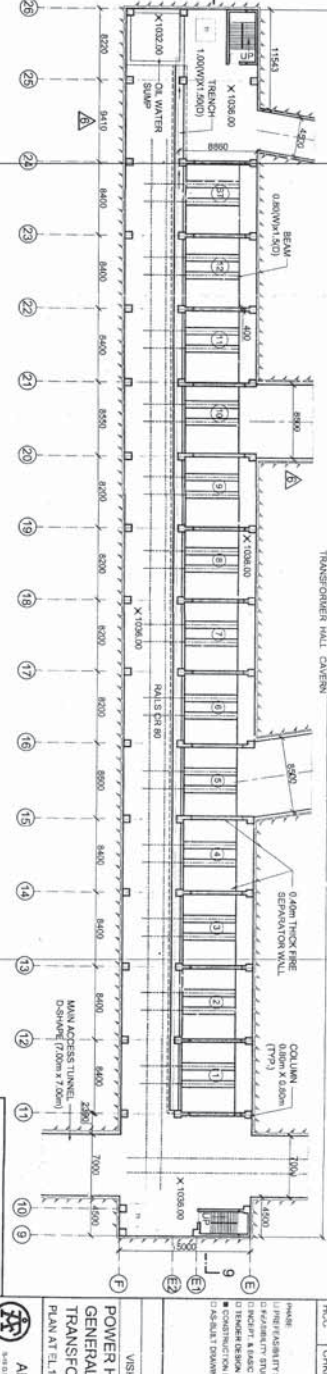
6.25 12.5m



PLAN AT EL 1046.00 (GIS FLOOR)



PLAN AT EL 1036.00 (TRANSFORMER FLOOR)



ISSUED FOR APPROVAL

THDC INDIA LIMITED

APPROVED

UNIT: D&E CIVIL (WPP) / 1036.00

DATE: 21-11-17

DESIGNED BY: [Signature]

CHECKED BY: [Signature]

DATE: 21-11-17

THDC INDIA LIMITED

APPROVED

UNIT: D&E CIVIL (WPP) / 1036.00

DATE: 21-11-17

DESIGNED BY: [Signature]

CHECKED BY: [Signature]

DATE: 21-11-17

THDC INDIA LIMITED

APPROVED

UNIT: D&E CIVIL (WPP) / 1036.00

DATE: 21-11-17

DESIGNED BY: [Signature]

CHECKED BY: [Signature]

DATE: 21-11-17

THDC INDIA LIMITED

APPROVED

UNIT: D&E CIVIL (WPP) / 1036.00

DATE: 21-11-17

DESIGNED BY: [Signature]

CHECKED BY: [Signature]

DATE: 21-11-17

THDC INDIA LIMITED

APPROVED

UNIT: D&E CIVIL (WPP) / 1036.00

DATE: 21-11-17

DESIGNED BY: [Signature]

CHECKED BY: [Signature]

DATE: 21-11-17

THDC INDIA LIMITED

APPROVED

UNIT: D&E CIVIL (WPP) / 1036.00

DATE: 21-11-17

DESIGNED BY: [Signature]

CHECKED BY: [Signature]

DATE: 21-11-17

NO. DWT/VA/20

2

3

4

5

6

7

NO. DWT/VA/20

ALL DIMENSIONS ARE IN MM FIRST ANGLE PROJECTION

Fold-1

Fold-2

FOR ALL OTHER HVAC EQUIPMENTS

CABLE (BIDDER'S SCOPE)

CENTRIFUGAL FAN 2 NOS.

CABLE (BIDDER'S SCOPE)

BIDDER'S SCOPE

AHU FOR TRANSFORMER CAVERN

AHU FOR POWER HOUSE

MCC LOCATED AT BUTTERFLY VALVE CHAMBER (BHEL SCOPE)

MCC LOCATED AT EL.1052.0M FOR ALL EQUIPMENTS FOR POWER & TRANSFORMER CAVERN

CONTROL CABLE (BIDDER'S SCOPE)

INCOMER CABLE (BIDDER'S SCOPE)

BIDDER'S SCOPE

BHEL SCOPE
COMPUTERIZED CONTROL SYSTEM (CCS)
AT EL.1030.50 (BHEL SCOPE)

PMCC AT EL.1036.0 (BHEL SCOPE)

FOR TENDER PURPOSE ONLY

CABLE (BIDDER'S SCOPE)

EXHAUST FAN 2 NOS. (1W+1S)
LOCATED AT NEAR MAT

FRESH AIR FAN 2NOS. (1W+1S)
LOCATED AT NEAR VENTILATION TUNNEL

MCC LOCATED AT POTHHEAD YARD (BHEL SCOPE)

COMPUTER FILE NAME :

CDPY RIGHT AND CONFIDENTIAL
The information on this document is the property of BHARAT HEAVY ELECTRICALS LIMITED
it must not be used directly or indirectly in any way detrimental to the interest of the company.

JOB No.	413
STATUS	CONTRACT
DISTRIBUTION	
TO	
NO. OF	
REV	
DATE	
ALTD	
CHD	
APPD	

4x111 MW VISHNUGAD HEP	
BHARAT HEAVY ELECTRICALS LTD	
POWER SECTOR	
PROJECT ENGINEERING MANAGEMENT	
INDIA	
DEPT	CODE
DRN	YK
DES	WK
CHD	LJ
APPD	GB
DATE	21/02/2020
DATE	21/02/2020
DATE	21/02/2020

ELECTRICAL SCHEME FOR HVAC

MP	C	MSE	I	MAX	E	DEPT.	SCALE:	NTS	DRAWING NO.
						SIGN			PE-DG-413-571-11000-E001
						DATE			SHEET 01 OF 01 REV 00

Fold-2

Fold-1

Fold-3

Fold-3

SIZE-A2