

POWERGRID CORPORATION OF INDIA LTD.

TOWER SPOTTING DATA




FOR

**132KV S/C (Single) TRANSMISSION LINE.
ACSR "PANTHER" CONDUCTOR-MAX TEMP-75 DEG C
(Using Tower A, B, C, D & E)**

**FOR WIND Speed-58 M/Sec
For Altitude: up to 2000m**

DOC.No. CC:ENGG:TL:TS:HILL:132:50 REV:1

**Project: 132KV S/C BALIPARA - KHUPI KIMI TRANSMISSION LINE -NEEPCO
CONSULTANCY**

Revision	Date	Description	Prepared By	Reviewed By	Approved By
1	21.11.2022	Leg combination and sag tension enclosed.			

PREPARED BY REVIEWED BY APPROVED BY

NOTE: Old tower spotting data approved earlier recompliled after enclosing leg combination and sag tension enclosed .

FOR 132 KV S/C

POWER GRID CORPORATION OF INDIA LTD., NEW DELHI
 TOWER SPOTTING DATA
 (BASIC WIND SPEED 50 M/SEC)

DRG. NO. CC:ENGG:TL:TS:HILL:132:501
 SHEET NO. 1 OF 3

132 KV S/C BALIBARA-KHUPI KIMI TRANSMISSION LINE - NEEPCO CONSULTANCY

DESCRIPTION

1. NORMAL SPAN 300 M

2. ALL SPAN ARE IN M

3. ALL LOADS ARE IN KG

ELECTRICAL CLEARANCE FOR XING OF RLY TRACKS MINIMUM CLEARANCE SHALL BE 17.9 METRES. HOWEVER APPROVAL OF RAILWAY CROSSING FROM RAILWAY AUTHORITY HAS TO BE OBTAINED IN EACH CASE

5. MINIMUM CLEARANCE FROM POWER LINE TO POWER LINE CROSSING (AS PER IS-5613 PART-II/SEC-I)

KV TO BE CROSSED	CLEARANCE IN METERS
23KV TO 132KV	3.05
220KV	4.58
400KV	6.10

6. MINIMUM GROUND CLEARANCE REQUIRED:

- a) 6100 mm for location above 1000 M from MSL
- b) 5330 mm for location above 1000 M from MSL

7. UPLIFT SPANS ARE INDICATED WITH A NEGATIVE MARK (-)

7. BROKEN WIRE CONDITION ANY ONE POWER CONDUCTOR OR GROUND WIRE BROKEN

8. MAXIMUM SUM OF ADJACENT SPANS FOR VARIOUS ANGLES OF DEVIATION ARE SUBJECT TO AVAILABILITY OF MINIMUM LIVE METAL AND GROUND CLEARANCES

9. LIMIT OF HIGHWAY CROSSING : 250 M

SL. NO.	DESCRIPTION	TOWER TYPE			
11.	DEVIATION NOT TO EXCEED	A	B	C	D/DE*
12.	INSULATOR STRING DETAILS	TENSION	TENSION	TENSION	TENSION
13.	VERTICAL LOAD LIMITATION ***				
	WEIGHT SPAN IN METERS (conductor)	MAX(MIN)	MAX(MIN)	MAX(MIN)	MAX(MIN)
	a) EFFECT OF BOTH SPANS	500 (270)	1000(-1000)	1000(-1000)	1000(-1000)
	b) EFFECT OF ONE SPAN	300(100)	600(-600)	600(-600)	600(-600)
14.	PERMISSIBLE SUM OF ADJACENT SPANS FOR VARIOUS DEVIATION ANGLES	0° - 600	15° - 600 14° - 640 13° - 680 12° - 720 11° - 760 10° - 800	30° - 600 29° - 639 28° - 678 27° - 717 26° - 756 25° - 795	60° - 600 59° - 635 58° - 670 57° - 705 56° - 740 55° - 775
15.	DESIGN LOAD TENSION FOR A, B, C, D & E TYPE TOWERS				
	a) GROUND WIRE 32° C (FW)	2807	2783/2807	2711/2807	2431/2807
	0° C & 36% (FW)	1874	1858/1874	1810/1874	1623/1874
	CONDUCTOR 32° C (FW)	5076	5033/5076	4903/5076	4396/5076
	0° C & 36% (FW) MAXIMUM	3627	3596/3627	3503/3627	3141/3627
16.	INDIVIDUAL SPAN				
	a) TOWER TYPE A	560M			
	b) TOWER TYPE B, C & D	600M			
	b) TOWER TYPE E	1000 M			

Dead end with 0 to 15 deg. deviation both on line & substation side (Slack Span)
 Tower type to be adopted only for longer individual crossing valleys
 Locations exceeding weight span limits given above are to be referred to Engr. For checking
 suitability of tower.



**TABLE FOR TENSIONS TO BE ADOPTED FOR SPANS MORE THAN
NORMAL INDIVIDUAL SPAN TO CHECK FOR EXTRA GROUND
CLEARANCES REQUIRED**

SL. NO.	INDIVIDUAL SPAN (M)	CONDUCTOR TENSION (KG)	SL. NO.	INDIVIDUAL SPAN (M)	CONDUCTOR TENSION (KG)
1	330	1657	25	570	1435
2	340	1636	26	580	1432
3	350	1618	27	590	1428
4	360	1601	28	600	1425
5	370	1585	29	620	1419
6	380	1571	30	640	1414
7	390	1558	31	660	1409
8	400	1546	32	680	1405
9	410	1535	33	700	1401
10	420	1525	34	720	1397
11	430	1516	35	740	1394
12	440	1507	36	760	1391
13	450	1499	37	780	1388
14	460	1492	38	800	1386
15	470	1485	39	820	1383
16	480	1478	40	840	1381
17	490	1472	41	860	1379
18	500	1466	42	880	1377
19	510	1461	43	900	1375
20	520	1456	44	920	1374
21	530	1451	45	940	1372
22	540	1447	46	960	1371
23	550	1443	47	980	1369
24	560	1439	48	1000	1368

NOTE: 1. Intermediate values of tensions may be interpolated linearly.

2. The above tension values are to be employed to draw Sag curve to check ground clearance. In case towers are located at differential levels in any span null point is to be calculated and accordingly sag is to be calculated for each span and ground/bill side clearances are to be checked by drawing sag curve on the profile.

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TOWERS
Engineering Design through Software

TOWER TYPE B
132 KV SVC B-K-K NERSCO CONSULTANCY WO
C2003

DATA :-

Basic Span (m) : 300.00
Wind Pressure (kg/sq.m) : 80.8500

CONDUCTOR DETAILS :-

Type : UserDefined :- PANTHER
Overall Diameter (cm) : 2.1000
Cross Sectional Area (sq.cm) : 2.6150
Unit Weight (kg/m) : .9740
Ultimate Tensile strength (kgs) : 9144.0000
Coeff. of Thermal Expansion(/degC) : .1780E-04
Modulus of Elasticity (kg/sq.cm) : 815800.0000
Creep (%) : .0000
Shape factor : 1.0000
Gust factor : 2.1000
Drag factor : 1.0000

Basic Condition:-

Temperature (deg C) : 32.0000
Wind factor : .0000
Ice thickness (cm) : .0000
Factor of Safety : 4.0000

SAG_TENSION_FOS COMPUTATIONS :

Sl. No.	Environmental Temperature (deg.C)	Wind Factor	Ice Thickness (cm)	Vertical Sag (m)	Tension (Kg)	FOS	REMARKS
1.	32.00	.0000	.00	4.793	2286.00	4.000	
2.	32.00	1.0000	.00	2.159	5075.77	1.801	
3.	75.00	.0000	.00	6.328	1731.70	5.280	
4.	.00	.3600	.00	3.021	3627.37	2.521	
5.	.00	.0000	.00	3.737	2931.80	3.119	

Max Vertical Sag (m) : 6.328
Max Tension (kgs) : 5075.77

01/08/03

PGCL

TOWERS
Engineering Design through Software

TOWER TYPE B
132 KV SVC B-K-K NERPCO CONSULTANCY WD
C2003

DATA :-

Basic Span (m) : 300.00
Wind Pressure (kg/sq.m) : 80.8500

SHIELD WIRE DETAILS :-

Type : UserDefined :- EW-7\3.15
Overall Diameter (cm) : .9450
Cross Sectional Area (sq.cm) : .5452
Unit Weight (kg/m) : .4280
Ultimate Tensile strength (Kgs) : 5708.0000
Coef. of Thermal Expansion (/degC) : .1150E-04
Modulus of Elasticity (kg/sq.cm) : 1936100.0000
Creep (%) : .0000
Shape factor : 1.0000
Gust factor : 2.1900
Drag factor : 1.2000

Basic Condition:-

Temperature (deg C) : 32.0000
Wind factor : .0000
Ice thickness (cm) : .0000
Factor of Safety : 4.7722

SAG_TENSION_FOS COMPUTATIONS :

Sl. No.	Environmental Temperature (deg.C)	Wind Factor	Ice Thickness (cm)	Vertical Sag (m)	Tension (kg)	FOS	REMARKS
1.	32.00	.0000	.00	4.026	1196.09	4.772	% GW/CON sag = 83.98
2.	32.00	1.0000	.00	1.715	2806.86	2.034	% GW/CON sag = 79.46
3.	53.00	.0000	.00	4.504	1068.93	5.340	% GW/CON sag = 71.19
4.	.00	.3600	.00	2.570	1873.51	3.047	% GW/CON sag = 85.08
5.	.00	.0000	.00	3.364	1431.53	3.987	% GW/CON sag = 90.00

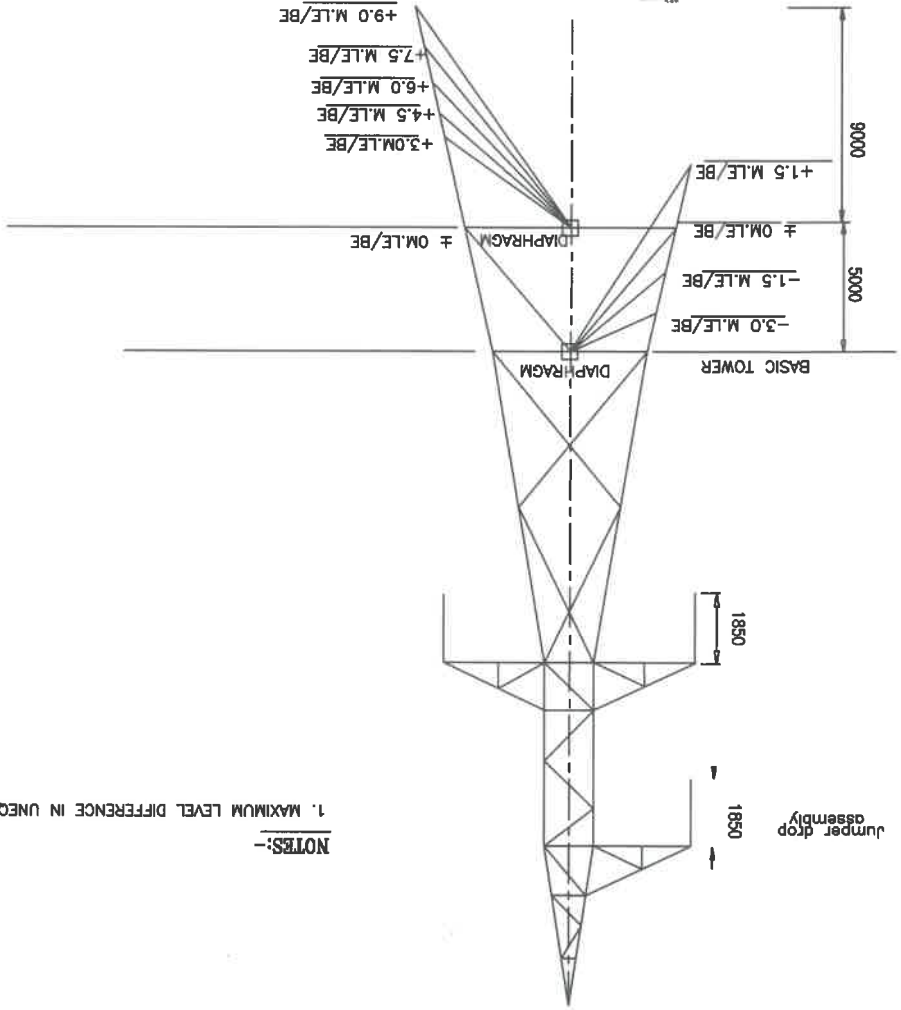
Max Vertical Sag (m) : 4.504
Max Tension (kgs) : 2806.86

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POWER GRID CORPORATION OF INDIA LIMITED		PROJECT		SPECIMEN NO.:-		DESIGNED BY		DRAWN BY		CHECKED BY		APPROVED BY	
132 KV S/C BALUPARA - KHURJI KHAM TI (W-5) NEER PROJECTS													
TYPICAL KEY TOWER COMBINATION SKETCH FOR "B" TYPE TOWER		SCALE		SHEET NO.		MIS		INITIALS		REVISION		DATE	
REV. 0				1 OF 1						FIRST ISSUE			

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UNEQUAL LEG & EQUAL BODY EXTNS. FROM BASIC & NORMAL TOWER LEVEL



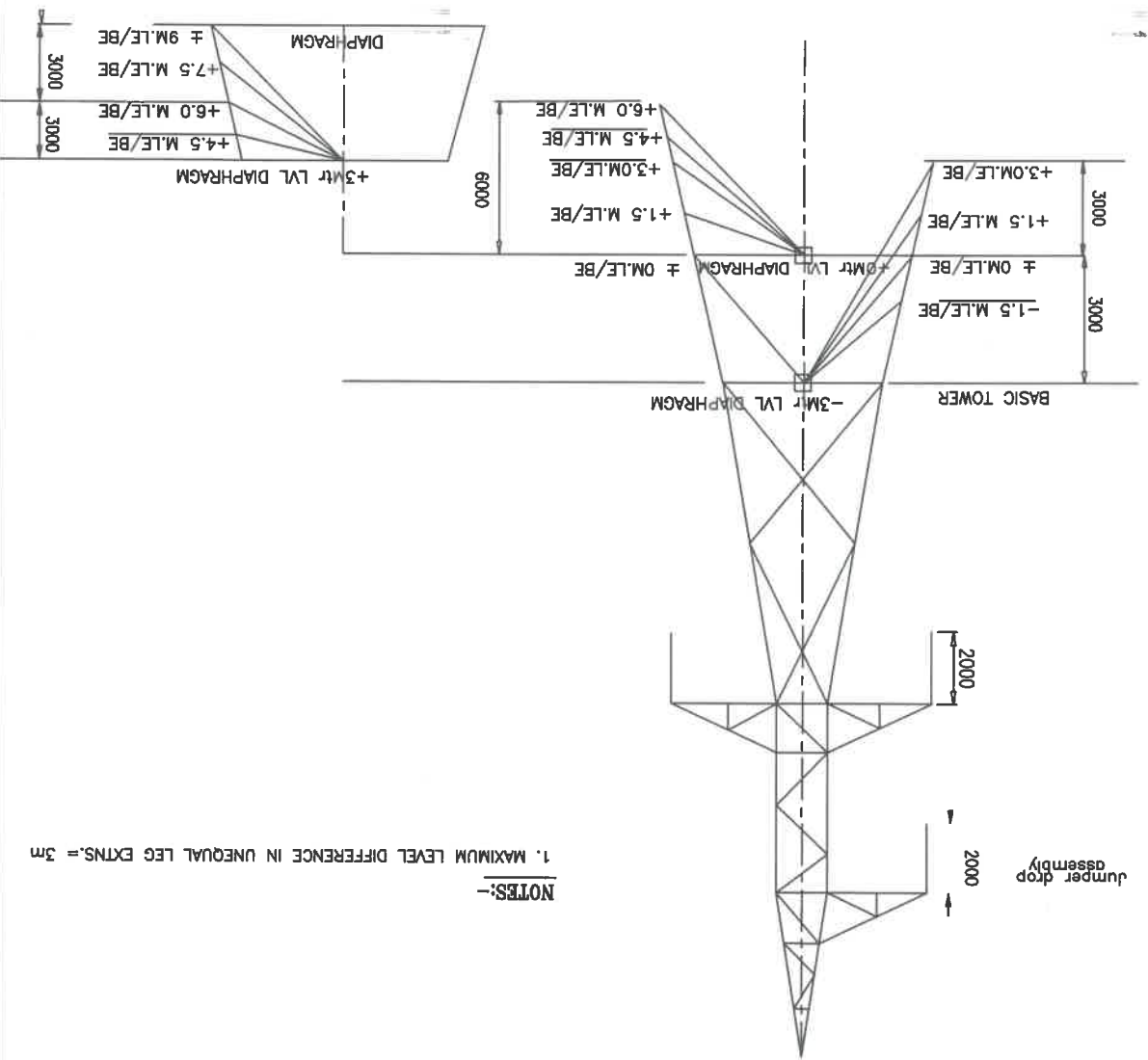
NOTES:-
1. MAXIMUM LEVEL DIFFERENCE IN UNEQUAL LEG F...

TYPE "B" TOWER
KEY SKETCH FOR LEG/BODY EXTENSIONS

SL.NO.	DATE	REVISION	INITIALS	SCALE	SHEET NO.	DRAWING NO.:-	REV.
		FIRST ISSUE			1 OF 1	020802/0201/0201-0200	0
DESIGNED BY			POWER GRID CORPORATION OF INDIA LIMITED				
DRAWN BY			PROJECT				
CHECKED BY			132 KV S/C BALPARA - KHUPI KHMM TL (WZ-5)				
APPROVED BY			NER PROJECTS				
			SPECNN NO:-				
			TYPICAL KEY TOWER COMBINATION SKETCH FOR "E" TYPE TOWER				

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UNEQUAL LEG & EQUAL BODY EXTNS. FROM BASIC & NORMAL TOWER LEVEL



**TYPE "E" TOWER
KEY SKETCH FOR LEG/BODY EXTENSIONS**

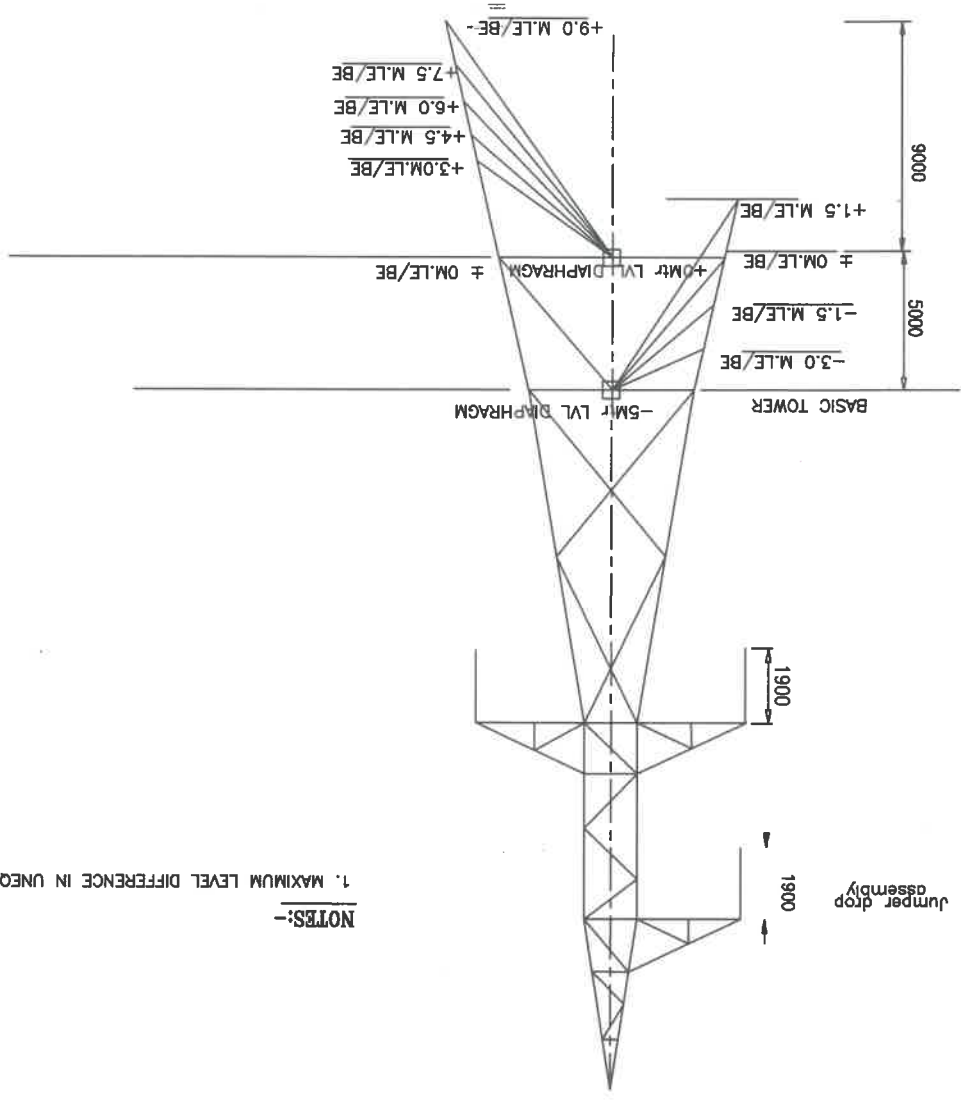
NOTES:-

1. MAXIMUM LEVEL DIFFERENCE IN UNEQUAL LEG EXTNS. = 3m

POWER GRID CORPORATION OF INDIA LIMITED	PROJECT	132 KV S/C BALUPARA - KHUP KHIM TL (WZ-5) NER PROJECTS	SPECNN NO:-	
TYPICAL KEY TOWER COMBINATION SKETCH FOR "C" TYPE TOWER	DESIGNED BY			
	DRAWN BY			
	CHECKED BY			
	APPROVED BY			
REV. 0				

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UNEQUAL LEG & EQUAL BODY EXTNS. FROM BASIC & NORMAL TOWER LEVEL.

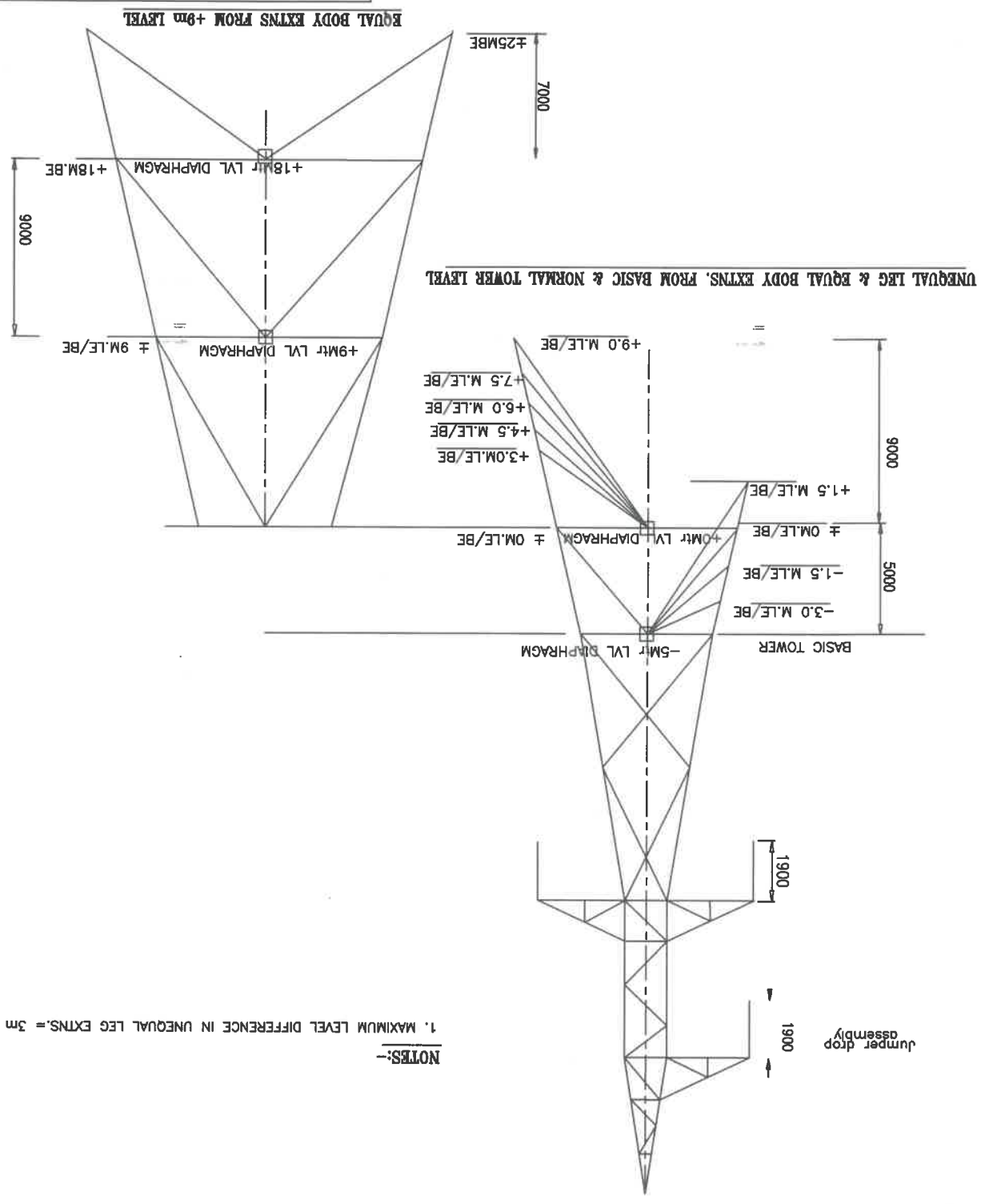


TYPE "C" TOWER
KEY SKETCH FOR LEG/BODY EXTENSIONS

NOTES:-
1. MAXIMUM LEVEL DIFFERENCE IN UNEQUAL LEG EXTNS. = 3m

POWER GRID CORPORATION OF INDIA LIMITED	PROJECT	132 KV S/C BALUPARA - KHUP KHIM TL (WZ-5)	NER PROJECTS	SPECNN NO:-	
TYPICAL KEY TOWER COMBINATION SKETCH FOR "D" TYPE TOWER	DESIGNED BY		DRAWN BY		CHECKED BY
	APPROVED BY		SCALE	SHEET NO.	1 OF 1
			INITIALS		
			REVISION	DATE	SLNO
			FIRST ISSUE		
REV.					0

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NOTES:-
1. MAXIMUM LEVEL DIFFERENCE IN UNEQUAL LEG EXTNS. = 3m

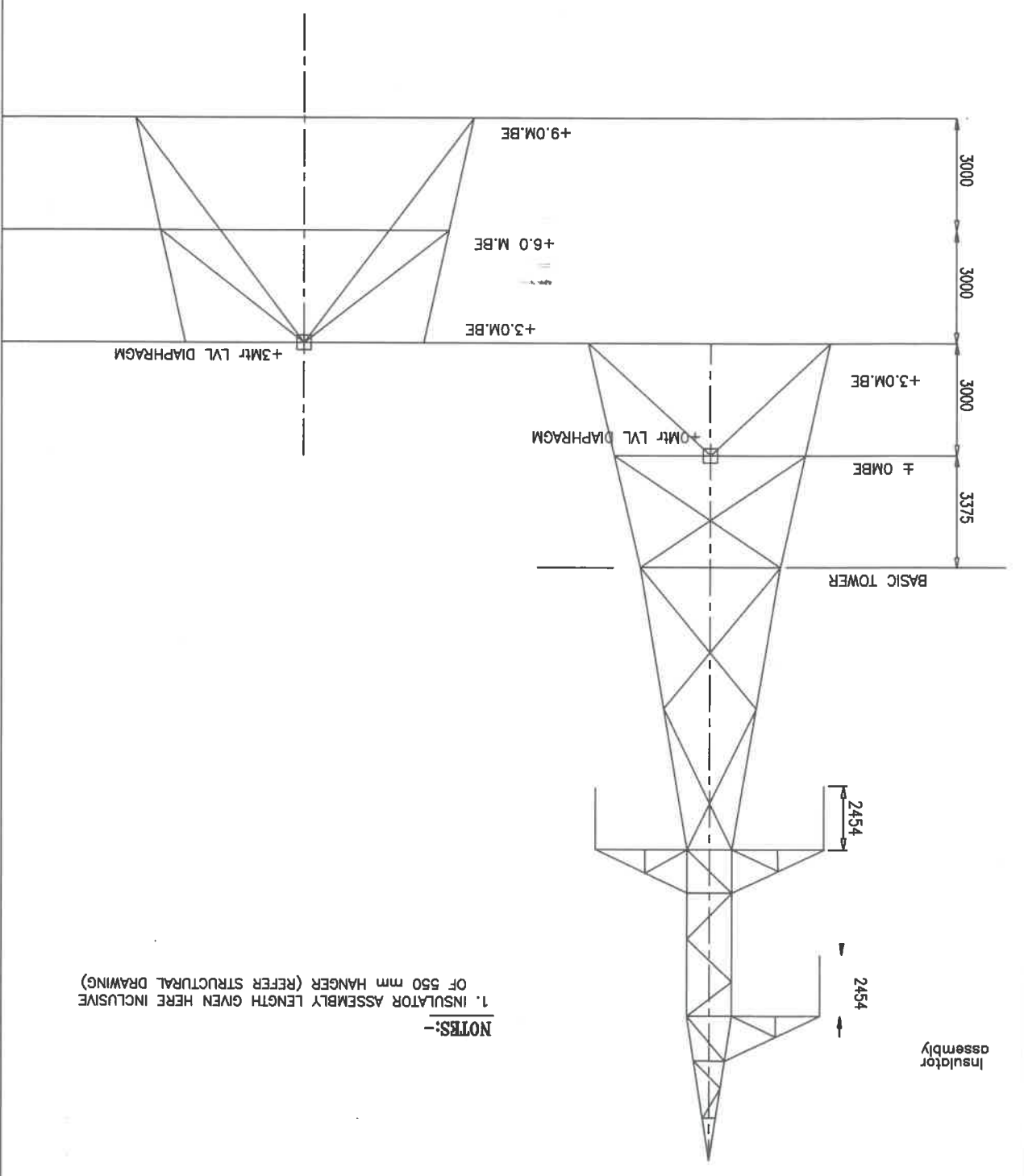
TYPE "D" TOWER
KEY SKETCH FOR LEG/BODY EXTENSIONS

Jumper drop assembly

SLNO.	DATE	REVISION	INITIALS	SCALE	SHEET NO.	1 OF 1	DRAWING NO.:-	020608/13/MLL-13200	REV.	0
		FIRST ISSUE							TYPICAL KEY TOWER COMBINATION SKETCH FOR TYPE TOWER A WZ-5	
									DESIGNED BY	
									DRAWN BY	
									CHECKED BY	
									APPROVED BY	
									SPECNN NO.:-	
									PROJECT	
									132 KV S/C BAUPARA - KHUPI KHAMI TL (WZ-5) NER PROJECTS	
									POWER GRID CORPORATION OF INDIA LIMITED	

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EQUAL BODY EXTNS. FROM BASIC, NORMAL TOWER & +3Mtr LEVEL



NOTES:-
 1. INSULATOR ASSEMBLY LENGTH GIVEN HERE INCLUSIVE OF 550 mm HANGER (REFER STRUCTURAL DRAWING)

**TYPE "A" TOWER
 KEY SKETCH FOR BODY EXTENSIONS**

Insulator assembly