



**4X270 MW BHADRADRI
VENTILATION SYSTEM**

SPECIFICATION NO. PE-TS-411-554-A001

ADDENDUM No. 1

DATE: 28.05.2015

SHEET 1 OF 4

4X270 MW BHADRADRI

ADDENDUM No. 1

(TECH SPEC No. PE-TS-411-554-A001 Rev 0)

VENTILATION SYSTEM



**4X270 MW BHADRADRI
VENTILATION SYSTEM**

SPECIFICATION NO. PE-TS-411-554-A001

ADDENDUM No. 1

DATE: 28.05.2015

SHEET 2 OF 4

ADDENDUM No. 1 TO THE TECHNICAL SPECIFICATION PE-TS-411-554-A001 Rev 0

1. AMENDMENT TO EXISTING CLAUSES OF THE TECHNICAL SPECIFICATION

S.No	VOLUME	SECTION	CLAUSE	Existing Description	To Be Read As (Amendment)
1.	II B	C1A	2.1	The supplied air in the lower level of TG hall after taking the heat load of TG bay rises through different openings to the upper floors and is then finally exhausted (60% of total supplied by Air washers) by means of roof exhausters placed over the roof of TG Hall. (stamp running page no. 10)	The supplied air in the lower level of TG hall after taking the heat load of TG bay rises through different openings to the upper floors and is then finally exhausted (70% of total supplied by Air washers) by means of roof exhausters placed over the roof of TG Hall
2.	II B	C1A	2.2 (3)	<u>Toilets, Pantries:</u> Mechanical ventilation with propeller type exhaust fan. (stamp running page no. 11)	<u>Toilets, pantries:</u> Mechanical ventilation with propeller type exhaust fan. Supply through undercut / opening below door.
3.	II B	C1A	2.2 (4)	<u>Battery and battery charger room:</u> Negative pressurization means of axial flow exhaust having spark proof construction fans with flameproof motors. (stamp running page no. 11)	<u>Battery and battery charger room:</u> Negative pressurization means of axial flow exhaust having spark proof constructions with flameproof motors. Supply of washed air to battery room shall be through intake louvers provided in wall opposite to the exhaust fan.
4.	II B	C1A	2.2 (8)	<u>CW & ACW Pumps House:</u> Supply air by wall-mounted axial flow fans exhaust through louvers. (stamp running page no. 11)	<u>CW & ACW Pumps House:</u> Supply air by wall-mounted axial flow fans exhaust through louvers and exhaust thru gravity louvers.
5.	II B	C1A	2.2 (9)	<u>AC Plant Equipment Areas:</u> Mechanical Exhaust by means of axial flow exhaust fans. (stamp running page no. 11)	<u>AC Plant Equipment Areas:</u> Mechanical Exhaust by means of axial flow exhaust fans and air entry through wall mounted louvers.
6.	II B	C1A	2.2 (10)	<u>SWAS Room (Non AC Area):</u> Supply air through axial fan filter unit and exhaust through gravity damper. (stamp running page no. 11)	<u>SWAS Room (Non AC Area):</u> Supply air from air washer through wall mounted louvers and exhaust through gravity damper.
7.	II B	C1A	2.2 (11)	<u>Oil rooms :</u> Wall mounted exhaust fans (stamp running page no. 11)	<u>Oil rooms :</u> Wall mounted exhaust fans and air entry through wall mounted louvers.
8.	II B	C1A	2.2 (15 & 16)	<u>Chemical House / DM Plant Building :</u> Mechanical exhaust by means of axial flow exhaust fans (stamp running page no. 12)	<u>Chemical House / DM Plant Building :</u> Mechanical exhaust by means of axial flow exhaust fans and air entry through wall mounted louvers.
9.	II B	C1A	2.2 (17)	<u>DM, service and potable water pump house:</u> Mechanical exhaust by means of axial flow exhaust fans (stamp running page no. 12)	<u>DM, service and potable water pump house :</u> Supply air by wall mounted axial flow fans and exhaust through gravity dampers.
10.	II B	C1A	2.2 (18)	<u>ETP / STP :</u> Mechanical exhaust by means of axial flow exhaust fans	<u>ETP / STP :</u> Mechanical exhaust by means of axial flow exhaust fans and air entry through



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S.No	VOLUME	SECTION	CLAUSE	Existing Description	To Be Read As (Amendment)																								
				(stamp running page no. 12)	wall mounted louvers																								
11.	II B	C1A	2.2 (19)	<u>Clarified water pump house:</u> Supply air by wall-mounted axial flow fans exhaust through louvers. (stamp running page no. 12)	<u>Clarified water pump house:</u> Supply air by wall-mounted axial flow fans and exhaust through gravity dampers.																								
12.	II B	C1A	3.0	<u>The outdoor design conditions</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Summer</th> <th>Monsoon</th> <th>Winter</th> </tr> </thead> <tbody> <tr> <td>DBT (°C)</td> <td>36.9</td> <td>31</td> <td>28.8</td> </tr> <tr> <td>WBT (°C)</td> <td>25.6</td> <td>26.2</td> <td>22.8</td> </tr> </tbody> </table> (stamp running page no. 12)		Summer	Monsoon	Winter	DBT (°C)	36.9	31	28.8	WBT (°C)	25.6	26.2	22.8	<u>The outdoor design conditions</u> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th></th> <th>Summer</th> <th>Monsoon</th> <th>Winter</th> </tr> </thead> <tbody> <tr> <td>DBT (°C)</td> <td>42.6</td> <td>30.9</td> <td>20.8</td> </tr> <tr> <td>WBT (°C)</td> <td>26.6</td> <td>25.8</td> <td>18.4</td> </tr> </tbody> </table>		Summer	Monsoon	Winter	DBT (°C)	42.6	30.9	20.8	WBT (°C)	26.6	25.8	18.4
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13.	II B	C1A	3.0	In the areas ventilated by evaporative cooling units, the inside dry bulb temperature shall be restricted to 3°C less than the summer ambient temperature (D) In dry type forced (mechanical) ventilation system, the inside temperature shall be restricted about 5°C higher than the summer ambient (outside) temperature (DB). (stamp running page no. 13)	In the areas ventilated by evaporative cooling units, the inside dry bulb temperature shall be restricted to 5°C less than the summer ambient temperature (DB). In dry type forced (mechanical) ventilation system, the inside temperature shall be restricted about 3°C higher than the summer ambient (outside) temperature (DB).																								
14.	II B	C1A	4.2 (h)	UAF chamber of sheet metal (2mm MS) construction (stamp running page no. 15)	UAF chamber of sheet metal (3.15mm MS) construction																								
15.	II B	C1A	4.5	NIL (stamp running page no. 16)	e). The speed of the roof ventilators shall not exceed 960 rpm for impeller diameters larger than 450 mm and 1440 rpm for impeller diameters 450 mm and less.																								
16.	II B	C1A	5.0 (c)	The air washer shall have minimum 90% saturation efficiency and UAF shall have 60% saturation efficiency (stamp running page no. 17)	The air washer shall have minimum 90% saturation efficiency and UAF shall have 70% saturation efficiency.																								
17.	II B	C1A	5.0 (e)	Velocity of air in duct shall not normally exceed 12 m/sec. However higher velocity of air shall be selected in case of layout constraint to run the ducting. (stamp running page no. 17)	Velocity of air in duct shall not normally exceed 12 m/sec for main duct, 9.0 m/sec for branch duct. However higher velocity of air shall be selected in case of layout constraint to run the ducting.																								
18.	II B	C1A	5.0 (f)	Supply Air Grills/Diffusers: 6m/s through face area (Max.) (stamp running page no. 17)	Supply Air Grills/Diffusers: 5m/s through face area (Max.)																								
19.	II B	C1A	6.4 (a)	Moisture Eliminators plates: 100% virgin PVC die-extruded construction of minimum finished thickness of 2 mm.	Moisture Eliminators plates: 100% virgin PVC die-extruded construction of minimum finished thickness of 3 mm.																								



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S.No	VOLUME	SECTION	CLAUSE	Existing Description	To Be Read As (Amendment)
				(stamp running page no. 21)	
20.	II B	C1A	6.5 (a)	Eliminators plates: 100% virgin PVC die-extruded construction of minimum finished thickness of 2 mm. (stamp running page no. 21)	Moisture Eliminators plates: 100% virgin PVC die-extruded construction of minimum finished thickness of 3 mm.
21.	II B	C1A	6.6.1 (b)	<u>Efficiency:</u> Average arrestance of 65-80% when tested in accordance with BS: 6540 / AS HRAE – 52-76. (stamp running page no. 22)	<u>Efficiency:</u> Shall be 90% down to 10 microns.
22.	II B	C1A	6.7 (b)	<u>Efficiency:</u> Average arrestance of 80-90% when tested in accordance with BS: 6540 / AS HRAE – 52-76 (stamp running page no. 23)	Deleted
23.	II B	C1A	6.7 (f)	The filter media shall be of High Density Polyethylene (HDPE) or equivalent and shall have efficiency not less than 85% down to particle size of 10 microns. (stamp running page no. 23)	The filter media shall be of High Density Polyethylene (HDPE) or equivalent and shall have efficiency not less than 99.5% down to particle size of 5 microns.
24.	II B	C1C	2.0	Temperature test at the out let of Air washer & UAF. The dry bulb temp shall be measured by measured by sling psychrometer which will have accuracy of +/-0.5% with a least count of 0.5 deg C. This will be carried out for 24 hrs continuously and readings will be taken every two hours. Standby equipments should be changed over during these 24 hours. This test shall be carried out during summer between months April to June. The format for recording the readings is as under. (stamp running page no. 105)	Temperature test at the out let of Air washer & UAF. The dry bulb temp shall be measured by measured by sling psychrometer which will have accuracy of +/-0.5% with a least count of 0.5 deg C. This will be carried out for 24 hrs continuously and readings will be taken every two hours. Standby equipment should be changed over during these 24 hours. This test shall be carried out during summer between months April to June. The format for recording the readings is as under. Measurement and requirement shall be guaranteed for cable spreader, HT switch gear, LT Switch gear, Cable Vault, Cable vault for boiler MCC & ESP building etc. Measurement of temperature shall also be recorded for TG building.
25.	II B	Annexure		Annexure-I "LIST OF MAKES" (stamp running page no. 270 to 272)	Revised Annexure-I "LIST OF MAKES" Rev 01 shall be considered as attached enclosure.
26.	III	5.		Suggestive price format (stamp running page no. 358 to 361)	Revised Suggestive price format Rev 01 shall be considered as attached enclosure.
27.	III	6.		Guaranteed power consumption (stamp running page no. 366).	Revised Guaranteed power consumption Rev 01 shall be considered as attached enclosure.
28.	III	7(l).		Typical scheme of air washer unit (PE-DG-411-554-A001 R-0), stamp running page no. 367.	Revised Typical scheme of air washer unit (PE-DG-411-554-A001 R-1) shall be considered as attached enclosure.



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S.No	VOLUME	SECTION	CLAUSE	Existing Description	To Be Read As (Amendment)
29.	III	7(II).		Typical scheme of UAF unit (PE-DG-411-554-A002 R-0), stamp running page no. 368.	Revised Typical scheme of UAF unit (PE-DG-411-554-A002 R-1) shall be considered as attached enclosure.
30.	III	7(III).		Make up water scheme with battery limit (PE-DG-411-554-A003 R-0), stamp running page no. 369.	Revised Make up water scheme with battery limit (PE-DG-411-554-A003 R-1) shall be considered as attached enclosure.



**4X270 MW BHADRADRI TPS
VENTILATION SYSTEM
LIST OF MAKES**

SPECIFICATION NO. PE-TS-411-554-A001

VOLUME II B

SECTION C

REV 01

DATE: MAY 2015

SHEET 1 OF 3

ANNEXURE-I

LIST OF MAKES



**4X270 MW BHADRADRI TPS
VENTILATION SYSTEM
LIST OF MAKES**

SPECIFICATION NO. PE-TS-411-554-A001

VOLUME II B

SECTION C

REV 01

DATE: MAY 2015

SHEET 2 OF 3

S.No.	Description	Makes
1.	AIR WASHER & UAF*	HYDERABAD POLLUTION CONTROL / SK SYSTEM / ADVANCE VENTILATION / DRAFT AIR / BLUE STAR / VOLTAS / STERLING WILSON & ROOTS COOLING SYSTEM / C.DOCTOR & OTHER BHEL QUALIFIED VENDOR
2.	CENTRIFUGAL FAN	FLAKT / KRUGGER / DRAFT AIR / HYDERABAD POLLUTION CONTROL / ADVANCE VENTILATION / PATEL AIR / NICOTRA/ SK SYSTEM / MARATHON / CB DOCTOR / SARLA
3.	AXIAL FLOW FANS/RE UNITS	HYDERABAD POLLUTION/ SK SYSTEM / ADVANCE VENTILATION / KRUGER / NICOTRA / MARATHON / FLAKT / CB DOCTOR/ PATEL AIR /SITAL
4.	CENTRIFUGAL WATER PUMP	BEST & CROMPTON / JYOTI / SAM TURBO / KBL / KSB / M&P / VOLTAS / BEACON-WEIR / WORTHINGTON / FLOWMORE / SULZER / BHARAT PUMPS & COMPRESSORS LTD / FLOWSERVE INDIA CONTROL PVT LTD / V-FLOW PUMPS & SYSTEMS CO
5.	INDUCTION MOTORS (LT)	SIEMENS / ABB / CGL / MARATHON / KEC / BHARAT BIJLEE / NGEF /JYOTI / LHP
6.	AIR FILTER	PUROLATOR / FMI / ANFILCO / TENACITY / JOHN FOWLER /SPECTRUM / AIR TECH / PUROMATIC
7.	INSULTATION MATERIAL	BEARDSHELL / K-FLEX / PARAMONT/ ARMAFLEX / SUPREME / LLOYDS / UP TWIGA
8.	FIRE DAMPER	TSC / CARRYAIRE / RAVISTAR (SYSTEM AIR)
9.	BUTTERFLY VALVE	AUDCO / FOURESS / INTER VALVE / BDK / WEIR BDK / TYCO / CRANE PROCESS / KEYSTONE
10.	NON RETURN VALVE	LEADER / H.SARKAR / FLUID LINE / HI -TECH / CRESENT / A V VALVES / BANKIM & COMPANY / SHIVADURGA
11.	GATE/GLOBE VALVES	CRESENT / BDK / AUDCO / FOURESS / KIRLOSAR / SANT / BOMBAY METAL & ALLOYS / BANKIM / LEADER / H SARKAR / AV VALVES / VENUS PUMPS AND ENGG
12.	PIPING - ERW	SURYA ROSHNI / TISCO / DADU PIPES / INDUS TUBE / WELSPUN / TATA / BST / JINDAL / SAIL
13.	GI SHEETS FOR DUCTING	TISCO / INDIAN IRON & STEEL CO LTD. / RASHITRYA ISPAT NIGAM LTD. / ESSAR/ ISPAT INDUSTRIES / JSW STEEL / LLOYDS STEEL / BHUSHAN / TATA / SAIL / JINDAL
14.	HUMID STAT	JHONSON CONTROL / HONEYWELL / PENN
15.	PRESSURE GAUGE	GENERAL INST CONSORTIUM / WAAREE INSTRUMENTS / A.N. INST / WIKA / ASHCROFT / BAUMER TECHNOLOGIES
16.	TEMPERATURE GAUGE	PYRO ELECTRIC / WAREE INSTRUMENTS / A.N.INST / GOA INSTRUMENTS / WIKA/ ASHCROFT
17.	LEVEL GAUGE	GENERAL INSTRUMENTS / CHEMTROLS / LEVCON



**4X270 MW BHADRADRI TPS
VENTILATION SYSTEM
LIST OF MAKES**

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VOLUME II B

SECTION C

REV 01

DATE: MAY 2015

SHEET 3 OF 3

18.	PRESSURE SWITCH / DP SWITCHES	SWITZER / INDFOSS / GIC
19.	LEVEL SWITCH	HI TECH / LEVCON / V ATUOMATE /CHEMTROLS
20.	Y / POT STRAINER	MULTITEX / GREAVES COTTON / JAYPEE / SANT / OTOKLIN / GRAND PRIX / GUJARAT OTOLIFT / DS ENGG / SAROJINI ENTERPRISE / BHATIA ENGINEERING / FILTERATION ENGINEERS INDIA PVT LTD / SUNGOV ENGINEERING
21.	CONTROL PANEL	INDUSTRIAL CONTROL & APPLIANCE/ PYROTECH /POSITRONICS / CONTROL & SWITCHGEAR /SIEMENS / L&T /GE POWER /RITTAL / HOFFMAN
NOTE		
	* Designed by C. Doctor / Blue Star / Voltas / Hyderabad Pollution Controls / SK System /Advance Ventilation / Draft Air / Sterling & Wilson / Roots cooling / Other BHEL qualified Vendor and fabricated by their approved fabricators.	
	Above sub-vendor are also subjected to Customer approval during detailed engineering.	

VENTILATION SYSTEM FOR BHADRADRI TPS (4X270 MW) - SUGGESTIVE PRICE FORMAT Rev.01 dated 28.05.2015

Clause No.	DESCRIPTION	Qty.	Unit	SUPPLY						ERECTION AND COMMISSIONING				TOTAL
				Unit Price (Rs)	Total ex-works price (Rs)	ED (IncCESS) (Rs)	CST / VAT (Rs)	Freight (Including service tax, if applicable) (Rs)	TOTAL FOR site price SUPPLY (Rs)	Unit Price (Rs)	Total price (Rs)	Service Tax (Rs)	TOTAL PRICE (Erection and commissioning including Service tax)	Total Price Supply FIOR site and E&C including service tax
1.0	Total lumpsum firm prices for equipment & Services as specified, Comprising Engineering, design, manufacture, inspection & Testing at manufacturer's/subvendor's works, Painting at manufactures works, duly packed for transportation, delivery to site, unloading, storage & handling at site, fabrication, erection and commissioning, performance and guarantee testing, submission of as built drawing, carrying out acceptance tests at site, and final painting of complete Ventilation system on turnkey basis as per specification PE-TS-411-554-A001 including mandatory spares, special tool & tackels for maintenance, commissioning spares, all taxes, duties etc.													
2.0	Break up prices for items covered in clause 1.0 above. In case, price indicated above does not match with item wise break-up given at 2.0, the highest price so calculated shall be considered for evaluation but in case of order, the same shall be placed at the lowest price.													
	VENTILATION SYSTEM													
2.1	Sheet metal containarized type air washer unit with centrifugal fan (DIDW) with motor, pumps with motors, air washer internals, inlet air louvers, filters, piping as per IS:1239, Part-I (heavy class galvanised), valves, nozzles, level switch, temp indicators, back wash arrangement, galvanised drain piping, etc as per specification of capacity 1,30,000 CMH. Each air washer has 1 no centrifugal fan (1 x 100% duty) of capacity 1,30,000 CMH at min. 75 mm SP.	16	NO											
2.2	Unitary air filtration unit with centrifugal fan (SISW) with motor, pumps with motors, filters, UAF internals, piping as per IS: 1239 pt I (heavy class galvanised), valves for auto start of standby equipment, nozzles, level switch, pressure switches, Temp. indicators, back wash arrangement, galvanised drain piping etc. as per spec. (Fan capacity 50,000 CMH at 60 mmwc static pressure)	2	NO											
2.3*	Supply air ducting (finished) for above area complete with dampers, grills (with VCD & without VCD), supports (painted) and all accessories as specified.													

VENTILATION SYSTEM FOR BHADRADRI TPS (4X270 MW) - SUGGESTIVE PRICE FORMAT Rev.01 dated 28.05.2015

Clause No.	DESCRIPTION	Qty.	Unit	SUPPLY						ERECTION AND COMMISSIONING				TOTAL
				Unit Price (Rs)	Total ex-works price (Rs)	ED (Inc CESS) (Rs)	CST / VAT (Rs)	Freight (Including service tax, if applicable) (Rs)	TOTAL FOR site price SUPPLY (Rs)	Unit Price (Rs)	Total price (Rs)	Service Tax (Rs)	TOTAL PRICE (Erection and commissioning including Service tax)	Total Price Supply FIOR site and E&C including service tax
2.3.1*	Finished GSS (zinc coating 180 gms/sq.m) Ducting with support structure etc.													
a)*	18 G	4700	SQM											
b)*	20 G	6500	SQM											
c)*	22 G	6500	SQM											
d)*	24 G	4600	SQM											
2.3.2*	MS Duct With Epoxy paint for battery room.	300	SQM											
2.3.3*	MS Grilles with VCD	300	SQM											
2.3.4*	MS Grilles without VCD	20	SQM											
2.3.5*	Thermal insulation 25 mm expanded polystyrene finished with sand cement plaster as specified for supply air duct	3500	SQM											
2.3.6*	Wall mounted dampers (gravity operated) for different areas.	40	SQM											
2.3.7*	Inlet Louvres	20	SQM											
2.3.8*	VOLUME CONTROL DAMPERS in GI construction as per specifications	20	SQM											
2.4*	FIRE DAMPER													
a)*	Fire damper	30	SQM											
b)*	Motorized Actuator with single phase power supply for the above Fire damper with auto resetting, limit switches, indication lamps etc	45	Nos											
c)*	Fusible Link type Fire Damper	20	SQM											
2.5*	Roof extractor units (axial flow type) with hood, disconnect switch and all accessories as specified. Following fan shall have 15 mmwc static pressure.													
a)*	Capacity 50,000 CMH with Motor rating 5.5 KW	32	Nos.											
b)*	Capacity 40,000 CMH with Motor rating 5.5 KW	6	Nos.											
c)*	Capacity 20,000 CMH with Motor rating 2.2 KW	28	Nos.											
2.6*	Axial flow supply fans with pre and fine filter (wall mounted) complete with casing, TEFC sq cage induction motors & mounting frame, MS rain protection cowl, bird screen and all other accessories (suitable for 415V/3-phase supply). Following fan shall have 30 mmwc static pressure.													

VENTILATION SYSTEM FOR BHADRADRI TPS (4X270 MW) - SUGGESTIVE PRICE FORMAT Rev.01 dated 28.05.2015

Clause No.	DESCRIPTION	Qty.	Unit	SUPPLY						ERECTION AND COMMISSIONING				TOTAL
				Unit Price (Rs)	Total ex-works price (Rs)	ED (Inc CESS) (Rs)	CST / VAT (Rs)	Freight (Including service tax, if applicable) (Rs)	TOTAL FOR site price SUPPLY (Rs)	Unit Price (Rs)	Total price (Rs)	Service Tax (Rs)	TOTAL PRICE (Erection and commissioning including Service tax)	
a)*	Capacity 10,000 CMH with Motor rating 2.2 KW	8	Nos.											
b)*	Capacity 7,500 CMH with Motor rating 1.5 KW	65	Nos.											
c)*	Capacity 6,000 CMH with Motor rating 1.1 KW	20	Nos.											
d)*	Capacity 4,000 CMH with Motor rating 0.75 KW	15	Nos.											
2.7*	Axial flow supply fans with pre filter (wall mounted) complete with casing, TEFC sq cage induction motors & mounting frame, MS rain protection cowl, bird screen and all other accessories (suitable for 415V/3-phase supply). Following fan shall have 20 mmwc static pressure.													
a)*	Capacity 10,000 CMH with Motor rating 1.5 KW	52	Nos.											
b)*	Capacity 7,500 CMH with Motor rating 1.1 KW	20	Nos.											
c)*	Capacity 6,000 CMH with Motor rating 1.1 KW	8	Nos.											
d)*	Capacity 4,000 CMH with Motor rating 0.75 KW	8	Nos.											
2.8*	Axial flow exhaust fans (Bifurcated type, spark proof construction, wall mounted) complete with casing, flame proof motor & mounting frame, MS rain protection cowl, bird screen and all other accessories epoxy painted (suitable for 415V/3-phase supply). Following fan shall have 15 mmwc static pressure.													
a)*	Capacity 15,000 CMH with Motor rating 2.2 KW	5	Nos.											
b)*	Capacity 10,000 CMH with Motor rating 1.5 KW	56	Nos.											
c)*	Capacity 7,500 CMH with Motor rating 1.1 KW	6	Nos.											
d)*	Capacity 2,000 CMH with Motor rating 0.55 KW	9	Nos.											
2.9*	Axial flow exhaust fans (Wall mounted) complete with casing, TEFC sq cage induction motor & mounting frame, MS rain protection cowl, bird screen and all other accessories epoxy painted (suitable for 415V/3-phase supply) as specified. Following fan shall have 10 mmwc static pressure.													
a)*	Capacity 15,000 CMH with Motor rating 1.1 KW	73	Nos.											
b)*	Capacity 10,000 CMH with Motor rating 0.75 KW	42	Nos.											
c)*	Capacity 7,500 CMH with Motor rating 0.55 KW	16	Nos.											
d)*	Capacity 6,000 CMH with Motor rating 0.55 KW	35	Nos.											
e)*	Capacity 2,000 CMH with Motor rating 0.37 KW	14	Nos.											

VENTILATION SYSTEM FOR BHADRADRI TPS (4X270 MW) - SUGGESTIVE PRICE FORMAT Rev.01 dated 28.05.2015

Clause No.	DESCRIPTION	Qty.	Unit	SUPPLY						ERECTION AND COMMISSIONING				TOTAL
				Unit Price (Rs)	Total ex-works price (Rs)	ED (Inc CESS) (Rs)	CST / VAT (Rs)	Freight (Including service tax, if applicable) (Rs)	TOTAL FOR site price SUPPLY (Rs)	Unit Price (Rs)	Total price (Rs)	Service Tax (Rs)	TOTAL PRICE (Erection and commissioning including Service tax)	
2.10*	Exhaust fan (propeller type) completes with induction motor & mounting frame MS rain protection cowl, bird screen and all other accessories as specified (suitable for 240V/ 1 phase). Following fan shall have 5 mmwc static pressure.													
a)*	Capacity 1200 CMH with Motor rating 100 watts	156	Nos.											
2.11	Total lumpsum price for special tools & tackles for maintenance inclusive of packing forwarding, transportation up to site, etc. (Bidder shall submit item-wise price break-up).	1	LOT											
2.12	Total lumpsum price for commissioning spares inclusive of packing forwarding, transportation up to site, etc. (Bidder shall submit item-wise price break-up).	1	LOT											
2.14	FIELD INSTRUMENTS like pressure gauge, temperature gauge, pressure switch, differential pressure switch, flow switch and other instrument required for Ventilation System etc.	1	LOT											
2.15	Any other item not indicated above, but required to make the system complete in all respects.	1	LOT											
2.16	Total lumpsum price for Mandatory Spare inclusive of packing forwarding, transportation up to site, etc. (Bidder to submit item-wise price break-up seperately).	1	LOT											

Note:

- 1 The bidder shall furnish unit rates for variable item (marked *) i.e., ducting, supply grilles (with and without VCD), fire damper, thermal insulation for ducting, gravity damper, MS Air-intake Louvers for Aux. Bldgs. only., RE Units, Axial Flow fans (Supply/Exhaust), Propellor Fans etc for necessary adjustment (plus or minus) variation during detailed engg. stage. The unit rates quoted above shall be considered and no separate unit rates shall be quoted. Unit rates shall be valid throughout the contract.
- 2 Bidder must submit prices in the Pro Forma duly filled in signed and stamped on every page without any ambiguity. The price shall be written against each item. Term such as "refer covering letter" etc. are not acceptable. Extra sheet may be attached if the space provided is not sufficient
- 3 Price format shall not be changed by the bidder
- 4 Any other item not indicated above, but required to complete Ventilation package as per system requirements.
- 5 For limitation on payment, percentages of individual items/equipments, as specified in the appendix-A shall be applicable

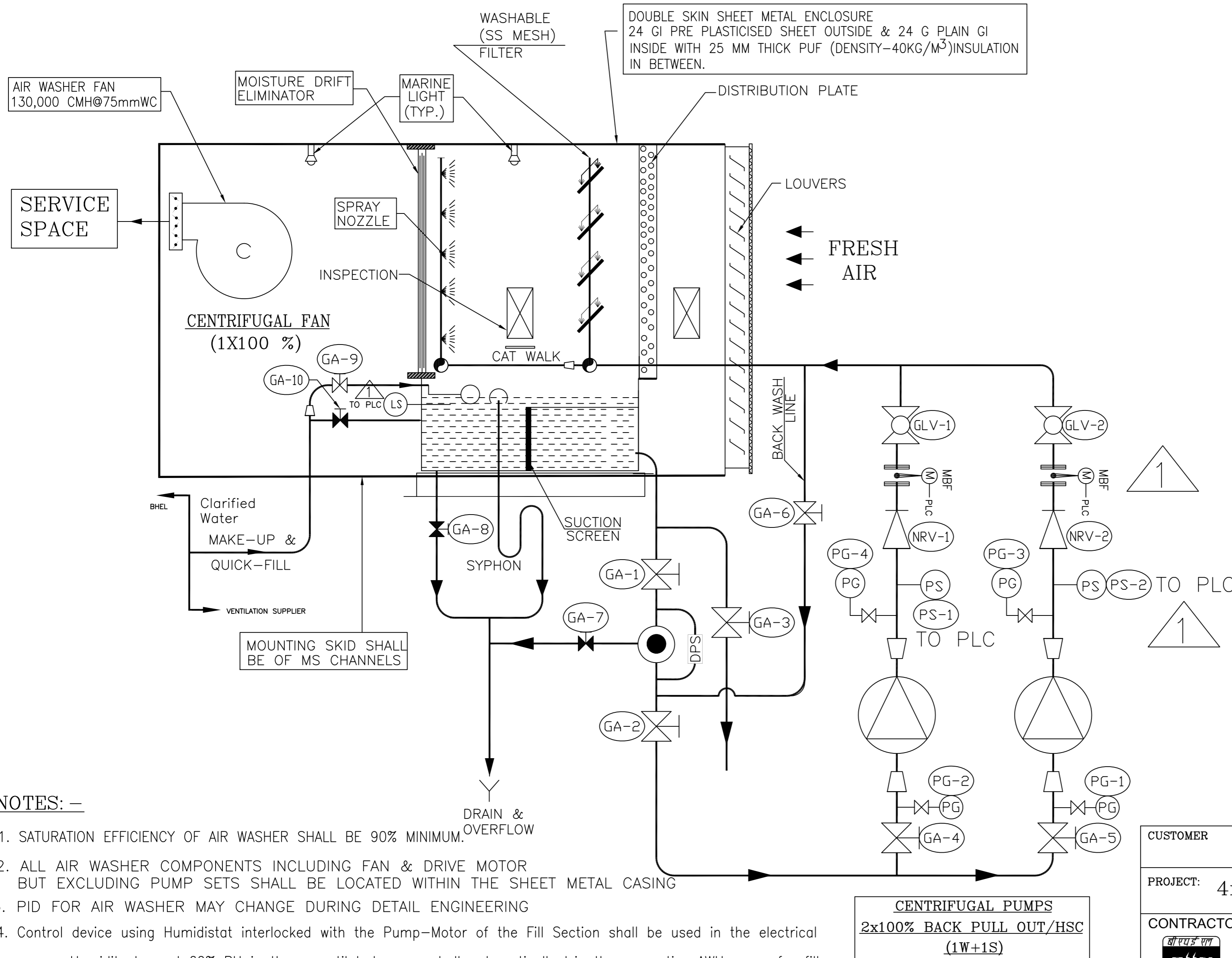
4X270 MW BHADRADRI TPS
VENTILATION SYSTEM
GUARANTEED POWER CONSUMPTION FIGURES Rev 01

S.NO.	DESCRIPTION OF EQUIPMENT	NO OF EQUIPMENT		TOTAL GUARANTEED POWER CONSUMPTION FOR EACH EQUIPMENT AT MOTOR INPUT TERMINAL AND CONTROL PANEL (IN KW)	DUTY FACTOR	TOTAL KW
		WORKING	STANDBY			
		3A	3B	4	5	6=3Ax4x5
1	VENTILATION SYSTEM FOR TG BUILDING					
1.1	Centrifugal Fan of cap. 1,30,000 CMH at 75 mmwc static pr for air washers.	16	0			
1.2	Pumps for circulation of water in spray chamber of above air washer	16	16			
1.3	RE Units 50,000 cmh at 15mmwc	26	0			
1.4	Centrifugal Fan of cap. 50,000 CMH at 60	4	0			
1.5	Pump for above UAF.	4	4			
TOTAL (KW)						1060

NOTE:

1 Estimated power consumption (EPC) figure for the system (for working drives only) has been considered as **1060 KW**. So long bidder's quoted guaranteed power consumption (GPC) above remains within this EPC, there will be no technical loading of bid on power consumption for evaluation. However, if bidder's quoted GPC exceeds EPC, there shall be technical loading of bid for evaluation @ **Rs 2,52,000/-** per KW of additional power over EPC.

2 Bidder's guaranteed power consumption at motor input terminals (not shaft power) as furnished in relevant schedule shall be demonstrated by the successful bidder during performance testing at works/ site. In case power consumption is noted higher than EPC / bidder's quoted GPC whichever is higher, during inspection/ PG test, penalty @ **Rs 2,52,000/-** per KW shall be levied on vendor.



LEGEND: -

SYMBOL	DESCRIPTION
	GATE VALVE
	GATE VALVE (NORMALLY CLOSED)
	GLOBE VALVE
	CHECK VALVE (NON-RETURN VALVE)
	POT STRAINER
	VOLUME CONTROL DAMPER(OPPOSD.BLD.)
	CENTRIFUGAL PUMP
	SS FILTER
	PRESSURE GAUGE
	PRESSURE SWITCH
	LEVEL SWITCH
	LOW LEVEL SWITCH
	TEMPERATURE INDICATOR
	FLOAT VALVE
	REDUCER
	SCOPE OF SUPPLY
	CENTRIFUGAL FAN
	DIFFERENTIAL PRESSURE SWITCH
	MOTORISED BUTTER FLY VALVE

FOR TENDER

- NOTES: -**
- SATURATION EFFICIENCY OF AIR WASHER SHALL BE 90% MINIMUM.
 - ALL AIR WASHER COMPONENTS INCLUDING FAN & DRIVE MOTOR BUT EXCLUDING PUMP SETS SHALL BE LOCATED WITHIN THE SHEET METAL CASING
 - PID FOR AIR WASHER MAY CHANGE DURING DETAIL ENGINEERING
 - Control device using Humidstat interlocked with the Pump-Motor of the Fill Section shall be used in the electrical areas. Humidity beyond 60% RH in these ventilated space shall automatically trip the respective AWU pump for fill section only. The pump may be restarted automatically at about 50% RH. Selection and starting of stand-by pump shall be automatic.
At least two (2) nos. Humidstat (RH High and Low) shall be provided for each Air Washer Unit. However, manual over riding facility shall be provided for humidistat controlled Pump sets of the Air Washer Unit.
 - P&ID shows only the bare minimum requirement of valves and instruments. Any instrumentation & valves as required for the completion of the system in line with technical specification shall be provided by bidder during detailed engineering without any commercial implication.

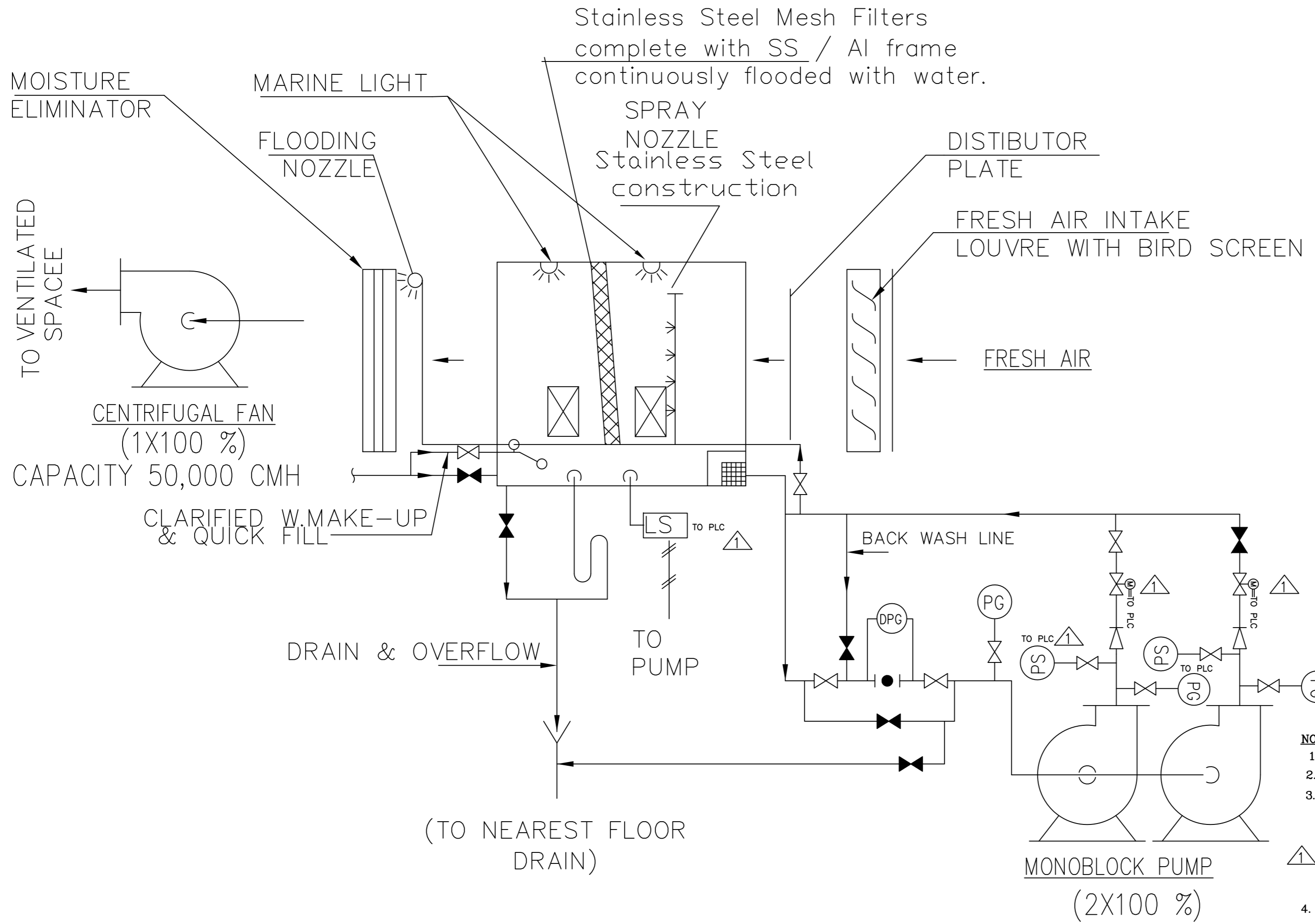
CUSTOMER: TSGENCO
 PROJECT: 4x270 MW MANUGURU TPS, TELANGANA
 CONTRACTOR: BHARAT HEAVY ELECTRICALS LTD
 POWER SECTOR
 PROJECT ENGINEERING MANAGEMENT, NOIDA

DESIGN. & DRAWN	NAME	DATE
CHECKED		
APPROVED		

TITLE: P&I DIAGRAM FOR AIR WASHER SYSTEM

REV. NO	DATE	DESCRIPTION	REVD. BY	CHKD. BY	APPD. BY
01	28.05.15	PID revised as per consultant comments	AK	SAK	PK

DEPT.	SCALE: 1:1	BHEL DRAWING NO:
SIGN		PE-DG-411-554-A001
DATE		SHEET: 1 OF 1 REV - 01



LEGEND:

GATE VALVE	
CHECK VALVE	
GLOBE VALVE	
GATE VALVE (NORMALLY CLOSED)	
POT STRAINER	
SYPHON	
DRAIN	
PRESSURE GAUGE	
LEVEL SWITCH	
COARSE STRAINER	
DIFF. PRESURE GAUGE	
PRESSURE SWITCH	
MOTORIZED BUTTER FLY VALVE	

NOTES:-

1. SATURATION EFFICIENCY OF UAF SHALL BE 70% MINIMUM.
2. PID FOR UAF MAY CHANGE DURING DETAIL ENGINEERING
3. Control device using Humidistat interlocked with the Pump Motor of shall be used in the electrical areas. Humidity beyond 60% RH in these ventilated space shall automatically trip the respective UAF pump. The pump may be restarted automatically at about 50% RH. Selection and starting of stand-by pump shall be automatic. At least two (2) nos. Humidistat (RH High and Low) shall be provided for each UAF Unit. However, manual over riding facility shall be provided for humidistat controlled Pump sets of the UAF Unit.
4. P&ID shows only the bare minimum requirement of valves and instruments. Any instrumentation & valves as required for the completion of the system in line with technical specification shall be provided by bidder during detailed engineering without any commercial implication.

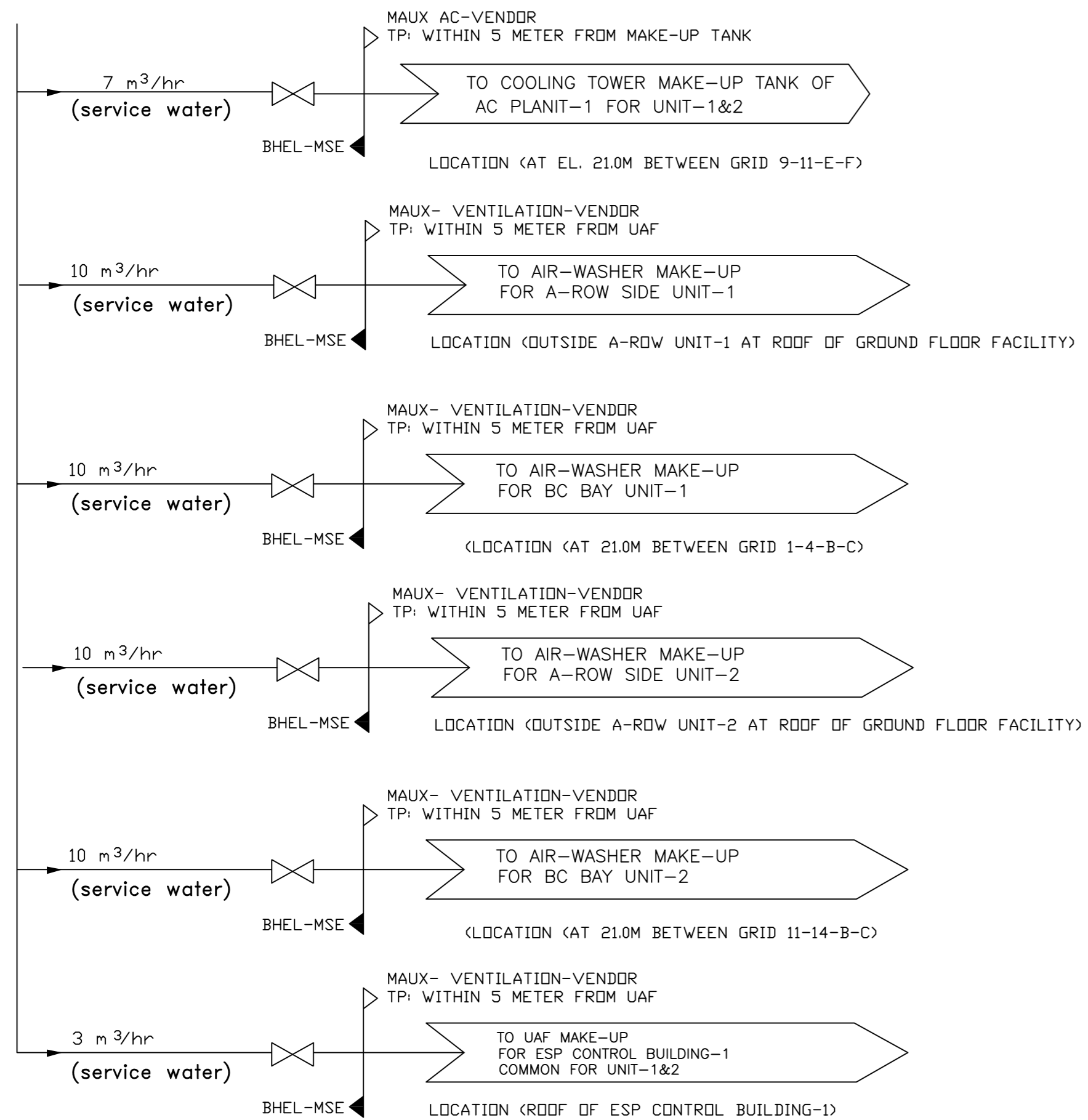
TYPICAL SCHEME FOR UAF UNIT FOR CAPACITY: 50,000 CMH STATIC PR. 60 mmwc

FOR TENDER

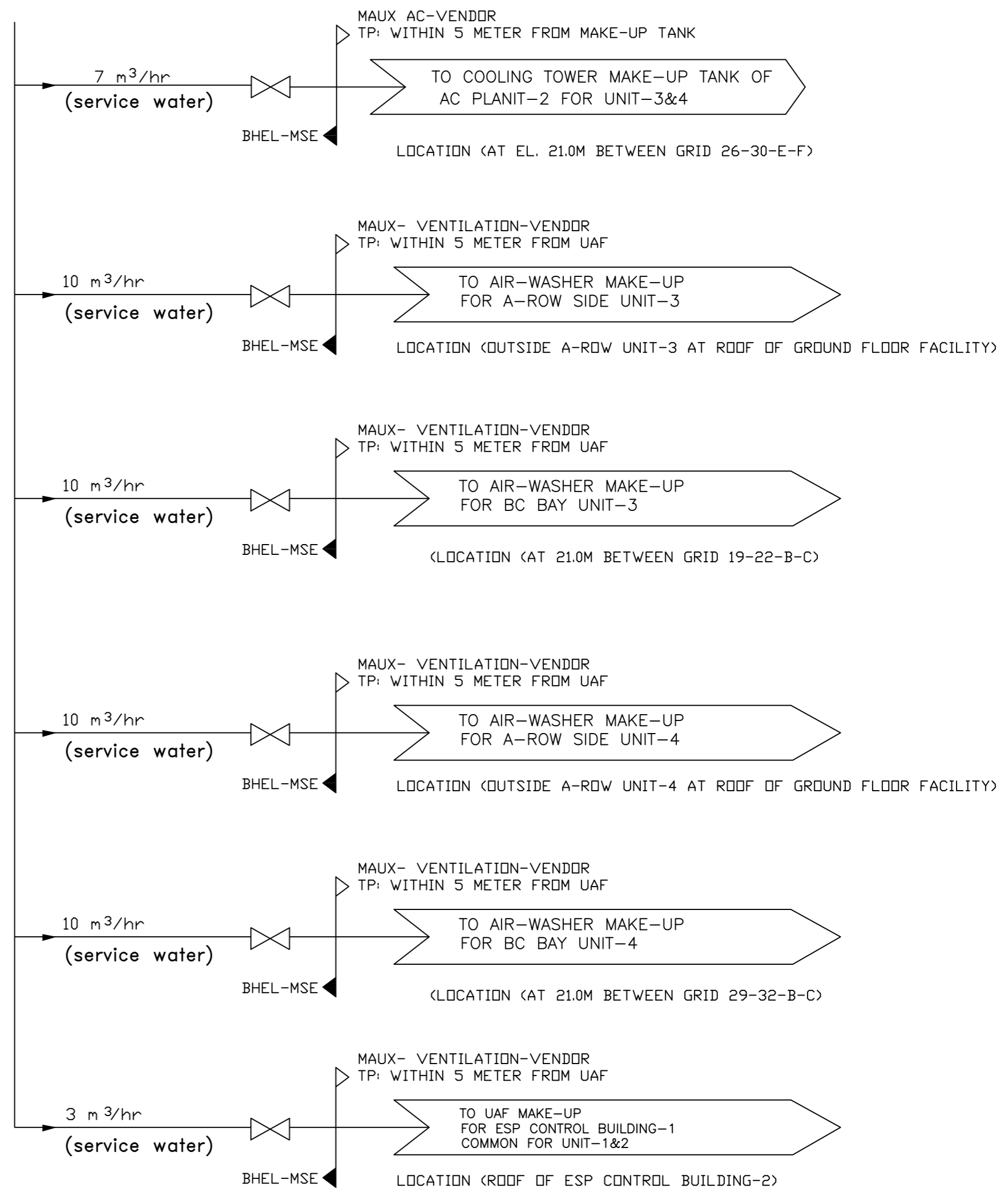
CUSTOMER	TSGENCO				
STATUS	CONTRACT	4x270 MW MANUGURU TPS, TELANGANA			
JOB NO.	360	VENTILATION SYSTEM			
REV	DATE	ALTD	CHD	APPD	
01	28.05.15	AK	SAK	PK	
01	Revised as per Consultant comments				
DEPT. SCALE		BHEL DRAWING NO.			
SIGN		PE-DG-411-554-A002.			
DATE		SHEET 1 OF 1 REV 01			

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4X270 MW BHADRADRI TPS FOR UNIT-1&2



4X270 MW BHADRADRI TPS FOR UNIT-3&4



NOTE:-

- HVAC MAKE-UP WATER PIPING INCLUDING FITTINGS SHALL BE TERMINATED WITHIN THE RANGE OF 5 METER DISTANCE FROM MAKE-UP WATER TANK / AIR-WASHER BY BHEL FURTHER PIPING SHALL BE DONE BY VENDOR AS MARKED IN THIS DRG.

PROJECT TITLE				4X270 MW BHADRADRI TPS			
TITLE				MAKE UP WATER SCHEME FOR HVAC SYSTEM			
DRG. NO.				PE-DG-411-554-A003 REV 01			
SCALE	DATE	CHECKED					
NTS	DRAWN	APPROVED					

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