

Report No: GG/RP/TS17037

**Report On
DGPS SURVEY OF 132 KV DCSS LINE FROM PROPOSED
132/33 KV S/S NAGRI TO PROPOSED 132/33 KV S/S
INDAGAON (TR-201)**



**For
Chhattisgarh State Power Transmission Co Ltd
(A Govt. of Chhattisgarh Undertaking)**

**Report Submitted to
Office of the Executive Director (EHT: C&M)
Dagania, Raipur (CG)**

By

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REPORT ON DGPS SURVEY OF 132 KV DCSS LINE FROM PROPOSED 132/33 KV S/S NAGRI TO PROPOSED 132/33 KV S/S INDAGAON (TR-201)

1.0 INTRODUCTION

132 KV DCSS line from proposed 132/33 KV S/S Nagri to proposed 132/33 KV S/s Indagaon was awarded by Chhattisgarh State Power Transmission Company Limited (A CG Govt Undertaking) to M/S Gaveshana Geosciences Pvt Ltd, New Delhi (India) vide work order reference ED/ C&LM/works/order/TR-201/1175 dated 23 July 2015.

The scope of work include the identification of route, the detail survey on identified route, the tree enumeration and doing ground work in order to finalize the route.

This present report summarize the detail survey using DGPS, which has been used for fixing all angle points and locate the exact position of forest area on ground in order to prepare forest proposal.

2.0 SURVEY AREA

A route from Nagri S/S to Indagaon S/S was finalized in our preliminary surveys. The survey area falls in Dhamatari and Gariyaband Districts comprising of two legislative constituencies – Dhamtari and Gariyaband. The survey area lies in UTM North Zone 44: from 20°03' N to 20°23' N latitude and 81°53' E to 82°23' E longitude. It is covered in the Survey of India Topo Sheet Nos 64L/3, 64H/15, 64H/4, and 64H/8.

The proposed line passing through forest and revenue land. The total forest area falling in this line is 111.456 hectare, whereas the revenue land is 71.263 hectare. As per district wise, in Dhamtari district the forest area is 14.460 hectare and revenue area is 40.771 hectare, whereas in Gariyaband district forest area is 96.996 hectare and revenue land is 30.492 hectare. As per forest division, the Dhamtari division occupy 14.460 hectare forest area and 40.446 hectare revenue area whereas in Gariyaband Division Occupy 96.996 hectare forest area and revenue land is 30.492 hectare .

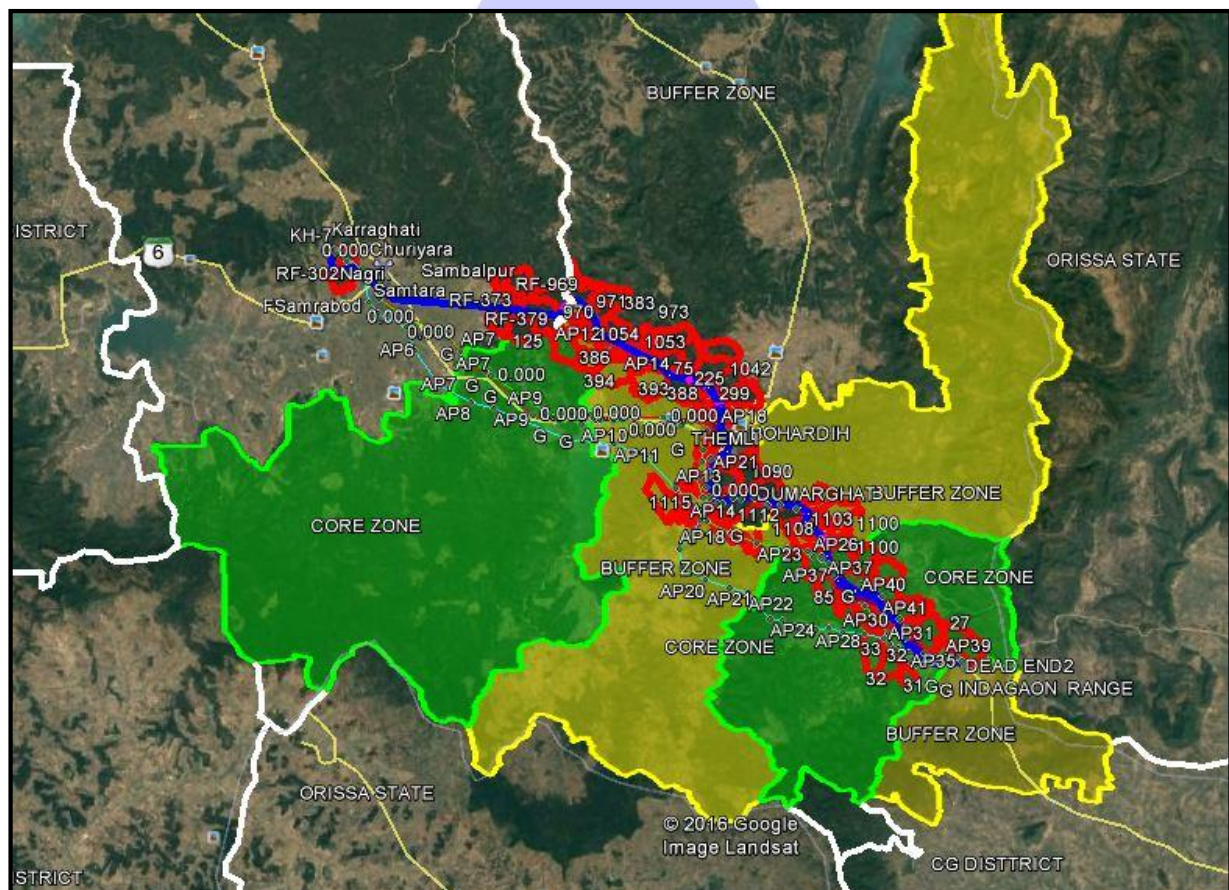
The starting point of the line is located at Nagri (village- chameda) which is a village panchayat of Nagri Tehsil, District Dhamtari. The end point of the line is in Indagaon which is a village panchayat of Mainpur tehsil, District Gariyaband. The population of indagaon is about one thousand.

The major occupation of the area is farming and forest products. The major river of the survey area is River Sondur and Mahanadi .

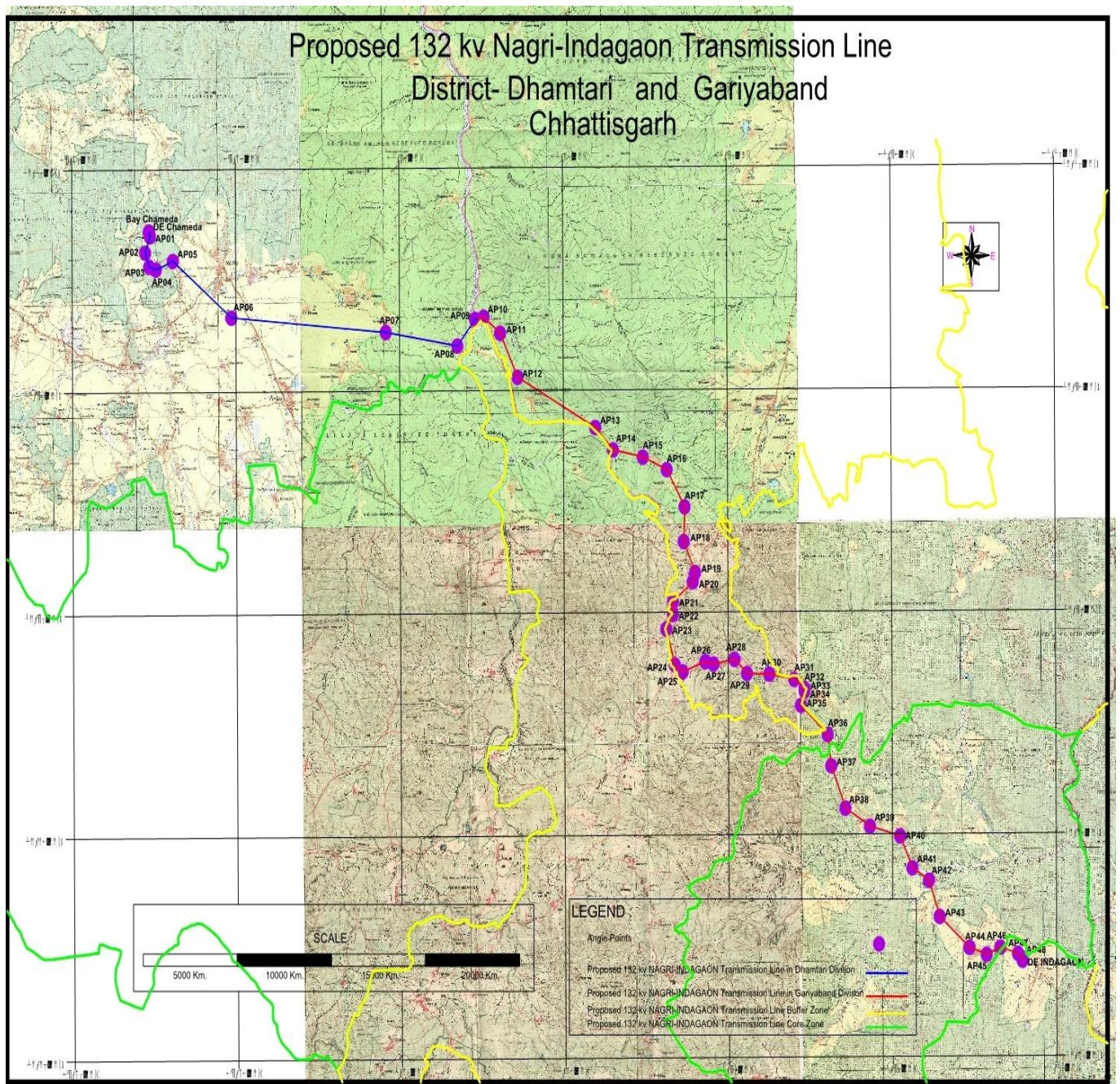
On almost entire route, the top soil consists of red sandy soil. However, major portion of the land is uncultivable barren land.

The google imagery and Satellite imagery for finalize route is given below:

LOCATION MAP:

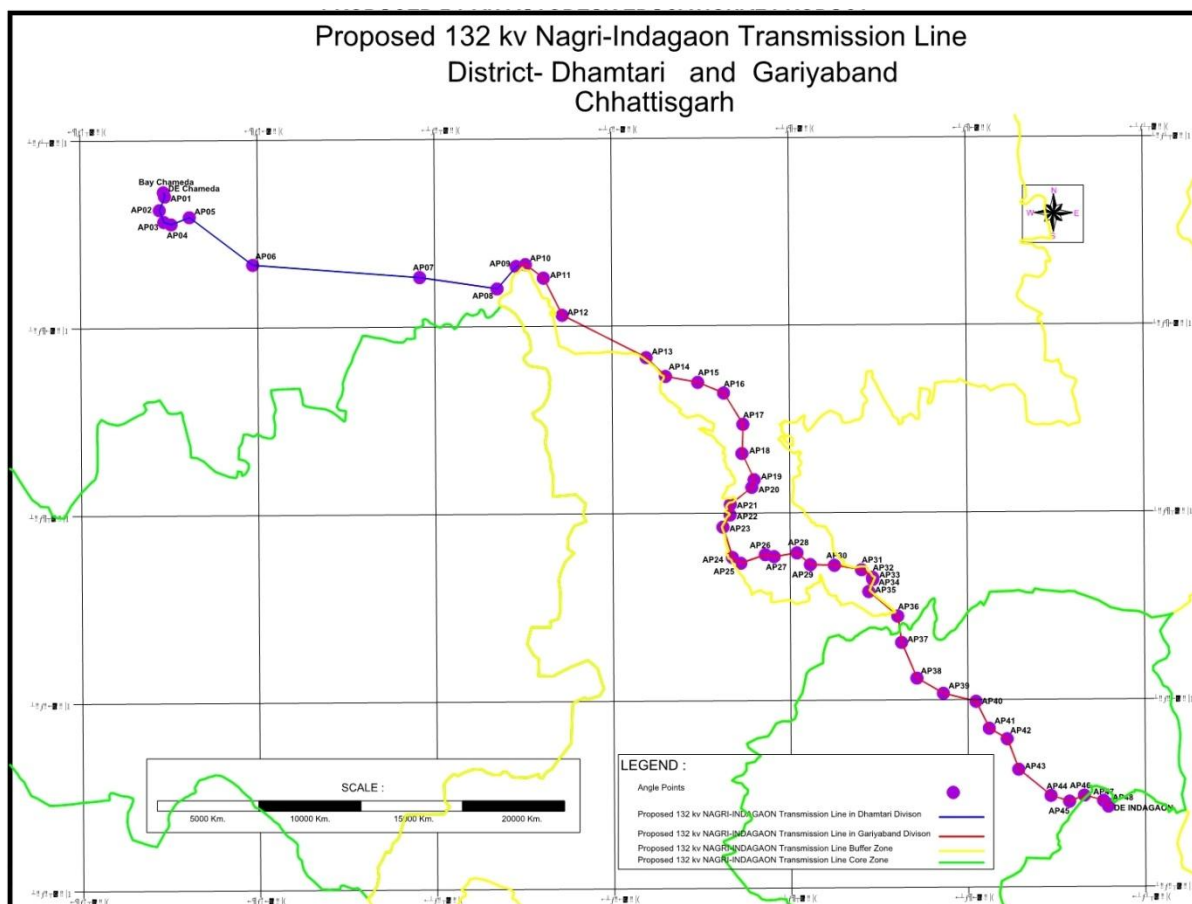


Google Imagery of Finalized route



Finalized route on Topo-sheet

The survey area is comprises with 50 Angle points, the list is given below in Table 1, whereas Table 2 contain the discrimination of area in respect of revenue and forest.



Map showing angle points

**Final Co-ordinate of Proposed 132kv/Dc Transmission Line From Proposed S/s Chameda To
Proposed S/s Indagaon**

Sr.No.	Description	Co-ordinate in UTM-44N		Deviation	Co-ordinate in WGS-84(DMS)	
		Easting	Northing	Angle	Latitude (N)	Longitude (E)
1	BAY CHAMEDA	596278.549	2251617.095	LINE START	20°21'36.901"N	81°55'20.948"E
2	DE CHAMEDA	596328.984	2251555.873	29°27'28"RT	20°21'34.900"N	81°55'22.675"E
3	AP01	596352.935	2251420.366	31°18'58"RT	20°21'30.488"N	81°55'23.475"E
4	AP02	596092.030	2250750.928	42°11'09"LT	20°21'08.761"N	81°55'14.348"E
5	AP03	596314.851	2250167.211	51°00'35"LT	20°20'49.735"N	81°55'21.919"E
6	AP04	596668.807	2250051.541	34°37'54"LT	20°20'45.908"N	81°55'34.104"E
7	AP05	597565.897	2250404.475	55°18'56"RT	20°20'57.223"N	81°56'05.110"E
8	AP06	600680.156	2248061.039	34°31'34"LT	20°19'40.416"N	81°57'52.039"E
9	AP07	608913.588	2247456.615	03°37'52"RT	20°19'19.126"N	82°02'35.810"E
10	AP08	612689.294	2246907.825	56°14'12"LT	20°19'00.487"N	82°04'45.872"E
11	AP09	613625.753	2248006.868	37°41'16"RT	20°19'36.033"N	82°05'18.409"E
12	AP10	614081.621	2248102.720	49°05'17"RT	20°19'39.053"N	82°05'34.150"E
13	AP11	614961.772	2247434.370	26°38'56"RT	20°19'17.124"N	82°06'04.344"E
14	AP12	615889.398	2245612.879	36°53'10"LT	20°18'17.678"N	82°06'35.906"E
15	AP13	620015.738	2243533.714	15°26'21"RT	20°17'09.136"N	82°08'57.663"E
16	AP14	620965.979	2242607.691	31°58'01"LT	20°16'38.802"N	82°09'30.195"E

17	AP15	622546.984	2242312.995	12°51'10"RT	20°16'28.855"N	82°10'24.618"E
18	AP16	623816.231	2241793.826	37°08'17"RT	20°16'11.675"N	82°11'08.238"E
19	AP17	624766.518	2240256.407	33°17'07"RT	20°15'21.449"N	82°11'40.609"E
20	AP18	624722.122	2238817.018	26°42'06"LT	20°14'34.645"N	82°11'38.721"E
21	AP19	625320.854	2237532.503	42°21'13"RT	20°13'52.726"N	82°11'59.033"E
22	AP20	625202.549	2237154.588	33°39'48"RT	20°13'40.463"N	82°11'54.862"E
23	AP21	624150.672	2236319.412	49°46'39"LT	20°13'13.546"N	82°11'18.411"E
24	AP22	624139.199	2235801.229	28°56'12"RT	20°12'56.695"N	82°11'17.888"E
25	AP23	623788.884	2235199.454	47°33'27"LT	20°12'37.204"N	82°11'05.669"E
26	AP24	624254.557	2233709.149	38°06'09"LT	20°11'48.625"N	82°11'21.345"E
27	AP25	624663.435	2233427.660	56°42'21"LT	20°11'39.374"N	82°11'35.362"E
28	AP26	625869.869	2233848.193	44°34'01"RT	20°11'52.768"N	82°12'17.028"E
29	AP27	626302.968	2233749.763	32°03'10"LT	20°11'49.464"N	82°12'31.924"E
30	AP28	627423.452	2233940.219	50°52'01"RT	20°11'55.392"N	82°13'10.574"E
31	AP29	628084.415	2233361.174	40°00'12"LT	20°11'36.401"N	82°13'33.197"E
32	AP30	629263.414	2233328.974	07°22'34"RT	20°11'35.069"N	82°14'13.804"E
33	AP31	630598.277	2233110.546	33°53'37"RT	20°11'27.640"N	82°14'59.733"E
34	AP32	631141.312	2232737.008	39°00'03"RT	20°11'15.358"N	82°15'18.342"E
35	AP33	631132.692	2232635.935	29°53'33"RT	20°11'12.072"N	82°15'18.019"E
36	AP34	631001.240	2232345.243	25°30'40"LT	20°11'02.650"N	82°15'13.415"E
37	AP35	630953.898	2232039.072	46°50'14"LT	20°10'52.704"N	82°15'11.705"E
38	AP36	632375.721	2230832.400	45°09'28"RT	20°10'13.108"N	82°16'00.364"E
39	AP37	632563.032	2229540.852	16°57'52"LT	20°09'31.056"N	82°16'06.476"E
40	AP38	633317.785	2227786.819	37°12'56"LT	20°08'33.821"N	82°16'32.008"E
41	AP39	634620.660	2227034.311	16°15'59"LT	20°08'09.021"N	82°17'16.675"E
42	AP40	636222.008	2226642.678	49°59'51"RT	20°07'55.878"N	82°18'11.713"E
43	AP41	636874.172	2225320.755	33°26'06"LT	20°07'12.719"N	82°18'33.812"E
44	AP42	637757.450	2224804.490	38°56'48"RT	20°06'55.701"N	82°19'04.085"E
45	AP43	638324.000	2223308.917	30°13'42"LT	20°06'06.915"N	82°19'23.183"E
46	AP44	639912.622	2222021.413	21°38'32"LT	20°05'24.629"N	82°20'17.520"E
47	AP45	640820.885	2221737.096	39°40'08"LT	20°05'15.145"N	82°20'48.708"E
48	AP46	641548.588	2222035.357	37°32'40"RT	20°05'24.653"N	82°21'13.843"E
49	AP47	642493.433	2221777.634	20°32'55"RT	20°05'16.021"N	82°21'46.296"E
50	AP48	642717.937	2221615.654	41°08'44"RT	20°05'10.693"N	82°21'53.979"E
51	DE INDAGAON	642730.572	2221496.102	18°38'25"RT	20°05'06.802"N	82°21'54.380"E

TABLE 2

AREA DETAILS

TOTAL AREA UNDER FOREST (hec.)		TOTAL AREA UNDER REVENUE (hec.)	
111.456 Hectare		71.263 Hectare	
AREA DETAILS OF DISTRICT WISE			
DHAMTARI DISTRICT		GARIYABAND DISTRICT	
FOREST LAND	REVENUE LAND	FOREST LAND	REVENUE LAND
14.460 hec	40.771 hec	96.996 hec	30.492 hec
AREA DETAILS OF FOREST DIVISION WISE			

DHAMTARI DIVISION		GARIYABAND DIVISION	
FOREST LAND	REVENUE LAND	FOREST LAND	REVENUE LAND
14.460 hec	40.771 hec	96.996 hec	30.492 hec

132KV NAGRI TO INDAGAON TRANSMISSION LINE				
DHAMTARI DIVISON FOREST COMPARTMENT				
RANGE	COMPARTMENT NO.	LENGTH IN KILOMETER	AREA REQ. TO BE DIVERT IN HACTARE	REMARKS
SANKRA	RF373	1.178	3.180	GENERAL FOREST
	RF378	0.408	1.102	GENERAL FOREST
	RF377	2.860	7.722	GENERAL FOREST
	RF376	0.989	2.334	GENERAL FOREST
Revenue forest		0.045	0.122	GENERAL FOREST
Non forest		14.976	40.771	
Total		20.456	55.231	
GARIYABAND DIVISON FOREST COMPARTMENT				
RANGE	COMPARTMENT NO.	LENGTH IN KILOMETER	AREA REQ. TO BE DIVERT IN HACTARE	REMARKS
CHHOTE GOBRA (MAIPUR)	PF969	1.285	3.471	GENERAL FOREST
	PF970	2.123	5.733	GENERAL FOREST
	PF1054	1.195	3.226	GENERAL FOREST
	PF1055(KH.23,28, 35,147,176,265)	1.857	5.013	GENERAL FOREST
	PF1058	1.779	4.803	GENERAL FOREST
Total		8.239	22.246	
PATHARI (MAIPUR)	PF1060	1.414	3.817	GENERAL FOREST
	PF1061(KH.118,122,124)	0.401	1.084	GENERAL FOREST
Total		1.815	4.901	
BOHRADIH (MAIPUR)	PF1078	0.191	0.516	GENERAL FOREST
	PF1076	3.430	9.261	GENERAL FOREST
Total		3.621	9.777	
DUMARGHAT (MAIPUR)	PF1091	0.328	0.886	GENERAL FOREST
Total		0.328	0.886	
ARGARI (MAIPUR)	PF1112	3.389	9.150	GENERAL FOREST
	PF1109	1.399	3.777	GENERAL FOREST
Total		4.788	12.927	
KODOMALI (MAIPUR)	PF1104	2.538	6.853	GENERAL FOREST
Total		2.538	6.853	
TAURENGA (MAIPUR)	PF1105	1.628	4.396	GENERAL FOREST
TAURENGA (TAURENGA)	PF1106	0.782	2.112	BUFFER ZONE
Total		2.410	6.508	
JUGAD (NORTHUDANTI)	PF89	1.970	5.319	CORE ZONE
	PF84	2.417	6.524	
Total		4.387	11.843	
KOIBA (SOUTHUDANTI)	RF29	0.443	1.195	
Total		0.443	1.195	
Revenue forest		7.286	19.860	
Total		7.286	19.860	
Non forest		11.364	30.492	
Total		11.364	30.492	
Grand Total		47.219	127.488	

3.0 DGPS (Differential Global Positioning System):

The survey using DGPS (Differential Global Positioning system) was the purpose to enhance location accuracy as compare to hand GPS from 7 – 10m to 10 cm.

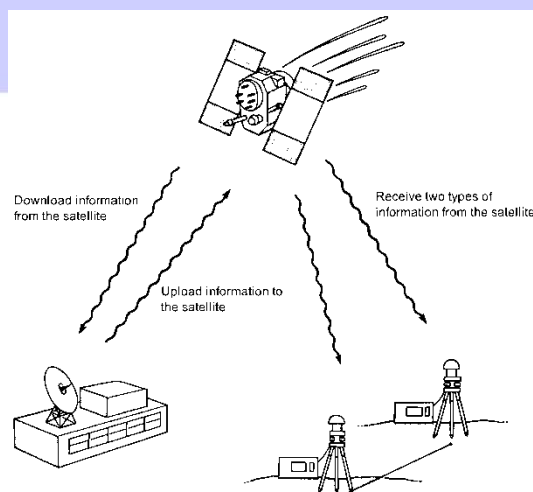
The real time DGPS occurs when the base station calculates and broadcasts corrections for each satellite as it receives the data. The correction is received by the roving receiver via a radio signal if the source is land based or via satellite signal if it is satellite based and applied to the position it is calculating. As a result, the position displayed and logged to the data file of the roving GPS receiver is a differential corrected position.

Another method for obtaining real – time differential correction data in the field is by using geostationary satellites. This system obtains corrections from more than one reference station. Reference stations collect the base station GPS data and relay this data in RTCM SC-104 format to a network control center, which sends the information to a geostationary satellite for verification. The verified information is sent to the roving GPS receiver to ensure it obtains GPS positions in real time.

3.1. ABOUT GPS (GLOBAL POSITIONING SYSTEM)

There are three segment of GPS system:

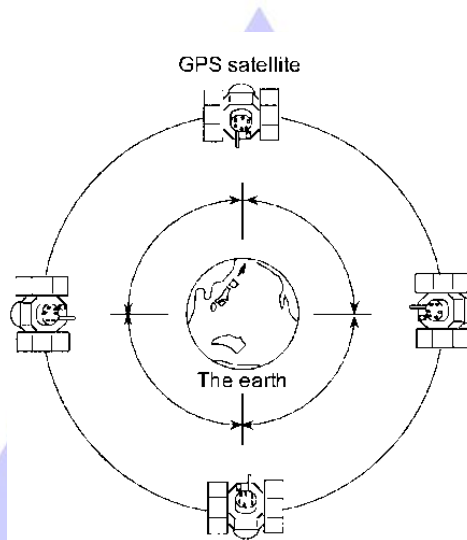
1. **Space segments:** Comprised of 24 satellites which transmit information to the user by means of various signals.
2. **Control Segments:** Monitor all GPS satellites and transmit data (new ephemerides, clock corrections, etc.)
3. **User Segments:** Compute the user position from GPS signals received from the satellites.



GPS SATELLITE ORBIT:

- Orbit plane: Circular
- Altitude: 20,000 km
- Orbital period: Approx. 12 hours
- Number of satellites: 24
- Number of orbital planes: 6

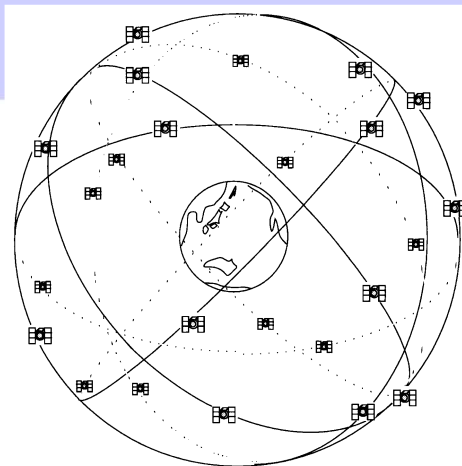
Relative Satellite Position on One Orbital plane



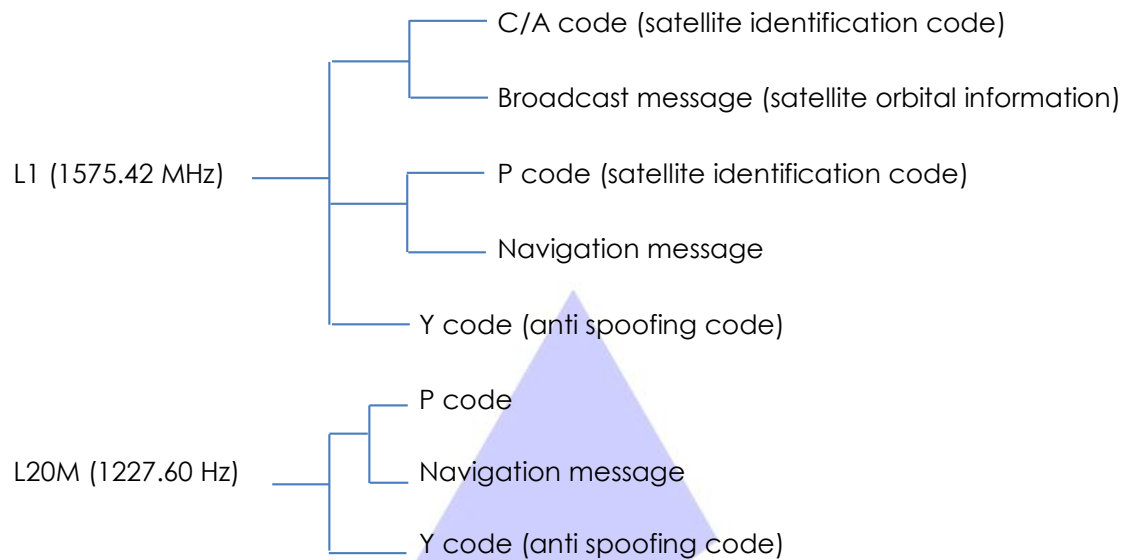
GPS Constellation

Twenty-four satellites (four satellites each in six orbital planes) circle the earth once every 12 hours (sidereal time: 11 hours 58 minutes) at an altitude of 20,000 km.

With this constellation, at least four satellites can be visible simultaneously from anywhere in the world.

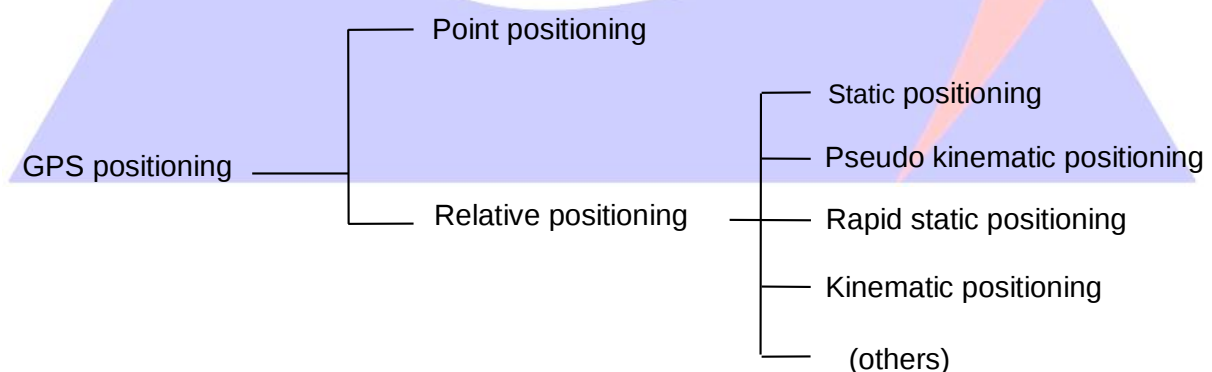


GPS SIGNAL STRUCTURE:



- Different C/A code and P code are assigned to each GPS satellite in order to isolate the signals of the satellites from each other.
- Navigation message provides information about the satellite position and the GPS time.
- You should calibrate the given distance at L1-band by measuring propagation delay of the satellite signal across the ionosphere for L1- and L2-bands.

TYPES OF POSITIONING:



4.0 EQUIPMENT DEPLOYED:

Specific Surveying equipment was used for fixing the control points on ground for this project. The present work was performed by using GRX-1 dual frequency GNSS base receiver in RTK model.



The GRX1 receiver is a multi-frequency, GNSS receiver built to be the most advanced and compact receiver for the surveying market. The receiver is a multi-function, multi-purpose receiver intended for survey and construction markets.

The GRX1 receivers and processes multiple signal types (including GPS L1, L2, C/A, L2C GLONASS L1, L2, C/A Signals) improving the accuracy and reliability of the survey points and positions, especially under difficult jobsite conditions. The receiver provides the functionality, accuracy, availability, and integrity needed for fast and easy data collection.

PRINCIPLES OF OPERATION:

Surveying with the right GPS receiver can provide users accurate and precise positioning; a requirement for any surveying project. This section gives an overview of existing and proposed Global Navigation Satellite Systems (GNSS) and receiver functions so that basic operating principles can be applied.

GNSS OVERVIEW:

Currently the following two global navigation satellite systems (GNSS) offer line of sight radio navigation and positioning, velocity, and time services on a global, all – weather scale to any user equipped with a GNSS tracking receiver on or near the earth surface:

- **GPS:** The Global Positioning System maintained and operated by the United States Department of Defence. For information on the status of this system, visit the US Naval Observatory website (<http://tycho.usno.navy.mil/>) or the US Coast Guard website (<http://www.navy.mil/naval/uscg.htm>).
- **GLONASS:** The Global Navigation Satellite system maintained and operated by the Russian Federation Ministry of Defence. For information on the status of this system, visit the Coordinational Scientific Information Center Website (<http://www.glonas-ianc.rsa.ru/>).

Despite numerous technical differences in the implementation of these systems, satellite positioning systems have three essential components:

- **SPACE:** GPS and GLONASS satellites orbit approximately 12,000 nautical miles above Earth and are equipped with a clock and radio. These satellites broadcast ranging signals and various digital information (ephemerides, almanacs, time and frequency corrections, and so forth).
- **CONTROL:** Ground stations located around the Earth that monitor the satellites and upload data, including clock corrections and new ephemerides (satellite positions as a function of time), to ensure the satellites transmit data properly.
- **USER:** the community and military that use GNSS receivers to calculate positions.

CALCULATING ABSOLUTE POSITIONS:

When calculating an absolute position, a stationary or moving receiver determines its three – dimensional position with respect to the origin of an Earth-Center Earth-Fixed coordinate system. To calculate this position, the receiver measures the distance (called pseudoranges) between it and at least four satellites. The measured pseudoranges are corrected for clock differences (receiver and satellites) and signal propagation delays due to atmospheric effects. The positions of the satellites are computed from the ephemeris data transmitted to the receiver in navigation messages. When using a single satellite system, the minimum number of satellites needed to compute a position is four. In a mixed satellite scenario (GPS and GLONASS), the receiver must lock onto five or more satellites to account for the different time scales used in these systems and to obtain an absolute position.

CALCULATING DIFFERENTIAL POSITIONS:

DGPS (Differential GPS) is a relative positioning technique where the measurements from two or more remote receivers are combined and processed using sophisticated algorithms to calculate the receivers relative coordinates with high accuracy. DGPS accommodates various implementation techniques that can be classified according to the following criteria:

- The type of GNSS measurements used, either code-phase differential measurements or carrier – phase differential measurements
- If real – time or post-mission results are required. Real-time applications can be further divided according to the source of differential data and communication link used.

With DGPS in its most traditional approach, one receiver is placed at a known, surveyed location and is referred to as the reference receiver or base station. Another receiver is placed at an unknown location and is referred to as the remote receiver or rover. The reference station collects the code-phase and carrier –phase measurements from each GNSS satellite in view.

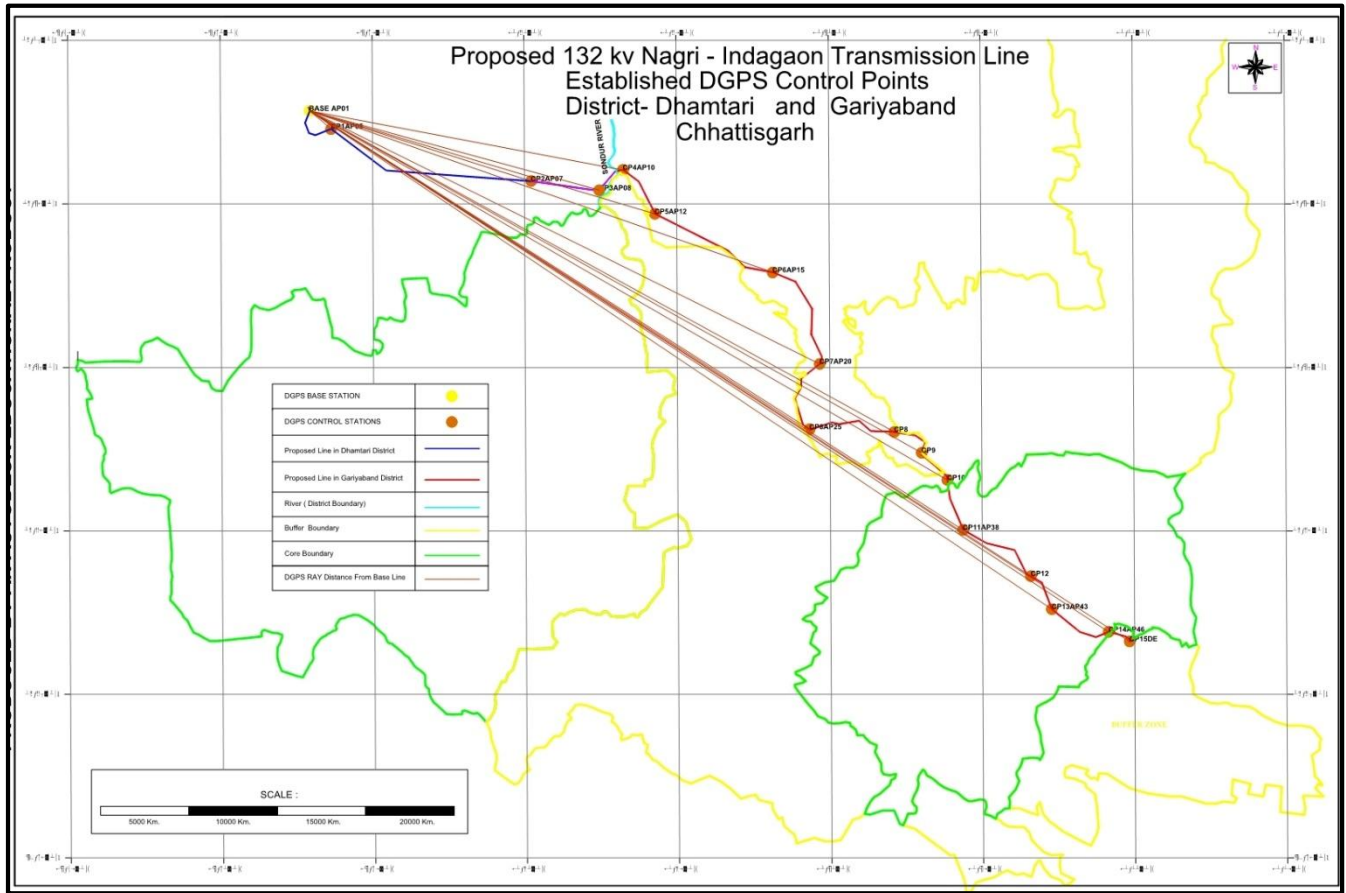
5.0 SURVEY WORK PROGRESS:

WORK SCHEDULE FOR CARRIED OUT DGPS SURVEY FOR 132 KV NAGRI TO INDAGAON TRANSMISSION LINE		
SL.No.	SURVEY DATE	SURVEY TIME
1	09/24/2016	10:00am to 4:10pm
2	09/25/2015	9:30am to 5:10pm
3	09/26/2015	10:00am to 4:30pm
4	09/27/2015	9:50am to 4:45pm
5	09/28/2015	10:00am to 4:30pm
6	09/29/2015	10:10am to 4:20pm
7	09/30/2016	10:00am to 5:30pm

6.0 DISCUSSION ON RESULTS:

The DGPS survey is conducted for 132 KV DCSS line from proposed 132/33 KV S/S Nagri to proposed 132/33 KV S/s Indagaon. Total 17 nos. Control points (CP) including base station have been established to complete the survey work. The list of Control points and other maps are given below:

CO-ORDINATES OF CONTROL POINTS ESTABLISHED BY DGPS							
Sr.No.	Co-Ordinate in UTM-44N		Co-Ordinate in WGS-84(in DMS)		Co-Ordinate in WGS-84(in DD)		Remarks
	Easting	Northing	Latitude	Longitude	Latitude	Longitude	
1	596322.2390	2251425.6860	20°21'30.667"	81°55'22.417"	20.358520	81.922890	BASEAP01
2	597546.0470	2250409.5910	20°20'57.393"	81°56'04.427"	20.349280	81.934560	CP1AP05
3	608854.8820	2247462.7700	20°19'19.339"	82°02'33.787"	20.322040	82.042720	CP2AP07
4	612711.6700	2246945.5320	20°19'01.708"	82°04'46.652"	20.317140	82.079630	CP3AP08
5	614051.3510	2248099.2530	20°19'38.946"	82°05'33.105"	20.327490	82.092530	CP4AP10
6	615859.1280	2245609.4110	20°18'17.572"	82°06'34.861"	20.304880	82.109680	CP5AP12
7	622516.7150	2242309.5270	20°16'28.749"	82°10'23.574"	20.274650	82.173220	CP6AP15
8	625172.2800	2237151.1210	20°13'40.357"	82°11'53.818"	20.227880	82.198280	CP7AP20
9	624604.7900	2233459.0810	20°11'40.410"	82°11'33.349"	20.194560	82.192600	CP8AP25
10	629394.0700	2233310.4410	20°11'34.435"	82°14'18.301"	20.192900	82.238420	CP8
11	630947.8200	2232135.5910	20°10'55.845"	82°15'11.520"	20.182180	82.253200	CP9
12	632396.8400	2230598.4960	20°10'05.496"	82°16'01.030"	20.168190	82.266950	CP10
13	633287.5160	2227783.5550	20°08'33.723"	82°16'30.964"	20.142700	82.275270	CP11AP38
14	637118.1400	2225177.2160	20°07'07.988"	82°18'42.174"	20.118890	82.311710	CP12
15	638304.1500	2223314.0330	20°06'07.086"	82°19'22.501"	20.101970	82.322920	CP13AP43
16	641518.3190	2222031.8900	20°05'24.548"	82°21'12.800"	20.090150	82.353560	CP14AP46
17	642700.3020	2221492.6350	20°05'06.697"	82°21'53.337"	20.085190	82.364820	CP15DE



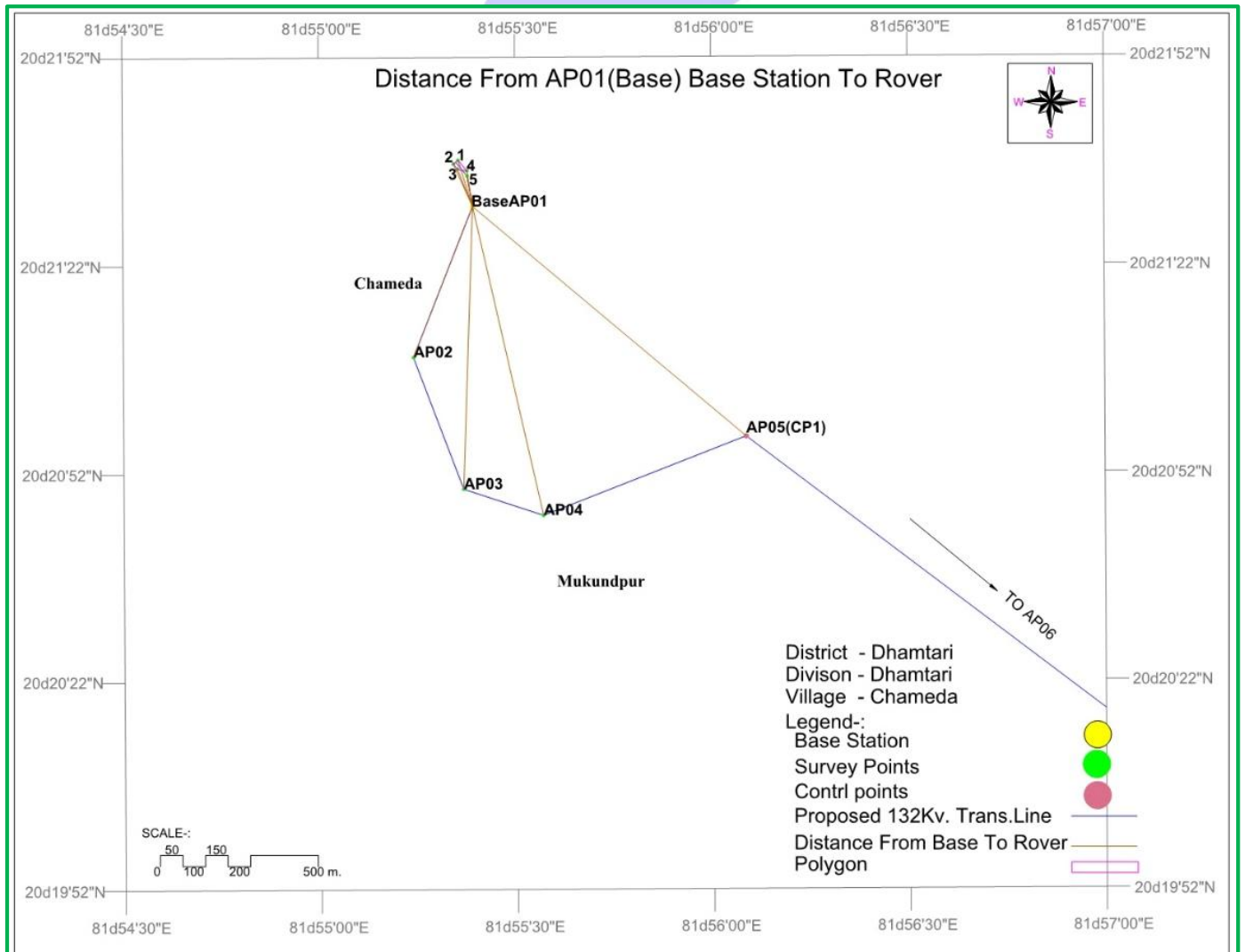
MAP SHOWING ESTABLISHED CONTROL POINTS USING DGPS

The detail of DGPS survey with reference to control points is given below along with distance covered by rover with reference to control points. The data is presented in Excel sheet with map in given below as Annexure 1.

ANNEXURE 1

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO BASE STATION ESTABLISHED AT AP01

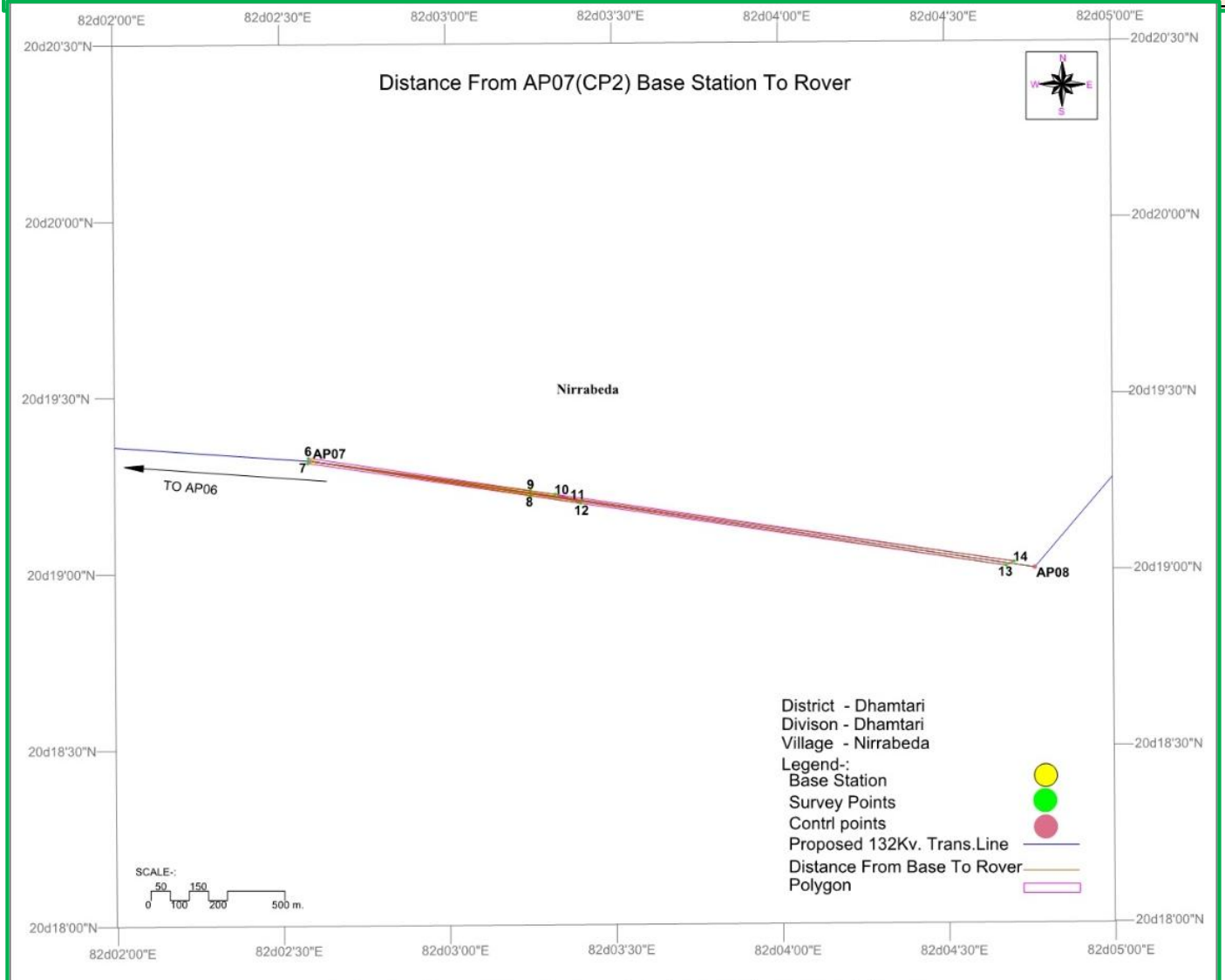
DISTANCE OF ROVER POINTS WITH REFERENCE TO BASE POINT AP01							
AP01	596351.451	2251420.792	20°21'30.503"	81°55'23.424"	20.35847	81.92317	BASE ANGLE POINT
1	596286.207	2251625.678	20°21'37.179"	81°55'21.213"	20.36033	81.92256	KH.7
2	596267.260	2251608.511	20°21'36.624"	81°55'20.557"	20.36017	81.92238	KH.7
3	596285.157	2251586.674	20°21'35.910"	81°55'21.170"	20.35998	81.92255	KH.7
4	596327.306	2251578.355	20°21'35.632"	81°55'22.622"	20.35990	81.92295	KH.7
DE CHAMEDA	596327.432	2251556.299	20°21'34.915"	81°55'22.622"	20.35970	81.92295	ANGLE POINT
AP02	596090.546	2250750.928	20°21'08.762"	81°55'14.296"	20.35243	81.92064	ANGLE POINT
AP03	596313.436	2250167.654	20°20'49.749"	81°55'21.871"	20.34715	81.92274	ANGLE POINT
AP04	596667.699	2250051.984	20°20'45.922"	81°55'34.066"	20.34609	81.92613	ANGLE POINT
AP05	597563.134	2250404.901	20°20'57.237"	81°56'05.015"	20.34923	81.93473	CP1 ANGLE POINT



Map showing relative distance of rover points with reference to Bases station AP 01

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 2 ESTABLISHED AT AP07

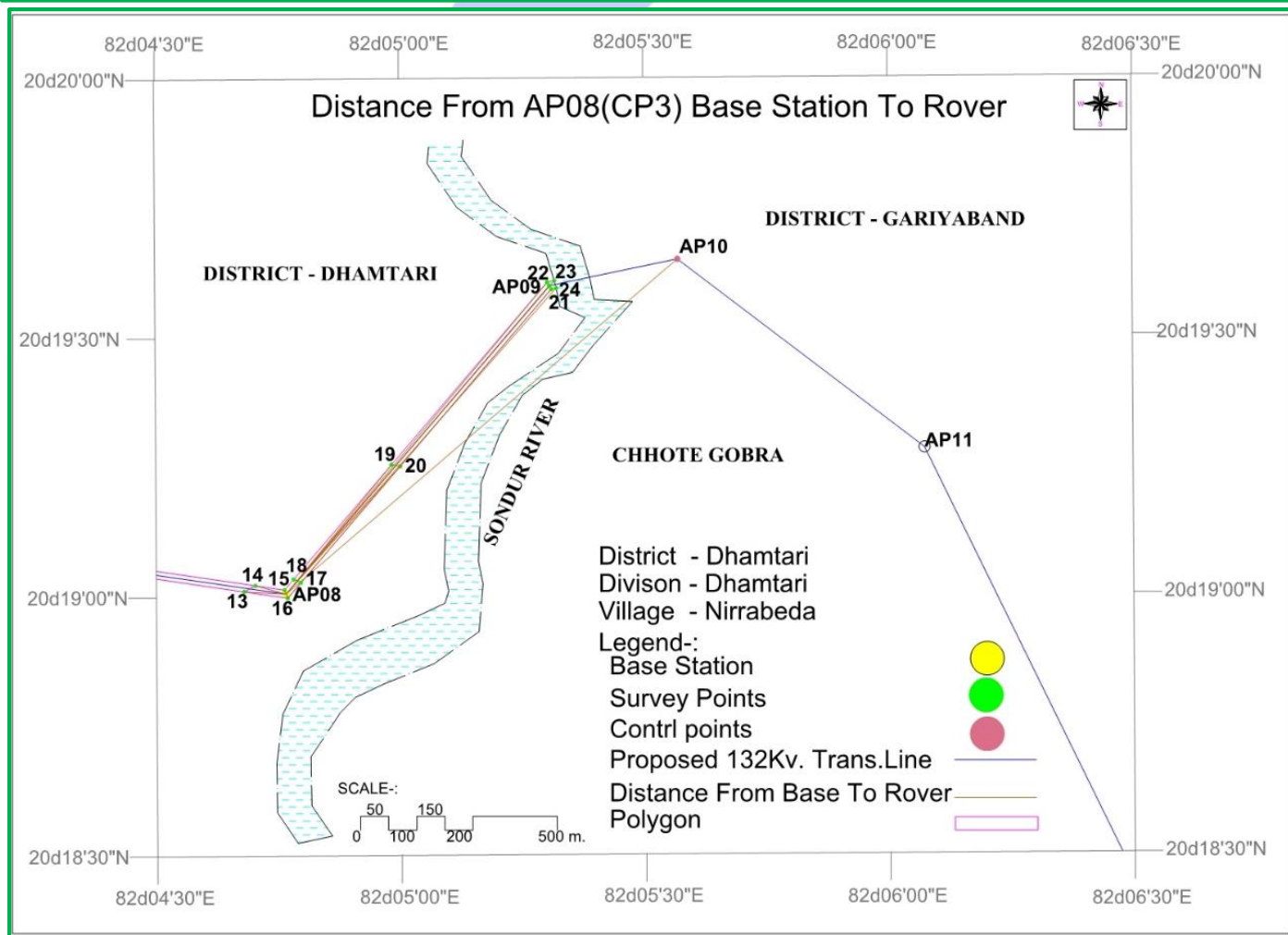
DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINTS 2 (AP07)							
AP07	608913.348	2247457.294	20°19'19.148"	82°02'35.802"	20.321990	82.043280	CP2ANGLE POINT
6	608885.553	2247472.489	20°19'19.648"	82°02'34.847"	20.322120	82.043010	RF373
7	608881.578	2247444.842	20°19'18.750"	82°02'34.704"	20.321870	82.042970	RF373
8	610047.556	2247278.420	20°19'13.096"	82°03'14.870"	20.320300	82.054130	RF373
9	610048.448	2247305.664	20°19'13.982"	82°03'14.907"	20.320550	82.054140	RF373
10	610174.976	2247286.758	20°19'13.341"	82°03'19.265"	20.320370	82.055350	RF378
11	610258.099	2247260.182	20°19'12.459"	82°03'22.125"	20.320130	82.056150	RF378
12	610307.759	2247239.430	20°19'11.774"	82°03'23.833"	20.319940	82.056620	RF378
13	612534.105	2246916.580	20°19'00.804"	82°04'40.523"	20.316890	82.077920	RF377
14	612574.086	2246937.200	20°19'01.467"	82°04'41.906"	20.317070	82.078310	RF377
AP08	612689.055	2246908.538	20°19'00.510"	82°04'45.864"	20.316810	82.079410	CP3ANGLE POINT



Map showing relative distance of rover points with reference to Control Point 2 AP 07

**DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 3 ESTABLISHED AT AP08**

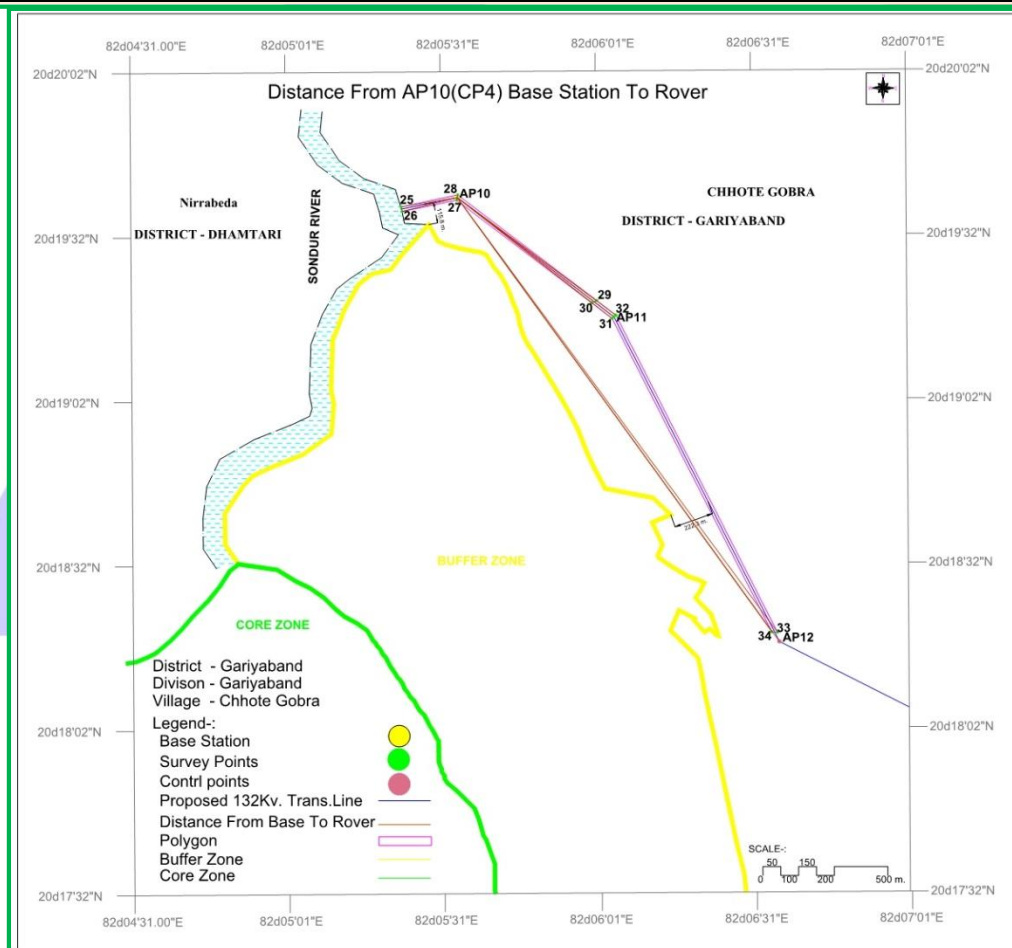
DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 3 (AP08)							
AP08	612689.3	2246909	20°19'00.5160"	82°04'45.8720"	20.316810	82.079410	CP3 ANGLE POINT
13	612534.3	2246917	20°19'00.8100"	82°04'40.5310"	20.316890	82.077930	RF378
14	612574.3	2246937	20°19'01.4720"	82°04'41.9150"	20.317080	82.078310	RF378
15	612678.3	2246923	20°19'00.9860"	82°04'45.4970"	20.316940	82.079300	RF378
16	612689.2	2246894	20°19'00.0450"	82°04'45.8660"	20.316680	82.079410	RF378
17	612736.4	2246949	20°19'01.8090"	82°04'47.5060"	20.317170	82.079860	RF378
18	612710.9	2246961	20°19'02.2220"	82°04'46.6280"	20.317280	82.079620	RF378
19	613058.8	2247370	20°19'15.4280"	82°04'58.7150"	20.320950	82.082980	RF377
20	613093.4	2247364	20°19'15.2420"	82°04'59.9070"	20.320900	82.083310	RF377
21	613631.3	2247995	20°19'35.6330"	82°05'18.5980"	20.326560	82.088500	RF376
22	613616.7	2248019	20°19'36.4340"	82°05'18.1010"	20.326790	82.088360	RF376
23	613641.9	2248025	20°19'36.6290"	82°05'18.9720"	20.326840	82.088600	RF376
24	613648.7	2247998	20°19'35.7480"	82°05'19.1970"	20.326600	82.088670	RF376
AP09	613625.8	2248008	20°19'36.0620"	82°05'18.4100"	20.326680	82.088450	ANGLE POINT
AP10	614081.6	2248104	20°19'39.0800"	82°05'34.1500"	20.327520	82.092820	CP4 ANGLE POINT



Map showing relative distance of rover points with reference to Control Point 3 AP 08

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 4 ESTABLISHED AT AP10

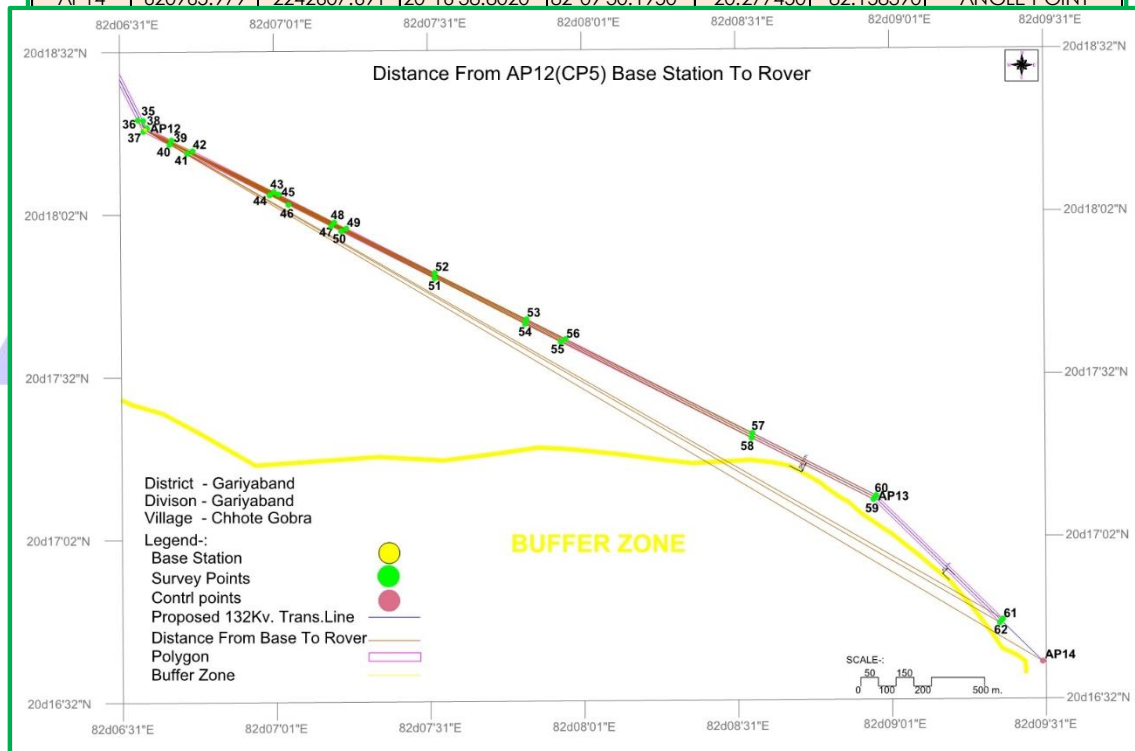
DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 4 (AP10)					
AP10	614081.6	2248103.573	20°19'39.0800"	82°05'34.1500"	CP4 ANGLE POINT
25	613765.2	2248051.212	20°19'37.4450"	82°05'23.2290"	PF969
26	613770.8	2248024.787	20°19'36.5850"	82°05'23.4150"	PF969
27	614076.6	2248088.241	20°19'38.5830"	82°05'33.9740"	PF969
28	614083.1	2248118.087	20°19'39.5520"	82°05'34.2060"	PF969
29	614862.7	2247526.117	20°19'20.1300"	82°06'00.9500"	PF969
30	614834.5	2247512.885	20°19'19.7050"	82°05'59.9760"	PF969
31	614948.5	2247426.341	20°19'16.8660"	82°06'03.8850"	PF970
AP11	614961.8	2247434.37	20°19'17.1240"	82°06'04.3440"	PF970
32	614969.8	2247444.104	20°19'17.4390"	82°06'04.6220"	PF970
33	615875.8	2245664.957	20°18'19.3750"	82°06'35.4500"	PF970
34	615844.3	2245667.405	20°18'19.4620"	82°06'34.3630"	PF970
AP12	615889.4	2245612.879	20°18'17.6780"	82°06'35.9060"	CP4 ANGLE POINT



Map showing relative distance of rover points with reference to Control Point 4 AP 10

**DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 5 ESTABLISHED AT AP12**

DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 5 (AP12)							
AP12	615907.050	2245577.615	20°18'16.5270"	82°06'36.5060"	20.304590	82.110140	CP5 ANGLE POINT
35	615893.486	2245629.693	20°18'18.2240"	82°06'36.0500"	20.305060	82.110010	PF1055
36	615861.940	2245632.140	20°18'18.3110"	82°06'34.9630"	20.305090	82.109710	PF1055
37	615894.400	2245568.401	20°18'16.2310"	82°06'36.0680"	20.304510	82.110020	PF1055
38	615914.447	2245588.568	20°18'16.8820"	82°06'36.7640"	20.304690	82.110210	PF1055
39	616053.418	2245518.544	20°18'14.5740"	82°06'41.5380"	20.304050	82.111540	PF1055
40	616042.888	2245494.252	20°18'13.7860"	82°06'41.1700"	20.303830	82.111440	PF1055
41	616142.945	2245442.983	20°18'12.0970"	82°06'44.6070"	20.303360	82.112390	PF1055
42	616174.355	2245457.390	20°18'12.5590"	82°06'45.6940"	20.303490	82.112690	PF1055
43	616634.004	2245226.636	20°18'04.9530"	82°07'01.4860"	20.301380	82.117080	PF1055
44	616609.426	2245207.934	20°18'04.3500"	82°07'00.6340"	20.301210	82.116840	PF1055
45	616659.370	2245213.855	20°18'04.5310"	82°07'02.3580"	20.301260	82.117320	PF1055
46	616716.313	2245154.929	20°18'02.6020"	82°07'04.3070"	20.300720	82.117860	PF1055
47	616957.767	2245032.413	20°17'58.5640"	82°07'12.6020"	20.299600	82.120170	PF1055
48	616975.014	2245054.844	20°17'59.2900"	82°07'13.2020"	20.299800	82.120330	PF1055
49	617043.088	2245020.543	20°17'58.1590"	82°07'15.5410"	20.299490	82.120980	PF1055
50	617012.646	2245004.703	20°17'57.6510"	82°07'14.4880"	20.299350	82.120690	PF1055
51	617540.841	2244738.558	20°17'48.8780"	82°07'32.6340"	20.296910	82.125730	PF1055
52	617541.063	2244768.680	20°17'49.8570"	82°07'32.6490"	20.297180	82.125740	PF1055
53	618060.318	2244507.040	20°17'41.2320"	82°07'50.4880"	20.294790	82.130690	PF1055
54	618051.944	2244481.025	20°17'40.3880"	82°07'50.1930"	20.294550	82.130610	PF1055
55	618254.209	2244379.109	20°17'37.0280"	82°07'57.1420"	20.293620	82.132540	PF1055
56	618281.827	2244395.426	20°17'37.5530"	82°07'58.0970"	20.293760	82.132800	PF1055
57	619337.212	2243863.643	20°17'20.0200"	82°08'34.3530"	20.288890	82.142880	PF1054
58	619332.976	2243835.577	20°17'19.1080"	82°08'34.2000"	20.288640	82.142830	PF1054
59	620022.354	2243488.216	20°17'07.6550"	82°08'57.8800"	20.285460	82.149410	PF1058
60	620038.355	2243510.422	20°17'08.3740"	82°08'58.4370"	20.285660	82.149570	PF1058
AP13	620033.390	2243499.302	20°17'08.0130"	82°08'58.2640"	20.285560	82.149520	ANGLE POINT
61	620755.442	2242811.612	20°16'45.4830"	82°09'22.9870"	20.279300	82.156390	PF1058
62	620738.277	2242790.639	20°16'44.8040"	82°09'22.3910"	20.279110	82.156220	PF1058
AP14	620965.979	2242607.691	20°16'38.8020"	82°09'30.1950"	20.277450	82.158390	ANGLE POINT

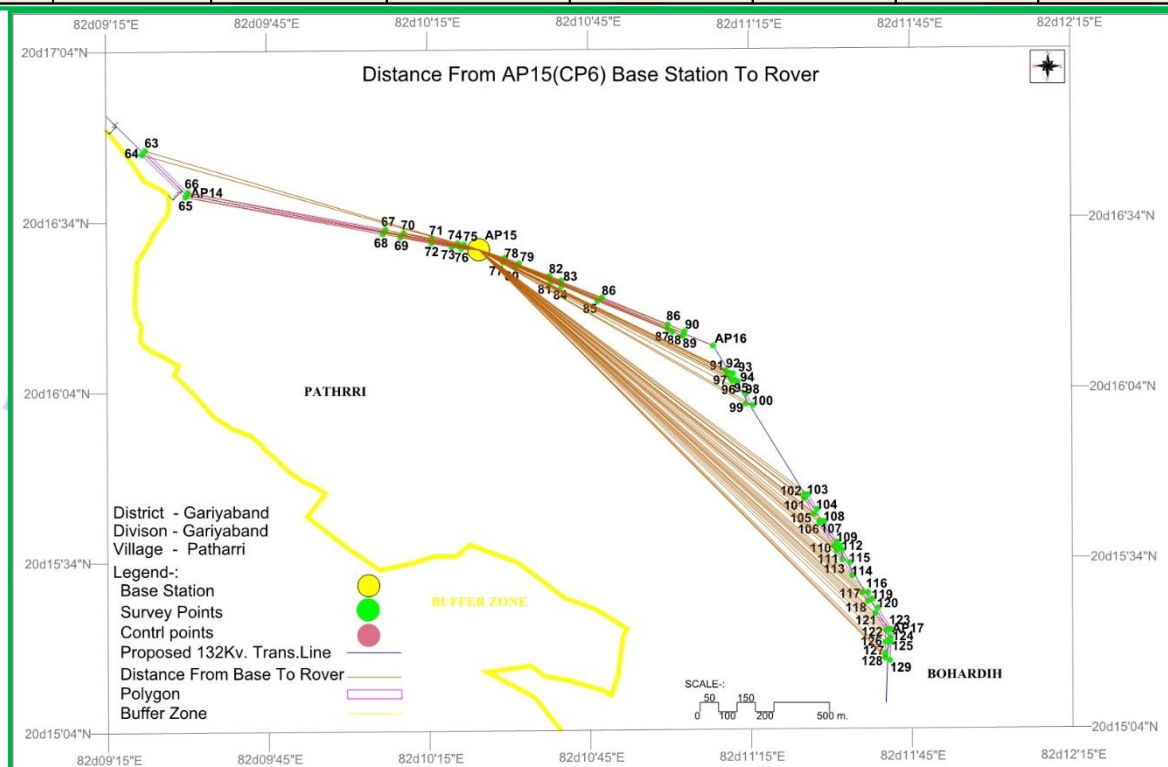


Map showing relative distance of rover points with reference to Control Point 5 AP 12

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 6 ESTABLISHED AT AP15

DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 6 (AP15)							
AP15	622546.984	2242313.848	20°16'28.8820"	82°10'24.6180"	20.274690	82.173510	CP6 ANGLE POINT
63	620737.726	2242846.797	20°16'46.6310"	82°09'22.3850"	20.279620	82.156220	PF1060
64	620720.625	2242825.903	20°16'45.9550"	82°09'21.7910"	20.279430	82.156050	PF1060
65	620956.518	2242596.022	20°16'38.4250"	82°09'29.8660"	20.277340	82.158300	PF1060
AP14	620965.979	2242607.691	20°16'38.8020"	82°09'30.1950"	20.277450	82.158390	ANGLE POINT
66	620969.505	2242621.066	20°16'39.2360"	82°09'30.3200"	20.277570	82.158420	PF1060
67	622039.372	2242421.645	20°16'32.5050"	82°10'07.1480"	20.275700	82.168650	PF1060
68	622024.557	2242396.976	20°16'31.7060"	82°10'06.6320"	20.275470	82.168510	PF1060
69	622120.010	2242379.183	20°16'31.1060"	82°10'09.9170"	20.275310	82.169420	KH.54
70	622137.905	2242403.279	20°16'31.8850"	82°10'10.5400"	20.275520	82.169590	KH.54
71	622288.570	2242374.342	20°16'30.9100"	82°10'15.7260"	20.275250	82.171040	KH.54
72	622288.722	2242346.849	20°16'30.0150"	82°10'15.7250"	20.275000	82.171030	KH.54
73	622397.756	2242327.378	20°16'29.3570"	82°10'19.4780"	20.274820	82.172080	KH.56
74	622430.515	2242347.884	20°16'30.0160"	82°10'20.6120"	20.275000	82.172390	KH.56
75	622464.101	2242342.476	20°16'29.8330"	82°10'21.7690"	20.274950	82.172710	KH.59
76	622450.278	2242317.588	20°16'29.0260"	82°10'21.2860"	20.274730	82.172580	KH.59
77	622674.597	2242244.997	20°16'26.6140"	82°10'29.0000"	20.274060	82.174720	KH.75
78	622686.435	2242270.213	20°16'27.4310"	82°10'29.4140"	20.274290	82.174840	KH.75
79	622762.746	2242238.999	20°16'26.3980"	82°10'32.0370"	20.274000	82.175570	KH.75
80	622744.383	2242217.395	20°16'25.7000"	82°10'31.3990"	20.273810	82.175390	KH.75
81	622935.590	2242139.184	20°16'23.1120"	82°10'37.9700"	20.273090	82.177210	KH.70
82	622928.109	2242171.415	20°16'24.1620"	82°10'37.7200"	20.273380	82.177140	KH.70
83	622990.735	2242145.799	20°16'23.3140"	82°10'39.8720"	20.273140	82.177740	KH.70
84	622992.076	2242116.079	20°16'22.3470"	82°10'39.9110"	20.272870	82.177750	KH.70
85	623188.416	2242035.861	20°16'19.6930"	82°10'46.6590"	20.272140	82.179630	PF1061
86	623568.306	2241909.551	20°16'15.4960"	82°10'59.7220"	20.270970	82.183260	PF1061
86	623212.265	2242055.186	20°16'20.3160"	82°10'47.4860"	20.272310	82.179860	PF1061
87	623567.793	2241886.437	20°16'14.7450"	82°10'59.6980"	20.270760	82.183250	PF1061
88	623593.842	2241869.935	20°16'14.2020"	82°11'00.5920"	20.270610	82.183500	PF1061
89	623649.246	2241847.273	20°16'13.4520"	82°11'02.4960"	20.270400	82.184030	KH.125
90	623660.119	2241872.248	20°16'14.2620"	82°11'02.8770"	20.270630	82.184130	KH.125
AP16	623816.231	2241794.679	20°16'11.7020"	82°11'08.2380"	20.269920	82.185620	ANGLE POINT
91	623879.995	2241662.290	20°16'07.3820"	82°11'10.4030"	20.268720	82.186220	KH.225
92	623901.065	2241647.887	20°16'06.9080"	82°11'11.1260"	20.268590	82.186420	KH.225
93	623922.358	2241645.106	20°16'06.8130"	82°11'11.8590"	20.268560	82.186630	KH.225
94	623949.051	2241601.921	20°16'05.4020"	82°11'12.7690"	20.268170	82.186880	KH.226
95	623935.727	2241605.012	20°16'05.5060"	82°11'12.3100"	20.268200	82.186750	KH.225
96	623918.874	2241597.868	20°16'05.2770"	82°11'11.7280"	20.268130	82.186590	KH.225
97	623907.999	2241615.463	20°16'05.8520"	82°11'11.3570"	20.268290	82.186490	KH.225
98	623990.762	2241534.438	20°16'03.1980"	82°11'14.1900"	20.267550	82.187270	KH.235
99	623990.752	2241480.477	20°16'01.4430"	82°11'14.1760"	20.267070	82.187270	KH.235
100	624025.730	2241472.479	20°16'01.1740"	82°11'15.3790"	20.266990	82.187610	KH.235

101	624304.661	2240969.859	20°15'44.7620"	82°11'24.8680"	20.262430	82.190240	KH.283
102	624304.067	2240990.207	20°15'45.4240"	82°11'24.8530"	20.262620	82.190240	KH.283
103	624323.656	2240990.480	20°15'45.4280"	82°11'25.5280"	20.262620	82.190420	KH.283
104	624373.470	2240909.889	20°15'42.7950"	82°11'27.2250"	20.261890	82.190900	KH.283
105	624357.780	2240883.921	20°15'41.9540"	82°11'26.6780"	20.261650	82.190740	KH.283
106	624387.445	2240835.926	20°15'40.3860"	82°11'27.6880"	20.261220	82.191020	KH.280
107	624387.527	2240847.451	20°15'40.7610"	82°11'27.6940"	20.261320	82.191030	KH.280
108	624413.043	2240845.900	20°15'40.7050"	82°11'28.5730"	20.261310	82.191270	KH.280
109	624482.731	2240733.156	20°15'37.0220"	82°11'30.9470"	20.260280	82.191930	KH.280
110	624465.966	2240708.892	20°15'36.2360"	82°11'30.3630"	20.260070	82.191770	KH.280
111	624480.305	2240684.841	20°15'35.4510"	82°11'30.8510"	20.259850	82.191900	KH.286
112	624510.318	2240687.637	20°15'35.5350"	82°11'31.8860"	20.259870	82.192190	KH.286
113	624510.482	2240636.872	20°15'33.8840"	82°11'31.8790"	20.259410	82.192190	KH.286
114	624563.567	2240550.135	20°15'31.0500"	82°11'33.6870"	20.258630	82.192690	KH.287
115	624551.421	2240621.991	20°15'33.3900"	82°11'33.2870"	20.259270	82.192580	KH.287
116	624650.637	2240461.475	20°15'28.1460"	82°11'36.6660"	20.257820	82.193520	KH.299
117	624619.748	2240459.243	20°15'28.0810"	82°11'35.6010"	20.257800	82.193220	KH.299
118	624649.389	2240412.175	20°15'26.5430"	82°11'36.6110"	20.257370	82.193500	KH.299
119	624674.032	2240423.659	20°15'26.9110"	82°11'37.4630"	20.257480	82.193740	KH.299
120	624703.409	2240376.097	20°15'25.3570"	82°11'38.4640"	20.257040	82.194020	KH.305
121	624689.338	2240346.657	20°15'24.4030"	82°11'37.9710"	20.256780	82.193880	KH.305
122	624747.374	2240252.764	20°15'21.3350"	82°11'39.9480"	20.255930	82.194430	KH.305
AP17	624766.518	2240256.408	20°15'21.4490"	82°11'40.6090"	20.255960	82.194610	ANGLE POINT
123	624774.611	2240260.903	20°15'21.5940"	82°11'40.8890"	20.256000	82.194690	KH.305
124	624773.219	2240214.907	20°15'20.0980"	82°11'40.8290"	20.255580	82.194670	KH.305
126	624745.430	2240190.599	20°15'19.3140"	82°11'39.8660"	20.255360	82.194410	KH.305
125	624772.477	2240191.714	20°15'19.3440"	82°11'40.7980"	20.255370	82.194670	KH.306
127	624746.242	2240131.210	20°15'17.3820"	82°11'39.8790"	20.254830	82.194410	KH.306
128	624742.871	2240107.668	20°15'16.6170"	82°11'39.7570"	20.254620	82.194380	KH.306
129	624769.424	2240092.746	20°15'16.1260"	82°11'40.6680"	20.254480	82.194630	KH.307

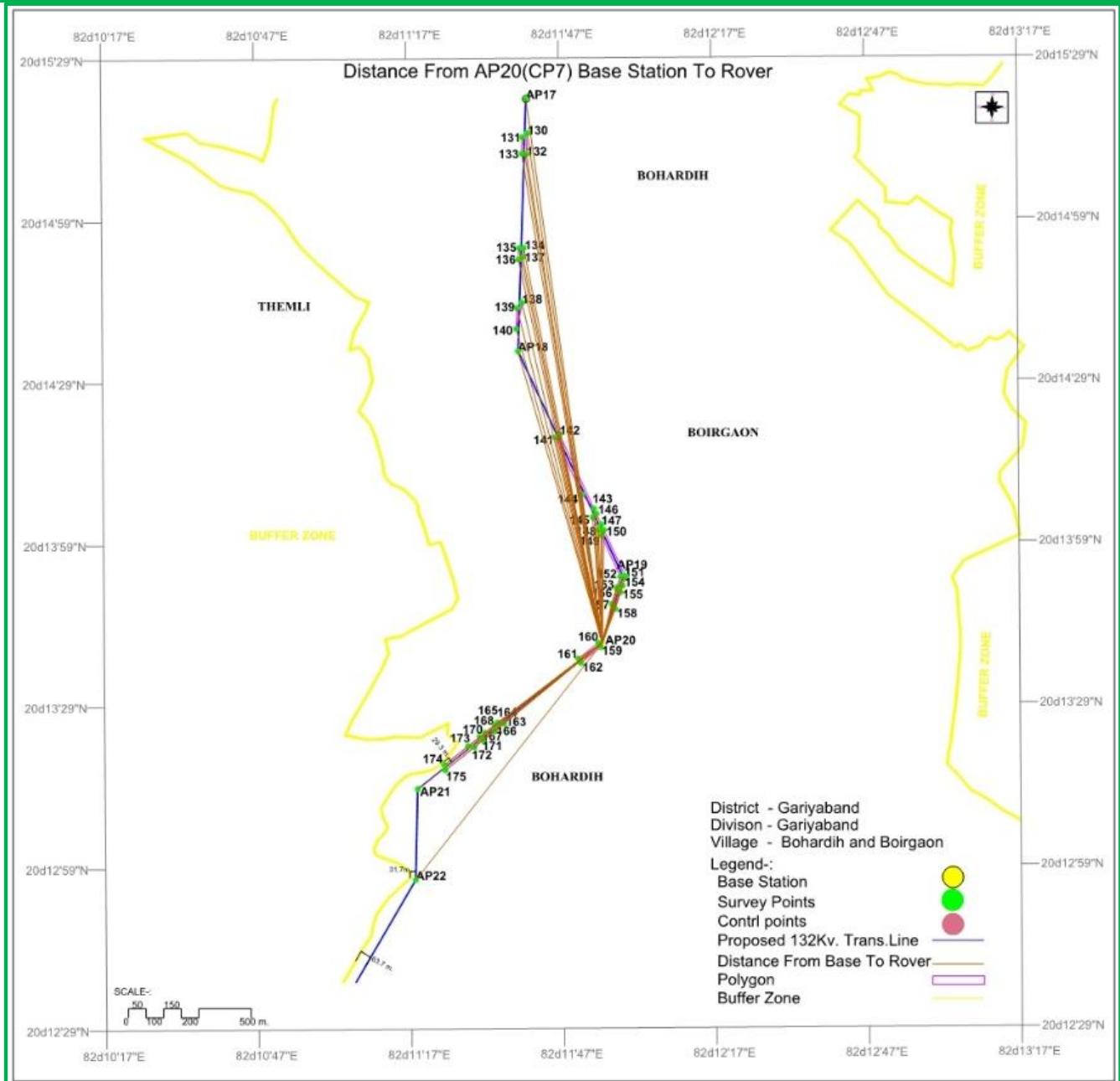


Map showing relative distance of rover points with reference to Control Point 6 AP 15

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 7 ESTABLISHED AT AP20

DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 7 (AP20)							
AP20	625202.549	2237155.441	20°13'40.4910"	82°11'54.8620"	20.227910	82.198570	CP7 ANGLE POINT
AP17	624766.518	2240256.408	20°15'21.4490"	82°11'40.6090"	20.255960	82.194610	ANGLE POINT
130	624768.461	2240061.503	20°15'15.1100"	82°11'40.6270"	20.254200	82.194620	KH.26
131	624740.745	2240038.713	20°15'14.3750"	82°11'39.6660"	20.253990	82.194350	KH.26
132	624737.871	2239945.509	20°15'11.3440"	82°11'39.5440"	20.253150	82.194320	KH.26
133	624764.805	2239942.953	20°15'11.2550"	82°11'40.4720"	20.253130	82.194580	KH.26
134	624748.279	2239407.150	20°14'53.8320"	82°11'39.7690"	20.248290	82.194380	KH.59
135	624721.211	2239405.379	20°14'53.7810"	82°11'38.8360"	20.248270	82.194120	KH.59
136	624719.240	2239341.469	20°14'51.7030"	82°11'38.7520"	20.247700	82.194100	KH.59
137	624743.303	2239355.360	20°14'52.1490"	82°11'39.5850"	20.247820	82.194330	KH.59
138	624738.670	2239095.664	20°14'43.7040"	82°11'39.3600"	20.245470	82.194270	KH.122
139	624710.678	2239063.917	20°14'42.6780"	82°11'38.3880"	20.245190	82.194000	KH.122
140	624707.027	2238945.516	20°14'38.8280"	82°11'38.2330"	20.244120	82.193950	KH.122
AP18	624722.122	2238817.906	20°14'34.6740"	82°11'38.7210"	20.242960	82.194090	ANGLE POINT
141	624930.377	2238326.421	20°14'18.6400"	82°11'45.7750"	20.238510	82.196050	KH.111
142	624952.181	2238343.553	20°14'19.1920"	82°11'46.5310"	20.238660	82.196260	KH.111
143	625149.751	2237920.541	20°14'05.3870"	82°11'53.2340"	20.234830	82.198120	KH.111
144	625081.871	2238001.407	20°14'08.0330"	82°11'50.9150"	20.235560	82.197480	KH.111
145	625142.881	2237871.371	20°14'03.7900"	82°11'52.9850"	20.234390	82.198050	KH.111
146	625163.517	2237891.007	20°14'04.4240"	82°11'53.7010"	20.234560	82.198250	KH.111
147	625191.610	2237829.884	20°14'02.4290"	82°11'54.6540"	20.234010	82.198510	KH.111
148	625176.575	2237799.116	20°14'01.4320"	82°11'54.1280"	20.233730	82.198370	KH.111
149	625191.266	2237767.600	20°14'00.4030"	82°11'54.6260"	20.233450	82.198510	KH.182
150	625206.726	2237798.307	20°14'01.3980"	82°11'55.1670"	20.233720	82.198660	KH.182
151	625329.776	2237534.316	20°13'52.7830"	82°11'59.3410"	20.231330	82.199820	KH.182
AP19	625320.854	2237533.390	20°13'52.7550"	82°11'59.0330"	20.231320	82.199730	ANGLE POINT
152	625300.882	2237532.395	20°13'52.7280"	82°11'58.3450"	20.231310	82.199540	KH.182
153	625281.581	2237470.739	20°13'50.7270"	82°11'57.6640"	20.230760	82.199350	KH.182
154	625313.227	2237481.451	20°13'51.0680"	82°11'58.7570"	20.230850	82.199650	KH.182
155	625301.306	2237443.373	20°13'49.8320"	82°11'58.3370"	20.230510	82.199540	KH.182
156	625280.262	2237466.526	20°13'50.5900"	82°11'57.6180"	20.230720	82.199340	KH.182
157	625251.949	2237376.081	20°13'47.6550"	82°11'56.6200"	20.229900	82.199060	KH.182
158	625271.660	2237348.703	20°13'46.7600"	82°11'57.2920"	20.229660	82.199250	KH.182
159	625188.812	2237131.717	20°13'39.7220"	82°11'54.3830"	20.227700	82.198440	KH.168
160	625174.768	2237155.008	20°13'40.4830"	82°11'53.9050"	20.227910	82.198310	KH.168
161	625061.904	2237065.395	20°13'37.5950"	82°11'49.9940"	20.227110	82.197220	KH.168
162	625074.571	2237040.977	20°13'36.7980"	82°11'50.4240"	20.226890	82.197340	KH.168
163	624636.456	2236693.119	20°13'25.5870"	82°11'35.2420"	20.223770	82.193120	KH.103/253
164	624600.798	2236699.284	20°13'25.7960"	82°11'34.0140"	20.223830	82.192780	KH.103/253
165	624584.878	2236686.643	20°13'25.3880"	82°11'33.4630"	20.223720	82.192630	KH.103/253
166	624583.343	2236650.949	20°13'24.2280"	82°11'33.4010"	20.223400	82.192610	KH.103/253
167	624516.092	2236597.552	20°13'22.5070"	82°11'31.0710"	20.222920	82.191960	KH.102
168	624528.623	2236642.012	20°13'23.9500"	82°11'31.5130"	20.223320	82.192090	KH.102
170	624497.479	2236617.250	20°13'23.1520"	82°11'30.4340"	20.223100	82.191790	KH.100

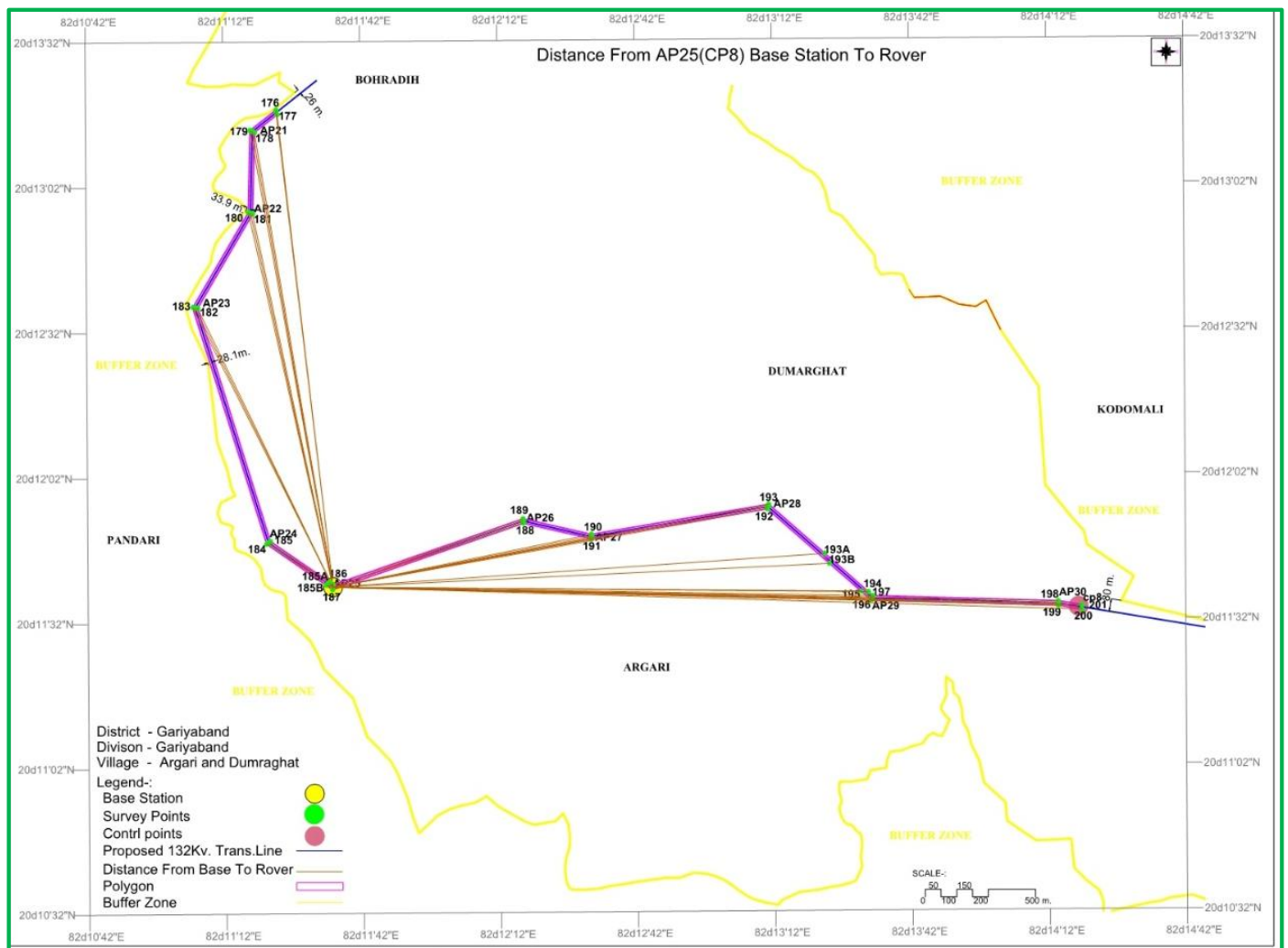
171	624484.134	2236571.326	20°13'21.6610"	82°11'29.9630"	20.222680	82.191660	KH.100
172	624466.821	2236557.579	20°13'21.2180"	82°11'29.3630"	20.222560	82.191490	KH.100
173	624431.819	2236565.116	20°13'21.4720"	82°11'28.1590"	20.222630	82.191160	KH.100
174	624296.895	2236457.136	20°13'17.9910"	82°11'23.4830"	20.221660	82.189860	PF1078
175	624302.215	2236427.737	20°13'17.0340"	82°11'23.6590"	20.221400	82.189910	PF1078
AP21	624150.672	2236319.412	20°13'13.5460"	82°11'18.4110"	20.220430	82.188450	ANGLE POINT
AP22	624139.199	2235801.229	20°12'56.6950"	82°11'17.8880"	20.215750	82.188300	ANGLE POINT



Map showing relative distance of rover points with reference to Control Point 7 AP 20

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 8 ESTABLISHED AT AP25

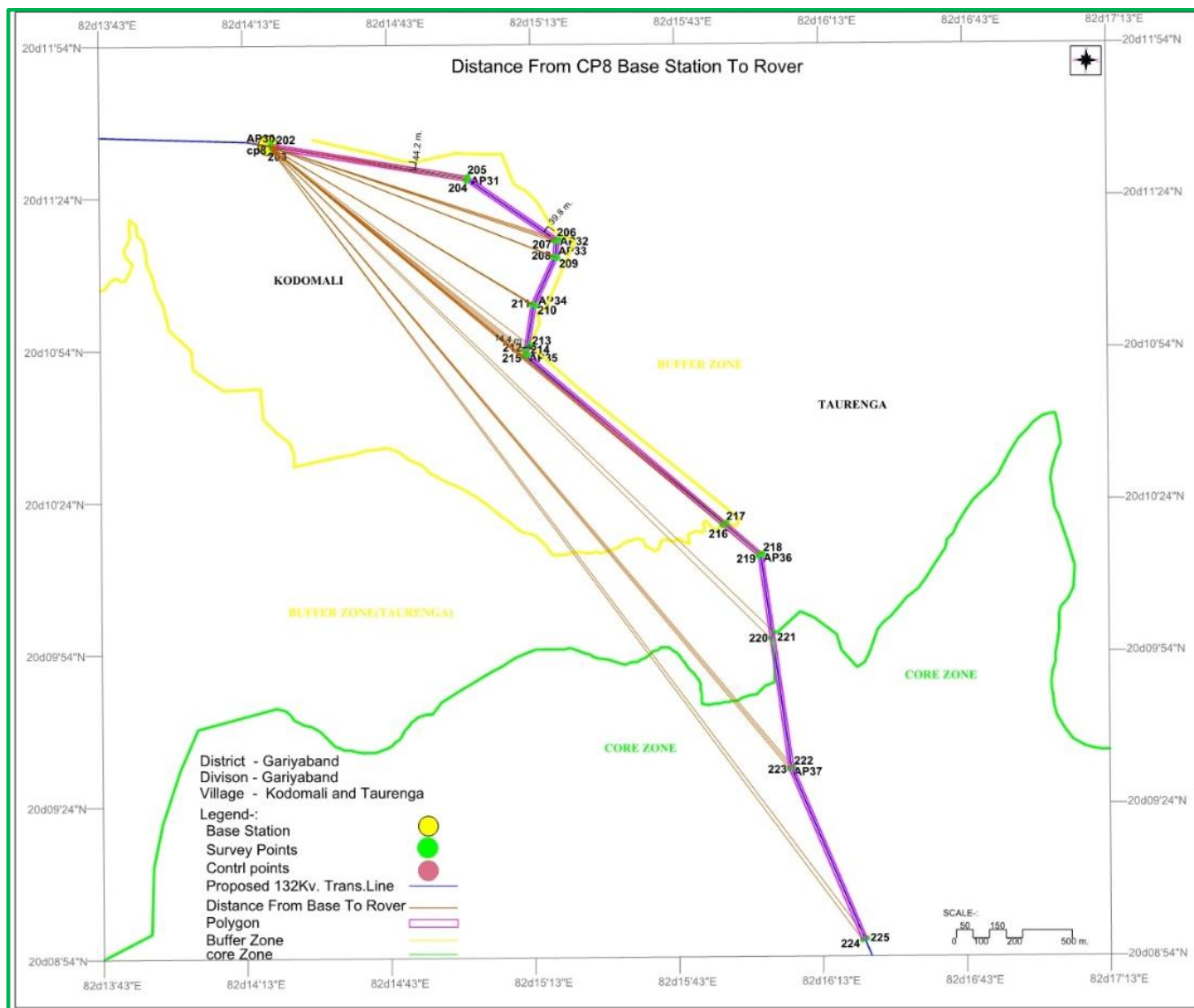
DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 8 (AP25)							
AP25	624663.435	2233428.512	20°11'39.4020"	82°11'35.3620"	20.194280	82.193160	CP8 ANGLE POINT
176	624295.007	2236456.490	20°13'17.9710"	82°11'23.4180"	20.221660	82.189840	PF1076
177	624302.215	2236426.885	20°13'17.0060"	82°11'23.6590"	20.221390	82.189910	PF1076
178	624158.503	2236313.666	20°13'13.3570"	82°11'18.6790"	20.220380	82.188520	PF1076
AP21	624150.672	2236319.412	20°13'13.5460"	82°11'18.4110"	20.220430	82.188450	ANGLE POINT
179	624131.790	2236326.932	20°13'13.7950"	82°11'17.7620"	20.220500	82.188270	PF1076
180	624120.254	2235805.897	20°12'56.8510"	82°11'17.2360"	20.215790	82.188120	PF1076
AP22	624139.222	2235801.287	20°12'56.6970"	82°11'17.8880"	20.215750	82.188300	ANGLE POINT
181	624147.093	2235798.335	20°12'56.5990"	82°11'18.1590"	20.215720	82.188380	PF1076
182	623798.018	2235198.689	20°12'37.1770"	82°11'05.9840"	20.210330	82.185000	PF1076
AP23	623788.884	2235200.306	20°12'37.2320"	82°11'05.6690"	20.210340	82.184910	ANGLE POINT
183	623768.699	2235201.992	20°12'37.2920"	82°11'04.9740"	20.210360	82.184720	PF1076
184	624237.536	2233701.559	20°11'48.3820"	82°11'20.7570"	20.196770	82.189100	PF1076
AP24	624254.557	2233709.149	20°11'48.6250"	82°11'21.3450"	20.196840	82.189260	ANGLE POINT
185	624260.527	2233718.511	20°11'48.9280"	82°11'21.5530"	20.196920	82.189320	PF1076
185A	624631.956	2233459.887	20°11'40.4300"	82°11'34.2850"	20.194560	82.192860	PF1076
185B	624608.810	2233443.041	20°11'39.8870"	82°11'33.4840"	20.194410	82.192630	PF1076
186	624659.928	2233443.547	20°11'39.8920"	82°11'35.2450"	20.194410	82.193120	PF1112
AP25	624663.435	2233428.512	20°11'39.4020"	82°11'35.3620"	20.194280	82.193160	ANGLE POINT
187	624655.891	2233413.546	20°11'38.9170"	82°11'35.0980"	20.194140	82.193080	PF1112
188	625865.129	2233835.057	20°11'52.3420"	82°12'16.8620"	20.197870	82.204680	PF1112
AP26	625868.356	2233848.519	20°11'52.7790"	82°12'16.9760"	20.197990	82.204720	ANGLE POINT
189	625863.558	2233863.103	20°11'53.2550"	82°12'16.8150"	20.198130	82.204670	PF1112
190	626297.822	2233764.408	20°11'49.9420"	82°12'31.7510"	20.197210	82.208820	PF1112
AP27	626302.968	2233749.763	20°11'49.4640"	82°12'31.9240"	20.197070	82.208870	ANGLE POINT
191	626297.064	2233736.892	20°11'49.0470"	82°12'31.7180"	20.196960	82.208810	PF1112
192	627413.860	2233926.721	20°11'54.9550"	82°13'10.2400"	20.198600	82.219510	PF1112
AP28	627423.452	2233941.106	20°11'55.4210"	82°13'10.5740"	20.198730	82.219600	ANGLE POINT
193	627421.994	2233955.490	20°11'55.8890"	82°13'10.5270"	20.198860	82.219590	PF1112
193A	627772.383	2233644.574	20°11'45.6930"	82°13'22.5200"	20.196030	82.222920	PF1112
193B	627803.111	2233581.759	20°11'43.6430"	82°13'23.5620"	20.195460	82.223210	PF1112
194	628054.538	2233401.343	20°11'37.7140"	82°13'32.1780"	20.193810	82.225600	PF1091
195	628010.143	2233404.339	20°11'37.8230"	82°13'30.6490"	20.193840	82.225180	PF1091
196	628073.655	2233348.699	20°11'35.9980"	82°13'32.8230"	20.193330	82.225780	PF1109
AP29	628084.415	2233362.061	20°11'36.4300"	82°13'33.1970"	20.193450	82.225890	ANGLE POINT
197	628084.124	2233375.423	20°11'36.8640"	82°13'33.1910"	20.193570	82.225890	PF1109
198	629259.169	2233343.331	20°11'35.5370"	82°14'13.6620"	20.193200	82.237130	PF1109
AP30	629262.134	2233329.861	20°11'35.0980"	82°14'13.7610"	20.193080	82.237160	ANGLE POINT
199	629256.609	2233316.390	20°11'34.6610"	82°14'13.5670"	20.192960	82.237100	PF1109
200	629414.665	2233291.113	20°11'33.8010"	82°14'19.0050"	20.192720	82.238610	PF1109
201	629413.897	2233323.161	20°11'34.8430"	82°14'18.9870"	20.193010	82.238610	PF1109
cp8	629391.171	2233324.220	20°11'34.8830"	82°14'18.2040"	20.193020	82.238390	CONTROL POINT



Map showing relative distance of rover points with reference to Control Point 8 AP 25

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 8

DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 8							
CP 8	629391.171	2233323.367	20°11'34.8560"	82°14'18.2040"	20.193020	82.238390	CONTROL POINT
AP30	629263.414	2233328.974	20°11'35.0690"	82°14'13.8040"	20.193070	82.237170	ANGLE POINT
202	629410.002	2233318.382	20°11'34.6890"	82°14'18.8520"	20.192970	82.238570	PF1104
203	629414.665	2233290.260	20°11'33.7730"	82°14'19.0050"	20.192710	82.238610	PF1104
204	630591.376	2233097.711	20°11'27.2240"	82°14'59.4920"	20.190900	82.249860	PF1104
AP31	630598.277	2233110.546	20°11'27.6400"	82°14'59.7330"	20.191010	82.249930	ANGLE POINT
205	630601.699	2233123.381	20°11'28.0560"	82°14'59.8540"	20.191130	82.249960	PF1104
206	631153.691	2232743.682	20°11'15.5720"	82°15'18.7700"	20.187660	82.255210	PF1104
AP32	631141.312	2232737.008	20°11'15.3580"	82°15'18.3420"	20.187600	82.255100	ANGLE POINT
207	631125.455	2232730.334	20°11'15.1440"	82°15'17.7940"	20.187540	82.254940	PF1104
208	631117.698	2232639.422	20°11'12.1900"	82°15'17.5030"	20.186720	82.254860	PF1104
AP33	631132.692	2232635.935	20°11'12.0720"	82°15'18.0190"	20.186690	82.255010	ANGLE POINT
209	631144.362	2232634.333	20°11'12.0180"	82°15'18.4200"	20.186670	82.255120	PF1104
210	631012.560	2232341.360	20°11'02.5210"	82°15'13.8040"	20.184030	82.253830	PF1104
AP34	631001.240	2232345.243	20°11'02.6500"	82°15'13.4150"	20.184070	82.253730	ANGLE POINT
211	630986.441	2232348.274	20°11'02.7530"	82°15'12.9060"	20.184100	82.253590	PF1104
212	630944.174	2232074.927	20°10'53.8730"	82°15'11.3790"	20.181630	82.253160	PF1104
213	630975.791	2232103.561	20°10'54.7960"	82°15'12.4760"	20.181890	82.253470	PF1104
214	630966.655	2232043.623	20°10'52.8490"	82°15'12.1450"	20.181350	82.253370	PF1105
AP35	630953.898	2232039.072	20°10'52.7040"	82°15'11.7050"	20.181310	82.253250	ANGLE POINT
215	630937.663	2232033.668	20°10'52.5330"	82°15'11.1440"	20.181260	82.253100	PF1105
216	632141.123	2231012.316	20°10'19.0180"	82°15'52.3310"	20.171950	82.264540	PF1105
217	632167.508	2231024.483	20°10'19.4070"	82°15'53.2430"	20.172060	82.264790	PF1105
218	632386.609	2230839.423	20°10'13.3340"	82°16'00.7410"	20.170370	82.266870	PF1106
AP36	632375.721	2230832.400	20°10'13.1080"	82°16'00.3640"	20.170310	82.266770	ANGLE POINT
219	632361.354	2230825.444	20°10'12.8860"	82°15'59.8680"	20.170250	82.266630	PF1106
220	632433.417	2230328.523	20°09'56.7060"	82°16'02.2190"	20.165750	82.267280	PF1106
221	632455.660	2230362.416	20°09'57.8030"	82°16'02.9940"	20.166060	82.267500	PF1106
222	632574.397	2229543.699	20°09'31.1460"	82°16'06.8690"	20.158650	82.268570	PF89(CZ)
AP37	632563.032	2229540.852	20°09'31.0560"	82°16'06.4760"	20.158630	82.268470	ANGLE POINT(CZ)
223	632548.188	2229537.152	20°09'30.9400"	82°16'05.9640"	20.158590	82.268320	PF89(CZ)
224	632992.083	2228500.277	20°08'57.1060"	82°16'20.9790"	20.149200	82.272490	PF89(CZ)
225	633019.288	2228510.101	20°08'57.4190"	82°16'21.9190"	20.149280	82.272760	PF89(CZ)

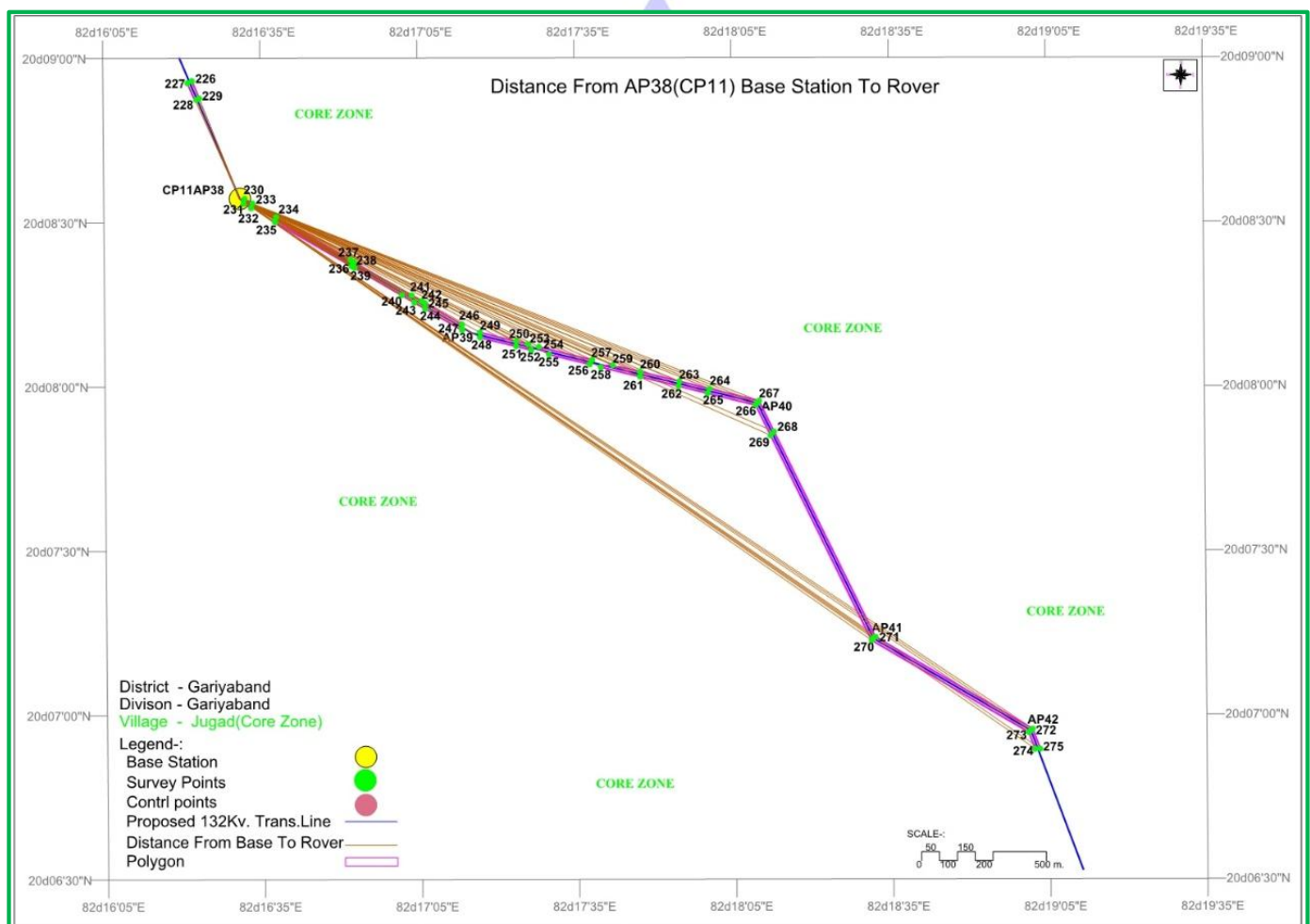


Map showing relative distance of rover points with reference to Control Point 8

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 11 ESTABLISHED AT AP 38

DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 11 AP38							
AP38	633317.785	2227787.705	20°08'33.8500"	82°16'32.0080"	20.142740	82.275560	CP11 ANGLE POINT
226	633046.084	2228449.212	20°08'55.4320"	82°16'22.8250"	20.148730	82.273010	KH.3
227	633022.031	2228435.949	20°08'55.0070"	82°16'21.9940"	20.148610	82.272780	KH.3
228	633072.209	2228343.624	20°08'51.9920"	82°16'23.6970"	20.147780	82.273250	KH.3
229	633088.108	2228351.584	20°08'52.2470"	82°16'24.2470"	20.147850	82.273400	KH.3
230	633342.453	2227788.009	20°08'33.8540"	82°16'32.8570"	20.142740	82.275790	KH.25
AP38	633317.785	2227787.705	20°08'33.8500"	82°16'32.0080"	20.142740	82.275560	ANGLE POINT
231	633336.484	2227760.276	20°08'32.9530"	82°16'32.6450"	20.142490	82.275730	KH.25
232	633379.487	2227736.673	20°08'32.1750"	82°16'34.1190"	20.142270	82.276140	KH.25
233	633386.824	2227762.382	20°08'33.0090"	82°16'34.3790"	20.142500	82.276220	KH.25
234	633519.352	2227685.837	20°08'30.4870"	82°16'38.9220"	20.141800	82.277480	KH.28
235	633512.849	2227658.413	20°08'29.5960"	82°16'38.6910"	20.141550	82.277410	KH.28
236	633942.979	2227409.980	20°08'21.4090"	82°16'53.4380"	20.139280	82.281510	KH.28
237	633936.288	2227445.025	20°08'22.5500"	82°16'53.2170"	20.139600	82.281450	KH.28
238	633956.148	2227433.588	20°08'22.1730"	82°16'53.8980"	20.139490	82.281640	KH.84
239	633959.627	2227400.399	20°08'21.0930"	82°16'54.0090"	20.139190	82.281670	KH.84
240	634225.664	2227246.708	20°08'16.0280"	82°17'03.1290"	20.137790	82.284200	KH.84
241	634280.038	2227245.630	20°08'15.9790"	82°17'05.0010"	20.137770	82.284720	KH.84
242	634336.461	2227213.042	20°08'14.9050"	82°17'06.9360"	20.137470	82.285260	KH.126
243	634296.107	2227206.022	20°08'14.6870"	82°17'05.5440"	20.137410	82.284870	KH.126
244	634355.014	2227170.264	20°08'13.5090"	82°17'07.5630"	20.137090	82.285430	KH.128
245	634352.428	2227203.790	20°08'14.6000"	82°17'07.4830"	20.137390	82.285410	KH.128
246	634562.881	2227082.237	20°08'10.5940"	82°17'14.6980"	20.136280	82.287420	KH.126
247	634563.398	2227049.906	20°08'09.5420"	82°17'14.7070"	20.135980	82.287420	KH.126
AP39	634620.660	2227035.197	20°08'09.0490"	82°17'16.6750"	20.135850	82.287970	ANGLE POINT
248	634663.737	2227009.456	20°08'08.2010"	82°17'18.1520"	20.135610	82.288380	KH.202
249	634663.891	2227037.214	20°08'09.1040"	82°17'18.1640"	20.135860	82.288380	KH.202
250	634866.542	2226987.619	20°08'07.4400"	82°17'25.1300"	20.135400	82.290310	KH.202
251	634866.531	2226959.826	20°08'06.5360"	82°17'25.1220"	20.135150	82.290310	KH.202
252	634952.199	2226938.875	20°08'05.8330"	82°17'28.0660"	20.134950	82.291130	KH.201
253	634933.390	2226971.270	20°08'06.8920"	82°17'27.4270"	20.135250	82.290950	KH.201
254	634993.988	2226957.208	20°08'06.4190"	82°17'29.5100"	20.135120	82.291530	KH.196
255	635050.812	2226915.515	20°08'05.0490"	82°17'31.4560"	20.134740	82.292070	KH.196
256	635278.850	2226859.745	20°08'03.1770"	82°17'39.2940"	20.134220	82.294250	KH.196
257	635292.541	2226884.193	20°08'03.9690"	82°17'39.7720"	20.134440	82.294380	KH.196
258	635341.366	2226844.490	20°08'02.6650"	82°17'41.4420"	20.134070	82.294850	KH.208
259	635408.463	2226854.343	20°08'02.9690"	82°17'43.7550"	20.134160	82.295490	KH.208
260	635562.382	2226818.199	20°08'01.7540"	82°17'49.0460"	20.133820	82.296960	KH.208
261	635562.507	2226790.373	20°08'00.8490"	82°17'49.0430"	20.133570	82.296960	KH.208
262	635778.520	2226737.544	20°07'59.0760"	82°17'56.4670"	20.133080	82.299020	KH.209
263	635781.996	2226763.723	20°07'59.9270"	82°17'56.5940"	20.133310	82.299050	KH.209
264	635952.748	2226722.730	20°07'58.5500"	82°18'02.4630"	20.132930	82.300680	KH.210
265	635940.450	2226697.942	20°07'57.7470"	82°18'02.0330"	20.132710	82.300560	KH.210
266	636210.435	2226631.913	20°07'55.5310"	82°18'11.3120"	20.132090	82.303140	KH.215
AP40	636219.076	2226644.102	20°07'55.9250"	82°18'11.6130"	20.132200	82.303230	ANGLE POINT

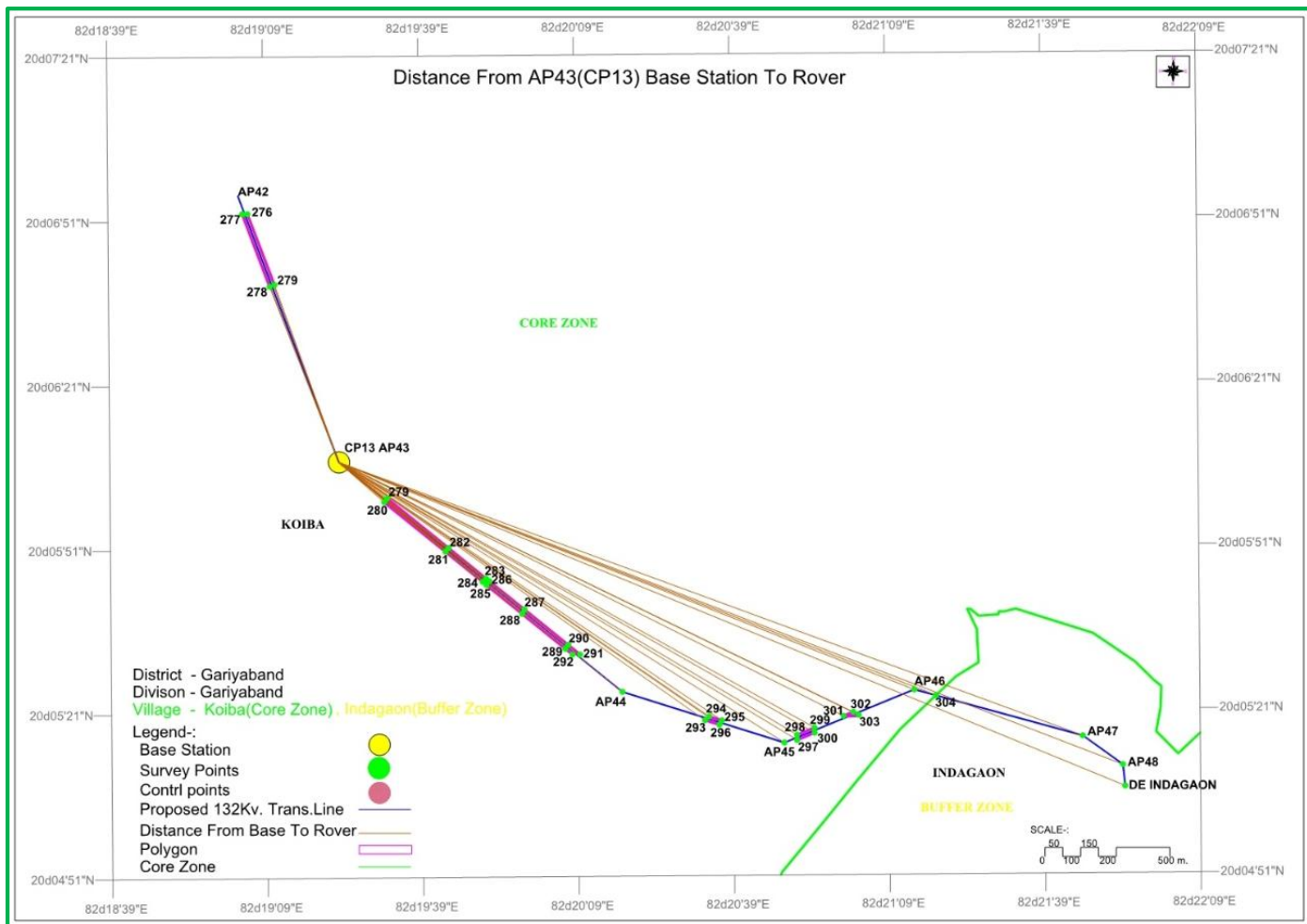
267	636229.078	2226655.149	20°07'56.2820"	82°18'11.9600"	20.132300	82.303320	KH.215
268	636314.032	2226482.983	20°07'50.6610"	82°18'14.8390"	20.130740	82.304120	KH.215
269	636294.778	2226460.985	20°07'49.9500"	82°18'14.1700"	20.130540	82.303940	KH.215
270	636861.607	2225311.998	20°07'12.4370"	82°18'33.3770"	20.120120	82.309270	PF84
AP41	636874.172	2225320.755	20°07'12.7190"	82°18'33.8120"	20.120200	82.309390	ANGLE POINT
271	636882.233	2225330.364	20°07'13.0290"	82°18'34.0930"	20.120290	82.309470	PF84
272	637766.132	2224813.736	20°06'56.0000"	82°19'04.3860"	20.115560	82.317890	PF84
AP42	637757.450	2224804.490	20°06'55.7010"	82°19'04.0850"	20.115470	82.317800	ANGLE POINT
273	637744.265	2224796.096	20°06'55.4320"	82°19'03.6290"	20.115400	82.317670	PF84
274	637779.526	2224702.161	20°06'52.3680"	82°19'04.8170"	20.114550	82.318000	PF84
275	637808.371	2224703.086	20°06'52.3900"	82°19'05.8110"	20.114550	82.318280	PF84



Map showing relative distance of rover points with reference to Control Point 11 AP 38

DGPS SURVEY COORDINATES OF ROVER POSITION WITH REFERENCE TO CONTROL
POINT 13 ESTABLISHED AT AP 43

DISTANCE OF ROVER POINTS WITH REFERENCE TO CONTROL POINT 13 AP43							
AP43	638324.000	2223309.770	20°06'06.9430"	82°19'23.1830"	20.101930	82.323110	CP13 ANGLE POINT
276	637808.883	2224703.086	20°06'52.3900"	82°19'05.8280"	20.114550	82.318290	RF29
277	637780.039	2224702.161	20°06'52.3680"	82°19'04.8350"	20.114550	82.318010	RF29
278	637934.217	2224295.685	20°06'39.1080"	82°19'10.0320"	20.110860	82.319450	RF29
279	638592.520	2223108.746	20°06'00.3350"	82°19'32.3730"	20.100090	82.325660	RF29
AP43	638324.000	2223309.770	20°06'06.9430"	82°19'23.1830"	20.101930	82.323110	ANGLE POINT
279	637960.840	2224306.471	20°06'39.4520"	82°19'10.9520"	20.110960	82.319710	KH.136
280	638575.392	2223087.276	20°05'59.6420"	82°19'31.7770"	20.099900	82.325490	KH.136
281	638919.093	2222808.722	20°05'50.4930"	82°19'43.5340"	20.097360	82.328760	KH.136
282	638936.909	2222829.037	20°05'51.1490"	82°19'44.1530"	20.097540	82.328930	KH.136
283	639146.513	2222658.760	20°05'45.5570"	82°19'51.3220"	20.095990	82.330920	KH.137
284	639128.195	2222639.254	20°05'44.9270"	82°19'50.6860"	20.095810	82.330750	KH.137
285	639149.381	2222622.084	20°05'44.3630"	82°19'51.4100"	20.095660	82.330950	KH.139
286	639166.049	2222643.329	20°05'45.0500"	82°19'51.9900"	20.095850	82.331110	KH.139
287	639363.116	2222483.615	20°05'39.8040"	82°19'58.7300"	20.094390	82.332980	KH.139
288	639349.521	2222459.880	20°05'39.0360"	82°19'58.2560"	20.094180	82.332850	KH.139
289	639591.254	2222264.492	20°05'32.6190"	82°20'06.5240"	20.092390	82.335150	KH.145
290	639607.458	2222285.588	20°05'33.3000"	82°20'07.0880"	20.092580	82.335300	KH.145
291	639673.612	2222231.973	20°05'31.5400"	82°20'09.3500"	20.092090	82.335930	KH.146/1
292	639630.883	2222231.849	20°05'31.5470"	82°20'07.8790"	20.092100	82.335520	KH.146/1
AP44	639912.622	2222021.413	20°05'24.6290"	82°20'17.5200"	20.090170	82.338200	ANGLE POINT
293	640374.541	2221863.012	20°05'19.3570"	82°20'33.3780"	20.088710	82.342610	KH.192
294	640397.745	2221884.041	20°05'20.0350"	82°20'34.1830"	20.088900	82.342830	KH.192
295	640468.524	2221861.885	20°05'19.2960"	82°20'36.6130"	20.088690	82.343500	KH.192
296	640454.172	2221838.085	20°05'18.5250"	82°20'36.1120"	20.088480	82.343360	KH.192
AP45	640820.885	2221737.948	20°05'15.1720"	82°20'48.7090"	20.087550	82.346860	ANGLE POINT
297	640890.117	2221752.393	20°05'15.6240"	82°20'51.0960"	20.087670	82.347530	KH.394
298	640890.156	2221781.575	20°05'16.5730"	82°20'51.1050"	20.087940	82.347530	KH.394
299	640987.650	2221821.405	20°05'17.8430"	82°20'54.4730"	20.088290	82.348460	KH.394
300	640987.161	2221792.367	20°05'16.8980"	82°20'54.4480"	20.088030	82.348460	KH.394
301	641149.287	2221887.766	20°05'19.9580"	82°21'00.0550"	20.088880	82.350020	KH.394
302	641201.324	2221909.025	20°05'20.6360"	82°21'01.8530"	20.089070	82.350510	KH.394
303	641233.916	2221893.173	20°05'20.1120"	82°21'02.9700"	20.088920	82.350830	KH.394
AP46	641548.588	2222036.210	20°05'24.6810"	82°21'13.8430"	20.090190	82.353850	ANGLE POINT
304	641666.875	2222003.229	20°05'23.5770"	82°21'17.9060"	20.089880	82.354970	CORE END BUFFER START
AP42	637757.450	2224804.490	20°06'55.7010"	82°19'04.0850"	20.115470	82.317800	ANGLE POINT
AP48	642717.937	2221616.541	20°05'10.7220"	82°21'53.9790"	20.086310	82.364990	ANGLE POINT
DEINDAGAON	642725.524	2221496.955	20°05'06.8310"	82°21'54.2070"	20.085230	82.365060	ANGLE POINT



Map showing relative distance of rover points with reference to Control Point 13 AP 43

for Gaveshana Geosciences Pvt Ltd

Authorized Signatory

PHOTOGRAPHS DURING DGPS SURVEY:

