

DGPS / Total Station Survey Report

Compensatory Afforestation Land Survey Report of 171.4929 ha. Revenue land effected under Baloda Bazar District, for Development of Economic corridor, Inter Corridors, Feeder Routes and National Corridors to improve the efficiency of freight movement in India under Bharatmala Pariyojana [Lot-3/Chhattisgarh/Packge-1(Urga- Pathalgaon Section of NH-130A Raipur Dhanbad Economic Corridor)]

Forest Proposal No - FP/CG/ROAD/122482/2021

Compensatory Afforestation Land Area –171.4929 Ha.

Baloda Bazar Forest Division

Submitted By

NHAI, Korba,

National Highway Authority of India



INTRODUCTION TO DGPS

WHAT IS DGPS AND WHY USE IT?

Differential Global Positioning System (DGPS) is an enhancement to Global Positioning System that provides improved location accuracy, from the 15-meter nominal GPS accuracy to about 10 cm in case of the best implementations.

DGPS refers to using a combination of receivers and satellites to reduce/eliminate common receiver based and satellite based errors, reduce orbit errors, reduce ionospheric and tropospheric errors, reduce effects of SA eliminate satellite and receiver clock errors. It also improves accuracy significantly 100's of metres to metres to centimetres to millimetres

1. DGPS uses one or several (network) fixed ground based reference stations (in known locations).
2. The base station compares its own known location, to that computed from a GPS receiver.
3. Any difference is then broadcast as a correction to the user. Correction signals can be broadcast either from ground stations, or via additional satellites. These services are privately owned and usually require a user subscription.

Examples:

- Satellite Based Augmentation System (SBAS),
- Wide Area Augmentation System (WAAS),
- Local Area Augmentation System (LAAS),
- European Geostationary Navigation Overlay Service (EGNOS),
- Omni STAR
- Coast guard beacon service.

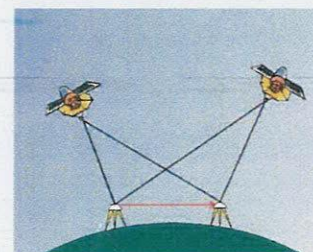
Why do we Need Differential GPS?

By using DGPS we can improve our positional accuracy from around 1.5m with standard GPS to around 40cm with DGPS, without the need for post processing. In the case of the road survey van (top right), users can measure the amount of road wear and judge whether the road should be resurfaced just by driving over it. Just one day's driving can replace a month's manual work using traditional methods.

There are many other applications like this. The labour saving is immense but at the same time, previously impossible tasks are made possible such as the prediction of earthquakes before they occur.

DGPS Summary

- Term refers to simple C/A code differential
- Available on GPS receivers from low cost to high cost
- Produces accuracies from sub-metre to metres
- Many real-time DGPS correction providers - Coast guard, EGNOS, Omni STAR



- Used for many different applications including marine navigation, precision farming and vehicle testing applications.

What is RTK?

Real Time Kinematic is an advanced form of DGPS which uses the satellites carrier wave to compare 2 observations from different receivers within the system, to fine tune the satellite and receiver clock errors, thus improving positional accuracy.

Real Time Kinematic (RTK)

The GPS signal is made up of 3 distinct components:

- Carrier wave • GPS Code
- Navigation message

Typical GPS receivers will use the GPS navigation message to calculate its position. RTK uses the carrier wave of the GPS signal, which is 19.02cm long. By counting the number of cycles (and phase of the carrier), the travel time and distance can be measured more accurately.

RTK Summary

- Similar technique as DGPS that uses the carrier phase to provide more accurate positioning
- Cost is higher compared to DGPS receivers • Produces accuracies from 20 cm to sub-centimetres
- RTK corrections provided via a local base station or by a private correction provider - Omni STAR, Leica, Trimble
- Produces accuracies from 20 cm to sub-centimetres
- RTK corrections provided via a local base station or by a private correction provider - Omni STAR, Leica, Trimble

Used for many different applications including machine control (construction, container ports, farming), vehicle testing applications, surveying (land, marine, hydrographic, aerial)

RINEX FILE

The first proposal for the **Receiver Independent Exchange Format RINEX** was developed by the Astronomical Institute of the University of Berne for the easy exchange of the Global Positioning System (GPS) data to be collected during the first large European GPS campaign EUREF 89, which involved more than 60 GPS receivers of 4 different manufacturers. The governing aspect during the development was the following fact: Most geodetic processing software for GPS data use a well-defined set of observables:

- The carrier-phase measurement at one or both carriers (actually being a measurement on the beat frequency between the received carrier of the satellite signal and a receiver generated reference frequency).



- The pseudo range (code) measurement, equivalent to the difference of the time of reception (expressed in the time frame of the receiver) and the time of transmission (expressed in the time frame of the satellite) of a distinct satellite signal.
- The observation time being the reading of the receiver clock at the instant of validity of the carrier-phase and/or the code measurements. Usually the software assumes that the observation time is valid for both the phase and the code measurements, and for all satellites observed. Consequently, all these programs do not need most of the information that is usually stored by the receivers: They need phase, code, and time in the above-mentioned definitions, and some station related information like station name, antenna height, etc. Up till now two major format versions have been developed and published:
- The original RINEX Version 1 presented at and accepted by the 5th International Geodetic Symposium on Satellite Positioning in Las Cruces, 1989. [Gurtner et al. 1989], [Evans 1989]
- RINEX Version 2 presented at and accepted by the Second International Symposium of Precise Positioning with the Global Positioning system in Ottawa, 1990, mainly adding the possibility to include tracking data from different satellite systems (GLONASS, SBAS). [Gurtner and Mader 1990a, 1990b], [Gurtner 1994]. Several subversions of RINEX Version 2 have been defined:
- Version 2.10: Among other minor changes allowing for sampling rates other than integer seconds and including raw signal strengths as new observables. [Gurtner 2002] • Version 2.11: Includes the definition of a two-character observation code for L2C pseudoranges and some modifications in the GEO NAV MESS files [Gurtner and Estey 2005]
- Version 2.20: Unofficial version used for the exchange of tracking data from spaceborne receivers within the IGS LEO pilot project [Gurtner and Estey 2002]. As spin-offs of this idea of a receiver-independent GPS
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- Version 2.20: Unofficial version used for the exchange of tracking data from spaceborne receivers within the IGS LEO pilot project [Gurtner and Estey 2002]. As spin-offs of this idea of a receiver-independent GPS exchange format other RINEX-like exchange file formats have been defined, mainly used by the International GNSS Service IGS:
- Exchange format for **satellite and receiver clock offsets** determined by processing data of a GNSS tracking network [Ray and Gurtner 1999]
- Exchange format for the complete **broadcast data of spacebased augmentation systems** SBAS. [Suard et al. 2004]
- IONEX: Exchange format for **ionosphere models** determined by processing data of a GNSS tracking network [Schaer et al. 1998] • ANTEX:



Exchange format for **phase centre variations** of geodetic GNSS antennae [Rothacher and Schmid 2005]. The upcoming European Navigation Satellite System Galileo and the enhanced GPS with new frequencies and observation types, especially the possibility to track frequencies on different channels, ask for a more flexible and more detailed definition of the observation codes. To improve the handling of the data files in case of "mixed" files, i.e. files containing tracking data of more than one satellite system, each one with different observation types, the record structure of the data record has been modified significantly and, following several requests, the limitation to 80 characters length has been removed. As the changes are quite significant, they lead to a new RINEX Version 3. The new version also includes the unofficial Version 2.20 definitions for space-borne receivers. The major change asking for a version 3.01 was the requirement to generate consistent phase observations across different tracking modes or channels, i.e. to apply $\frac{1}{4}$ -cycle shifts prior to RINEX file generation, if necessary, to facilitate the processing of such data.

- IONEX: Exchange format for **ionosphere models** determined by processing data of a GNSS tracking network [Schaer et al. 1998] •

ANTEX: Exchange format for **phase centre variations** of geodetic GNSS antennae [Rothacher and Schmid 2005].

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The RINEX version 3.00 format consists of three ASCII file types:

1. Observation data File
2. Navigation message File
3. Meteorological data File

Each file type consists of a header section and a data section. The header section contains global information for the entire file and is placed at the beginning of the file. The header section contains header labels in columns 61-80 for each line contained in the header section. These labels are mandatory and must appear exactly as given



in these descriptions and examples. The format has been optimized for minimum space requirements independent from the number of different observation types of a specific receiver or satellite system by indicating in the header the types of observations to be stored for this receiver and the satellite systems having been observed. In computer systems allowing variable record lengths the observation records may be kept as short as possible. Trailing blanks can be removed from the records. There is no maximum record length limitation for the observation records.

Each Observation file and each Meteorological Data file basically contain the data from one site and one session. Starting with Version 2 RINEX also allows including observation data from more than one site subsequently occupied by a roving receiver in rapid static or kinematic applications. Although Version 2 and higher allow to insert header records into the data section it is not recommended to concatenate data of more than one receiver (or antenna) into the same file, even if the data do not overlap in time. If data from more than one receiver have to be exchanged, it would not be economical to include the identical satellite navigation messages collected by the different receivers several times. Therefore the navigation message file from one receiver may be exchanged or a composite navigation message file created containing non-redundant information from several receivers in order to make the most complete file. The format of the data records of the RINEX Version 1 navigation message file was identical to the former NGS exchange format. RINEX version 3 navigation message files may contain navigation messages of more than one satellite system (GPS, GLONASS, Galileo, Quasi Zenith Satellite System (QZSS), BeiDou System (BDS) and SBAS).

The actual format descriptions as well as examples are given in the Appendix Tables at the end of the document.

BASIC DEFINITIONS

Time:

The time of the measurement is the receiver time of the received signals. It is identical for the phase and range measurements and is identical for all satellites observed at that epoch. For single-system data files it is by default expressed in the time system of the respective satellite system. Otherwise the actual time can (for mixed files must) be indicated in the Start Time header record.

Pseudo-Range:

The pseudo-range (PR) is the distance from the receiver antenna to the satellite antenna including receiver and satellite clock offsets—satellite clock offset + other biases) so that the pseudo-range reflects the actual behaviour of the receiver and satellite clocks. The pseudo-range is stored in units of meters.

Phase:

The phase is the carrier-phase measured in whole cycles. The half cycles measured by squaring type receivers must be converted to whole cycles and flagged by the respective observation code.

The phase changes in the same sense as the range (negative doppler). The phase observations between epochs must be connected by including the integer number of



cycles. The observables are not corrected for external effects like atmospheric refraction, satellite clock offsets, etc. If necessary phase observations are corrected for phase shifts needed to guarantee consistency between phases of the same frequency and satellite system based on different signal channels.

If the receiver or the converter software adjusts the measurements using the real-time-derived receiver clock offsets $dT(r)$, the consistency of the 3 1 Time (corr) = $\text{Time}(r) - dT(r)$

$$2 \text{ PR (corr)} = \text{PR}(r) - dT(r) * c \quad 3 \text{ phase (corr)} = \text{phase}(r) - dT(r) * \text{freq}$$

Doppler:

The sign of the doppler shift as additional observable is defined as usual: Positive for approaching satellites.

Satellite numbers:

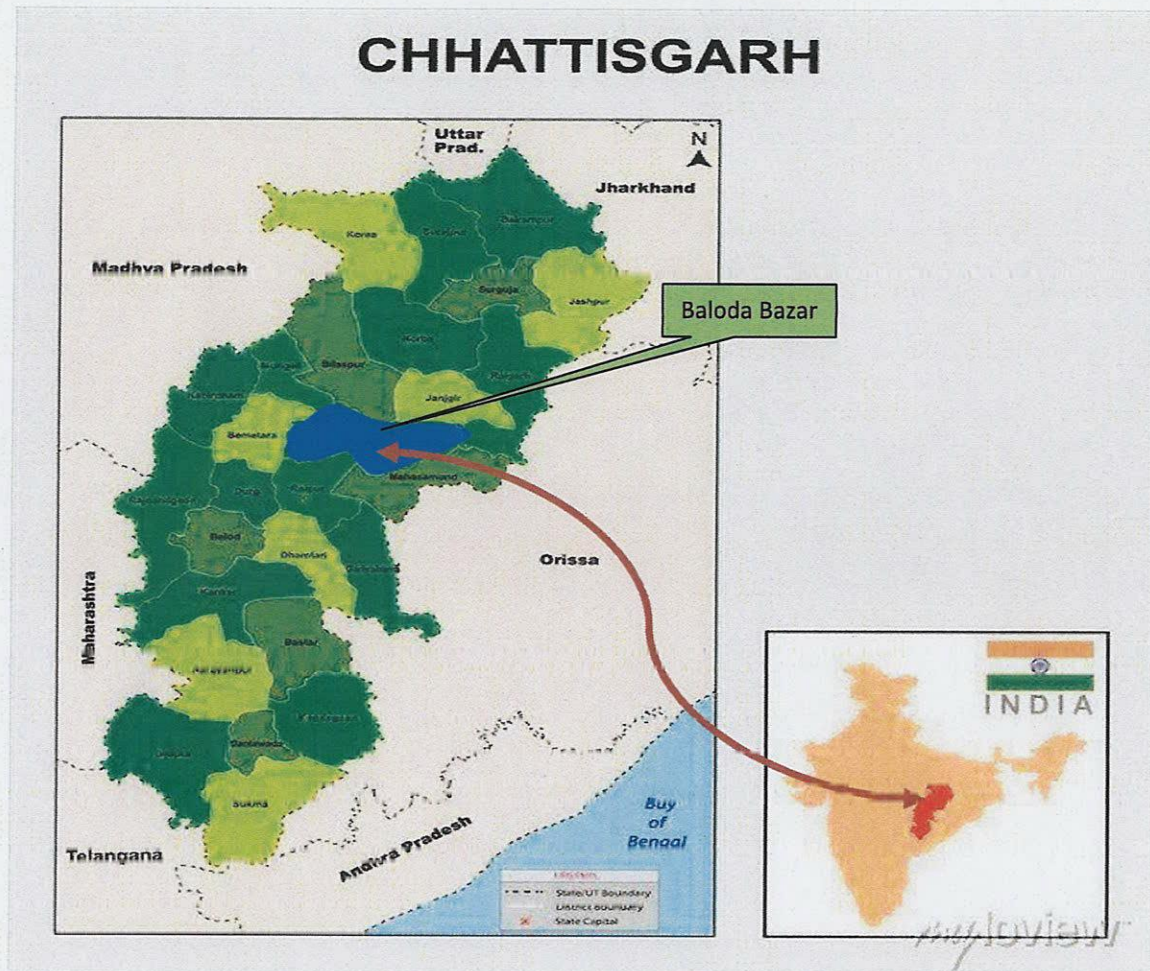
Starting with RINEX Version 2 the former two-digit satellite numbers **nn** are preceded by a one-character system identifier **s**. The same satellite system identifiers are also used in all header records when appropriate.

THE EXCHANGE OF RINEX FILES:

The original RINEX file naming convention was implemented in the MSDOS era when file names were restricted to 8.3 characters. Modern operating systems typically support 255 character file names. The goal of the new file naming convention is to be more: descriptive, flexible and extensible than the RINEX 2.11 file naming convention. All elements are fixed length and are separated by an underscore "_" except for the: file type and compression fields that uses a period "." separator. Fields must be padded with zeros to fill the field width. The file compression field is optional. In order to further reduce the size of observation files Yuki Hatanaka developed a compression scheme that takes advantage of the structure of the RINEX observation data by forming higher order differences in time between observations of the same type and satellite. This compressed file is also an ASCII file that is subsequently compressed again using the above mentioned standard compression programs.



Location Map



Compensatory Afforestation Land Survey Report of 171.4929 ha. for Development of Economic corridor, Inter Corridors, Feeder Routes and National Corridors to improve the efficiency of freight movement in India under Bharatmala Pariyojana [Lot-3/Chhattisgarh/Packge-1(Urga-Pathalgaon Section of NH-130A Raipur Dhanbad Economic Corridor)]

GPS Survey Points for CA Land

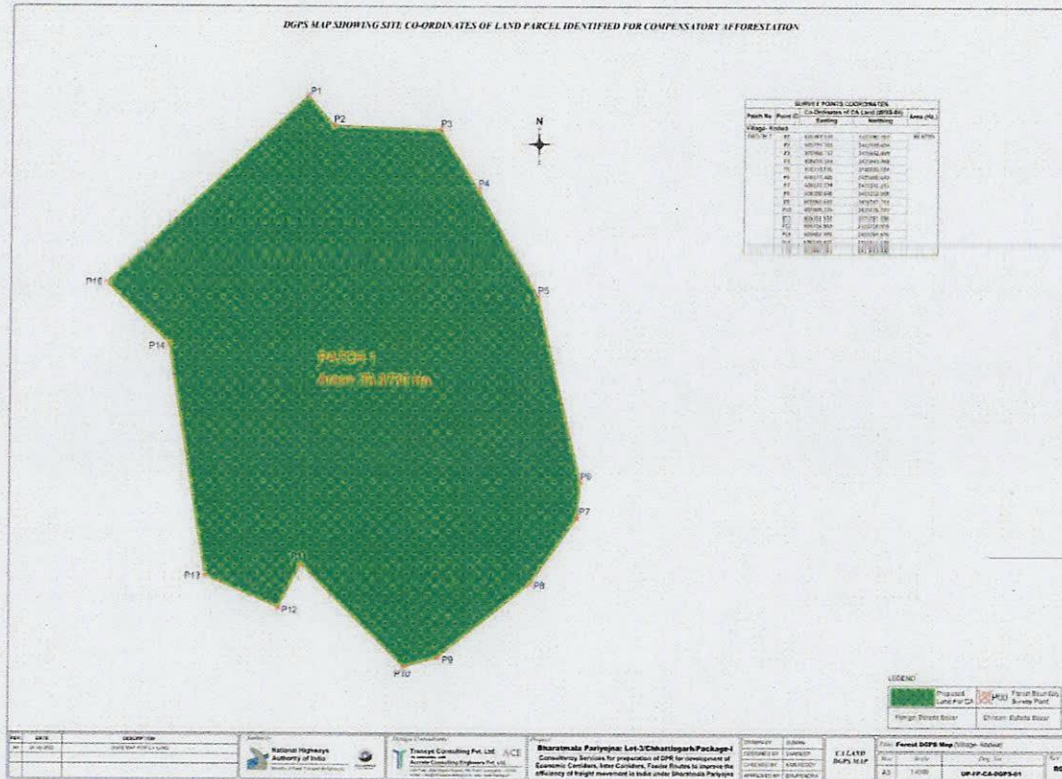
Baloda Bazar Forest division, District Baloda Bazar



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1. Village – Kodwa, Tehsil – Bhatapara, Area – 39.473 Ha.



GPS Coordinates: (Survey No.- 1643/4, Area- 39.473 ha.)

Point No.	Easting	Northing	Remark	Survey No	Area in (Ha)
P1	605757.544	2415983.254	Village- Kodwa	1643/4	39.473
P2	605797.765	2415939.034			
P3	605960.717	2415932.669			
P4	606018.584	2415843.058			
P5	606110.530	2415683.584			
P6	606177.485	2415405.643			
P7	606172.274	2415351.281			
P8	606100.846	2415252.998			
P9	605960.619	2415142.233			
P10	605909.326	2415128.293			
P11	605751.913	2415281.284			
P12	605716.869	2415216.919			
P13	605602.393	2415264.376			
P14	605544.504	2415611.138			

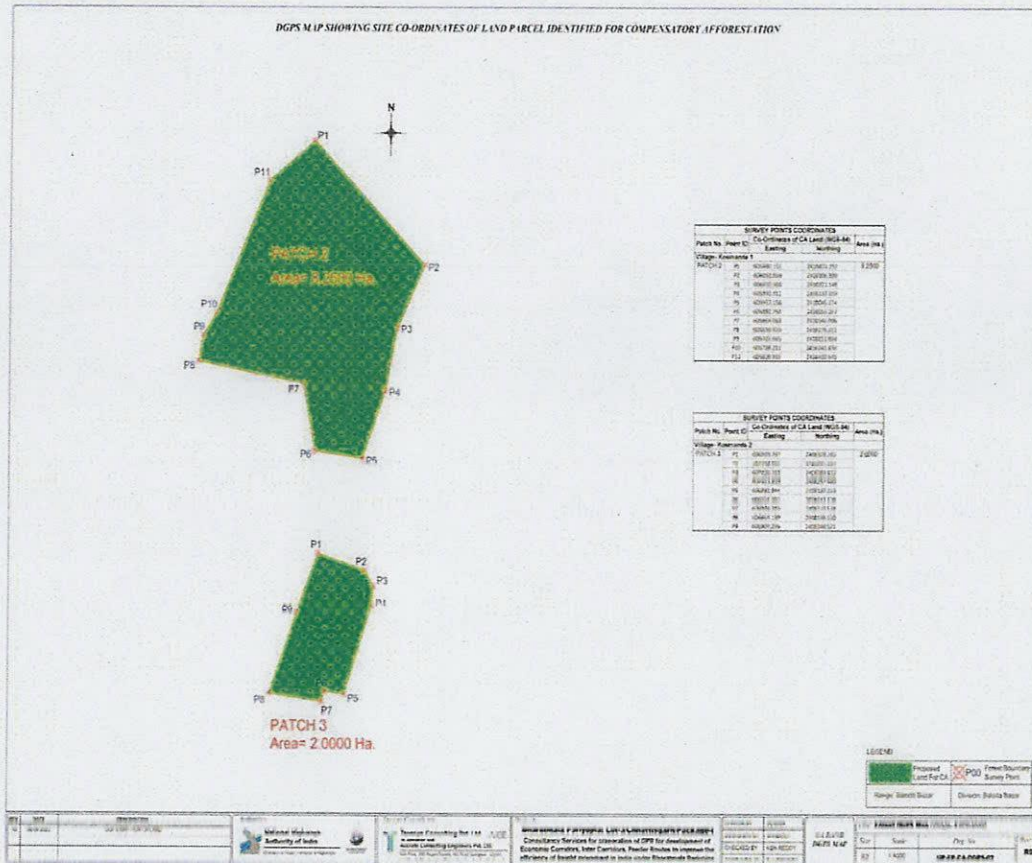


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P15	605447.665	2415703.058			
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2. Village – Kosmanda, Tehsil – Bhatapara, Area – 10.250 Ha.



GPS Coordinates: (Survey No.- 1/1, 1040/1/k/1, Area- 10.250 ha.)

Point No.	Eastings	Northing	Remark	Survey No	Area in (Ha)
P1	605880.151	2410474.197	Village-Kosmanda	1/1	8.250
P2	606053.556	2410306.399			
P3	606010.968	2410221.148			
P4	605992.911	2410137.359			
P5	605957.156	2410045.174			
P6	605882.764	2410055.057			
P7	605864.863	2410146.096			
P8	605699.970	2410176.011			
P9	605707.665	2410211.834			

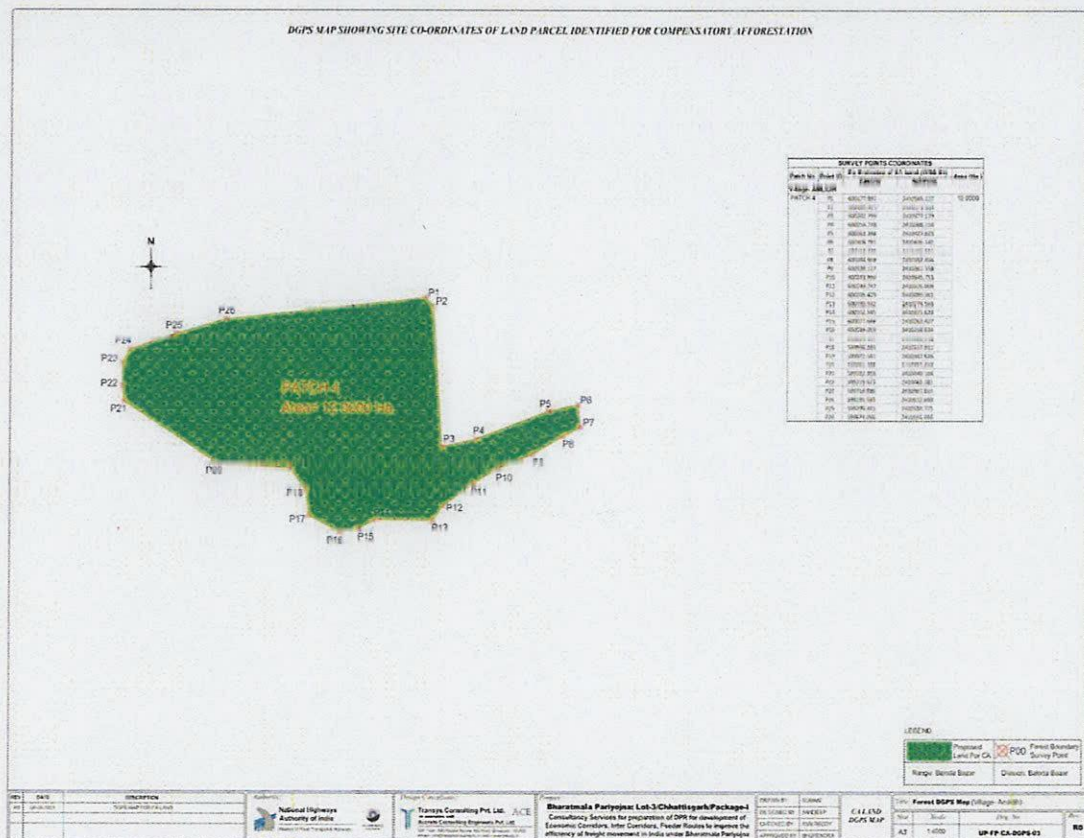


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P10	605728.211	2410241.838	Village- Kosmanda	1040/1/k/1	2.000
P11	605809.931	2410420.645			
P1	606939.797	2408328.285			
P2	607012.881	2408305.124			
P3	607026.313	2408283.837			
P4	607023.839	2408257.440			
P5	606981.944	2408137.313			
P6	606951.803	2408142.379			
P7	606946.316	2408127.574			
P8	606864.139	2408138.550			
P9	606907.276	2408248.521			

3. Village – Amlidih, Tehsil - Bhatapara, Area – 12.000 Ha.



GPS Coordinates: (Survey No.- 377, Area- 12.000 ha.)

Point No.	Easting	Northing	Remark	Survey No	Area in (Ha)
P1	600177.897	2410585.127	Village-	377	12.000



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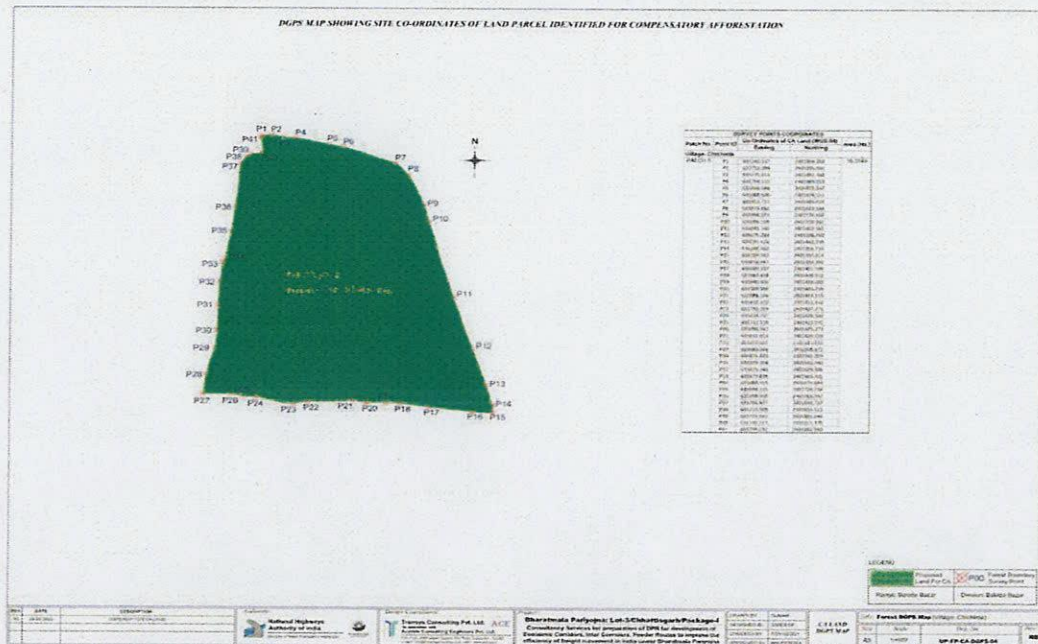
P2	600189.423	2410573.364	Kosmanda		
P3	600202.799	2410377.179			
P4	600254.748	2410388.154			
P5	600363.288	2410427.623			
P6	600406.781	2410436.142			
P7	600410.680	2410405.065			
P8	600384.968	2410392.494			
P9	600339.127	2410367.358			
P10	600283.850	2410345.753			
P11	600249.747	2410326.008			
P12	600205.420	2410295.361			
P13	600189.532	2410274.563			
P14	600102.585	2410275.623			
P15	600077.666	2410263.427			
P16	600049.018	2410258.624			
P17	600001.483	2410281.336			
P18	599996.285	2410317.911			
P19	599972.541	2410347.616			
P20	599861.488	2410354.238			
P21	599722.918	2410440.104			
P22	599719.573	2410461.381			
P23	599710.806	2410494.604			
P24	599731.533	2410512.650			
P25	599799.443	2410534.721			
P26	599874.066	2410555.016			

4. Village –Chichirda, Tehsil – Baloda Bazar, Area – 16.3149 Ha.




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CPC Coordinates: (Survey No.- 243/1, Area-10.3149 Ha.)

Point No.	Easting	Northing	Remark	Survey No	Area in (Ha.)
P1	635740.357	2401894.266	Village-Chichirda	243/1	16.3149
P2	635755.094	2401895.801			
P3	635775.214	2401891.462			
P4	635794.113	2401889.915			
P5	635846.688	2401878.557			
P6	635868.600	2401874.511			
P7	635953.717	2401845.028			
P8	635973.852	2401823.568			
P9	635998.273	2401770.166			
P10	636006.169	2401738.961			
P11	636045.340	2401602.965			
P12	636076.204	2401508.760			
P13	636097.620	2401442.759			
P14	636108.462	2401406.734			
P15	636108.363	2401392.814			
P16	636076.451	2401393.990			
P17	636009.337	2401402.598			
P18	635962.856	2401408.922			
P19	635940.820	2401410.089			
P20	635909.996	2401409.735			
P21	635888.106	2401414.115			




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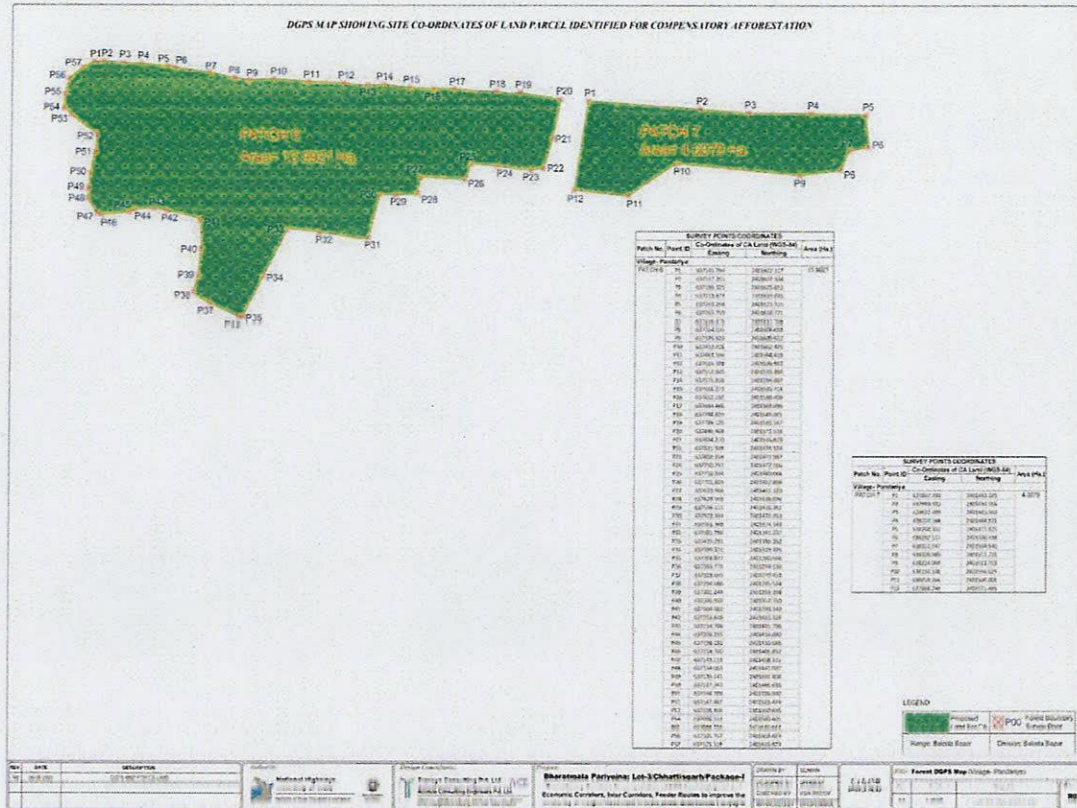
P22	635816.372	2401412.142			
P23	635793.019	2401407.776			
P24	635734.757	2401420.309			
P25	635712.310	2401421.072			
P26	635694.947	2401425.274			
P27	635651.024	2401424.728			
P28	635655.855	2401461.292			
P29	635669.008	2401508.572			
P30	635671.863	2401541.029			
P31	635674.010	2401586.480			
P32	635675.343	2401629.846			
P33	635679.836	2401663.421			
P34	635684.319	2401671.644			
P35	635693.155	2401720.744			
P36	635698.958	2401765.567			
P37	635706.877	2401843.757			
P38	635714.909	2401855.513			
P39	635723.547	2401861.069			
P40	635740.367	2401864.478			
P41	635738.231	2401890.360			

5. Village –Pandariya, Tehsil –Baloda Bazar, Area – 18.000 Ha.




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GPS Coordinates: (Survey No.- 8/1,85/1,404/1/K, Area-18.000 Ha.)

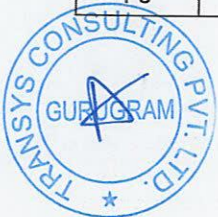
Point No.	Easting	Northing	Remark	Survey No	Area in (Ha)
P1	637141.784	2401627.117	Village-Pandariya	8/1, 85/1	13.9921
P2	637157.265	2401627.834			
P3	637185.525	2401625.812			
P4	637213.874	2401624.635			
P5	637253.264	2401621.131			
P6	637263.759	2401618.771			
P7	637316.325	2401611.798			
P8	637354.035	2401604.038			
P9	637375.923	2401600.932			
P10	637412.026	2401602.476			
P11	637463.596	2401598.418			
P12	637515.508	2401596.952			
P13	637552.045	2401593.498			
P14	637575.838	2401594.667			
P15	637616.273	2401590.718			
P16	637652.150	2401588.409			
P17	637684.466	2401588.696			



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P18	637748.859	2401584.861			
P19	637785.126	2401583.567			
P20	637846.408	2401573.516			
P21	637834.270	2401516.879			
P22	637821.349	2401474.554			
P23	637802.354	2401471.987			
P24	637750.797	2401477.566			
P25	637710.244	2401480.066			
P26	637701.824	2401457.899			
P27	637633.966	2401461.120			
P28	637629.568	2401438.096			
P29	637596.111	2401436.361			
P30	637572.364	2401435.814			
P31	637555.368	2401374.143			
P32	637481.286	2401381.237			
P33	637435.091	2401386.362			
P34	637399.331	2401319.491			
P35	637368.877	2401260.666			
P36	637363.779	2401259.536			
P37	637319.695	2401279.453			
P38	637294.686	2401295.534			
P39	637301.844	2401319.398			
P40	637305.950	2401357.350			
P41	637304.083	2401399.140			
P42	637253.848	2401413.325			
P43	637234.706	2401415.796			
P44	637206.255	2401414.680			
P45	637198.181	2401410.686			
P46	637154.700	2401406.852			
P47	637149.113	2401408.131			
P48	637134.063	2401431.007			
P49	637135.141	2401445.808			
P50	637137.747	2401466.636			
P51	637144.789	2401496.892			
P52	637147.467	2401523.474			
P53	637108.498	2401550.636			
P54	637096.933	2401560.401			
P55	637098.778	2401580.944			
P56	637105.757	2401603.424			
P57	637125.318	2401618.829			
P1	637867.393	2401443.025	Village- Pandariya	404/1/k	4.0079
P2	637949.482	2401434.956			
P3	638022.989	2401481.669			
P4	638207.566	2401464.821			
P5	638268.452	2401471.825			
P6	638282.111	2401500.438			

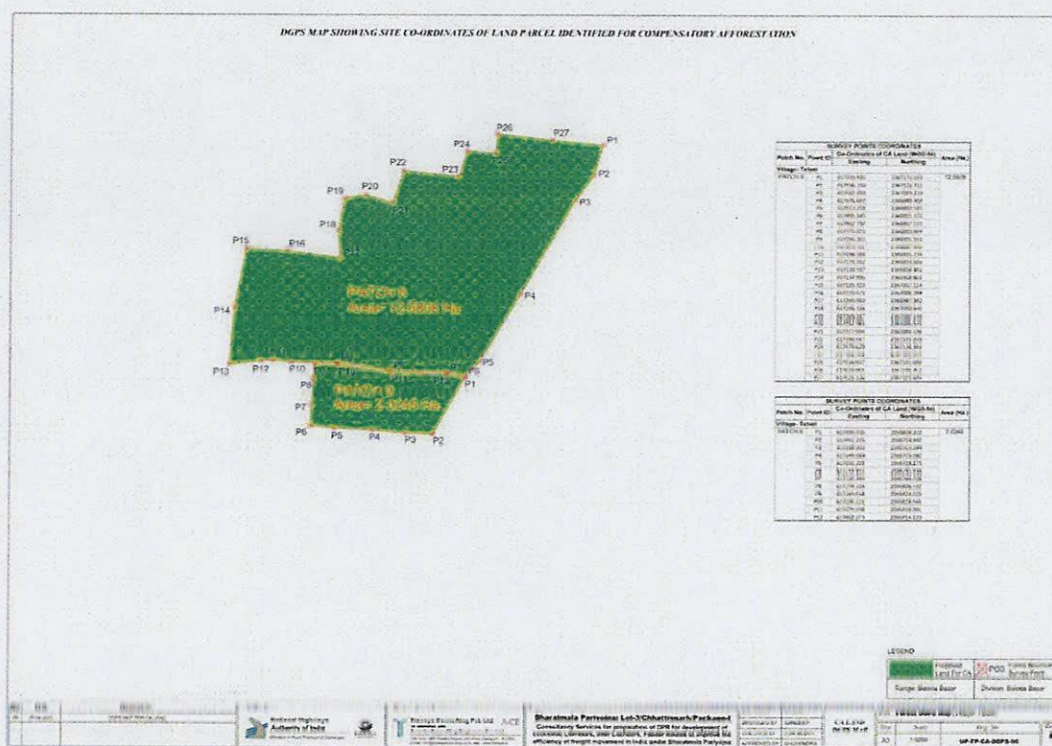


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P7	638311.047	2401504.940			
P8	638306.965	2401551.721			
P9	638224.000	2401553.753			
P10	638130.546	2401554.625			
P11	638058.266	2401560.001			
P12	637888.240	2401571.495			

6. Village – Telasi, Tehsil– Baloda Bazar, Area – 14.705 Ha.



GPS Coordinates: (Survey No.- 452, Area- 14.705 Ha.)

Point No.	Easting	Northing	Remark	Survey No	Area in (Ha)
P1	617703.995	2367176.183	Village-Telasi	452	12.6805
P2	617690.150	2367128.721			
P3	617661.493	2367089.220			
P4	617576.682	2366940.404			
P5	617513.258	2366833.585			
P6	617491.145	2366811.172			
P7	617462.732	2366817.123			
P8	617375.825	2366819.894			
P9	617296.361	2366831.563			



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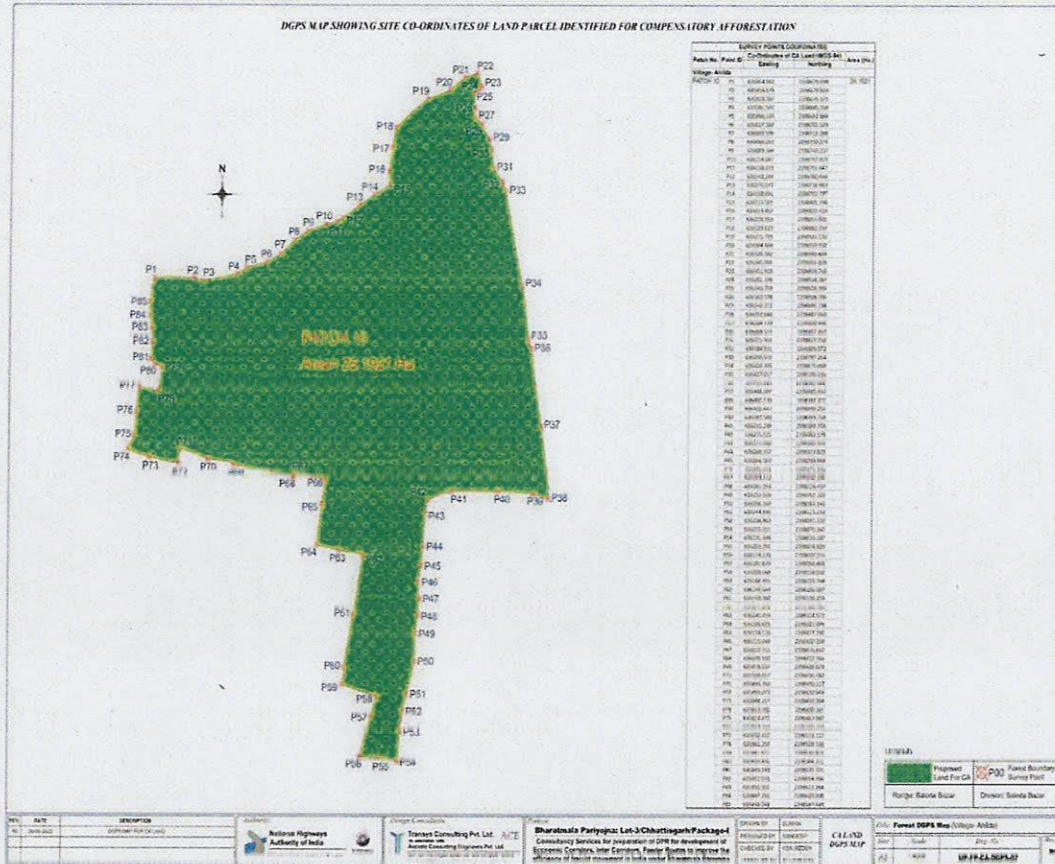
P10	617225.462	2366832.489			
P11	617198.388	2366835.734			
P12	617179.452	2366834.680			
P13	617130.557	2366828.461			
P14	617137.995	2366918.816			
P15	617155.823	2367012.114			
P16	617220.475	2367008.398			
P17	617299.060	2366997.302			
P18	617296.336	2367040.640			
P19	617305.347	2367092.144			
P20	617337.965	2367096.971			
P21	617377.994	2367084.136			
P22	617394.657	2367135.249			
P23	617479.629	2367126.363			
P24	617492.380	2367166.964			
P25	617536.977	2367162.690			
P26	617538.965	2367193.452			
P27	617625.126	2367183.673			
P1	617490.035	2366808.322	Village- Telasi	452	2.0245
P2	617441.315	2366718.842			
P3	617398.305	2366720.394			
P4	617349.033	2366725.082			
P5	617291.222	2366728.175			
P6	617253.911	2366731.539			
P7	617256.395	2366766.038			
P8	617259.103	2366806.532			
P9	617260.638	2366829.029			
P10	617296.122	2366828.565			
P11	617375.558	2366816.901			
P12	617462.373	2366814.133			

7. Village – Ahilda, Tehsil – Baloda Bazar, Area – 25.1921 Ha.



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GPS Coordinates: (Survey No.- 87/1/k, Area-25.1921 Ha.)

Point No.	Easting	Northing	Remark	Survey No	Area in (Ha)
P1	635854.942	2398679.699	Village- Ahilda	87/1/k	25.1921
P2	635916.175	2398679.624			
P3	635928.787	2398676.372			
P4	635981.502	2398685.569			
P5	635996.124	2398693.869			
P6	636027.282	2398701.529			
P7	636048.509	2398712.288			
P8	636069.042	2398730.279			
P9	636089.304	2398743.257			
P10	636118.047	2398752.419			
P11	636134.273	2398755.647			
P12	636143.244	2398760.446			
P13	636170.077	2398778.983			
P14	636192.691	2398792.797			
P15	636215.561	2398805.194			



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P16	636213.853	2398823.424
P17	636218.053	2398855.901
P18	636223.625	2398882.953
P19	636270.725	2398921.130
P20	636304.463	2398933.332
P21	636326.560	2398949.834
P22	636345.095	2398955.828
P23	636351.918	2398938.765
P24	636351.198	2398934.787
P25	636340.758	2398928.389
P26	636342.598	2398908.796
P27	636342.211	2398895.198
P28	636352.648	2398887.668
P29	636364.710	2398866.465
P30	636368.515	2398852.457
P31	636371.461	2398827.250
P32	636384.931	2398809.872
P33	636390.572	2398797.254
P34	636416.705	2398670.669
P35	636427.017	2398598.236
P36	636431.513	2398585.681
P37	636448.007	2398480.933
P38	636460.170	2398383.720
P39	636435.447	2398390.256
P40	636382.580	2398393.750
P41	636310.289	2398393.758
P42	636275.521	2398382.178
P43	636271.486	2398362.935
P44	636268.357	2398319.823
P45	636266.063	2398293.848
P46	636261.651	2398271.103
P47	636263.312	2398249.106
P48	636261.353	2398226.437
P49	636257.039	2398202.320
P50	636256.367	2398165.140
P51	636244.892	2398121.233
P52	636238.803	2398097.722
P53	636235.011	2398070.342
P54	636231.484	2398030.187
P55	636203.291	2398034.829
P56	636174.135	2398037.310
P57	636191.679	2398092.858
P58	636200.069	2398118.050
P59	636146.455	2398133.769
P60	636149.644	2398156.587
P61	636163.382	2398228.259




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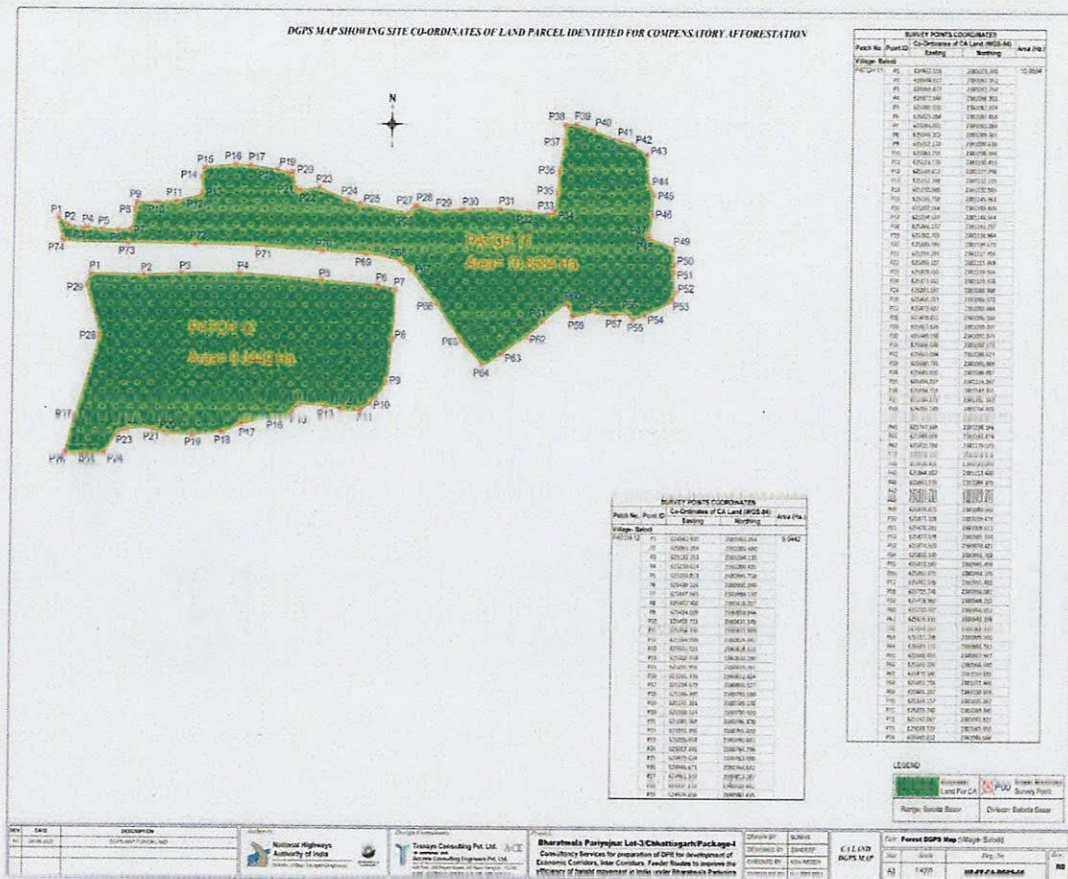
P62	636177.663	2398308.381			
P63	636140.418	2398314.672			
P64	636106.625	2398321.076			
P65	636114.536	2398377.192			
P66	636120.049	2398410.238			
P67	636072.715	2398416.842			
P68	636070.183	2398412.765			
P69	635978.537	2398428.673			
P70	635938.557	2398436.482			
P71	635895.760	2398450.122			
P72	635893.072	2398430.649			
P73	635848.357	2398439.364			
P74	635813.781	2398450.161			
P75	635824.671	2398467.987			
P76	635827.703	2398500.129			
P77	635832.437	2398533.112			
P78	635861.203	2398528.336			
P79	635867.631	2398559.876			
P80	635855.851	2398564.221			
P81	635849.143	2398570.771			
P82	635852.035	2398544.405			
P83	635850.501	2398613.284			
P84	635847.731	2398629.008			
P85	635848.048	2398647.849			

8. Village – Balodi, Tehsil – Baloda Bazar, Area – 19.9026 Ha.




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GPS Coordinates: (Survey No.- 586/1, Area- 19.9026 Ha.)

Point No.	Easting	Northing	Remark	Survey No	Area in (Ha)
P1	624932.518	2381078.280	Village- Balodi	586/1	10.8584
P2	624948.017	2381067.951			
P3	624969.877	2381063.750			
P4	624977.044	2381065.392			
P5	625000.510	2381061.124			
P6	625023.264	2381061.453			
P7	625044.001	2381063.080			
P8	625049.302	2381089.381			
P9	625052.270	2381098.636			
P10	625082.155	2381098.394			
P11	625113.135	2381100.415			
P12	625149.612	2381107.796			
P13	625152.748	2381112.135			
P14	625150.966	2381132.545			
P15	625155.759	2381145.963			



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P16	625202.164	2381149.449			
P17	625224.527	2381148.564			
P18	625266.277	2381143.237			
P19	625282.703	2381138.864			
P20	625289.799	2381139.670			
P21	625294.284	2381117.704			
P22	625299.107	2381115.969			
P23	625329.455	2381119.916			
P24	625371.661	2381103.958			
P25	625391.587	2381098.369			
P26	625466.223	2381086.579			
P27	625473.637	2381095.684			
P28	625478.851	2381096.160			
P29	625507.626	2381090.297			
P30	625549.188	2381092.373			
P31	625606.046	2381092.573			
P32	625651.094	2381088.627			
P33	625680.791	2381085.889			
P34	625689.830	2381086.887			
P35	625694.037	2381115.267			
P36	625696.319	2381143.355			
P37	625704.273	2381182.343			
P38	625705.148	2381204.935			
P39	625721.971	2381205.279			
P40	625717.569	2381150.100			
P41	625789.059	2381183.874			
P42	625810.784	2381179.079			
P43	625833.153	2381166.346			
P44	625836.452	2381125.070			
P45	625844.062	2381113.400			
P46	625842.529	2381084.976			
P47	625835.793	2381058.097			
P48	625837.840	2381053.872			
P49	625874.825	2381040.566			
P50	625877.108	2381019.474			
P51	625876.281	2381008.611			
P52	625877.978	2380981.334			
P53	625874.355	2380970.421			
P54	625832.340	2380951.768			
P55	625813.583	2380945.498			
P56	625803.575	2380954.105			
P57	625782.506	2380951.482			
P58	625755.746	2380956.081			
P59	625718.960	2380948.232			
P60	625710.707	2380966.652			
P61	625673.555	2380942.256			



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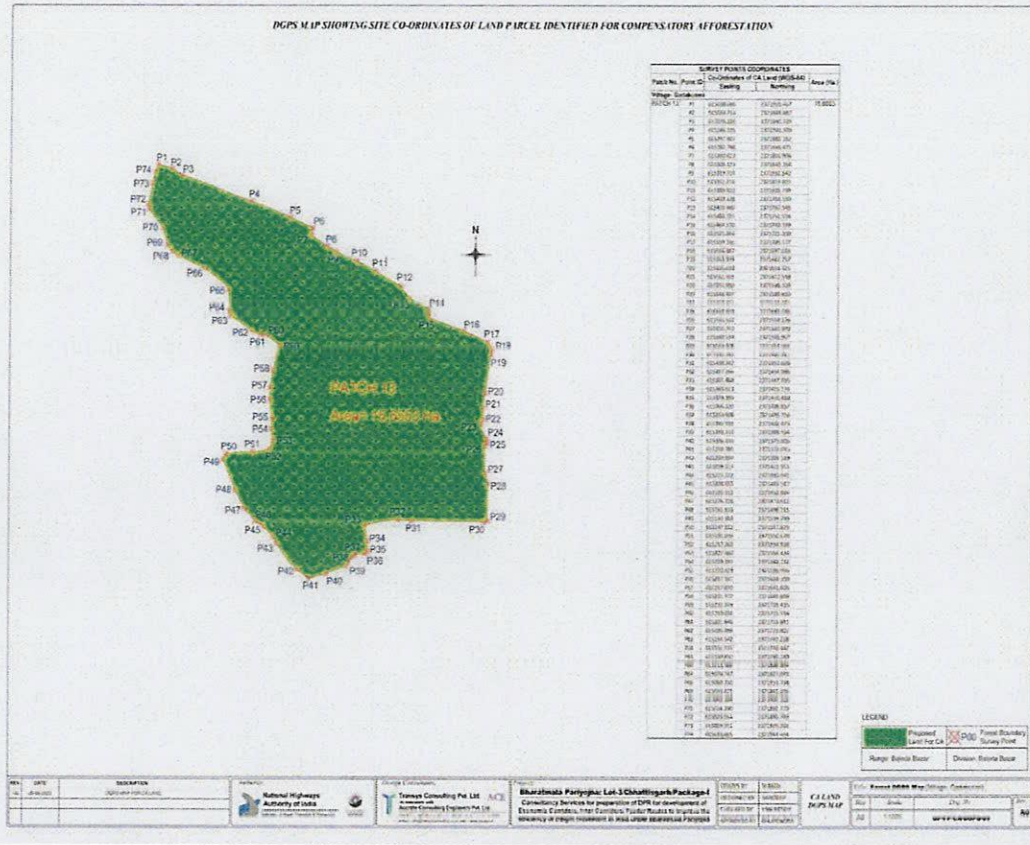
P62	625649.323	2380922.136			
P63	625611.298	2380899.348			
P64	625581.115	2380885.232			
P65	625548.433	2380917.947			
P66	625509.220	2380966.590			
P67	625470.346	2381010.689			
P68	625453.758	2381022.466			
P69	625401.287	2381030.939			
P70	625334.157	2381035.262			
P71	625235.740	2381040.345			
P72	625142.067	2381042.821			
P73	625039.739	2381043.950			
P74	624940.012	2381046.668			
P1	624982.935	2381003.054	Village- Balodi	586/1	9.0442
P2	625063.204	2381001.680			
P3	625122.753	2381004.135			
P4	625210.614	2381004.435			
P5	625333.813	2380995.758			
P6	625420.121	2380990.340			
P7	625447.665	2380984.170			
P8	625442.900	2380918.037			
P9	625434.009	2380859.844			
P10	625409.711	2380831.345			
P11	625394.730	2380822.989			
P12	625364.999	2380824.447			
P13	625341.221	2380828.503			
P14	625302.458	2380830.290			
P15	625291.956	2380819.761			
P16	625261.336	2380812.824			
P17	625214.679	2380803.527			
P18	625186.390	2380792.590			
P19	625141.191	2380789.178			
P20	625100.123	2380790.420			
P21	625081.361	2380795.870			
P22	625042.195	2380795.892			
P23	625026.918	2380790.883			
P24	625007.246	2380764.796			
P25	624979.624	2380763.098			
P26	624946.671	2380764.643			
P27	624961.333	2380813.287			
P28	624997.219	2380920.812			
P29	624976.856	2380987.455			



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9. Village-Gadakusmi, Tehsil-Baloda Bazar, Area-15.6553 Ha.



GPS Coordinates: (Survey No.- 24/1, Area-15.6553 Ha.)

Point No.	Eastings	Northing	Remark	Survey No	Area in (Ha)
P1	615038.686	2371955.467	Village-Gadakusmi	24/1	15.6553
P2	615060.754	2371948.887			
P3	615076.126	2371940.729			
P4	615186.235	2371903.300			
P5	615247.807	2371881.162			
P6	615282.798	2371866.471			
P7	615280.623	2371855.906			
P8	615304.423	2371840.264			
P9	615319.714	2371832.542			
P10	615351.216	2371819.803			
P11	615380.920	2371805.799			
P12	615420.138	2371784.180			
P13	615433.460	2371767.545			
P14	615464.725	2371751.594			

P15	615464.510	2371740.199			
P16	615521.266	2371721.200			
P17	615559.246	2371705.177			
P18	615566.662	2371697.018			
P19	615563.939	2371687.757			
P20	615555.033	2371634.425			
P21	615551.401	2371612.548			
P22	615551.900	2371596.109			
P23	615548.487	2371589.850			
P24	615558.268	2371569.255			
P25	615558.404	2371563.485			
P26	615555.532	2371559.336			
P27	615555.762	2371520.970			
P28	615560.534	2371505.907			
P29	615560.208	2371454.055			
P30	615553.543	2371451.911			
P31	615438.342	2371453.606			
P32	615417.266	2371454.996			
P33	615365.464	2371447.855			
P34	615369.613	2371425.133			
P35	615370.395	2371410.460			
P36	615366.120	2371406.857			
P37	615350.908	2371405.756			
P38	615345.928	2371402.473			
P39	615338.114	2371389.594			
P40	615306.430	2371379.005			
P41	615278.785	2371372.035			
P42	615259.997	2371385.189			
P43	615228.515	2371421.951			
P44	615223.222	2371430.941			
P45	615208.655	2371445.517			
P46	615195.312	2371452.864			
P47	615176.726	2371470.612			
P48	615162.810	2371496.215			
P49	615143.303	2371539.789			
P50	615147.832	2371547.875			
P51	615191.039	2371550.678			
P52	615217.263	2371554.538			
P53	615222.460	2371566.424			
P54	615219.197	2371583.232			
P55	615220.923	2371596.996			
P56	615217.187	2371624.100			
P57	615217.870	2371641.605			
P58	615221.972	2371665.898			
P59	615232.378	2371701.435			
P60	615210.031	2371715.556			

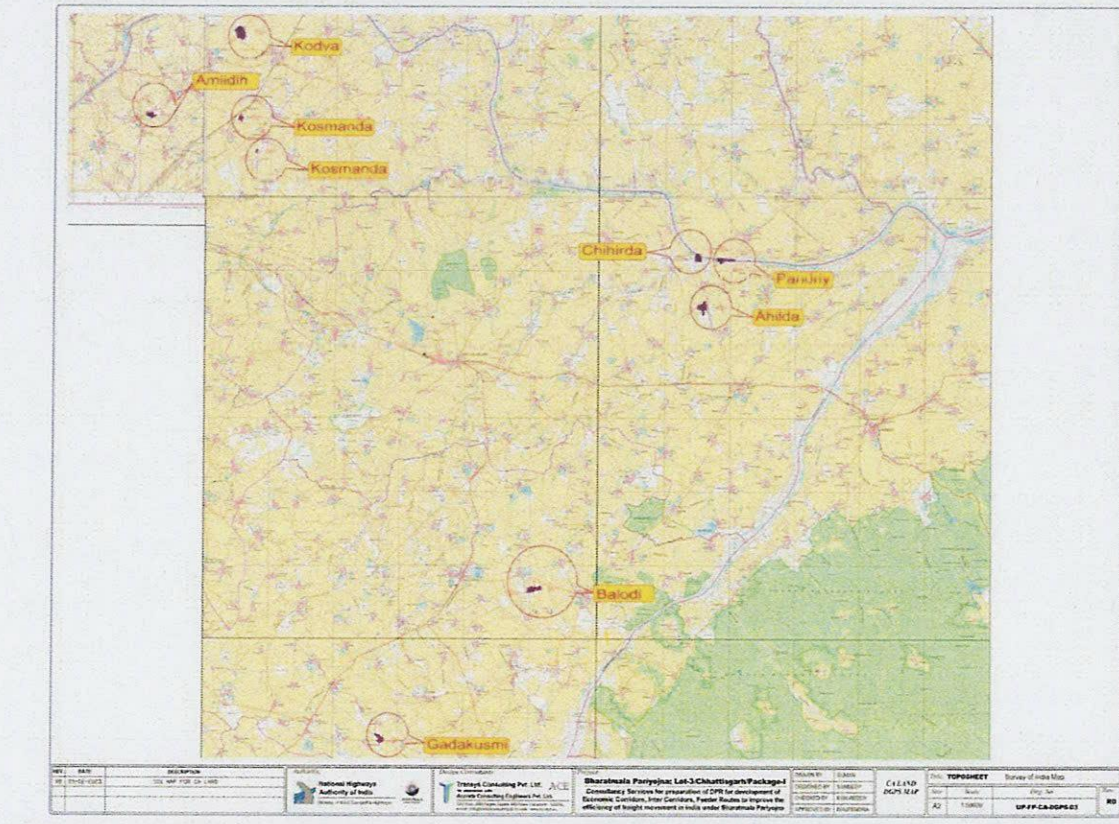


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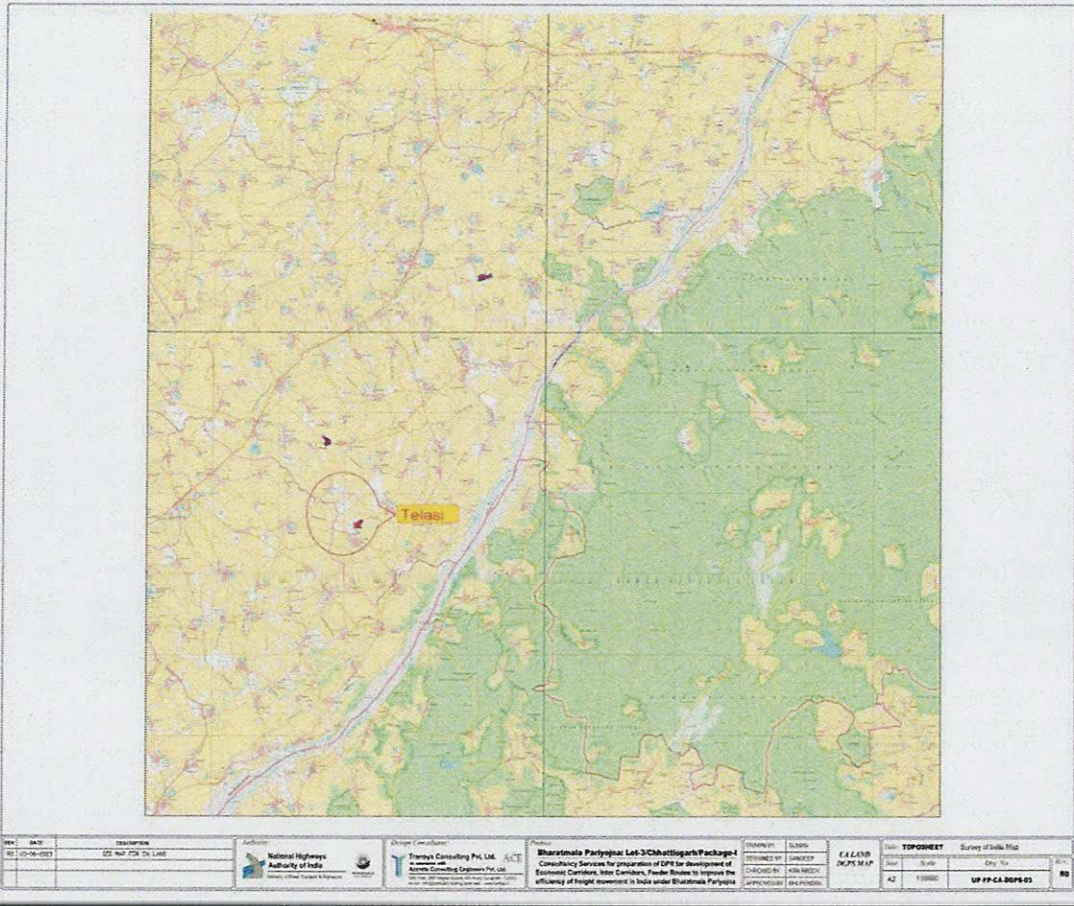
P61	615201.846	2371715.841			
P62	615186.498	2371721.801			
P63	615154.542	2371742.238			
P64	615152.239	2371748.447			
P65	615150.850	2371780.180			
P66	615113.502	2371808.884			
P67	615070.747	2371827.073			
P68	615060.730	2371833.358			
P69	615053.821	2371841.205			
P70	615045.984	2371867.102			
P71	615024.190	2371892.770			
P72	615023.054	2371899.749			
P73	615029.951	2371929.202			
P74	615033.665	2371944.464			

Survey of India Map



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