

Contents

Sl. No.	Document Title	Document No.	No. of Sheets
1.	Route Alignment Survey Plan and profile for 400 kV Transmission Line (Sh. No. 1 to 14) along with Tower Schedule	TCE-7219B-765-RA-6001	5+14

NTPC DOC. NO. : 0370-572-PVC-U-504

Rev-04

DOC. TITLE: Report of Route survey, tower spotting and transmission line Profile

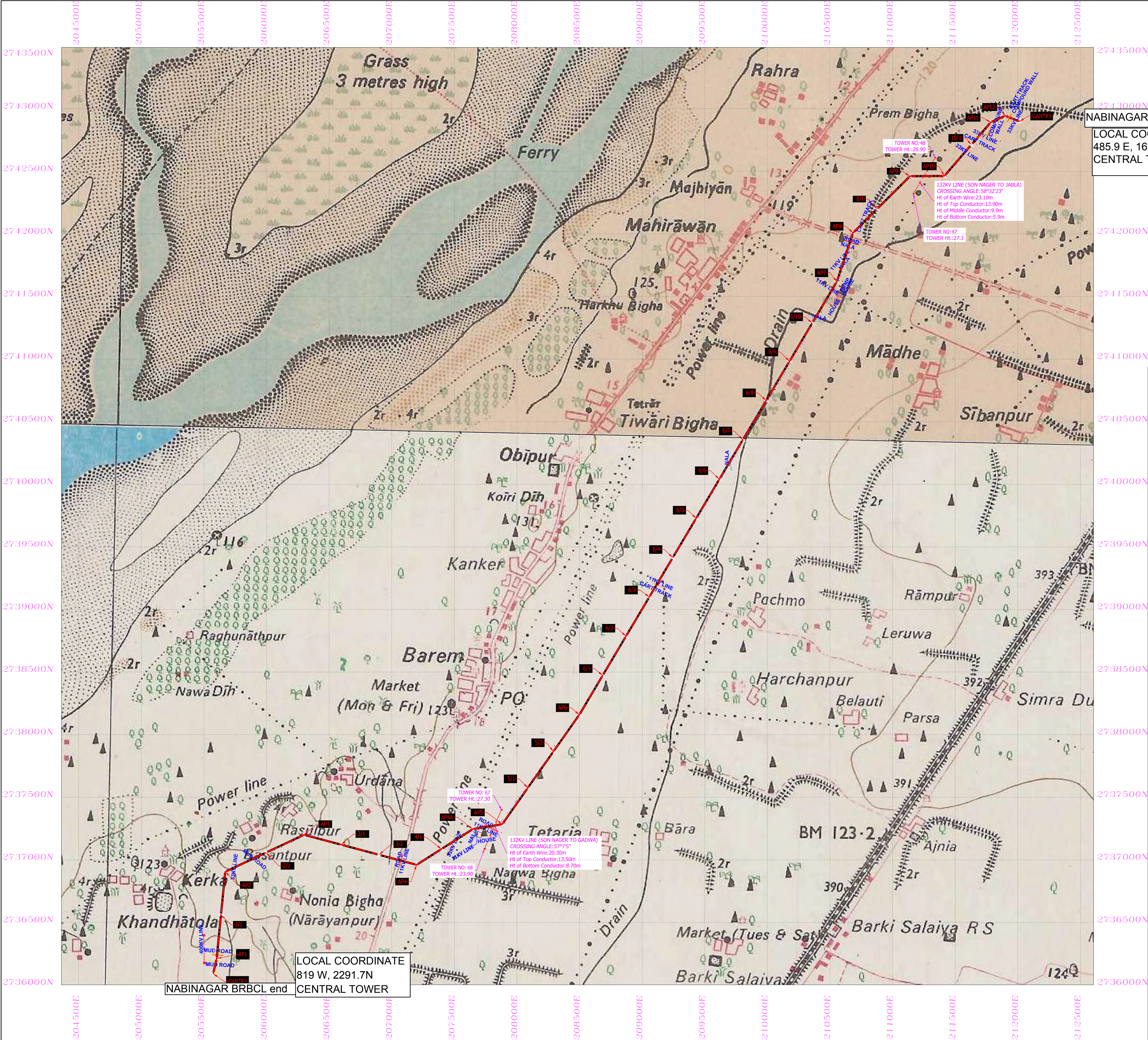
NABINAGAR POWER GENERATION CO. PVT. LTD.
(A JV OF NTPC LTD. & BIHAR STATE POWER (HOLDING) CO. LTD.)

400/132 kV SWITCHYARD AT NABINAGR STPP (3X660MW)
& 400 KV SWITCHYARD EXTENSION AT NABINAGAR TPP(BRBCL)
NOA Number :CS-0370-572-2-FC-NOA-0009 DATED 12-02-2013

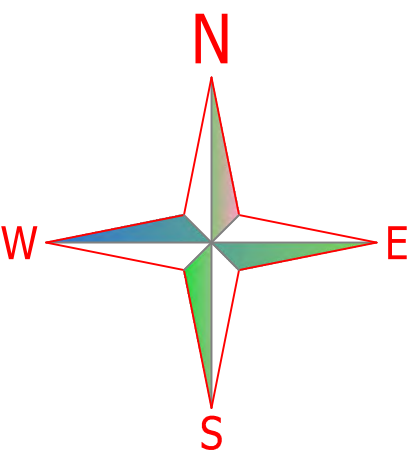


BHARAT HEAVY ELECTRICALS LTD.
TRANSMISSION PROJECTS DIVISION
NEW DELHI

W.O. Number : 81004



NABINAGAR STPP end
LOCAL COORDINATE
485.9 E, 1612N
CENTRAL TOWER



DETAILED ROUTE SURVEY
PLAN ON TOPO SHEET FOR
400kV DC TRANSMISSION
LINE AT NABINAGAR, BIHAR

Tower Abstract of 400kV D/C TL							
Tower Type\Extn	+0	+3	+6	+9	+18	+25	Total
DA	16	3	0	0	0	0	19
DB	1	0	1	0	-	-	2
DC	0	0	1	0	-	-	1
DD	5	0	0	4	1	0	10
Total	22	3	2	4	1	0	32

Total Line Length = 10452.87 m

Bee Length = 9370.45 m

Total No. of DA Tower = 19

Total No. of DD Tower = 13

Height of Normal DA type tower = 47.913 m

Height of Normal DD type tower = 47.670 m

Height of towers shall be as per design/ calculations

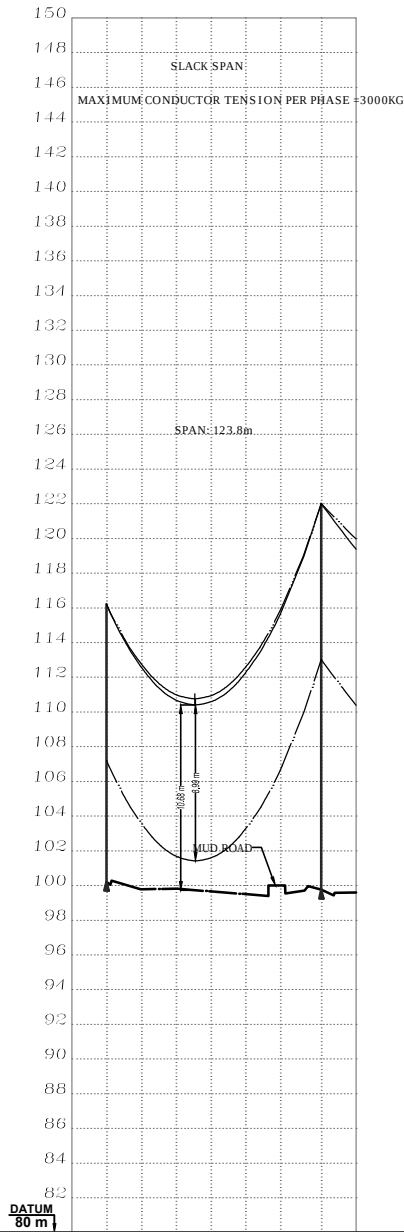
Note : DD type tower to be used in place of DB and DC.

PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR																							
CUSTOMER: M/S NABINAGAR POWER GENERATION COMPANY																							
CONTRACTOR: M/S BHARAT HEAVY ELECTRICALS LIMITED																							
CONSULTANT: M/S TATA CONSULTING ENGINEERS LIMITED																							
TOWER SCHEDULE FOR DC 400kV TRANSMISSION LINE																							
Sl. No	Twr No.	Tower Type	Deviation Angle (DMS)	Span (m)	Section Length (m)	Chainage (m)	Wind Span (m)	Adjacent Span			Weight Span (Cold)			Weight Span (Hot)			Major Crossings (with in 23m either side from CL)/Remarks	UTM Coordinate (Zone - 45N)			Twr Extn	Spherical Coordinate	
								Left	Right	Total	Left	Right	Total	Left	Right	Total		Easting	Northing	Elevation		Longitude	Latitude
1	GANTRY	GANTRY			-	0.0	61.9	0.0	123.8	123.8	0.0	50.8	50.8	0.0	51.3	51.3	BRBCL end	2,05,573.950	27,36,091.790	100.210	-6	84°05'23.5" E	24°42'40.1" N
				123.8													(Ground Clearance required: 8.99m & Ground clearance available: 10.68m) Mud Road, 9.8m wide	Local Coordinate = 819 W, 2291.7 N Central Tower					
2	AP1	DD+00	7°18'26" (LT)		123.8	123.8	236.9	123.8	350.0	473.8	73.0	220.2	293.2	72.5	208.0	280.5	Dead End Tower	2,05,601.700	27,36,212.410	99.750	0	84°05'24.4" E	24°42'44.1" N
				350.0													(Ground Clearance required: 8.99m & Ground clearance available: 13.58m) Mud Road 2nos, 4.3m & 10.2m wide						
3	1/1	DA+00				473.8	348.6	350.0	347.1	697.1	129.8	184.5	314.3	142.1	181.5	323.6		2,05,636.160	27,36,560.740	92.100	0	84°05'25.4" E	24°42'55.4" N
				347.1													(Ground Clearance required: 8.99m & Ground clearance available: 12.9m)						
4	AP2	DD+00	59°14'06" (RT)		697.2	820.9	353.6	347.1	360.0	707.1	162.7	161.8	324.5	165.6	166.7	332.4		2,05,670.330	27,36,906.200	90.270	0	84°05'26.3" E	24°43'06.6" N
				360.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.73m) 33kv Line (Clearance required: 6.3m & clearance available: 6.8m), Mud Road 3.2m wide						
5	2/1	DA+00				1,180.9	347.6	360.0	335.1	695.1	198.1	179.6	377.7	193.2	176.3	369.6		2,05,996.250	27,37,058.980	93.430	0	84°05'37.8" E	24°43'11.8" N
				335.1													(Ground Clearance required: 8.99m & Ground clearance available: 10.03m)						
6	AP3	DD+00	40°04'08" (RT)		695.1	1,516.0	322.6	335.1	310.0	645.1	155.5	142.2	297.7	158.8	145.7	304.4		2,06,299.690	27,37,201.220	91.480	0	84°05'48.5" E	24°43'16.7" N
				310.0													(Ground Clearance required:8.99m & Ground clearance available: 12.83m)						
7	3/1	DA+00				1,826.0	310.0	310.0	310.0	620.0	167.8	127.8	295.7	164.3	135.2	299.5		2,06,599.170	27,37,121.240	93.400	0	84°05'59.2" E	24°43'14.3" N
				310.0													(Ground Clearance required: 8.99m & Ground clearance available: 12.63m)						
8	3/2	DA+00				2,136.0	310.2	310.0	310.3	620.3	182.2	150.6	332.7	174.8	151.8	326.6		2,06,898.690	27,37,041.250	97.470	0	84°06'09.9" E	24°43'11.9" N
				310.3													(Ground Clearance required: 8.99m & Ground clearance available: 15.72m) 11kv Line (Clearance required: 6.3m & clearance available: 10.9m), village Road 7.4m wide						
9	AP4	DD+00	47°23'48" (LT)		930.3	2,446.3	272.7	310.3	235.0	545.3	159.7	102.4	262.1	158.5	106.5	265.0		2,07,198.530	27,36,961.170	98.160	0	84°06'20.6" E	24°43'09.5" N
				235.0													(Ground Clearance required: 8.99m & Ground clearance available: 19.58m)						
10	4/1	DA+03				2,681.4	265.7	235.0	296.4	531.4	132.7	102.8	235.4	128.6	115.1	243.6		2,07,396.880	27,37,087.260	96.880	3	84°06'27.6" E	24°43'13.7" N
				296.4													(Ground Clearance required: 8.99m & Ground clearance available: 19.58m) 33kv Line (Clearance required: 6.3m & clearance available: 13.5m)						
11	AP4A	DD+09	22°57'06" (RT)		531.4	2,977.8	267.4	296.4	238.3	534.7	193.6	121.3	314.9	181.3	120.7	302.1		2,07,647.020	27,37,246.270	97.390	9	84°06'36.4" E	24°43'19.0" N
				238.3													(Ground Clearance required: 8.99m & Ground clearance available: 25.94m) Nala; 23.4m wide, 11kv Line 2nos (Clearance required: 6.3m & clearance available: 19.8m & 20.4), Village Road; 6.9m wide, 132kv Line (Clearance required: 6.3m & clearance available: 7.5m)						
12	AP5	DD+09	45°21'33" (LT)		238.3	3,216.1	296.7	238.3	355.0	593.3	117.0	234.0	350.9	117.6	218.7	336.2		2,07,882.050	27,37,285.570	97.140	9	84°06'44.7" E	24°43'20.5" N
				355.0													(Ground Clearance required:8.99m & Ground clearance available: 15.94m)						
13	5/1	DA+00				3,571.1	355.0	355.0	355.0	710.0	121.0	181.7	302.7	136.3	180.6	316.9		2,08,086.430	27,37,575.840	96.450	0	84°06'51.7" E	24°43'30.0" N
				355.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.95m)						
14	5/2	DA+00				3,926.1	357.0	355.0	359.0	714.0	173.3	182.9	356.2	174.4	182.0	356.4		2,08,290.800	27,37,866.110	95.730	0	84°06'58.8" E	24°43'39.6" N
				359.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.48m)						
15	AP6	DB+00	4°24'31" (LT)		1,069.0	4,285.1	362.0	359.0	365.0	724.0	176.1	185.7	361.9	177.0	184.9	361.9		2,08,497.500	27,38,159.680	95.140	0	84°07'05.9" E	24°43'49.3" N
				365.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.17m)						
16	6/1	DA+00				4,650.1	365.0	365.0	365.0	730.0	179.3	185.7	365.0	180.1	184.9	365.0		2,08,684.070	27,38,473.400	94.570	0	84°07'12.3" E	24°43'59.6" N
				365.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.12m)						
17	6/2	DA+00				5,015.1	365.0	365.0	365.0	730.0	179.3	167.3	346.6	180.1	171.4	351.6		2,08,870.630	27,38,787.120	94.000	0	84°07'18.7" E	24°44'09.9" N
				365.0													(Ground Clearance required: 8.99m & Ground clearance available: 12.73m)						
18	6/3	DA+03				5,380.1	365.0	365.0	365.0	730.0	197.7	201.8	399.5	193.6	196.6	390.2		2,09,057.200	27,39,100.830	93.680	3	84°07'25.1" E	24°44'20.2" N

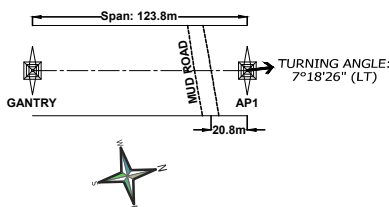
PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR																							
CUSTOMER: M/S NABINAGAR POWER GENERATION COMPANY																							
CONTRACTOR: M/S BHARAT HEAVY ELECTRICALS LIMITED																							
CONSULTANT: M/S TATA CONSULTING ENGINEERS LIMITED																							
TOWER SCHEDULE FOR DC 400kV TRANSMISSION LINE																							
Sl. No	Twr No.	Tower Type	Deviation Angle (DMS)	Span (m)	Section Length (m)	Chainage (m)	Wind Span (m)	Adjacent Span			Weight Span (Cold)			Weight Span (Hot)			Major Crossings (with in 23m either side from CL)/Remarks	UTM Coordinate (Zone - 45N)			Twr Extn	Spherical Coordinate	
								Left	Right	Total	Left	Right	Total	Left	Right	Total		Easting	Northing	Elevation		Longitude	Latitude
				365.0													(Ground Clearance required: 8.995m & Ground clearance available: 12.42m) Cart Track; 6m wide, 11kv Line (Clearance required: 6.3m & clearance available: 7.6m)						
19	6/4	DA+00				5,745.1	365.0	365.0	365.0	730.0	163.18	184.76	347.94	168.4	184.1	352.6		2,09,243.770	27,39,414.550	93.270	0	84°07'31.5" E	24°44'30.5" N
				365.0													(Ground Clearance required: 8.99m & Ground clearance available: 10.53m)						
20	6/5	DA+00				6,110.1	365.0	365.0	365.0	730.0	180.2	185.8	366.0	180.8	184.9	365.7		2,09,430.330	27,39,728.260	92.870	0	84°07'37.9" E	24°44'40.9" N
				365.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.09m)						
21	6/6	DA+00				6,475.1	365.0	365.0	365.0	730.0	179.2	183.0	362.2	180.1	182.9	363.0		2,09,616.900	27,40,041.980	92.290	0	84°07'44.3" E	24°44'51.2" N
				365.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.01m) Nala, 12m wide						
22	6/7	DA+00				6,840.1	365.0	365.0	365.0	730.0	182.0	183.0	364.9	182.1	182.8	365.0		2,09,803.470	27,40,355.700	92.200	0	84°07'50.7" E	24°45'01.5" N
				365.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.24m)						
23	6/8	DA+00				7,205.1	365.0	365.0	365.0	730.0	182.0	183.2	365.2	182.2	183.0	365.2		2,09,990.040	27,40,669.410	92.120	0	84°07'57.1" E	24°45'11.8" N
				365.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.05m)						
24	6/9	DA+00				7,570.1	360.0	365.0	355.0	720.0	181.8	177.7	359.6	182.0	177.7	359.7		2,10,176.600	27,40,983.130	92.000	0	84°08'03.5" E	24°45'22.1" N
				355.0													(Ground Clearance required: 8.99m & Ground clearance available: 11.79m)						
25	6/10	DA+00				7,925.1	369.4	355.0	383.7	738.7	177.3	158.8	336.1	177.3	167.8	345.1		2,10,358.060	27,41,288.250	91.960	0	84°08'09.7" E	24°45'32.1" N
				383.7													(Ground Clearance required: 8.99m & Ground clearance available: 12.63m) Nala; 13.7m wide, 11kv Line (Clearance required: 6.3m & clearance available: 16.8m)						
26	AP7	DB+06	12°19'36" (LT)		4,023.7	8,308.8	398.3	383.7	412.8	796.5	224.9	207.0	431.9	215.9	206.8	422.8		2,10,554.180	27,41,618.030	92.090	6	84°08'16.5" E	24°45'43.0" N
				412.8													(Ground Clearance required: 8.99m & Ground clearance available: 14.07m) Nala 2nos; 13.1m & 48.1m wides, 11kv Line (Clearance required: 6.3m & clearance available: 7.2m), Village Road; 4m wide						
27	AP8	DC+06	26°44'23" (RT)		412.8	8,721.6	341.4	412.8	270.0	682.8	205.9	158.0	363.9	206.0	151.8	357.8		2,10,684.580	27,42,009.730	91.980	6	84°08'20.8" E	24°45'55.8" N
				270.0													(Ground Clearance required: 8.99m & Ground clearance available: 19.74m) Cart Track, 7.7m wide						
28	8/1	DA+03				8,991.7	320.9	270.0	371.7	641.7	112.0	102.9	214.9	118.3	125.3	243.6		2,10,876.040	27,42,200.160	91.980	3	84°08'27.5" E	24°46'02.1" N
				371.7													(Ground Clearance required: 8.99m & Ground clearance available: 20.06m)						
29	AP9	DD+18	44°31'34" (RT)		641.7	9,363.3	322.7	371.7	273.7	645.4	268.8	203.1	471.9	246.3	185.2	431.5		2,11,139.550	27,42,462.270	91.890	18	84°08'36.6" E	24°46'10.8" N
				273.7													(Ground Clearance required: 8.99m & Ground clearance available: 28.72m) 132kv Line (Clearance required: 6.3m & clearance available: 7.4m)						
30	AP10	DD+09	48°48'09" (LT)		273.7	9,637.0	301.9	273.7	330.0	603.7	70.6	223.2	293.7	88.5	207.4	295.9		2,11,413.240	27,42,463.800	92.120	9	84°08'46.4" E	24°46'11.0" N
				330.0													(Ground Clearance required: 8.99m & Ground clearance available: 17.02m) 33kV Line (Clearance required: 6.3m & clearance available: 11.1m)						
31	10/1	DA+00				9,967.1	283.7	330.0	237.3	567.3	106.9	120.5	227.3	122.6	120.0	242.6		2,11,629.220	27,42,713.350	91.840	0	84°08'53.9" E	24°46'19.3" N
				237.3													(Ground Clearance required: 8.99m & Ground clearance available: 17.81m) Cart Track; 13.9m wide, 33kV Line (Clearance required: 6.3m & clearance available: 7.5m)						
32	AP11	DD+00	25°12'04" (RT)		567.3	10,204.4	181.8	237.3	126.3	363.6	116.8	-106.8	10.0	117.3	-60.7	56.6		2,11,784.520	27,42,892.770	91.630	0	84°08'59.3" E	24°46'25.2" N
				126.3													(Ground Clearance required: 8.99m & Ground clearance available: 23.16m)						
33	AP12	DD+09	45°34'47" (RT)		126.3	10,330.7	124.3	126.3	122.2	248.5	233.1	90.7	323.8	187.1	89.5	276.6		2,11,900.000	27,42,944.000	93.010	9	84°09'03.3" E	24°46'27.0" N
				122.2													(Ground Clearance required: 8.99m & Ground clearance available: 13.7m) Cart Track; 13.2m wide, 33kV Line (Clearance required: 6.3m & clearance available: 7.2m), Compound wall						
34	AP13	GANTRY			122.2	10,452.9	61.1	122.2	0.0	122.2	31.5	0.0	31.5	32.7	0.0	32.7	NPGC end	2,12,013.550	27,42,898.910	92.990	-6.253	84°09'07.4" E	24°46'25.6" N
																		Local Coordinate = 485.9 E, 1612 N Central Tower					

LOC NO: GANTRY	
TOWER TYPE	GANTRY
WIND SPAN	(L:0.0+R:123.8)/2=61.9m
WT. SPAN (C)	(L:0.0+R:50.8)=50.8m
WT. SPAN (H)	(L:0.0+R:51.3)=51.3m
LATITUDE	24°42'40.1" N
LONGITUDE	84°05'23.5" E
ELEVATION	100.210

LOC NO: AP1	
TOWER TYPE	DD+00
WIND SPAN	(L:123.8+R:350.0)/2=236.9m
WT. SPAN (C)	(L:73.0+R:220.2)=293.2m
WT. SPAN (H)	(L:72.5+R:208.0)=280.5m
LATITUDE	24°42'44.1" N
LONGITUDE	84°05'24.4" E
ELEVATION	99.750



GROUND LEVEL (m)	100.208	99.783	99.813	99.660	99.500	100.000	99.753
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	123.8



PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Shall be as per calculations

Legends

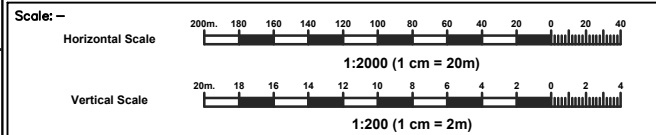
Sr.No.	Description	Symbol
1).	Alignment	-----
2).	Power Line Corridor	=====
3).	Hot Curve / Cold Curve	----- / -----
4).	Ground Clearance / Ground Profile	----- / -----
5).	House / Ground Profile Side Hill	----- / -----
6).	Railway Track	=====
7).	National Highway / State Highway	===== / -----
8).	Road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

Notes:-

- All Dimensions are in metre unless otherwise stated.
- UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	Gantry Height reduced	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: GANTRY - AP01 Section Length: 123.8m Paper Size: 24" Roll Date: 31-07-2014



DO NOT SCALE FOR APPROVAL

NTPC DRG NO: 0370-572-PVC-U-504 (SHEET 1 OF 14)

CUSTOMER: NABINAGAR POWER GENERATION COMPANY

PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR

CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION PROJECT DIVISION
NEW DELHI

TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR
ROUTE ALIGNMENT SURVEY PLAN & PROFILE
FOR 400kV DC TRANSMISSION LINE (SHEET 1 OF 14)

TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: 1:100	APPROVED	DATE (R0 ISSUE)	16-08-2013
OFFICE-DISC: DV-CV	VDB	DATE (CURRENT ISSUE)	31-07-2014
DRN: RVJ	SCK	ASK	
CHD: KKK	DWG NO	TCE-7219B-765-RA-6001	ISSUE R5

LOC NO: AP1	
TOWER TYPE	DD+00
WIND SPAN	(L:123.8+R:350.0)/2=236.9m
WT. SPAN (C)	(L:73.0+R:220.2)=293.2m
WT. SPAN (H)	(L:72.5+R:208.0)=280.5m
LATITUDE	24°42'44.1" N
LONGITUDE	84°05'24.4" E
ELEVATION	99.750

LOC NO: 1/1	
TOWER TYPE	DA+00
WIND SPAN	(L:350.0+R:347.1)/2=348.6m
WT. SPAN (C)	(L:129.8+R:184.5)=314.3m
WT. SPAN (H)	(L:142.1+R:181.5)=323.6m
LATITUDE	24°42'55.4" N
LONGITUDE	84°05'25.4" E
ELEVATION	92.100

LOC NO: AP2	
TOWER TYPE	DD+00
WIND SPAN	(L:347.1+R:360.0)/2=353.6m
WT. SPAN (C)	(L:162.7+R:161.8)=324.5m
WT. SPAN (H)	(L:165.6+R:166.7)=332.3m
LATITUDE	24°43'06.6" N
LONGITUDE	84°05'26.3" E
ELEVATION	90.270

PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

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

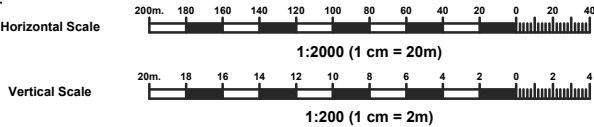
Notes:-

1. All Dimensions are in metre unless otherwise stated.
2. UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	Details at AP1 revised	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: AP01 - AP02 Section Length: 697.1m Paper Size: 24" Roll Date: 31-07-2014

Scale:-



DO NOT SCALE

FOR APPROVAL

NTPC DRG NO: 0370-572-PVC-U-504 (SHEET 2 OF 14)

CUSTOMER: NABINAGAR POWER GENERATION COMPANY

PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR

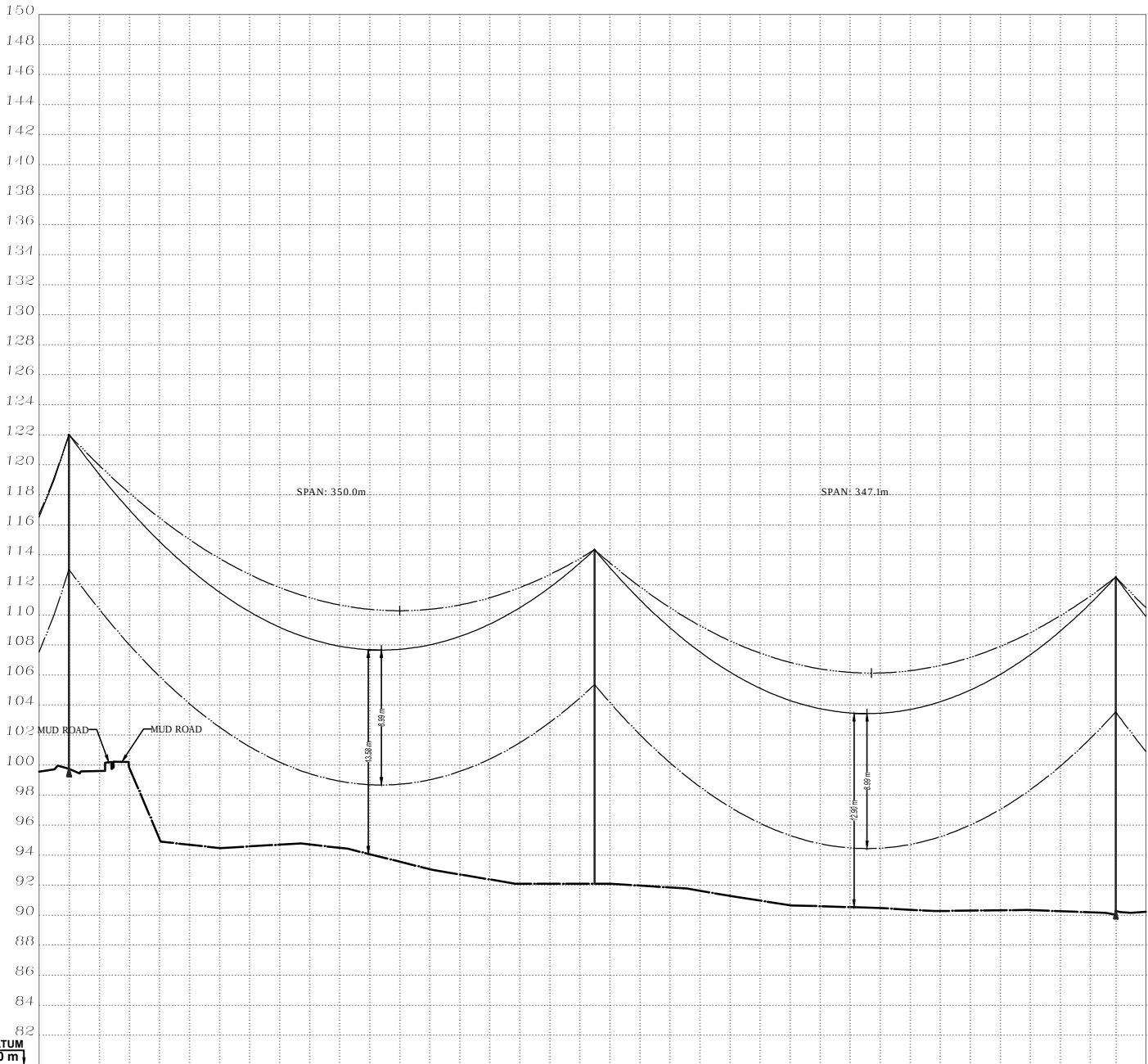
CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION PROJECT DIVISION
NEW DELHI

TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR
ROUTE ALIGNMENT SURVEY PLAN & PROFILE
FOR 400kV DC TRANSMISSION LINE (SHEET 2 OF 14)

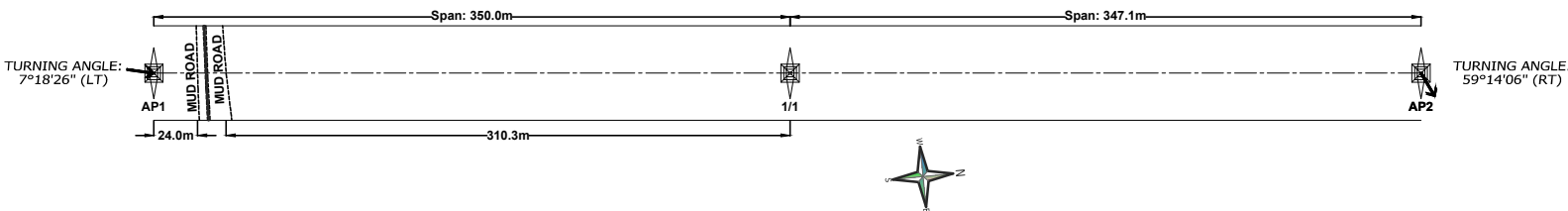


TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: 1:100	APPROVED	DATE (R0 ISSUE) 16-08-2013
OFFICE-DISC: DV-CV	VDB	DATE (CURRENT ISSUE) 31-07-2014
DRN: RVJ	SCK	ASK
CHD: KKK	DWG NO TCE-7219B-765-RA-6001	ISSUE R5



GROUND LEVEL (m)	99.753	99.598	99.859	99.147	94.691	94.477	94.579	94.691	94.711	94.485	94.065	93.567	93.068	92.715	92.381	92.092	92.093	92.095	92.096	91.971	91.843	91.625	91.284	90.970	90.666	90.594	90.537	90.473	90.363	90.276	90.301	90.326	90.342	90.264	90.187	90.272
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0	380.0	400.0	420.0	440.0	460.0	480.0	500.0	520.0	540.0	560.0	580.0	600.0	620.0	640.0	660.0	680.0	697.2



LOC NO: AP2	
TOWER TYPE	DD+00
WIND SPAN	(L:347.1+R:360.0)/2=353.6m
WT. SPAN (C)	(L:162.7+R:161.8)=324.5m
WT. SPAN (H)	(L:165.6+R:166.7)=332.3m
LATITUDE	24°43'06.6" N
LONGITUDE	84°05'26.3" E
ELEVATION	90.270

LOC NO: 2/1	
TOWER TYPE	DA+00
WIND SPAN	(L:360.0+R:335.1)/2=347.6m
WT. SPAN (C)	(L:198.1+R:179.6)=377.7m
WT. SPAN (H)	(L:193.2+R:176.3)=369.6m
LATITUDE	24°43'11.8" N
LONGITUDE	84°05'37.8" E
ELEVATION	93.430

LOC NO: AP3	
TOWER TYPE	DD+00
WIND SPAN	(L:355.1+R:310.0)/2=322.6m
WT. SPAN (C)	(L:155.5+R:142.2)=297.7m
WT. SPAN (H)	(L:158.8+R:145.7)=304.4m
LATITUDE	24°43'16.7" N
LONGITUDE	84°05'48.5" E
ELEVATION	91.480

PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

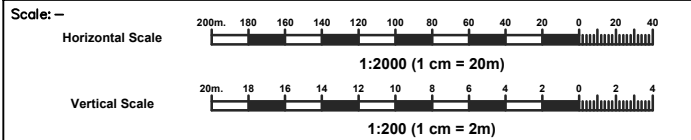
Sr.No.	Description	Symbol
1).	Alignment	---
2).	Power Line Corridor	=====
3).	Hot Curve / Cold Curve	----- / -----
4).	Ground Clearance / Ground Profile	----- / -----
5).	House / Ground Profile Side Hill	 / -----
6).	Railway Track	=====
7).	National Highway / State Highway	----- / -----
8).	Road / Cart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

Notes:-

- All Dimensions are in metre unless otherwise stated.
- UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	Revised Plan and profile between Tower 2/1 and AP3	10-12-2013	MS/VS
R3	No change	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: AP02 - AP03 Section Length: 695.1m Paper Size: 24" Roll Date: 31-07-2014



DO NOT SCALE

FOR APPROVAL

NTPC DRG NO: 0370-572-PVC-U-504 (SHEET 3 OF 14)

CUSTOMER: NABINAGAR POWER GENERATION COMPANY

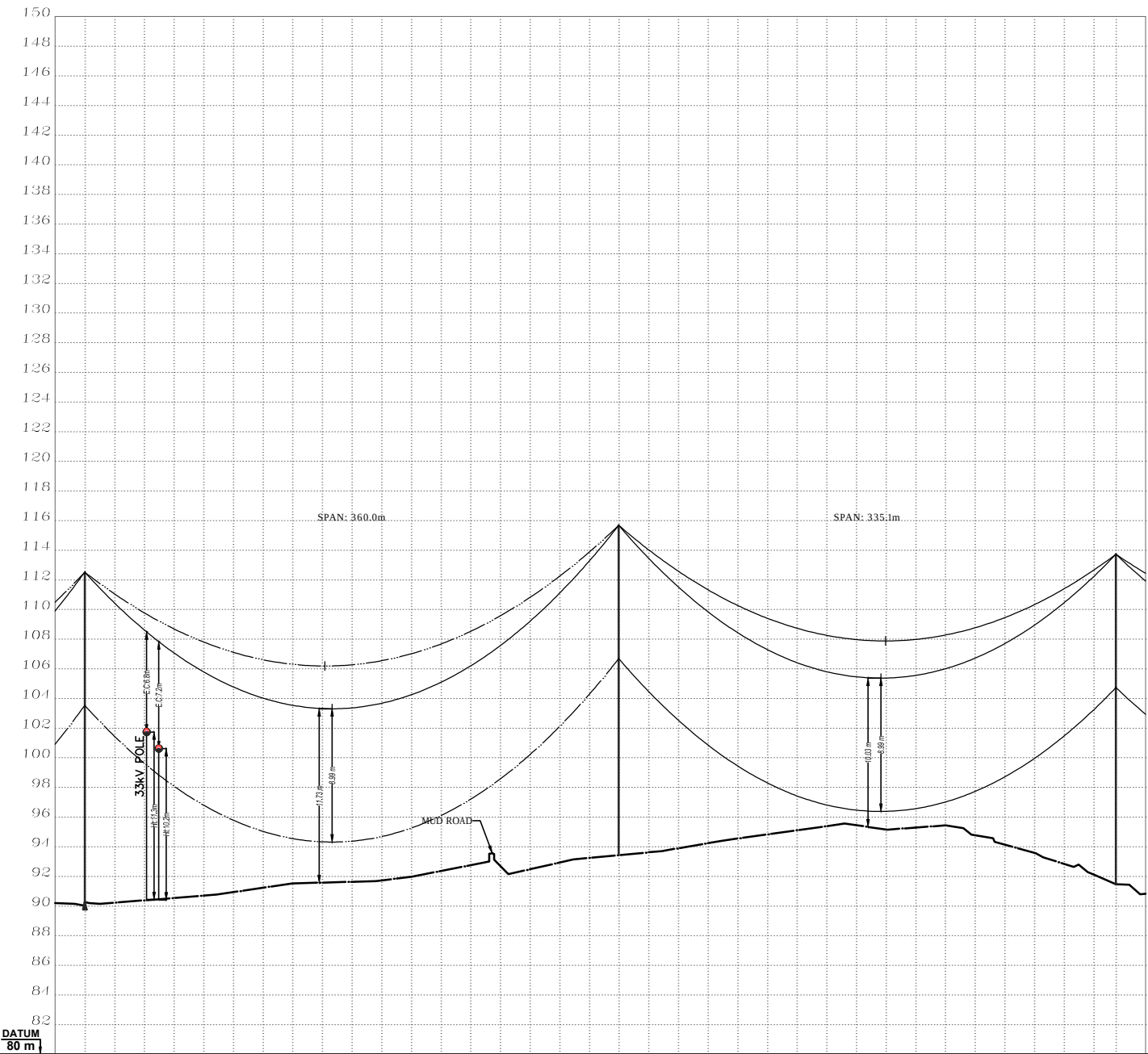
PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR

CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION PROJECT DIVISION
NEW DELHI

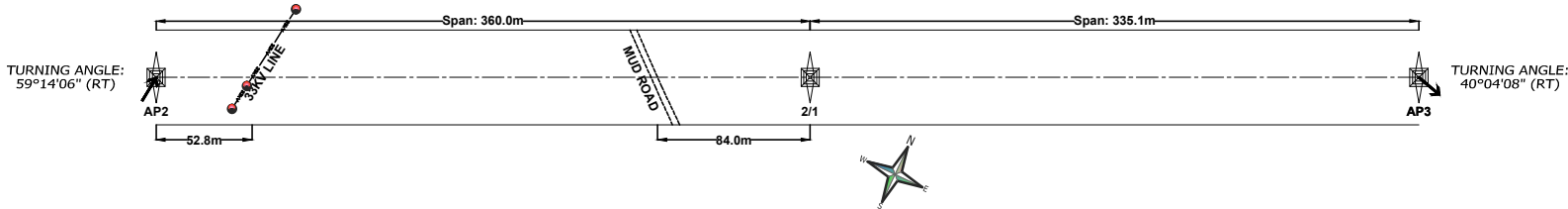
TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR
ROUTE ALIGNMENT SURVEY PLAN & PROFILE
FOR 400kV DC TRANSMISSION LINE (SHEET 3 OF 14)

 TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: 1:100	APPROVED	DATE (RD ISSUE) 16-08-2013
OFFICE-DISC: DV-CV	VDB	DATE (CURRENT ISSUE) 31-07-2014
DRN: RVJ	SKK	ASK
CHD: KKK	DWG NO: TCE-7219B-765-RA-6001	ISSUE R5



GROUND LEVEL (m)	90.272	90.224	90.382	90.540	90.698	90.933	91.231	91.527	91.583	91.638	91.728	91.976	92.365	92.756	92.727	92.477	92.931	93.244	93.433	93.622	93.897	94.243	94.551	94.830	95.110	95.389	95.451	95.170	95.293	95.440	94.785	94.148	93.585	92.850	92.124	91.479
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0	380.0	400.0	420.0	440.0	460.0	480.0	500.0	520.0	540.0	560.0	580.0	600.0	620.0	640.0	660.0	680.0	695.1

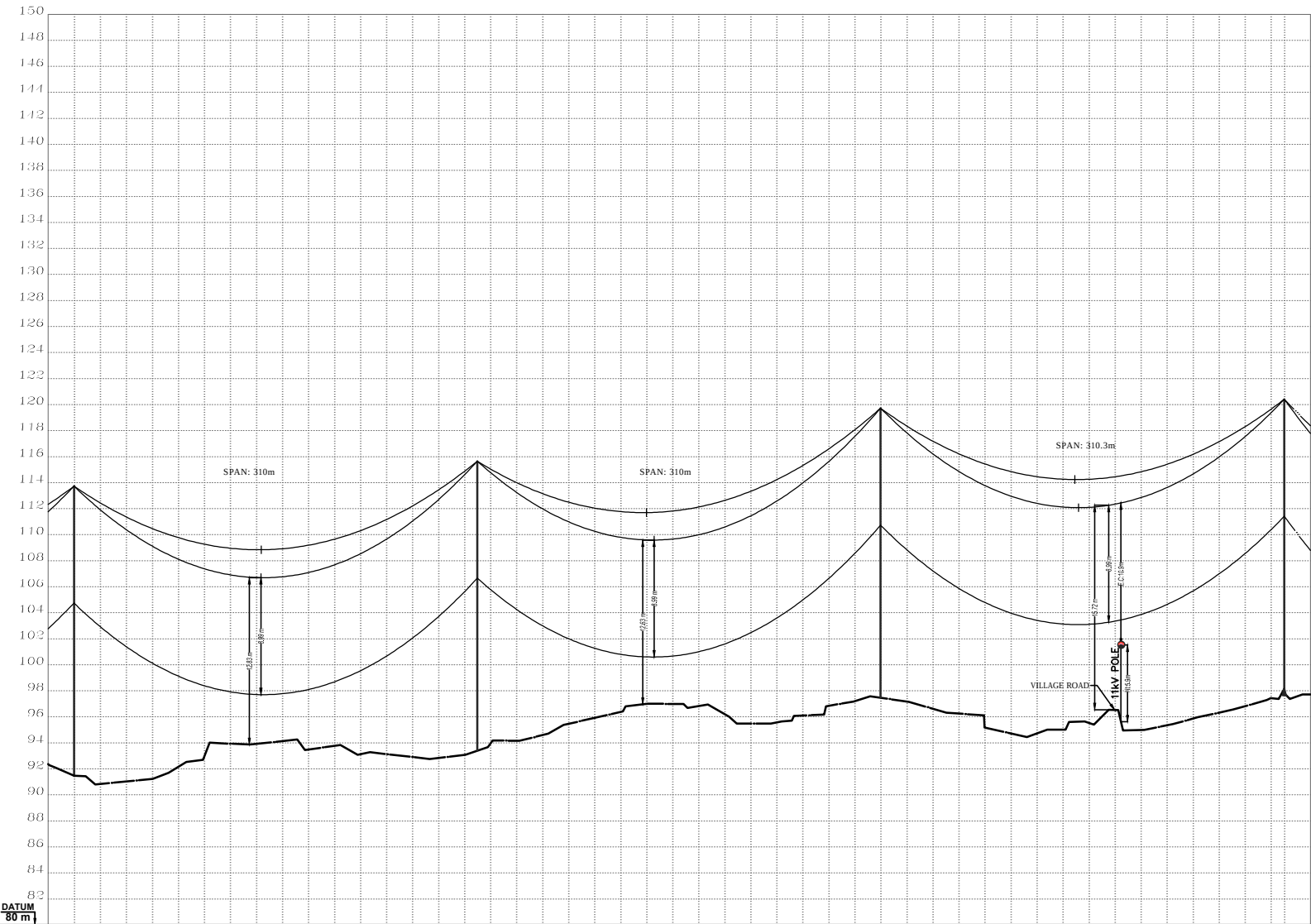


LOC NO: AP3	
TOWER TYPE	DD+00
WIND SPAN	(L:355.1+R:310.0)/2=332.6m
WT. SPAN (C)	(L:158.5+R:142.2)=297.7m
WT. SPAN (H)	(L:158.8+R:145.7)=304.4m
LATITUDE	24°43'16.7" N
LONGITUDE	84°05'48.5" E
ELEVATION	91.480

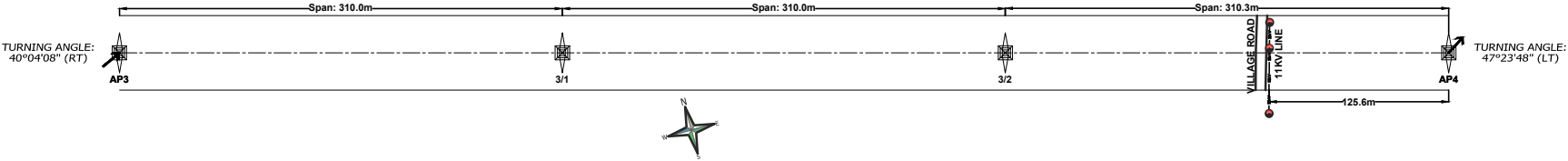
LOC NO: 3/1	
TOWER TYPE	DA+00
WIND SPAN	(L:310.0+R:310.0)/2=310.0m
WT. SPAN (C)	(L:167.8+R:127.8)=295.7m
WT. SPAN (H)	(L:164.3+R:135.2)=299.5m
LATITUDE	24°43'14.3" N
LONGITUDE	84°05'59.2" E
ELEVATION	93.400

LOC NO: 3/2	
TOWER TYPE	DA+00
WIND SPAN	(L:310.0+R:310.3)/2=310.2m
WT. SPAN (C)	(L:182.2+R:150.6)=332.7m
WT. SPAN (H)	(L:174.8+R:151.8)=326.6m
LATITUDE	24°43'11.9" N
LONGITUDE	84°06'09.9" E
ELEVATION	97.470

LOC NO: AP4	
TOWER TYPE	DD+00
WIND SPAN	(L:310.3+R:235.0)/2=272.7m
WT. SPAN (C)	(L:159.7+R:102.4)=262.1m
WT. SPAN (H)	(L:158.5+R:106.5)=265.0m
LATITUDE	24°43'09.5" N
LONGITUDE	84°06'20.8" E
ELEVATION	98.160



GROUND LEVEL (m)	91.479	90.835	91.033	91.231	92.146	92.912	93.934	93.915	94.130	93.484	93.768	93.119	93.137	92.908	92.837	93.078	93.940	94.159	94.592	95.463	95.912	96.377	96.997	96.990	96.822	96.220	95.485	95.565	96.094	96.844	97.199	97.468	97.180	96.625	96.249	95.163	94.721	94.713	95.009	95.529	96.527	94.981	95.341	95.863	96.317	96.811	97.438	98.156
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0	380.0	400.0	420.0	440.0	460.0	480.0	500.0	520.0	540.0	560.0	580.0	600.0	620.0	640.0	660.0	680.0	700.0	720.0	740.0	760.0	780.0	800.0	820.0	840.0	860.0	880.0	900.0	920.0	930.3



PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

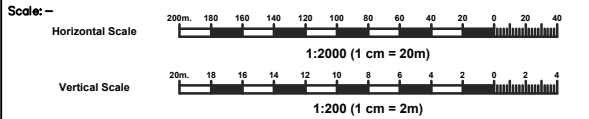
Sr.No.	Description	Symbol
1).	Alignment	— — — — —
2).	Power Line Corridor	— — — — —
3).	Hot Curve / Cold Curve	— — — — — / — — — — —
4).	Ground Clearance / Ground Profile	— — — — — / — — — — —
5).	House / Ground Profile Side Hill	□ / — — — — —
6).	Railway Track	— — — — —
7).	National Highway / State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

Notes:-

- All Dimensions are in metre unless otherwise stated.
- UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	Revised Plan and profile between Tower AP3 and AP4	10-12-2013	MS/VS
R3	No change	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: AP03-AP04 Section Length: 930.4m Paper Size: 24" Roll Date: 31-07-2014

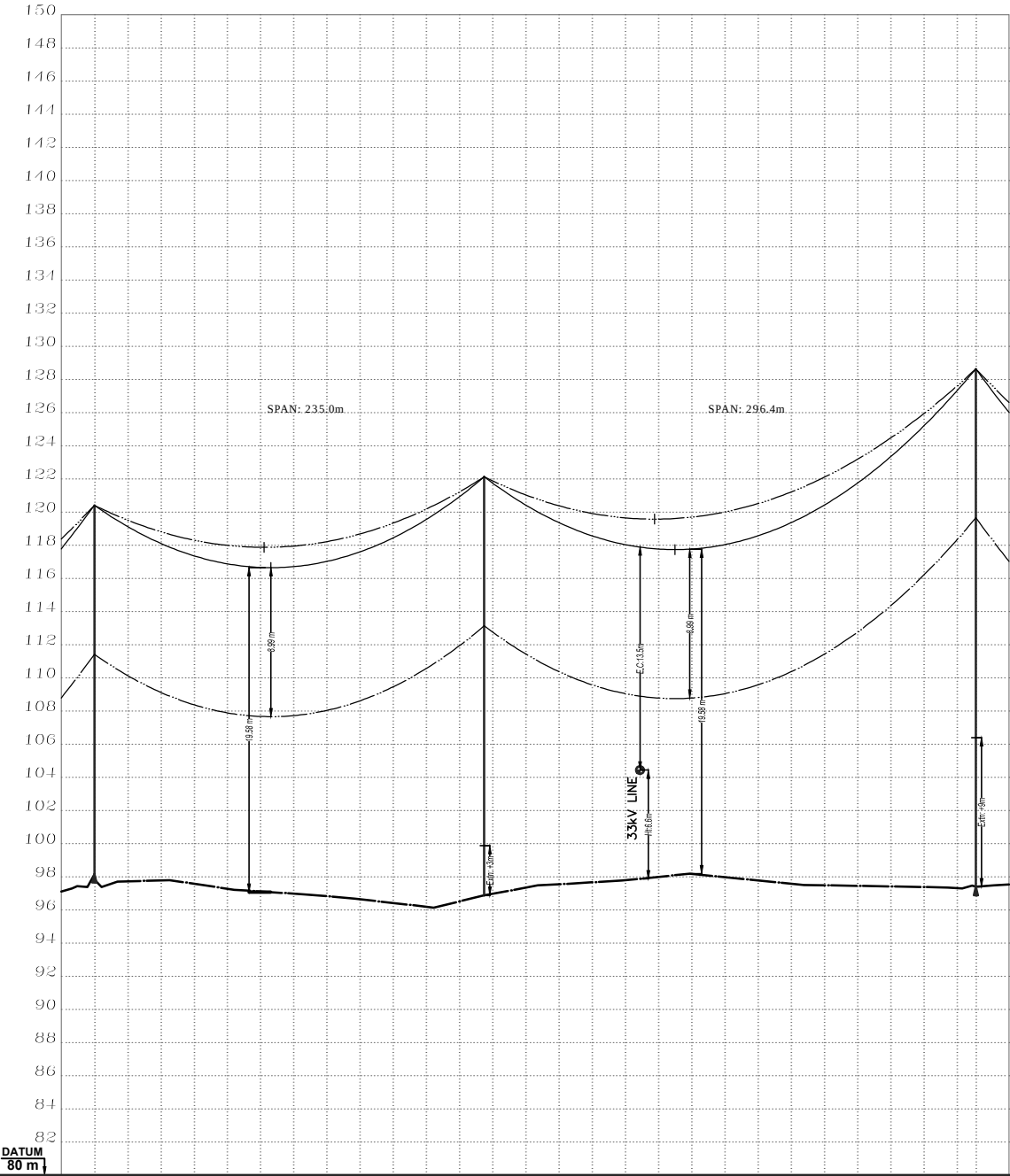


DO NOT SCALE		FOR APPROVAL	
NTPC DRG NO: 0370-572-PVC-U-504		(SHEET 4 OF 14)	
CUSTOMER: NABINAGAR POWER GENERATION COMPANY			
PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR			
CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI			
TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE		(SHEET 4 OF 14)	
TATA CONSULTING ENGINEERS LIMITED MUMBAI			
SCALE: 1:100	APPROVED		DATE (RD ISSUE) 16-08-2013
OFFICE-DISC: DW-CV	VDB		DATE (CURRENT ISSUE) 31-07-2014
DRN: RVJ	SKK		ASK
CHD: KKK	DWD NO TCE-7219B-765-RA-6001		ISSUE R5

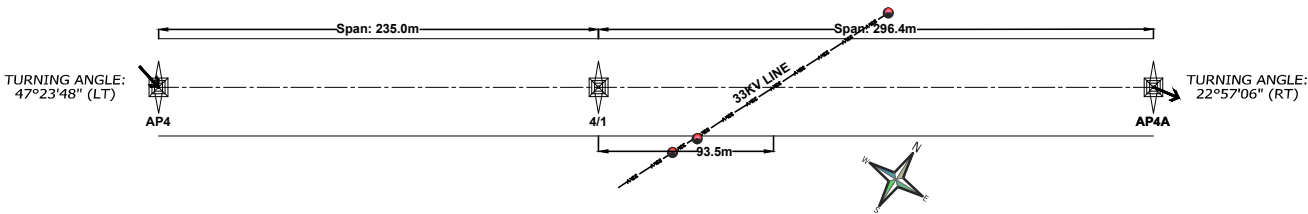
LOC NO: AP4	
TOWER TYPE:	DD+00
WIND SPAN:	(L:475.4+R:235.0)/2=355.2m
WT. SPAN (C):	(L:203.6+R:102.4)=306.0m
WT. SPAN (H):	(L:212.8+R:106.5)=319.3m
LATITUDE:	24°43'09.5" N
LONGITUDE:	84°06'20.6" E
ELEVATION:	98.160

LOC NO: 4/1	
TOWER TYPE:	DA+03
WIND SPAN:	(L:235.0+R:296.4)/2=265.7m
WT. SPAN (C):	(L:132.7+R:102.8)=235.5m
WT. SPAN (H):	(L:128.6+R:115.1)=243.7m
LATITUDE:	24°43'13.7" N
LONGITUDE:	84°06'27.6" E
ELEVATION:	96.880

LOC NO: AP4A	
TOWER TYPE:	DD+09
WIND SPAN:	(L:296.4+R:236.3)/2=267.4m
WT. SPAN (C):	(L:193.6+R:121.3)=314.9m
WT. SPAN (H):	(L:181.3+R:120.7)=302.0m
LATITUDE:	24°43'19.0" N
LONGITUDE:	84°06'36.4" E
ELEVATION:	97.390



GROUND LEVEL (m)	98.156	97.726	97.780	97.577	97.278	97.112	96.983	96.823	96.642	96.416	96.191	96.512	96.969	97.340	97.548	97.662	97.786	97.992	98.178	97.979	97.780	97.581	97.482	97.447	97.411	97.376	97.319	97.392
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0	380.0	400.0	420.0	440.0	460.0	480.0	500.0	520.0	531.4



PLS--CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

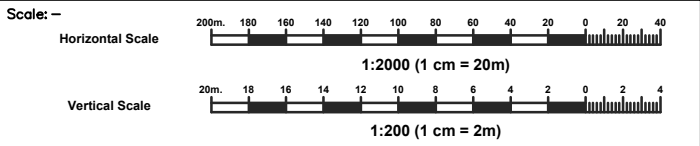
Sr.No.	Description	Symbol
1).	Alignment	---
2).	Power Line Corridor	=====
3).	Hot Curve / Cold Curve	--- / ---
4).	Ground Clearance / Ground Profile	--- / ---
5).	House / Ground Profile Side Hill	□ / ---
6).	Railway Track	=====
7).	National Highway / State Highway	--- / ---
8).	Road / Cart Track	---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

Notes:-

1. All Dimensions are in metre unless otherwise stated.
2. UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	No change	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

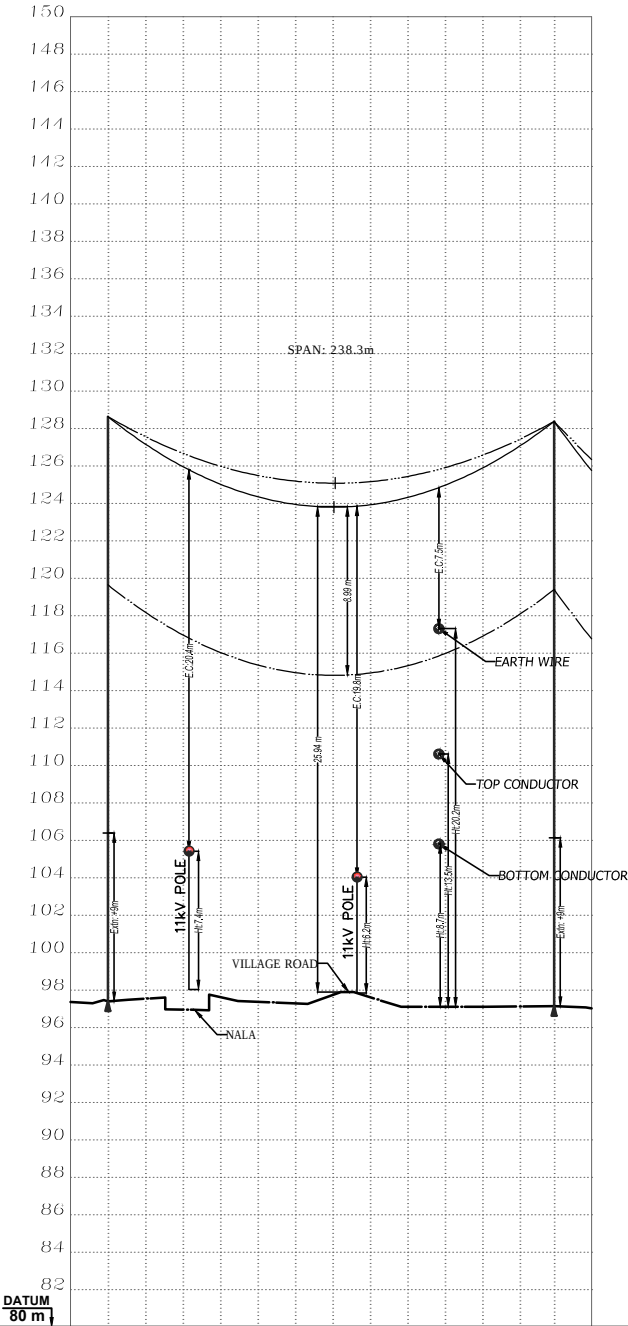
Sheet Name: AP04-AP04A	Section Length: 531.4m	Paper Size: 24" Roll	Date: 31-07-2014
------------------------	------------------------	----------------------	------------------



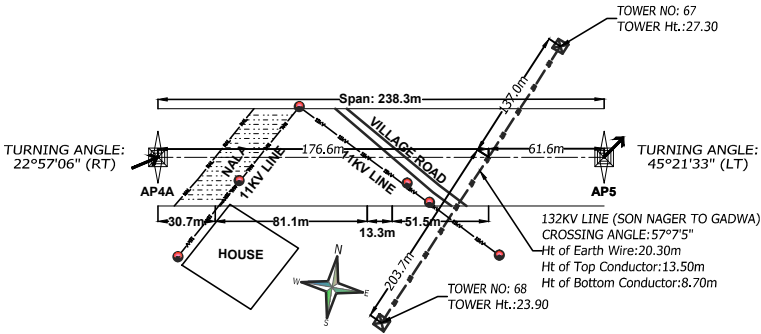
DO NOT SCALE		FOR APPROVAL	
NTPC DRG NO:		0370-572-PVC-U-504 (SHEET 5 OF 14)	
CUSTOMER: NABINAGAR POWER GENERATION COMPANY			
PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR			
CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI			
TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE (SHEET 5 OF 14)			
TATA CONSULTING ENGINEERS LIMITED MUMBAI			
SCALE: 1:100		APPROVED	
OFFICE-DISC: DV-CV		DATE (RD ISSUE) 16-08-2013	
DRN: RVJ		DATE (CURRENT ISSUE) 31-07-2014	
CHD: KKK		ASK	
DWG NO		ISSUE	
TCE-7219B-765-RA-6001		R5	

LOC NO: AP4A	
TOWER TYPE:	DD+09
WIND SPAN:	(L:296.4+R:238.3)/2=267.4m
WT. SPAN (C):	(L:193.6+R:121.3)=314.9m
WT. SPAN (H):	(L:181.3+R:120.7)=302.0m
LATITUDE:	24°43'19.0" N
LONGITUDE:	84°06'36.4" E
ELEVATION:	97.390

LOC NO: AP5	
TOWER TYPE:	DD+09
WIND SPAN:	(L:238.3+R:355.0)/2=296.7m
WT. SPAN (C):	(L:117.0+R:234.0)=351.0m
WT. SPAN (H):	(L:117.6+R:218.7)=336.3m
LATITUDE:	24°43'20.5" N
LONGITUDE:	84°06'44.7" E
ELEVATION:	97.140



GROUND LEVEL (m)	97.392	97.538	96.956	97.621	97.369	97.293	97.729	97.621	97.107	97.108	97.108	97.122	97.135
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	238.3



PLS--CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

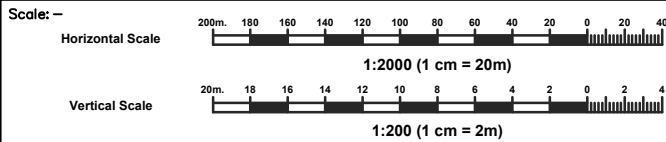
Sr.No.	Description	Symbol
1).	Alignment	---
2).	Power Line Corridor	=====
3).	Hot Curve / Cold Curve	----- / -----
4).	Ground Clearance / Ground Profile	----- / -----
5).	House / Ground Profile Side Hill	□ / -----
6).	Railway Track	=====
7).	National Highway / State Highway	=====
8).	Road / Cart Track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

Notes:-

- All Dimensions are in metre unless otherwise stated.
- UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	No change	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: AP04A - AP05 Section Length: 238.3m Paper Size: 24" Roll Date: 31-07-2014



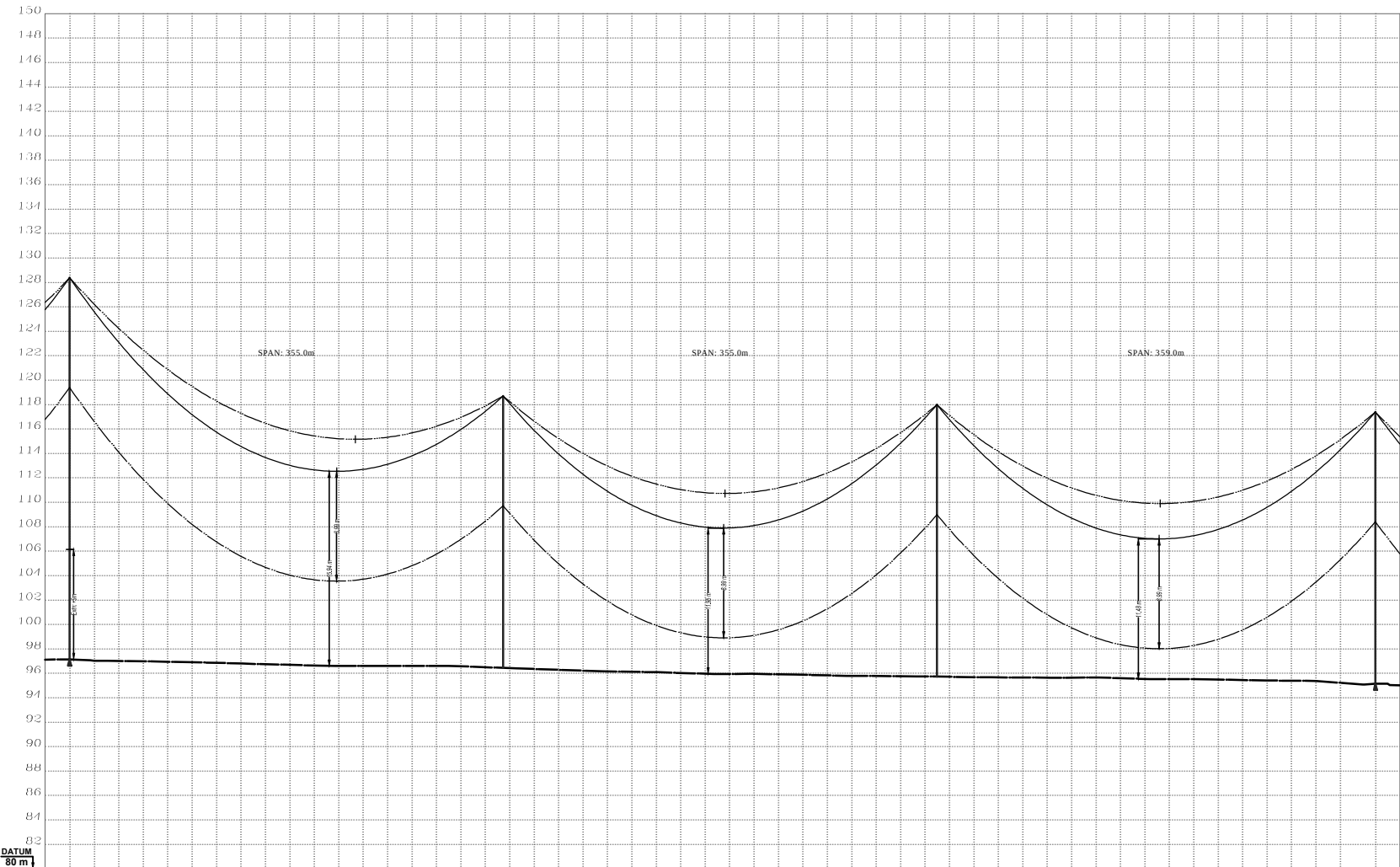
DO NOT SCALE		FOR APPROVAL	
NTPC DRG NO:		0370-572-PVC-U-504 (SHEET 6 OF 14)	
CUSTOMER:		NABINAGAR POWER GENERATION COMPANY	
PROJECT:		400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR	
CONTRACTOR:		BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI	
TITLE:		400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE (SHEET 6 OF 14)	
		TATA CONSULTING ENGINEERS LIMITED MUMBAI	
SCALE: 1:100	APPROVED		DATE (RD ISSUE) 16-08-2013
OFFICE-DISC: DV-CV	VDB		DATE (CURRENT ISSUE) 31-07-2014
DRN: RVJ	SKK		ASK
CHD: KKK	DWG NO	TCE-7219B-765-RA-6001	ISSUE R5

LOC NO: AP5	
TOWER TYPE	DD+00
WIND SPAN	(L:238.3+R:355.0)/2=296.7m
WT. SPAN (C)	(L:117.0+R:234.0)=351.0m
WT. SPAN (H)	(L:117.0+R:218.7)=336.3m
LATITUDE	24°43'20.5" N
LONGITUDE	84°06'44.7" E
ELEVATION	97.140

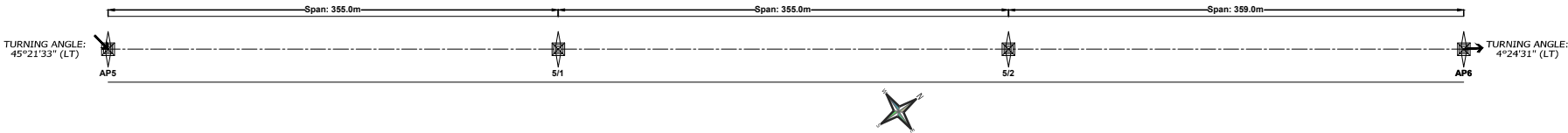
LOC NO: S/1	
TOWER TYPE	DA+00
WIND SPAN	(L:355.0+R:355.0)/2=355.0m
WT. SPAN (C)	(L:121.0+R:181.7)=302.7m
WT. SPAN (H)	(L:136.3+R:180.6)=316.9m
LATITUDE	24°43'39.6" N
LONGITUDE	84°06'51.7" E
ELEVATION	96.450

LOC NO: S/2	
TOWER TYPE	DA+00
WIND SPAN	(L:355.0+R:359.0)/2=357.0m
WT. SPAN (C)	(L:173.3+R:182.9)=356.2m
WT. SPAN (H)	(L:174.4+R:182.0)=356.4m
LATITUDE	24°43'39.6" N
LONGITUDE	84°06'58.8" E
ELEVATION	95.730

LOC NO: AP6	
TOWER TYPE	DB+00
WIND SPAN	(L:359.0+R:365.0)/2=362.0m
WT. SPAN (C)	(L:176.1+R:185.7)=361.8m
WT. SPAN (H)	(L:177.0+R:184.9)=361.9m
LATITUDE	24°43'49.3" N
LONGITUDE	84°07'05.9" E
ELEVATION	95.140



GROUND LEVEL (m)	97.135	97.016	97.010	96.979	96.947	96.913	96.857	96.800	96.745	96.689	96.633	96.598	96.605	96.611	96.612	96.576	96.503	96.429	96.357	96.286	96.215	96.150	96.121	96.092	96.029	95.962	95.947	95.956	95.919	95.879	95.831	95.790	95.776	95.762	95.743	95.715	95.687	95.663	95.650	95.638	95.644	95.633	95.602	95.541	95.521	95.513	95.493	95.450	95.408	95.393	95.377	95.224	95.144	
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0	380.0	400.0	420.0	440.0	460.0	480.0	500.0	520.0	540.0	560.0	580.0	600.0	620.0	640.0	660.0	680.0	700.0	720.0	740.0	760.0	780.0	800.0	820.0	840.0	860.0	880.0	900.0	920.0	940.0	960.0	980.0	1000.0	1020.0	1040.0	1069.0



PLS--CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone--4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

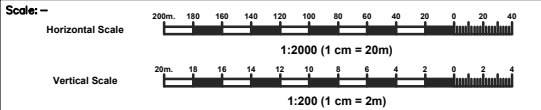
Sr.No.	Description	Symbol
1).	Alignment	---
2).	Power Line Corridor	=====
3).	Hot Curve / Cold Curve	--- / ---
4).	Ground Clearance / Ground Profile	--- / ---
5).	House / Ground Profile Side Hill	[] / ---
6).	Railway Track	=====
7).	National Highway / State Highway	=====
8).	Road / Cart Track	=====
9).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

Notes:-

- All Dimensions are in metre unless otherwise stated.
- UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	No change	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: AP05 - AP06 Section Length: 1069m Paper Size: 24" Roll Date: 31-07-2014



DO NOT SCALE		FOR APPROVAL	
NTPC DRG NO:		0370-572-PVC-U-504	
CUSTOMER:		NABINAGAR POWER GENERATION COMPANY	
PROJECT:		400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR	
CONTRACTOR:		BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI	
TITLE:		400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE	
TATA		TCE CONSULTING ENGINEERS LIMITED MUMBAI	
SCALE: 1:100		APPROVED	
OFFICE-DWG: DVCV		VDS	
DRN: RVJ		SKK	
CHD: KKK		ASK	
DWG NO:		TCE-7219B-705-RA-6001	
DATE (RD ISSUE):		16-08-2013	
DATE (CURRENT ISSUE):		31-07-2014	
R4		R4	

LOC NO: AP6	
TOWER TYPE	DB+00
WIND SPAN	(L:359.0+R:365.0)/2=362.0m
WT. SPAN (C)	(L:176.1+R:185.7)=361.8m
WT. SPAN (H)	(L:177.0+R:184.9)=361.9m
LATITUDE	24°43'49.3" N
LONGITUDE	84°07'05.9" E
ELEVATION	95.140

LOC NO: 6/1	
TOWER TYPE	DA+00
WIND SPAN	(L:365.0+R:365.0)/2=365.0m
WT. SPAN (C)	(L:179.3+R:185.7)=365.0m
WT. SPAN (H)	(L:180.1+R:184.9)=365.0m
LATITUDE	24°43'59.6" N
LONGITUDE	84°07'12.3" E
ELEVATION	94.570

LOC NO: 6/2	
TOWER TYPE:	DA+00
WIND SPAN	(L:365.0+R:365.0)/2=365.0m
WT. SPAN(C)	(L:179.3+R:167.3)=346.6m
WT. SPAN(H)	(L:180.1+R:171.4)=351.6m
LATITUDE	24°44'09.9" N
LONGITUDE	84°07'18.7" E
ELEVATION	94.00m

LOC NO: 613	
TOWER TYPE	DA+03
WIND SPAN	(L:365.0+R:365.0)=730.0m
WT. SPAN(C)	(L:197.7+R:201.8)=399.5m
WT. SPAN(H)	(L:193.6+R:196.6)=390.2m
LATITUDE	24°44'20.2" N
LONGITUDE	84°07'25.1" E
ELEVATION	93.680

LOC NO: 6/4	
TOWER TYPE	DA+00
WIND SPAN	(L:365.0+R:365.0)/2=365.0m
WT. SPAN (C)	(L:163.2+R:184.8)=347.9m
WT. SPAN (H)	(L:168.4+R:184.1)=352.6m
LATITUDE	24°44'30.5" N
LONGITUDE	84°07'31.5" E
ELEVATION	93.270

LOC NO: 6/5	
TOWER TYPE	DA+00
WIND SPAN	(L:365.0+R:365.0)/2=365.0m
WT. SPAN (G)	(L:180.2+R:185.8)=366.0m
WT. SPAN (H)	(L:180.8+R:184.9)=365.7m
LATITUDE	24°44'40.9" N
LONGITUDE	84°07'37.9" E
ELEVATION	92.870

LOC NO: 6/6	
TOWER TYPE	DA+00
WIND SPAN	(L:365.0+R:365.0)/2=365.0m
WT. SPAN (C)	(L:179.2+R:183.0)=362.2m
WT. SPAN (H)	(L:180.1+R:182.9)=363.0m
LATITUDE	24°44'51.2" N
LONGITUDE	84°07'44.3" E
ELEVATION	92.290

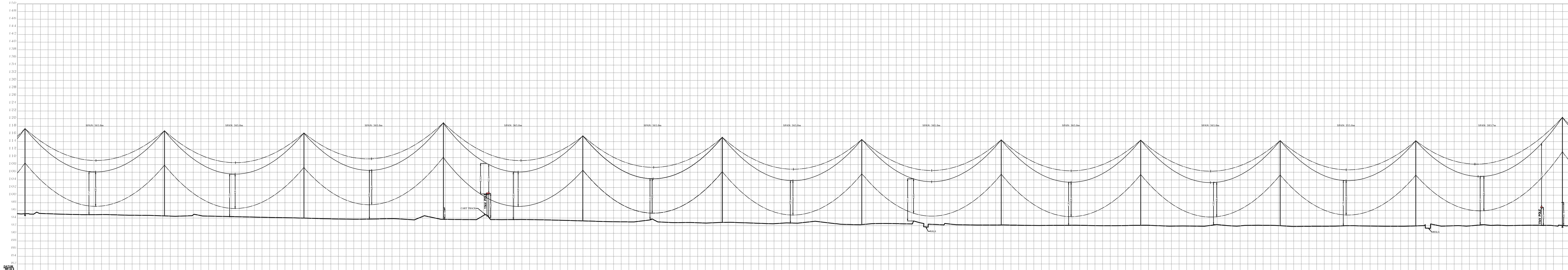
LOC NO: 6/7	
TOWER TYPE	DA+00
WIND SPAN:	$(L:365.0+R:365.0)/2=365.0m$
WT. SPAN (C)	$(L:182.0+R:183.0)=365.0m$
WT. SPAN (H)	$(L:182.1+R:182.8)=364.9m$
LATITUDE	24°45'01.5" N
LONGITUDE	84°07'50.7" E
ELEVATION	92.200

LOC NO: 6/8	
TOWER TYPE:	DA+00
WIND SPAN	(L:365.0+R:365.0)/2=365.0
WT. SPAN (C)	(L:182.0+R:183.2)/2=365.2n
WT. SPAN (H)	(L:182.2+R:183.0)/2=365.2n
LATITUDE	24°45'11.8" N
LONGITUDE	84°07'57.1" E
ELEVATION	92.120

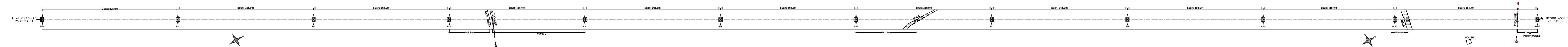
LOC NO. 6/9	
TOWER TYPE	DA+00
WIND SPAN	(L:365.0+R:355.0)/2=360.0
WT. SPAN (C)	(L:181.8+R:177.7)/2=359.6
WT. SPAN (H)	(L:182.0+R:177.7)/2=359.7
LATITUDE	24°45'22.1" N
LONGITUDE	84°08'03.5" E
ELEVATION	92.000

LOC NO: 6/10	
TOWER TYPE	DA+00
WIND SPAN	(L:355.0+R:383.7)/2=369.4m
WT. SPAN (C)	(L:177.3+R:158.8)=336.1m
WT. SPAN (H)	(L:177.3+R:167.8)=345.1m
LATITUDE	24°45'32.1" N
LONGITUDE	84°08'09.7" E
ELEVATION	91.960

LOC NO: AP7	
TOWER TYPE	DB+06
WIND SPAN	(L:383.7+R:412.8)/2=3
WT. SPAN (C)	(L:224.9+R:207.0)=43
WT. SPAN (H)	(L:215.9+R:206.8)=42
LATITUDE	24°45'43.0" N
LONGITUDE	84°06'16.5" E
ELEVATION	92.090



GROUND LEVEL (m)	CHARGE (kg)	95.144 95.021 95.200 95.337 95.069 95.008 94.965 94.922 94.889 94.899 94.909 94.897 94.835 94.775 94.738 94.732 94.726 94.663 94.951 94.901 94.941 94.942 94.857 94.825 94.643 94.600 94.572 94.778 94.816 93.866 93.777 93.623 93.576 93.536 93.576 93.623 93.600 93.576 93.536 93.487 93.489 93.436 93.389 93.338 93.270 93.270 93.207 93.142 93.077 93.044 93.004 92.958 92.908 92.858 92.808 92.758 92.708 92.658 92.608 92.558 92.508 92.458 92.408 92.358 92.308 92.258 92.208 92.158 92.108 92.058 92.008 91.958 91.908 91.858 91.808 91.758 91.708 91.658 91.608 91.558 91.508 91.458 91.408 91.358 91.308 91.258 91.208 91.158 91.108 91.058 91.008 90.958 90.908 90.858 90.808 90.758 90.708 90.658 90.608 90.558 90.508 90.458 90.408 90.358 90.308 90.258 90.208 90.158 90.108 90.058 90.008 89.958 89.908 89.858 89.808 89.758 89.708 89.658 89.608 89.558 89.508 89.458 89.408 89.358 89.308 89.258 89.208 89.158 89.108 89.058 89.008 88.958 88.908 88.858 88.808 88.758 88.708 88.658 88.608 88.558 88.508 88.458 88.408 88.358 88.308 88.258 88.208 88.158 88.108 88.058 88.008 87.958 87.908 87.858 87.808 87.758 87.708 87.658 87.608 87.558 87.508 87.458 87.408 87.358 87.308 87.258 87.208 87.158 87.108 87.058 87.008 86.958 86.908 86.858 86.808 86.758 86.708 86.658 86.608 86.558 86.508 86.458 86.408 86.358 86.308 86.258 86.208 86.158 86.108 86.058 86.008 85.958 85.908 85.858 85.808 85.758 85.708 85.658 85.608 85.558 85.508 85.458 85.408 85.358 85.308 85.258 85.208 85.158 85.108 85.058 85.008 84.958 84.908 84.858 84.808 84.758 84.708 84.658 84.608 84.558 84.508 84.458 84.408 84.358 84.308 84.258 84.208 84.158 84.108 84.058 84.008 83.958 83.908 83.858 83.808 83.758 83.708 83.658 83.608 83.558 83.508 83.458 83.408 83.358 83.308 83.258 83.208 83.158 83.108 83.058 83.008 82.958 82.908 82.858 82.808 82.758 82.708 82.658 82.608 82.558 82.508 82.458 82.408 82.358 82.308 82.258 82.208 82.158 82.108 82.058 82.008 81.958 81.908 81.858 81.808 81.758 81.708 81.658 81.608 81.558 81.508 81.458 81.408 81.358 81.308 81.258 81.208 81.158 81.108 81.058 81.008 80.958 80.908 80.858 80.808 80.758 80.708 80.658 80.608 80.558 80.508 80.458 80.408 80.358 80.308 80.258 80.208 80.158 80.108 80.058 80.008 79.958 79.908 79.858 79.808 79.758 79.708 79.658 79.608 79.558 79.508 79.458 79.408 79.358 79.308 79.258 79.208 79.158 79.108 79.058 79.008 78.958 78.908 78.858 78.808 78.758 78.708 78.658 78.608 78.558 78.508 78.458 78.408 78.358 78.308 78.258 78.208 78.158 78.108 78.058 78.008 77.958 77.908 77.858 77.808 77.758 77.708 77.658 77.608 77.558 77.508 77.458 77.408 77.358 77.308 77.258 77.208 77.158 77.108 77.058 77.008 76.958 76.908 76.858 76.808 76.758 76.708 76.658 76.608 76.558 76.508 76.458 76.408 76.358 76.308 76.258 76.208 76.158 76.108 76.058 76.008 75.958 75.908 75.858 75.808 75.758 75.708 75.658 75.608 75.558 75.508 75.458 75.408 75.358 75.308 75.258 75.208 75.158 75.108 75.058 75.008 74.958 74.908 74.858 74.808 74.758 74.708 74.658 74.608 74.558 74.508 74.458 74.408 74.358 74.308 74.258 74.208 74.158 74.108 74.058 74.008 73.958 73.908 73.858 73.808 73.758 73.708 73.658 73.608 73.558 73.508 73.458 73.408 73.358 73.308 73.258 73.208 73.158 73.108 73.058 73.008 72.958 72.908 72.858 72.808 72.758 72.708 72.658 72.608 72.558 72.508 72.458 72.408 72.358 72.308 72.258 72.208 72.158 72.108 72.058 72.008 71.958 71.908 71.858 71.808 71.758 71.708 71.658 71.608 71.558 71.508 71.458 71.408 71.358 71.308 71.258 71.208 71.158 71.108 71.058 71.008 70.958 70.908 70.858 70.808 70.758 70.708 70.658 70.608 70.558 70.508 70.458 70.408 70.358 70.308 70.258 70.208 70.158 70.1
---------------------	----------------	--



PLS-CADD Profile Drawing of 400kV D/C TL	
Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)	
1. Conductor	ACSR MOOSE
2. Cable Diameter	31.77mm.
3. Area of Conductor	597 Sq. mm.
4. Unit Weight of Conductor	2.004 Kg./M.
5. Normal Span (Ruling Span)	400 Mtr.
6. Maximum Sag @ 75° Temperature, No Wind	12.80 Mtr.
7. Ground Clearance (Including Sag error of 0.15m)	8.90 Mtr.
8. Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9. Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

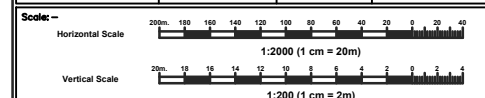
Legends		
Sl.No.	Description	Symbol
1.	Alignment	
2.	Power Line Corridor	
3.	Hot Curve / Cold Curve	
4.	Ground Clearance / Ground Profile	
5.	House / Ground Profile Side Hill	
6.	Railway Track	
7.	National Highway / State Highway	
8.	Road / Cart Track	
9.	Existing 110kV / 220kV / 330kV / 400kV & above TL	
10.	66kV / 23kV Line	
11.	11kV Line / LT Line	
12.	Telephone Line / Fence	
13.	Pond / Canal / Nala / River	
14.	Bund / Well / Tube Well / Tree	

Notes:-

1. All Dimensions are in metre unless otherwise stated.
2. UTM (Zone - 45N) coordinate system has been adopted for detailed survey

Revision	Description	Date	Drawn
R0	<i>Released for Approval</i>	16-08-2013	MS/VS
R1	<i>Revised as per Client's Comments</i>	22-11-2013	MS/VS
R2	<i>Revised Plan and profile between Tower 6/3 and AP7</i>	10-12-2013	MS/VS
R3	<i>Revised profile between Tower 6/3 and 6/4 as per client comment</i>	20-01-2014	MS/VS
R4	<i>Revised as per Client's Comments</i>	18-03-2014	MS/VS
R5	<i>No change</i>	31-07-2014	MS/VS

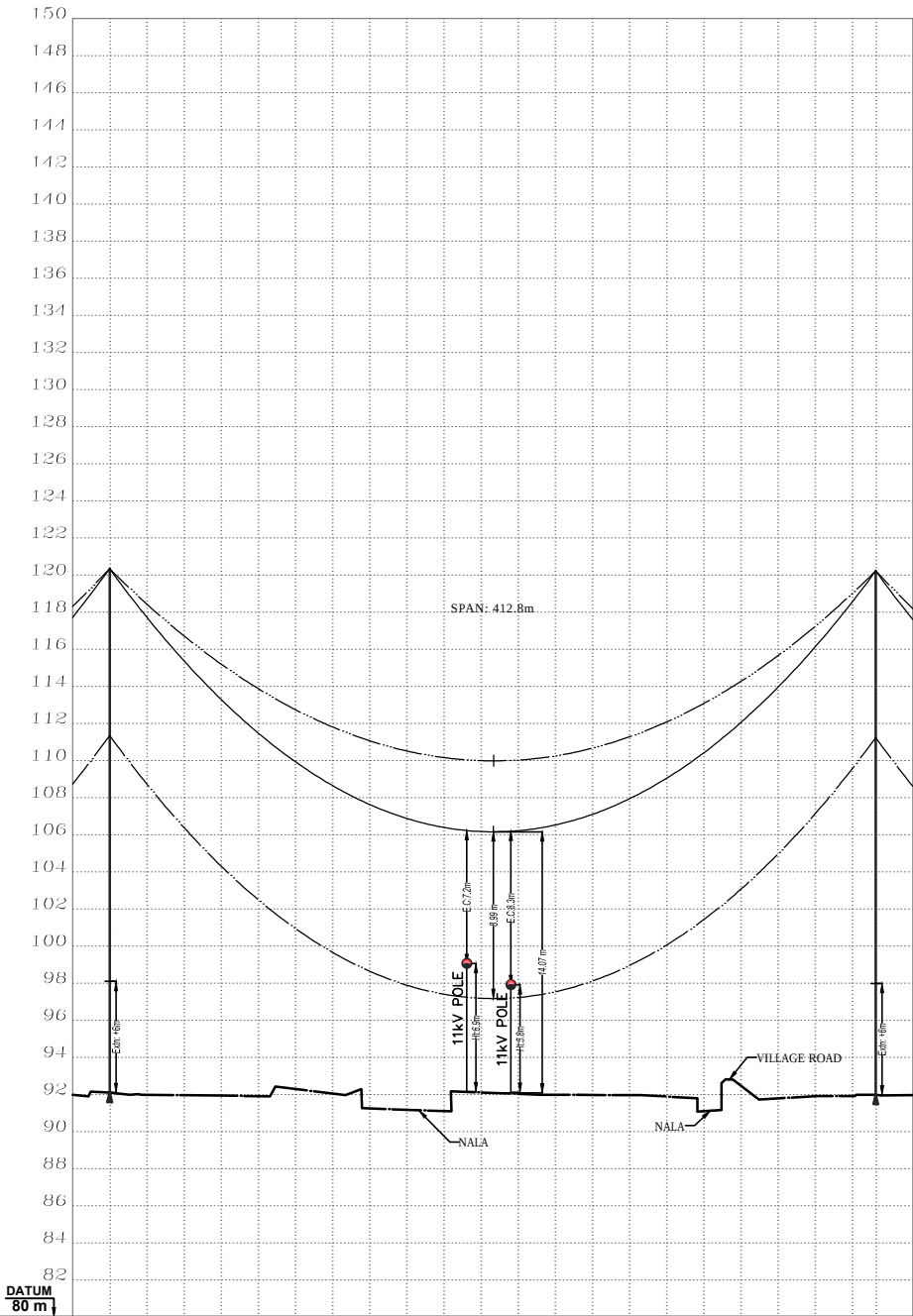
Sheet Name: AP06 - AP07 Section Length: 4023.7m Paper Size: 24" Roll Date: 31-07-2014



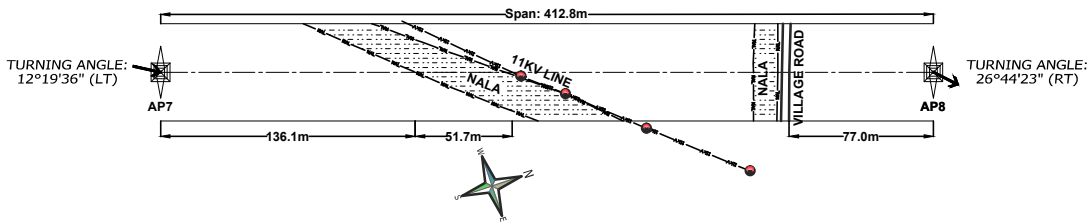
DO NOT SCALE		FOR APPROVAL	
WCTC CDRG NO.		0370-72-PVC-U-504	
CUSTOMER:		NABINAGAR POWER GENERATION COMPANY	
PROJECT:		400KV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR	
CONTRACTOR:		BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI	
TITLE:		400V & 33KV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400KV DC TRANSMISSION LINE	
  TATA CONSULTING ENGINEERS LIMITED		NABINAGAR	
SCALE: 1/500		APPROVED	
APPROVAL: SENY		 SENY	
NAME: PUG		 PUG	
CNO:		 CNO	
DPO		TCE-72198-765-R-6001	
		 PMS	

LOC NO: AP7	
TOWER TYPE:	DB+06
WIND SPAN:	(L:383.7+R:412.8)/2=398.3m
WT. SPAN (C):	(L:224.9+R:207.0)=431.9m
WT. SPAN (H):	(L:215.9+R:206.8)=422.8m
LATITUDE:	24°45'43.0" N
LONGITUDE:	84°08'16.5" E
ELEVATION:	92.090

LOC NO: AP8	
TOWER TYPE:	DC+06
WIND SPAN:	(L:412.8+R:270.0)/2=341.4m
WT. SPAN (C):	(L:205.9+R:158.0)=363.9m
WT. SPAN (H):	(L:206.0+R:151.8)=357.8m
LATITUDE:	24°45'55.8" N
LONGITUDE:	84°08'20.8" E
ELEVATION:	91.980



GROUND LEVEL (m)	92.091	91.976	91.954	91.931	91.907	92.291	92.046	91.238	91.167	91.097	92.108	92.032	91.980	91.971	91.961	91.883	91.098	92.488	91.787	91.902	91.915	91.976
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0	380.0	400.0	412.8



PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

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

Notes:-

1. All Dimensions are in metre unless otherwise stated.
2. UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	Details at AP7 revised	10-12-2013	MS/VS
R3	No change	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: AP07 - AP08 Section Length: 412.8m Paper Size: 24" Roll Date: 31-07-2014



DO NOT SCALE

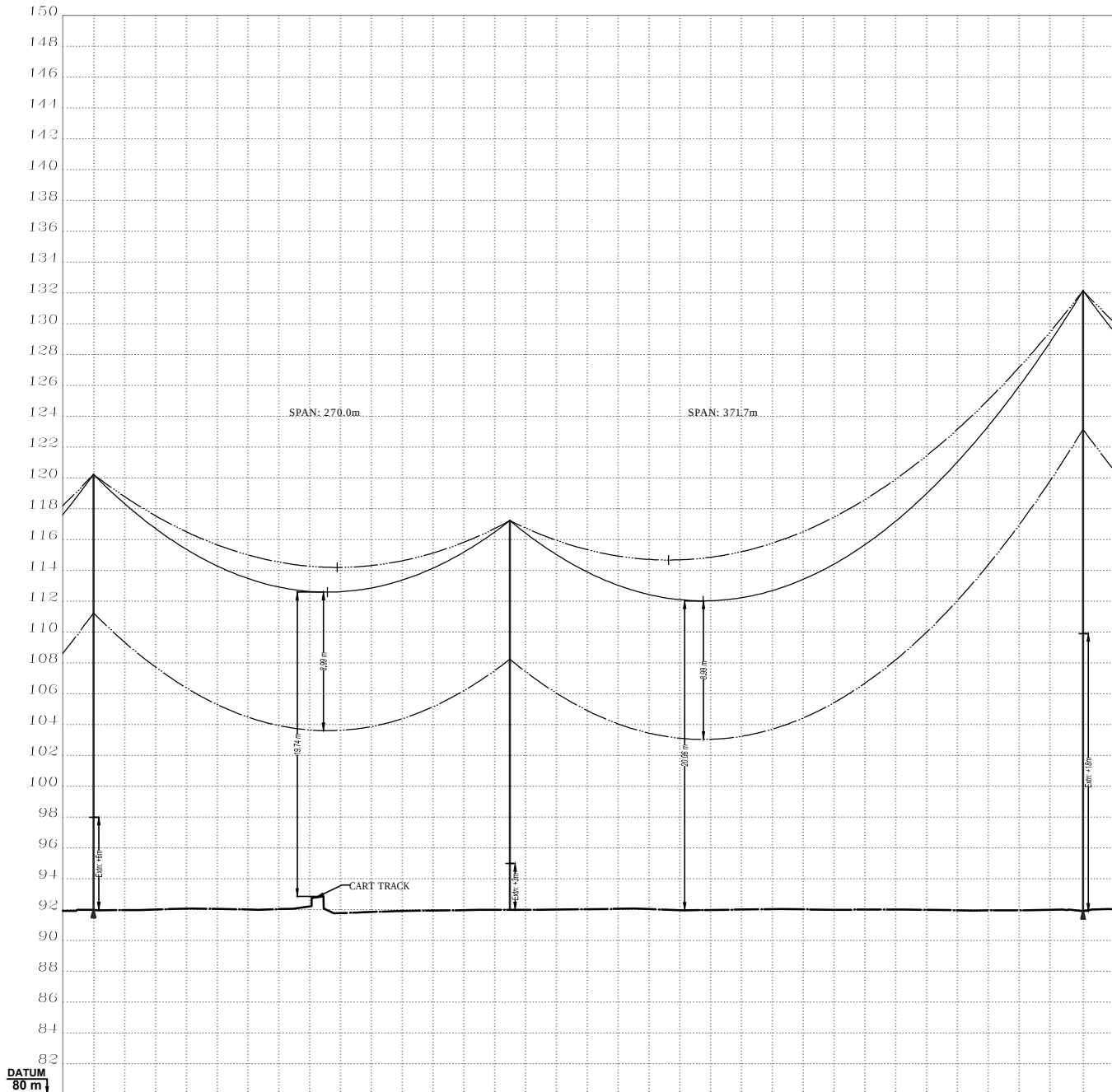
FOR APPROVAL

NTPC DRG NO: 0370-572-PVC-U-504 (SHEET 9 OF 14)	
CUSTOMER: NABINAGAR POWER GENERATION COMPANY	
PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR	
CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI	
TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE (SHEET 9 OF 14)	
TATA CONSULTING ENGINEERS LIMITED MUMBAI	
SCALE: 1:100	APPROVED
OFFICE-DISC: DV-CV	VDB
DRN: RVJ	SCK
CHD: KKK	DWG NO
TCE-7219B-765-RA-6001	
DATE (R0 ISSUE) 16-08-2013 DATE (CURRENT ISSUE) 31-07-2014	
ISSUE R5	

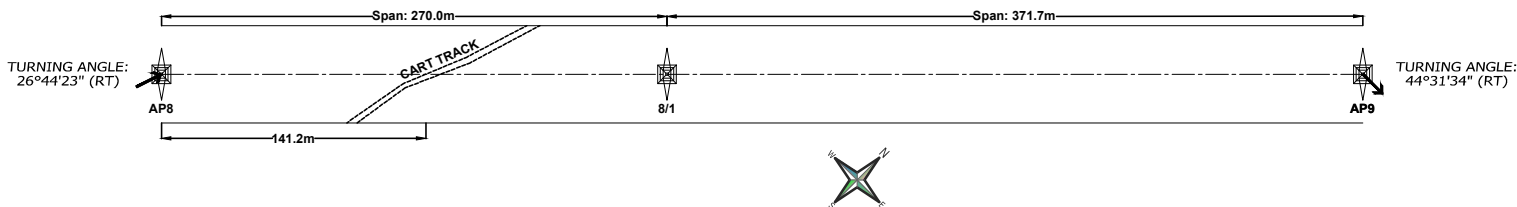
LOC NO: AP8	
TOWER TYPE:	DC+06
WIND SPAN:	(L:412.8+R:270.0)/2=341.4m
WT. SPAN (C):	(L:205.9+R:158.0)=363.9m
WT. SPAN (H):	(L:206.0+R:151.8)=357.8m
LATITUDE:	24°45'55.8" N
LONGITUDE:	84°08'20.8" E
ELEVATION:	91.980

LOC NO: 8/1	
TOWER TYPE:	DA+03
WIND SPAN:	(L:270.0+R:371.7)/2=320.9m
WT. SPAN (C):	(L:112.0+R:102.9)=214.9m
WT. SPAN (H):	(L:118.3+R:125.3)=243.6m
LATITUDE:	24°46'02.1" N
LONGITUDE:	84°08'27.5" E
ELEVATION:	91.980

LOC NO: AP9	
TOWER TYPE:	DD+18
WIND SPAN:	(L:371.7+R:273.7)/2=322.7m
WT. SPAN (C):	(L:268.8+R:203.1)=471.9m
WT. SPAN (H):	(L:246.3+R:185.2)=431.5m
LATITUDE:	24°46'10.8" N
LONGITUDE:	84°08'36.6" E
ELEVATION:	91.890



GROUND LEVEL (m)	91.976	91.957	91.994	92.057	92.034	91.998	92.024	92.202	91.763	91.837	91.902	91.930	91.958	91.976	91.982	91.988	92.014	92.042	92.023	91.950	91.966	91.994	92.022	92.009	91.980	91.990	92.000	91.980	91.947	91.935	91.947	91.977	91.892
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0	380.0	400.0	420.0	440.0	460.0	480.0	500.0	520.0	540.0	560.0	580.0	600.0	620.0	641.7



PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

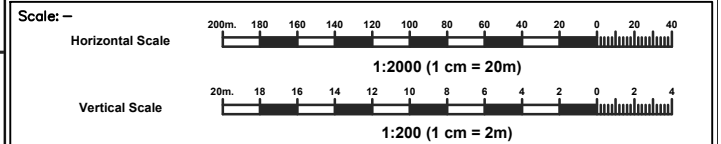
Sr.No.	Description	Symbol
1).	Alignment	---
2).	Power Line Corridor	=====
3).	Hot Curve / Cold Curve	--- / ---
4).	Ground Clearance / Ground Profile	--- / ---
5).	House / Ground Profile Side Hill	□ / ---
6).	Railway Track	=====
7).	National Highway / State Highway	=====
8).	Road / Cart Track	=====
9).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

Notes:-

- All Dimensions are in metre unless otherwise stated.
- UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	No change	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

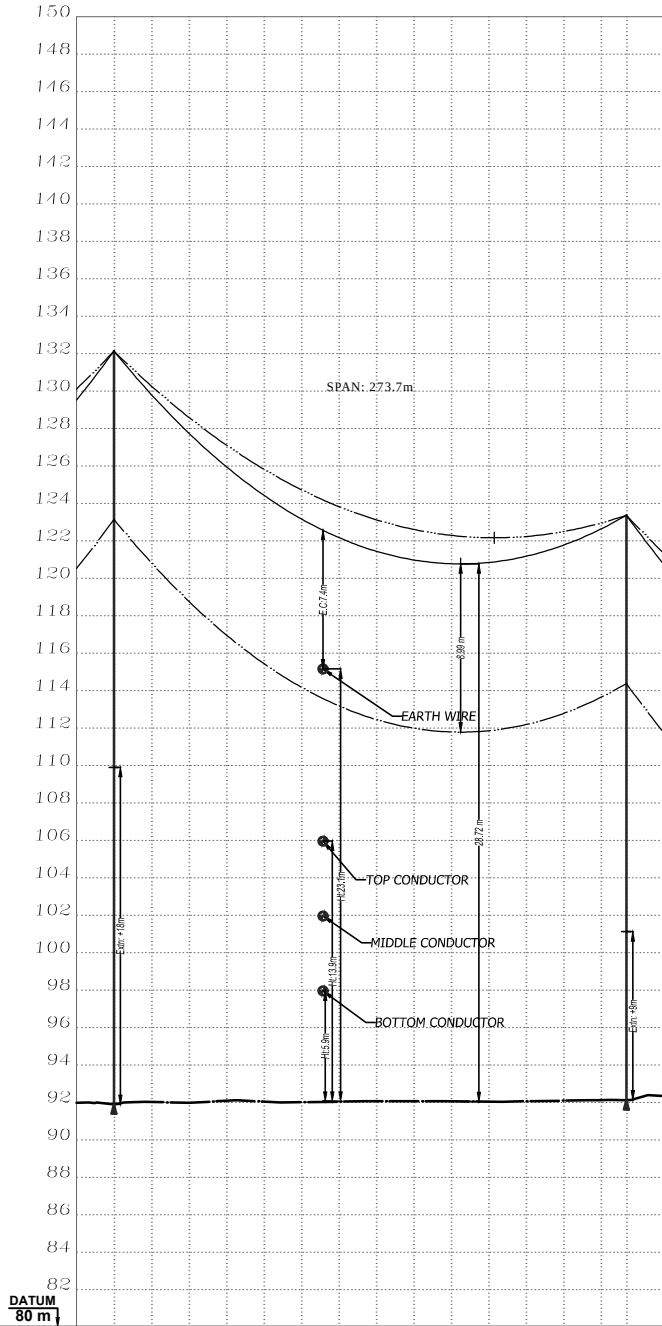
Sheet Name: AP08 - AP09	Section Length: 641.7m	Paper Size: 24" Roll	Date: 31-07-2014
-------------------------	------------------------	----------------------	------------------



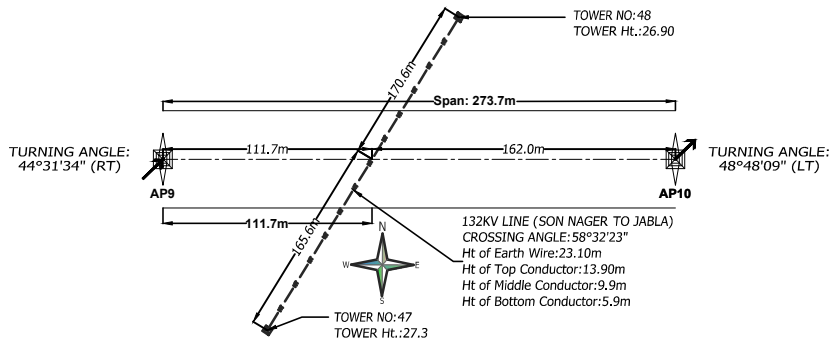
DO NOT SCALE		FOR APPROVAL	
NTPC DRG NO: 0370-572-PVC-U-504 (SHEET 10 OF 14)			
CUSTOMER: NABINAGAR POWER GENERATION COMPANY			
PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR			
CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI			
TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE (SHEET 10 OF 14)			
TATA CONSULTING ENGINEERS LIMITED MUMBAI			
SCALE: 1:100		APPROVED	
OFFICE-DISC: DV-CV		DATE (R0 ISSUE) 16-08-2013	
DRN: RVJ		DATE (CURRENT ISSUE) 31-07-2014	
CHD: KKK		DWG NO TCE-7219B-765-RA-6001	
		ISSUE R5	

LOC NO: AP9	
TOWER TYPE:	DD+18
WIND SPAN:	(L:371.7+R:273.7)/2=322.7m
WT. SPAN (C):	(L:268.8+R:203.1)=471.9m
WT. SPAN (H):	(L:246.3+R:185.2)=431.5m
LATITUDE:	24°46'10.8" N
LONGITUDE:	84°08'36.4" E
ELEVATION:	91.890

LOC NO: AP10	
TOWER TYPE:	DD+09
WIND SPAN:	(L:273.7+R:330.0)/2=301.9m
WT. SPAN (C):	(L:70.6+R:223.2)=293.8m
WT. SPAN (H):	(L:88.5+R:207.4)=295.9m
LATITUDE:	24°46'11.0" N
LONGITUDE:	84°08'46.4" E
ELEVATION:	92.120



GROUND LEVEL (m)	91.892	92.018	91.977	92.085	92.043	92.014	92.038	92.055	92.055	92.053	92.041	92.058	92.091	92.115	92.119
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	273.7



PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

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

Notes:-

- All Dimensions are in metre unless otherwise stated.
- UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	No change	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: AP09-AP10 | Section Length: 273.7m | Paper Size: 24" Roll | Date: 31-07-2014



DO NOT SCALE

FOR APPROVAL

NTPC DRG NO: 0370-572-PVC-U-504 (SHEET 11 OF 14)

CUSTOMER: NABINAGAR POWER GENERATION COMPANY

PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR

CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED
TRANSMISSION PROJECT DIVISION
NEW DELHI



TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR
ROUTE ALIGNMENT SURVEY PLAN & PROFILE
FOR 400kV DC TRANSMISSION LINE (SHEET 11 OF 14)



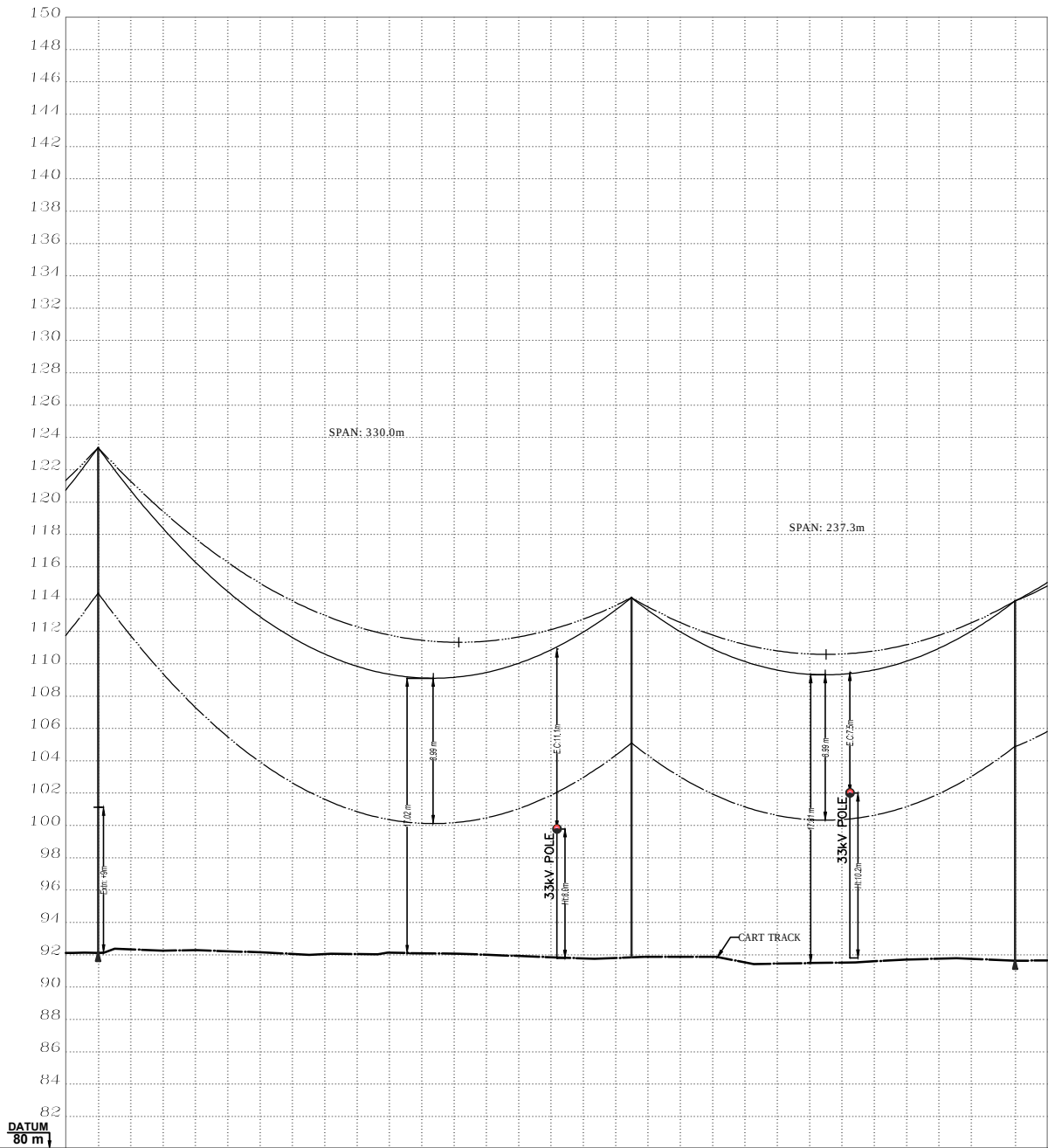
TATA CONSULTING ENGINEERS LIMITED
MUMBAI

SCALE: 1:100	APPROVED	DATE (RD ISSUE) 16-08-2013
OFFICE-DISC: DV-CV	VDB	DATE (CURRENT ISSUE) 31-07-2014
DRN: RVJ	SKK	ASK
CHD: KKK	DWG NO TCE-7219B-765-RA-6001	ISSUE R5

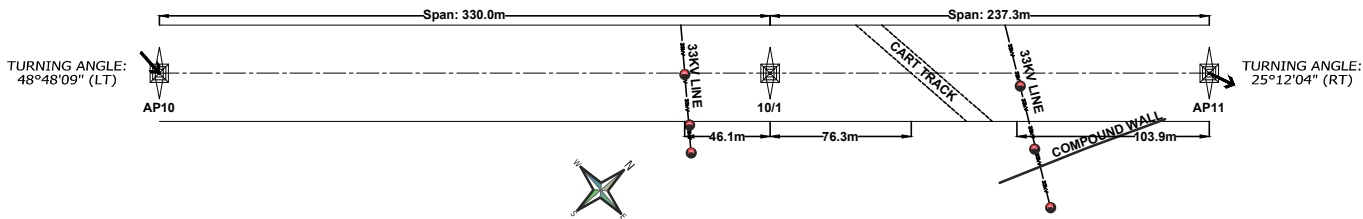
LOC NO: AP10	
TOWER TYPE:	DD+09
WIND SPAN:	(L:273.7+R:330.0)/2=301.9m
WT. SPAN (C):	(L:70.6+R:223.2)=293.8m
WT. SPAN (H):	(L:88.5+R:207.4)=295.9m
LATITUDE:	24°46'11.0" N
LONGITUDE:	84°08'46.4" E
ELEVATION:	92.120

LOC NO: 10/1	
TOWER TYPE:	DA+00
WIND SPAN:	(L:330.0+R:237.3)/2=283.7m
WT. SPAN (C):	(L:106.9+R:120.5)=227.4m
WT. SPAN (H):	(L:122.6+R:120.0)=242.6m
LATITUDE:	24°46'19.3" N
LONGITUDE:	84°08'53.9" E
ELEVATION:	91.840

LOC NO: AP11	
TOWER TYPE:	DD+00
WIND SPAN:	(L:237.3+R:126.3)/2=181.8m
WT. SPAN (C):	(L:116.8+R:-106.8)=10m
WT. SPAN (H):	(L:117.3+R:-60.7)=56.6m
LATITUDE:	24°46'25.2" N
LONGITUDE:	84°08'59.3" E
ELEVATION:	91.630



GROUND LEVEL (m)	92.119	92.338	92.252	92.281	92.220	92.156	92.054	92.041	92.045	92.126	92.098	92.071	92.003	91.928	91.853	91.778	91.799	91.869	91.870	91.872	91.539	91.455	91.487	91.520	91.597	91.706	91.760	91.752	91.632
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	120.0	140.0	160.0	180.0	200.0	220.0	240.0	260.0	280.0	300.0	320.0	340.0	360.0	380.0	400.0	420.0	440.0	460.0	480.0	500.0	520.0	540.0	567.3



PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

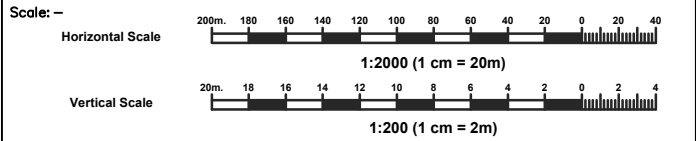
Sr.No.	Description	Symbol
1).	Alignment	-----
2).	Power Line Corridor	=====
3).	Hot Curve / Cold Curve	----- / -----
4).	Ground Clearance / Ground Profile	----- / -----
5).	House / Ground Profile Side Hill	----- / -----
6).	Railway Track	-----
7).	National Highway / State Highway	-----
8).	Road / Cart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

Notes:-

- All Dimensions are in metre unless otherwise stated.
- UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	Details at AP11 revised	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

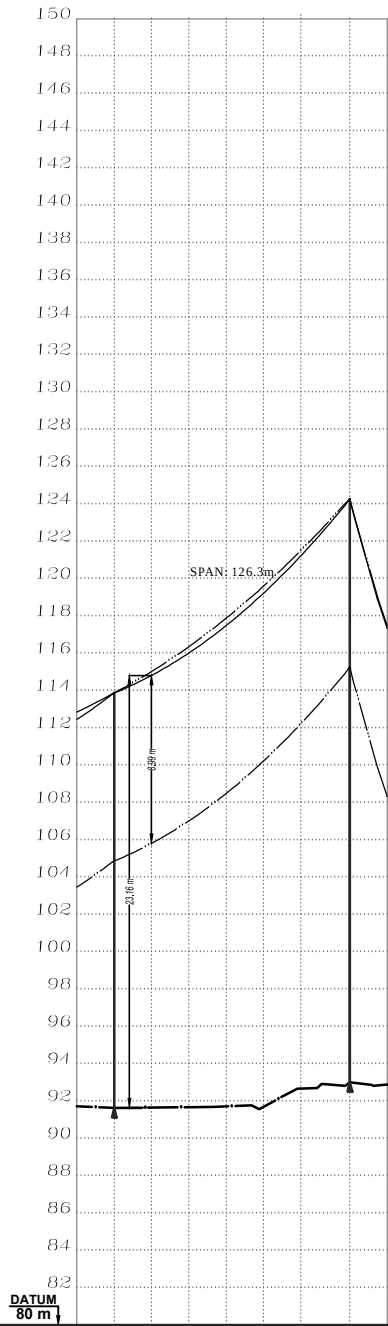
Sheet Name: AP010 - AP011	Section Length:567.3m	Paper Size: 24" Roll	Date: 31-07-2014
---------------------------	-----------------------	----------------------	------------------



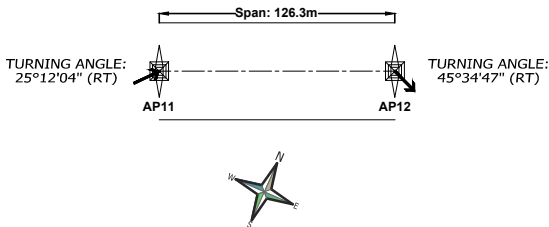
DO NOT SCALE		FOR APPROVAL	
NTPC DRG NO:		0370-572-PVC-U-504 (SHEET 12 OF 14)	
CUSTOMER:		NABINAGAR POWER GENERATION COMPANY	
PROJECT:		400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR	
CONTRACTOR:		BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI	
			
TITLE:		400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE (SHEET 12 OF 14)	
		TATA CONSULTING ENGINEERS LIMITED MUMBAI	
SCALE: 1:100	APPROVED		DATE (R0 ISSUE) 16-08-2013
OFFICE-DISC: DV-CV	VDB		DATE (CURRENT ISSUE) 31-07-2014
DRN: RVJ	SCK		ASK
CHD: KKK	DWG NO	TCE-7219B-765-RA-6001	ISSUE R5

LOC NO: AP11	
TOWER TYPE:	DD+00
WIND SPAN:	(L:237.3+R:126.3)/2=181.8m
WT. SPAN (C):	(L:116.8+R:-106.8)=10m
WT. SPAN (H):	(L:117.3+R:-60.7)=56.6m
LATITUDE:	24°46'25.2" N
LONGITUDE:	84°08'59.3" E
ELEVATION:	91.630

LOC NO: AP12	
TOWER TYPE:	DD+09
WIND SPAN:	(L:126.3+R:122.2)/2=124.3m
WT. SPAN (C):	(L:233.1+R:90.7)=323.8m
WT. SPAN (H):	(L:187.1+R:89.5)=276.6m
LATITUDE:	24°46'27.0" N
LONGITUDE:	84°09'03.3" E
ELEVATION:	93.010



GROUND LEVEL (m)	91.632	91.651	91.670	91.717	91.702	92.678	93.012
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	126.3



PLS-CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

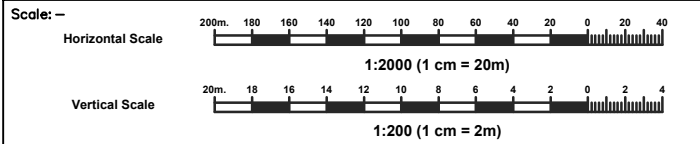
Sr.No.	Description	Symbol
1).	Alignment	-----
2).	Power Line Corridor	=====
3).	Hot Curve / Cold Curve	----- / -----
4).	Ground Clearance / Ground Profile	----- / -----
5).	House / Ground Profile Side Hill	----- / -----
6).	Railway Track	=====
7).	National Highway / State Highway	=====
8).	Road / Cart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

Notes:-

1. All Dimensions are in metre unless otherwise stated.
2. UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	Tower AP12 Height Revised	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

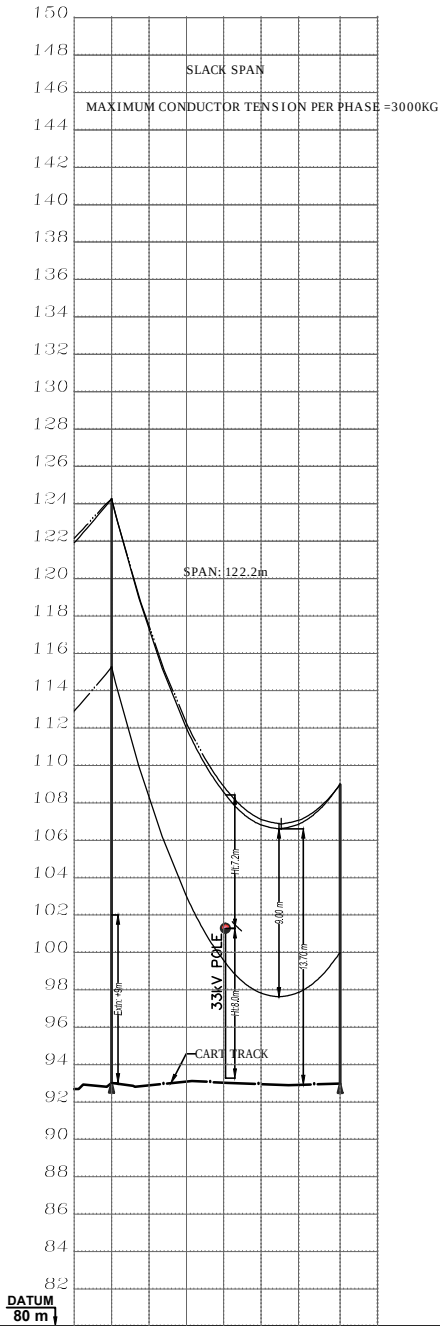
Sheet Name: AP011 - AP012	Section Length: 126.3m	Paper Size: 24" Roll	Date: 31-07-2014
---------------------------	------------------------	----------------------	------------------



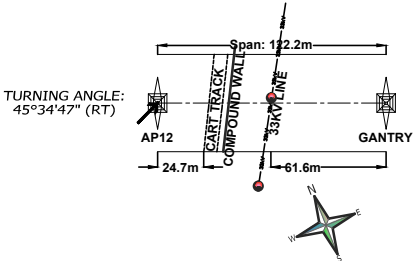
DO NOT SCALE		FOR APPROVAL	
NTPC DRG NO:		0370-572-PVC-U-504 (SHEET 13 OF 14)	
CUSTOMER:		NABINAGAR POWER GENERATION COMPANY	
PROJECT:		400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR	
CONTRACTOR:		BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI	
			
TITLE:		400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE (SHEET 13 OF 14)	
		TATA CONSULTING ENGINEERS LIMITED MUMBAI	
SCALE: 1:100	APPROVED		DATE (R0 ISSUE) 16-08-2013
OFFICE-DISC: DV-CV	VDB		DATE (CURRENT ISSUE) 31-07-2014
DRN: RVJ	SCK		ASK
CHD: KKK	DWG NO	TCE-7219B-765-RA-6001	ISSUE R5

LOC NO: AP12	
TOWER TYPE:	DD+09
WIND SPAN:	(L:126.3+R:122.2)/2=124.3m
WT. SPAN (C):	(L:233.1+R:90.7)=323.8m
WT. SPAN (H):	(L:187.1+R:89.5)=276.6m
LATITUDE:	24°46'27.0" N
LONGITUDE:	84°09'03.3" E
ELEVATION:	93.010

LOC NO: GANTRY	
TOWER TYPE:	GANTRY
WIND SPAN:	(L:122.2+R:0.0)/2=61.1m
WT. SPAN (C):	(L:31.5+R:0.0)=31.5m
WT. SPAN (H):	(L:32.7+R:0.0)=32.7m
LATITUDE:	24°46'25.6" N
LONGITUDE:	84°09'07.4" E
ELEVATION:	92.990



GROUND LEVEL (m)	93.012	92.891	93.089	93.036	92.958	92.921	92.993
CHAINAGE (m)	0.0	20.0	40.0	60.0	80.0	100.0	122.2



PLS--CADD Profile Drawing of 400kV D/C TL

Tower Spotting Data for 400kV D/C TL (Wind Zone-4, 47m/s)

1). Conductor	ACSR MOOSE
2). Cable Diameter	31.77mm.
3). Area of Conductor	597 Sq. mm.
4). Unit Weight of Conductor	2.004 Kg./M.
5). Normal Span (Ruling Span)	400 Mtr.
6). Maximum Sag @ 75° Temperature, No Wind	12.86 Mtr.
7). Ground Clearance (Including Sag error of 0.15m)	8.99 Mtr.
8). Sag Tension For Hot Curve (75° Temp, No Wind)	3116.00 Kg.
9). Sag Tension For Cold Curve (0° Temp, No Wind)	4144.81 Kg.

Legends

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

Notes:-

1. All Dimensions are in metre unless otherwise stated.
2. UTM (Zone - 45N) coordinate system has been adopted for detailed survey.

Revision	Description	Date	Drawn
R0	Released for Approval	16-08-2013	MS/VS
R1	Revised as per Client's Comments	22-11-2013	MS/VS
R2	No change	10-12-2013	MS/VS
R3	Gantry Height reduced	20-01-2014	MS/VS
R4	Revised as per Client's Comments	18-03-2014	MS/VS
R5	No change	31-07-2014	MS/VS

Sheet Name: AP012- GANTRY Section Length: 122.2m Paper Size: 24" Roll Date: 31-07-2014



DO NOT SCALE

FOR APPROVAL

NTPC DRG NO: 0370-572-PVC-U-504		(SHEET 14 OF 14)
CUSTOMER: NABINAGAR POWER GENERATION COMPANY		
PROJECT: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR		
CONTRACTOR: BHARAT HEAVY ELECTRICALS LIMITED TRANSMISSION PROJECT DIVISION NEW DELHI		
TITLE: 400kV & 33kV TRANSMISSION LINES AT NABINAGAR, BIHAR ROUTE ALIGNMENT SURVEY PLAN & PROFILE FOR 400kV DC TRANSMISSION LINE		(SHEET 14 OF 14)
TATA CONSULTING ENGINEERS LIMITED MUMBAI		
SCALE: 1:100	APPROVED	DATE (RD ISSUE) 16-08-2013
OFFICE-DISC: DV-CV	VDB	DATE (CURRENT ISSUE) 31-07-2014
DRN: RVJ	SCK	ASK
CHD: KKK	DWG NO: TCE-7219B-765-RA-6001	ISSUE R5