

DGPS SURVEY REPORT

FOR

**(WIDENING & UPGRADING TO 2/4 LANE WITH PAVED SHOULDER
OF NH-930 , from DHANORA TO KOHKA IN THE STATE
OF CHHATTISGARH.)
(Approximate Length of 85 km)**

RAJNANDGAON FOREST DIVISION

AREA : 46.9548 Hect.



Report Prepared by.
SAN SURVEY ENGINEERING
HOOGLY (W.B.)
& S S ENGINEERING SOLUTIONS
RAIPUR (CHHATTISGARH)

Submitted by
Executive Engineer
PWD , NH Division No. 1
Raipur (Chhattisgarh)

To,
Divisional Forest Officer
Rajnandgaon Forest Division
Rajnandgaon (Chhattisgarh)

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
 - improve 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.

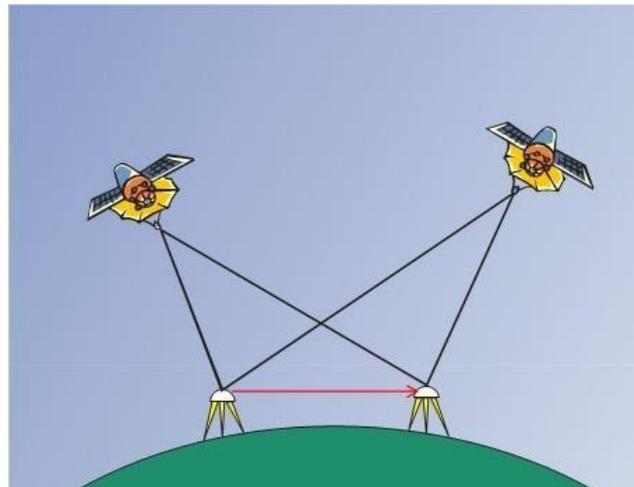
In the case of the road survey van (top right), users can measure the amount of road wear and judge whether the road should be resurfaced just

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, OmniSTAR
- 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 - OmniSTAR, 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 pseudorange (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 stationrelated 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

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 center 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.

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 (and other

biases, such as atmospheric delays): $PR = \text{distance} + c * (\text{receiver clock offset} - \text{satellite clock offset} + \text{other biases})$

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 halfcycles 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

quantities phase / pseudo-range / epoch must be maintained, i.e. the receiver clock correction should be applied to all 3 observables:

$$1 \text{ Time (corr)} = \text{Time}(r) - dT(r)$$

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

$$\text{(corr)} = \text{phase}(r) - dT(r) * \text{freq}$$

Doppler:

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

Satellite numbers:

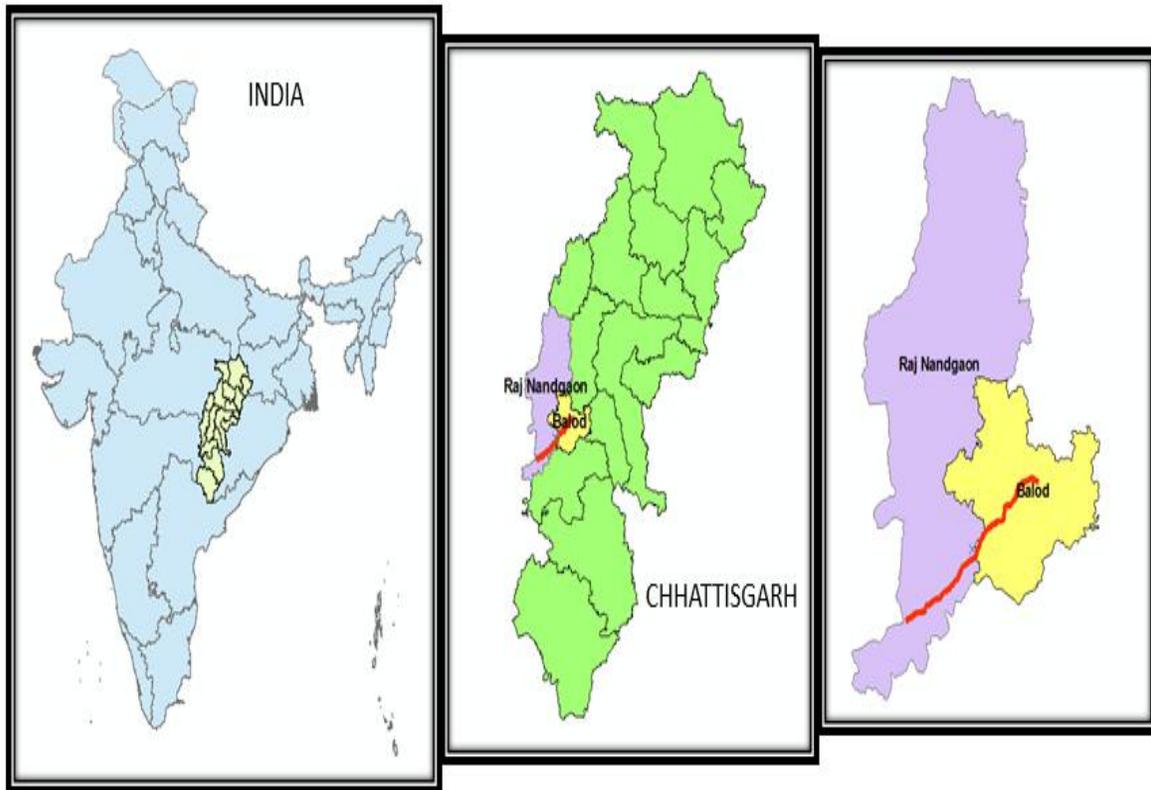
Starting with RINEX Version 2 the former two-digit satellite numbers **nn** are preceded by a one-character system identifier **s**. The same satellite system identifiers are also used in all header records when appropriate.

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

**(WIDENING & UPGRADING TO 2/4 LANE WITH PAVED SHOULDER OF NH-930 ,
from DHANORA TO KOHKA IN THE STATE OF CHHATTISGARH.)**

Location Plan



**(REHABILITATION & UPGRADATION TO 2/4 LANE WITH PAVED SHOULDER OF NH-930 , from
JHALMALA-BALOD-KUSUMKASA-MANPUR-KOHKA IN THE STATE OF CHATTISGARH.)**

DETAILS OF FOREST LAND

Sr. No.	FOREST	FOREST	District	Village	COMPART	R.F./P.F.	AREA
	DIVISION	RANGE			MENT		(HECT.)
					NO.		
1	Rajnandgaon	Manpur	Rajnandgaon	Dorba	P526	PF	1.67564
2				Ghodagaon	544	RF	4.69248
3				Adjal	545	RF	2.44194
4				Umarpal Tiju	546	RF	4.3337
5				Tumdikasa	918	RF	2.09033
6				Manpur	919	RF	3.04107
7				Manpur	924	RF	3.88287
8				Khairakata	926	RF	3.56241
9				Kohaka	941	RF	6.28918
10				Kande	942	RF	0.20816
11				Kande	942	RF	0.22275
12				Kande	942	RF	2.2417
13				Kande	P943	PF	4.18134
14				Kande	P944	PF	2.43589
15				Kande	P944	PF	0.01182
16				Kande	P947	PF	0.09253
17				Khairakata	P949	PF	4.48153
18				Manpur	950	RF	0.11268
19				Manpur	950	RF	0.86578
						Total	46.86380

DETAILS OF REVENUE FOREST LAND

Sr. No.	District	Tehsil	Village	Khasra No.	Area(Hect.)
1.	Rajnandgaon	Mohla	Bitejhar	212	0.091
				Total	0.091

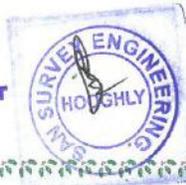
Reserve Forest : 33.98505

Protected Forest : 12.87875

Revenue Forest : 0.091

Total Forest Area : 46.95480 Ha.

[Signature]
Executive Engineer
NH Dn. 1, PWD, Raipur
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[Signature]
Divisional Manager
Nuberas Project Dn.
Rajnandgaon (C.G.)

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Divisional Manager
Nuberas Project Dn.
Rajnandgaon (C.G.)

[Signature]
परियोजना परिक्षेत्र अधिकारी
उत्तर मणपुर

परियोजना परिक्षेत्र अधिकारी
पानावरस परियोजना
परिक्षेत्र सिम्पी

[Signature]
उप वन भंडालाधिकारी
मणपुर

[Signature]
वन परिक्षेत्र अधिकारी
उत्तर मणपुर

COORDINATE LIST

(WIDENING & UPGRADING TO 2/4 LANE WITH PAVED SHOULDER OF NH-930 ,
from DHANORA TO KOHKA IN THE STATE OF CHHATTISGARH.)

Rajnandgaon Forest Division **Manpur Range**

Date of Survey Dec. 11th to 17th 2016 Time 10:30 to 17:12

BASE STATION POINT

S.No.	Pillar ID	LONGITUDE_DMS	LATTITUDE_DMS
1	BS 1	E80°39'36.28"	N20°20'36.59"
2	BS 2	E80°44'14.33"	N20°22'30.92"
3	BS 3	E80°50'54.72"	N20°26'07.92"
4	BS 4	E80°51'32.20"	N20°26'35.81"
5	BS 5	E80°55'18.55"	N20°29'46.43"

DGPS SURVEY POINTS

Point#	Latitude (DMS)	Longitude (DMS)	Description
1	N20°22'29.99"	E80°44'08.74"	AL1
2	N20°26'21.36"	E80°51'12.92"	AL1
3	N20°25'44.97"	E80°50'23.67"	AL10
4	N20°25'40.93"	E80°50'18.21"	AL11
5	N20°25'33.00"	E80°50'07.51"	AL12
6	N20°25'28.93"	E80°50'02.00"	AL13
7	N20°26'17.28"	E80°51'07.46"	AL2
8	N20°26'13.21"	E80°51'02.01"	AL3
9	N20°26'09.18"	E80°50'56.54"	AL4
10	N20°26'05.15"	E80°50'50.99"	AL5
11	N20°26'01.08"	E80°50'45.41"	AL6
12	N20°25'57.03"	E80°50'39.91"	AL7
13	N20°25'53.09"	E80°50'34.60"	AL8
14	N20°25'49.15"	E80°50'29.29"	AL9
15	N20°26'26.27"	E80°51'18.18"	AR1

16	N20°25'57.63"	E80°50'39.38"	AR8
17	N20°25'49.15"	E80°50'29.29"	AL9
18	N20°25'53.70"	E80°50'34.09"	AR9
19	N20°25'44.97"	E80°50'23.67"	AL10
20	N20°25'49.72"	E80°50'28.73"	AR10
21	N20°25'40.93"	E80°50'18.21"	AL11
22	N20°25'45.58"	E80°50'23.16"	AR11
23	N20°25'33.00"	E80°50'07.51"	AL12
24	N20°25'41.57"	E80°50'17.76"	AR12
25	N20°25'28.93"	E80°50'02.00"	AL13
26	N20°25'33.67"	E80°50'07.07"	AR13
27	N20°25'29.54"	E80°50'01.49"	AR14
28	N20°20'36.59"	E80°39'36.28"	BS
29	N20°29'57.10"	E80°55'40.29"	KL1
30	N20°29'54.19"	E80°55'34.21"	KL2
31	N20°29'54.89"	E80°55'33.85"	KR2
32	N20°29'51.18"	E80°55'27.98"	KL3
33	N20°29'51.87"	E80°55'27.60"	KR3
34	N20°29'48.03"	E80°55'21.87"	KL4
35	N20°29'48.70"	E80°55'21.44"	KR4
36	N20°29'46.52"	E80°55'18.96"	KL5
37	N20°29'47.21"	E80°55'18.56"	KR5
38	N20°27'23.71"	E80°52'15.90"	KL6
39	N20°27'24.09"	E80°52'15.18"	KR6
40	N20°27'21.30"	E80°52'14.65"	KL7
41	N20°27'21.59"	E80°52'13.89"	KR7
42	N20°27'15.50"	E80°52'11.32"	KL8
43	N20°27'15.88"	E80°52'10.59"	KR8
44	N20°27'09.81"	E80°52'07.57"	KL9
45	N20°27'10.14"	E80°52'06.82"	KR9
46	N20°27'04.16"	E80°52'04.00"	KL10
47	N20°27'04.60"	E80°52'03.32"	KR10
48	N20°26'58.56"	E80°52'00.59"	KL11
49	N20°26'58.94"	E80°51'59.87"	KR11
50	N20°26'54.40"	E80°51'55.60"	KL12
51	N20°26'51.03"	E80°51'49.41"	KR12
52	N20°26'50.45"	E80°51'49.96"	KL13
53	N20°26'55.03"	E80°51'55.12"	KR13
54	N20°26'45.58"	E80°51'45.44"	KL14
55	N20°26'46.17"	E80°51'44.88"	KR14
56	N20°26'41.51"	E80°51'40.04"	KL15

57	N20°26'42.13"	E80°51'39.52"	KR15
58	N20°26'37.41"	E80°51'34.56"	KL16
59	N20°26'38.03"	E80°51'34.04"	KR16
60	N20°26'36.09"	E80°51'32.77"	KL17
61	N20°26'36.73"	E80°51'32.29"	KR17
62	N20°22'03.15"	E80°43'15.56"	ML1
63	N20°21'59.87"	E80°43'12.51"	MR1
64	N20°21'53.97"	E80°43'08.72"	MR2
65	N20°21'53.56"	E80°43'09.43"	ML3
66	N20°21'48.45"	E80°43'05.17"	MR3
67	N20°21'48.05"	E80°43'05.88"	ML4
68	N20°21'42.83"	E80°43'01.56"	MR4
69	N20°21'42.46"	E80°43'02.29"	ML5
70	N20°21'37.21"	E80°42'57.95"	MR5
71	N20°21'36.81"	E80°42'58.66"	ML6
72	N20°21'31.80"	E80°42'54.42"	MR6
73	N20°21'31.37"	E80°42'55.10"	ML7
74	N20°21'29.02"	E80°42'51.69"	MR7
75	N20°21'28.37"	E80°42'52.16"	ML8
76	N20°21'25.20"	E80°42'42.97"	MR8
77	N20°21'24.48"	E80°42'43.29"	ML9
78	N20°21'21.34"	E80°42'37.23"	MR9
79	N20°21'20.79"	E80°42'37.82"	ML10
80	N20°21'18.14"	E80°42'29.05"	MR10
81	N20°21'17.40"	E80°42'29.00"	ML11
82	N20°21'18.57"	E80°42'15.31"	MR11
83	N20°21'17.79"	E80°42'15.23"	ML12
84	N20°21'18.66"	E80°42'11.38"	MR12
85	N20°21'17.88"	E80°42'11.39"	ML13
86	N20°21'18.47"	E80°42'04.29"	MR13
87	N20°21'17.70"	E80°42'04.44"	ML14
88	N20°21'17.19"	E80°41'57.39"	MR14
89	N20°21'16.42"	E80°41'57.58"	ML15
90	N20°21'15.95"	E80°41'50.83"	MR15
91	N20°21'15.18"	E80°41'50.99"	ML16
92	N20°21'14.95"	E80°41'45.51"	MR16
93	N20°21'14.18"	E80°41'45.68"	ML17
94	N20°21'12.06"	E80°41'30.21"	MR17
95	N20°21'11.29"	E80°41'30.35"	ML18
96	N20°21'10.79"	E80°41'23.50"	MR18
97	N20°21'10.03"	E80°41'23.66"	ML19

98	N20°21'07.82"	E80°40'49.24"	MR19
99	N20°21'07.04"	E80°40'49.26"	ML20
100	N20°21'07.31"	E80°40'42.28"	MR20
101	N20°21'06.55"	E80°40'42.49"	ML21
102	N20°21'05.79"	E80°40'35.62"	MR21
103	N20°21'05.05"	E80°40'35.87"	ML22
104	N20°21'04.06"	E80°40'28.81"	MR22
105	N20°21'03.31"	E80°40'29.04"	ML23
106	N20°21'02.34"	E80°40'22.06"	MR23
107	N20°21'01.60"	E80°40'22.31"	ML24
108	N20°21'00.59"	E80°40'15.23"	MR24
109	N20°20'59.86"	E80°40'15.52"	ML25
110	N20°20'57.83"	E80°40'09.30"	MR25
111	N20°20'57.20"	E80°40'09.78"	ML26
112	N20°20'54.13"	E80°40'03.32"	MR26
113	N20°20'53.49"	E80°40'03.79"	ML27
114	N20°20'50.53"	E80°39'57.50"	MR27
115	N20°20'49.86"	E80°39'57.93"	ML28
116	N20°20'46.96"	E80°39'51.72"	MR28
117	N20°20'46.29"	E80°39'52.17"	ML29
118	N20°20'43.32"	E80°39'45.85"	MR29
119	N20°20'42.65"	E80°39'46.28"	ML30
120	N20°20'39.86"	E80°39'40.26"	MR30
121	N20°20'39.20"	E80°39'40.71"	ML31
122	N20°20'36.23"	E80°39'34.40"	MR31
123	N20°20'35.59"	E80°39'34.87"	ML32
124	N20°20'32.66"	E80°39'28.63"	MR32
125	N20°20'32.00"	E80°39'29.06"	ML33
126	N20°20'29.06"	E80°39'22.81"	MR33
127	N20°20'28.43"	E80°39'23.31"	ML34
128	N20°20'25.97"	E80°39'16.81"	MR34
129	N20°20'25.25"	E80°39'17.11"	ML35
130	N20°20'23.69"	E80°39'10.30"	MR35
131	N20°20'22.97"	E80°39'10.60"	ML36
132	N20°20'21.43"	E80°39'03.82"	MR36
133	N20°20'20.71"	E80°39'04.14"	ML37
134	N20°20'19.11"	E80°38'57.17"	MR37
135	N20°20'18.37"	E80°38'57.43"	ML38
136	N20°20'16.88"	E80°38'50.80"	MR38
137	N20°20'16.19"	E80°38'51.10"	ML39
138	N20°20'14.27"	E80°38'43.34"	MR39

139	N20°20'13.56"	E80°38'43.58"	ML40
140	N20°20'12.38"	E80°38'37.95"	MR40
141	N20°20'11.64"	E80°38'38.14"	ML41
142	N20°20'10.09"	E80°38'31.40"	MR41
143	N20°20'09.37"	E80°38'31.67"	ML42
144	N20°20'07.81"	E80°38'24.85"	MR42
145	N20°20'07.08"	E80°38'25.16"	ML43
146	N20°20'05.15"	E80°38'17.25"	MR43
147	N20°20'04.41"	E80°38'17.51"	ML44
148	N20°20'02.69"	E80°38'10.24"	MR44
149	N20°20'01.96"	E80°38'10.50"	ML45
150	N20°20'00.23"	E80°38'03.18"	MR45
151	N20°19'55.92"	E80°37'58.10"	MR46
152	N20°19'52.34"	E80°37'53.04"	MR47
153	N20°19'50.27"	E80°37'46.75"	MR48
154	N20°23'04.87"	E80°45'09.59"	SL1
155	N20°23'05.60"	E80°45'09.29"	SR1
156	N20°23'02.88"	E80°45'04.31"	SL2
157	N20°23'03.62"	E80°45'04.03"	SR2
158	N20°23'00.46"	E80°44'57.87"	SL3
159	N20°23'01.18"	E80°44'57.56"	SR3
160	N20°22'57.86"	E80°44'51.63"	SL4
161	N20°22'58.45"	E80°44'51.09"	SR4
162	N20°22'53.39"	E80°44'46.58"	SL5
163	N20°22'53.96"	E80°44'46.02"	SR5
164	N20°22'48.82"	E80°44'41.69"	SL6
165	N20°22'49.38"	E80°44'41.11"	SR6
166	N20°22'44.22"	E80°44'36.76"	SL7
167	N20°22'44.80"	E80°44'36.21"	SR7
168	N20°22'39.58"	E80°44'31.79"	SL8
169	N20°22'40.15"	E80°44'31.22"	SR8
170	N20°22'34.97"	E80°44'26.83"	SL9
171	N20°22'35.56"	E80°44'26.30"	SR9
172	N20°22'30.57"	E80°44'21.80"	SL10
173	N20°22'31.35"	E80°44'21.43"	SR10
174	N20°22'29.78"	E80°44'11.24"	SL11
175	N20°22'30.56"	E80°44'11.22"	SR11
176	N20°22'30.36"	E80°44'08.73"	SR12
177	N20°20'08.53"	E80°38'26.27"	tp1
178	N20°20'10.45"	E80°38'25.54"	tp2
179	N20°20'07.90"	E80°38'18.27"	tp3

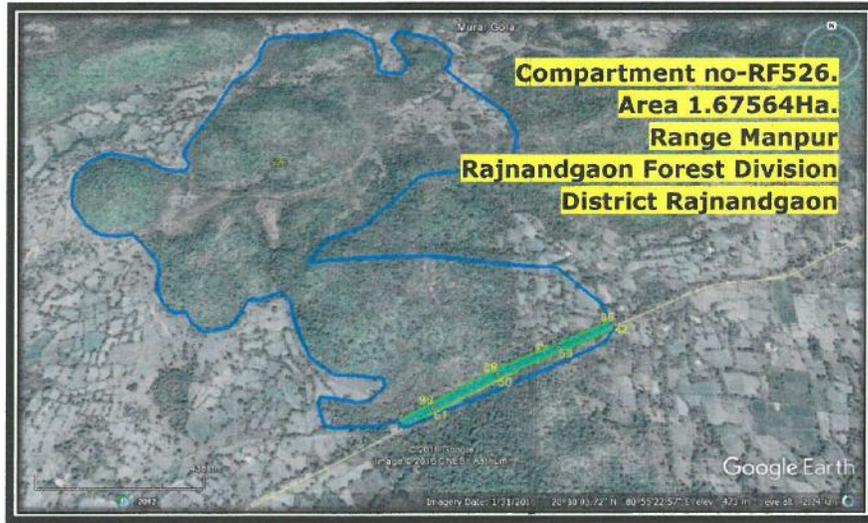
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182	N20°20'02.47"	E80°38'12.53"	tp6
183	N20°20'00.70"	E80°38'13.35"	tp7
184	N20°20'02.68"	E80°38'19.01"	tp8
185	N20°20'04.71"	E80°38'24.79"	tp9
186	N20°20'06.42"	E80°38'24.03"	tp10

(REHABILITATION & UPGRADATION TO 2/4 LANE WITH PAVED SHOULDER OF NH-930 , from JHALMALA-BALOD-KUSUMKASA-MANPUR-KOHKA IN THE STATE OF CHATTISGARH.)

Rajnandgaon Forest Division

Manpur Range

On Google Earth



[Signature]
Executive Engineer
NH.Dn. 1, PWD, Raipur

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[Signature]
Div. Manager
Panabaras Project Dn.
Rajnandgaon (C.G.)

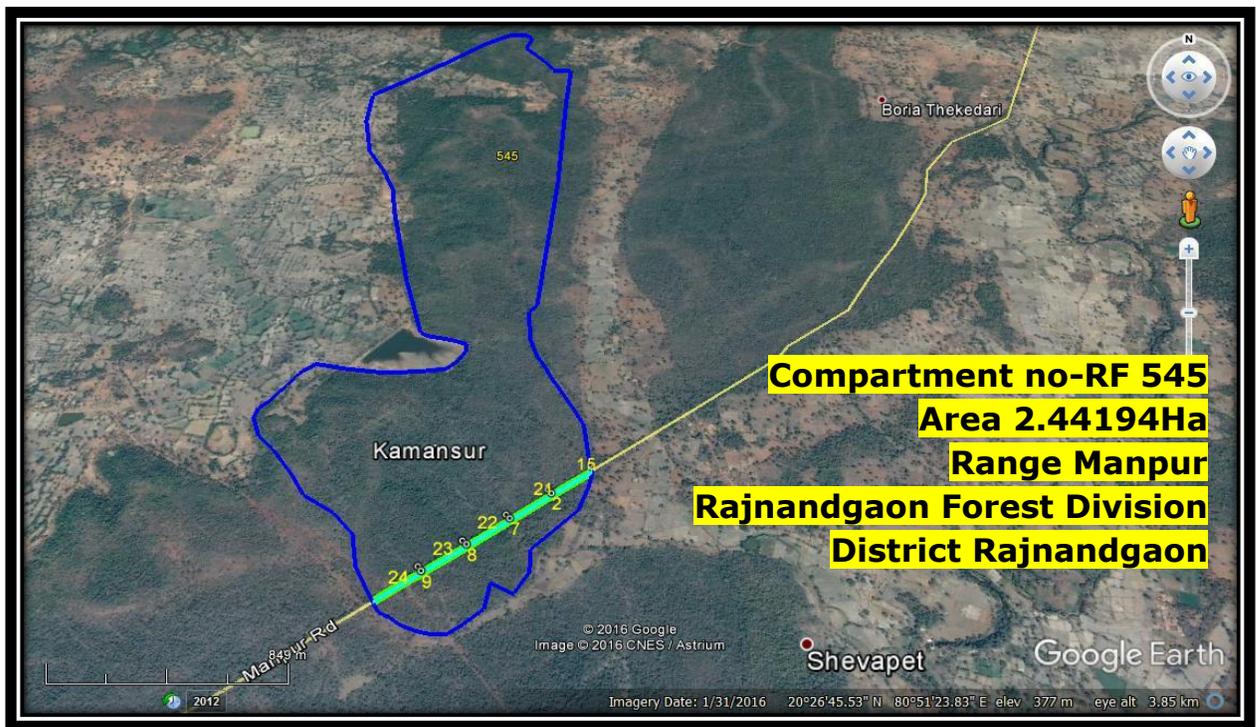
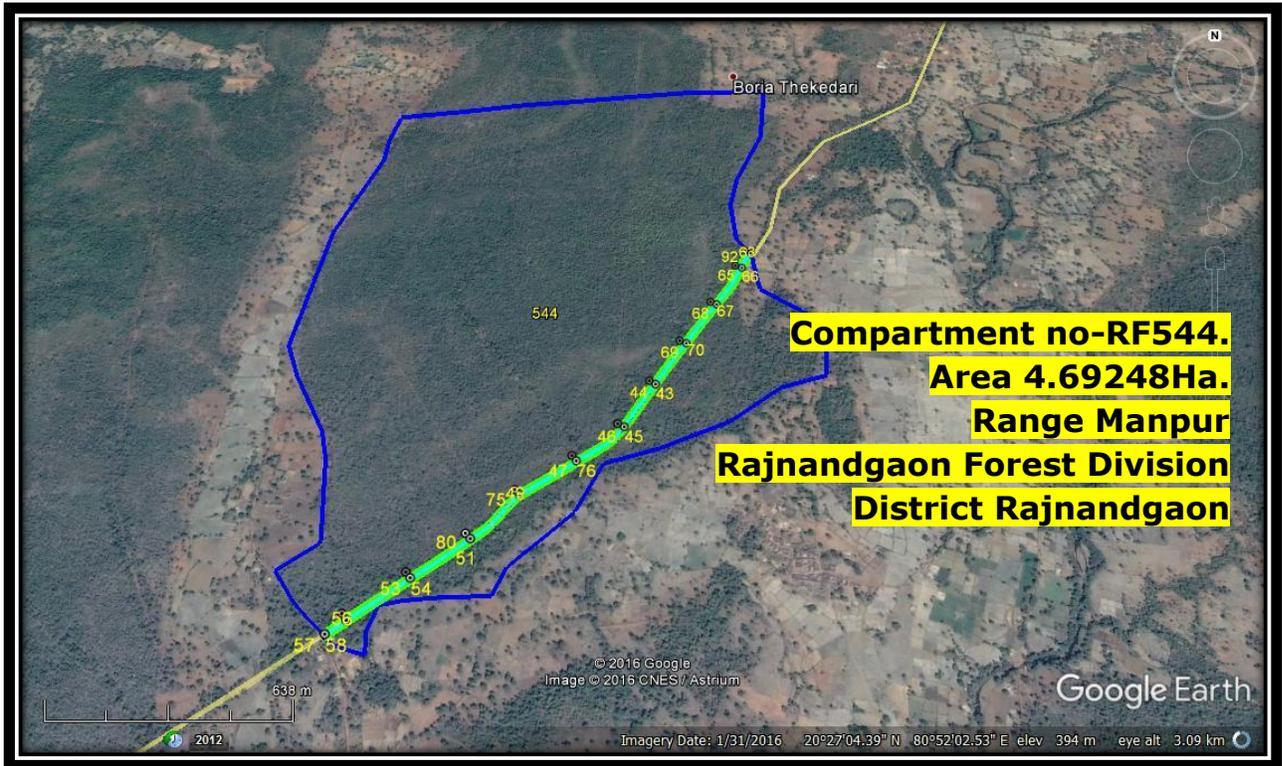
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Panabaras Project Dn.
Rajnandgaon (C.G.)

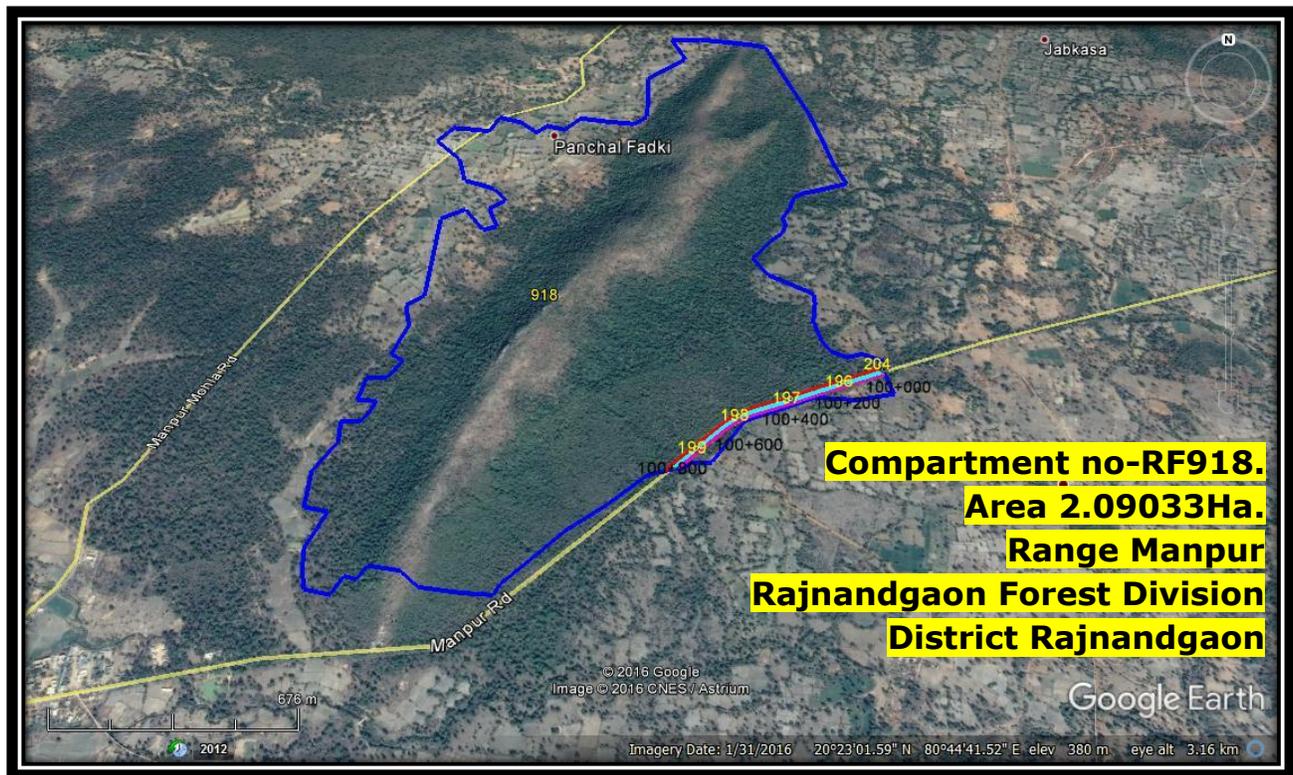
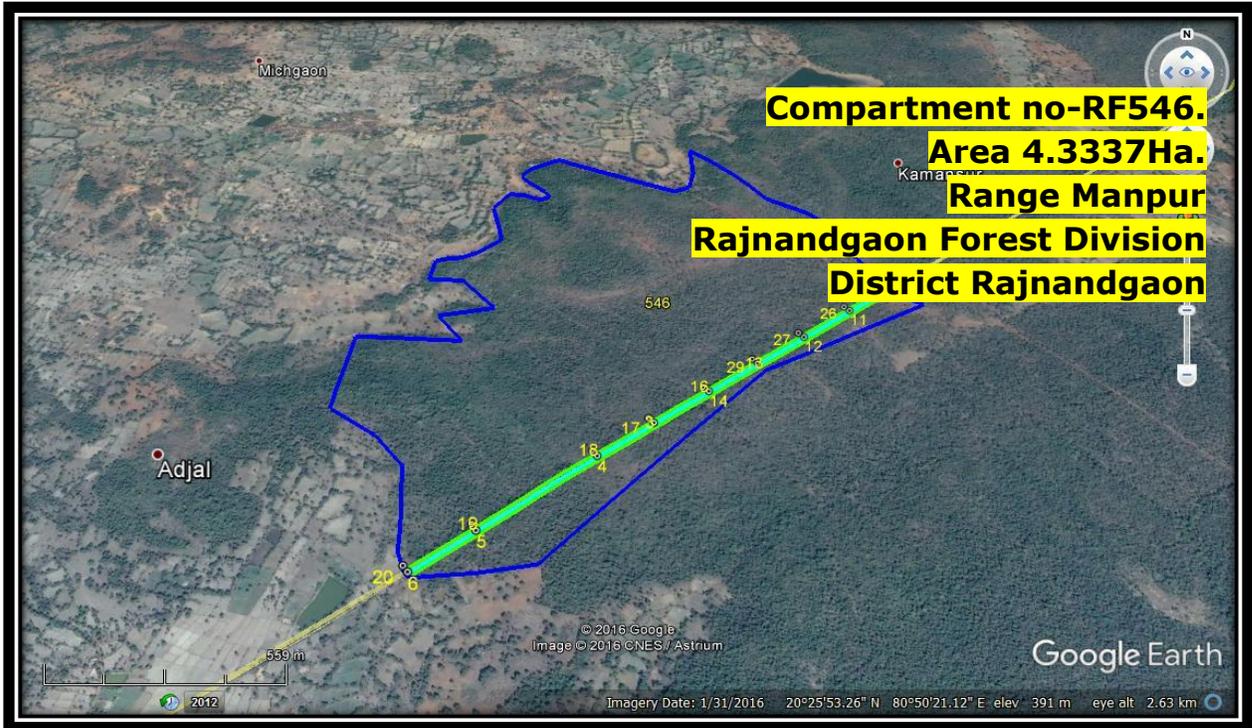
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पानाबरस परियोजना
परिश्रेय मिर्मि

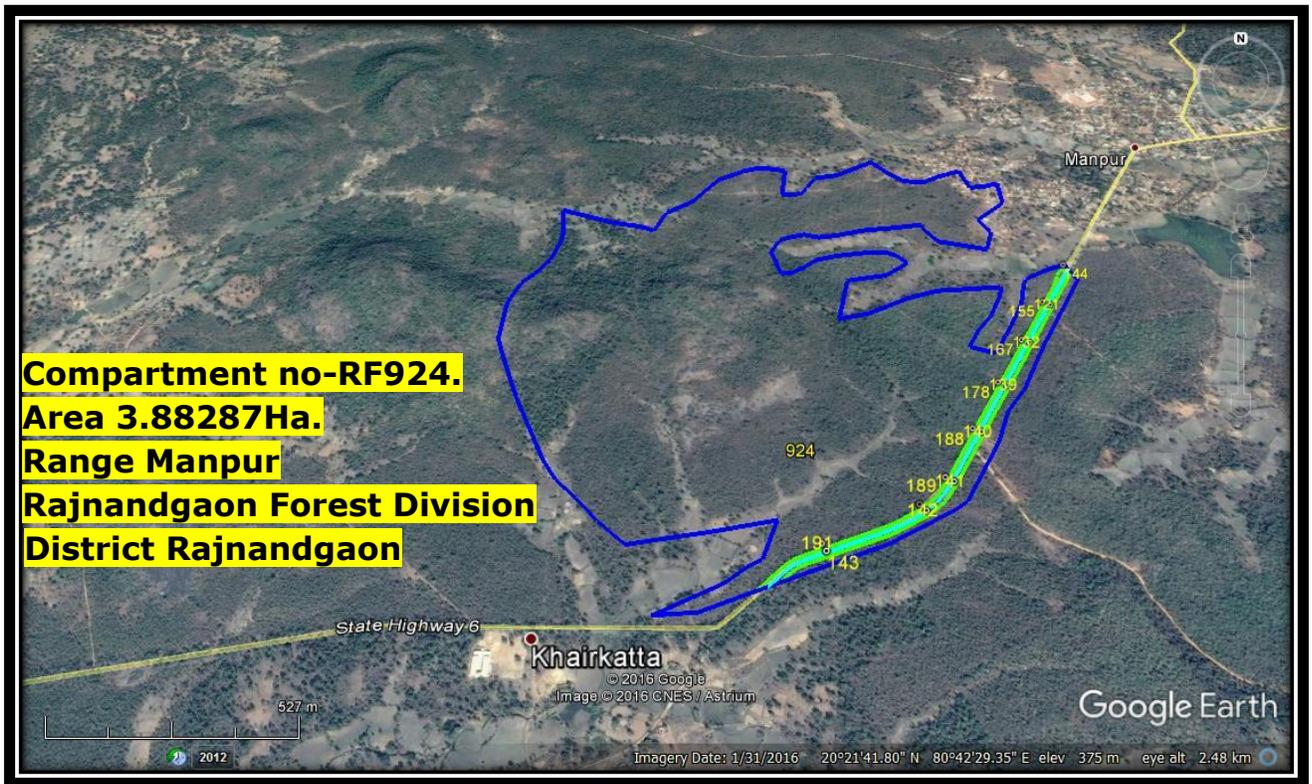
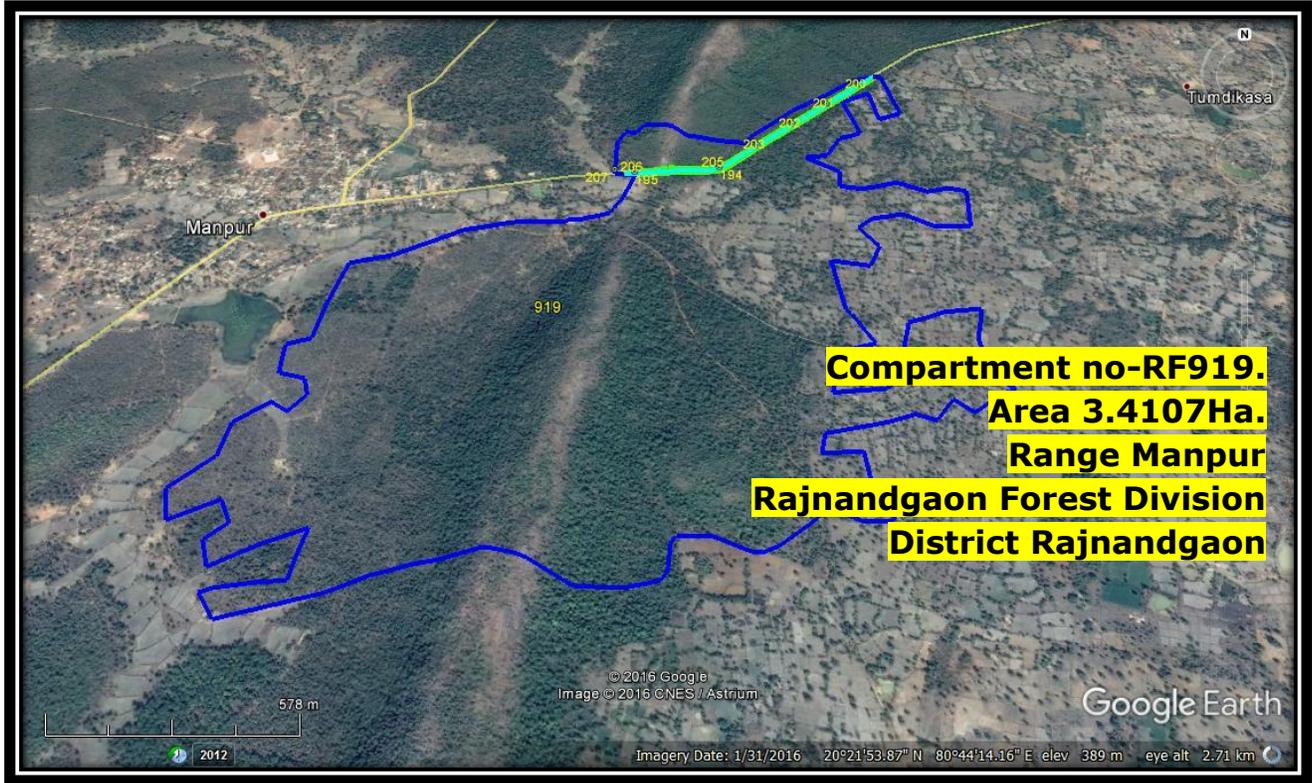
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परिश्रेय मिर्मि

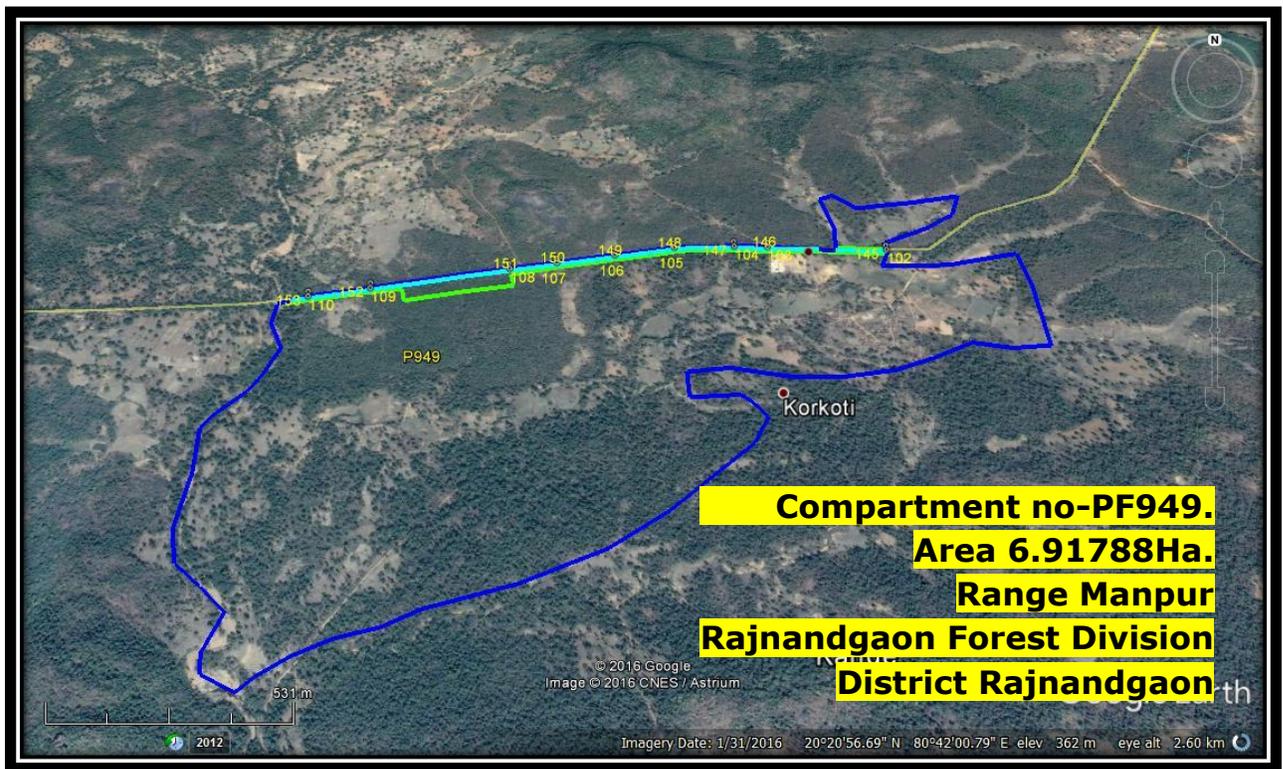
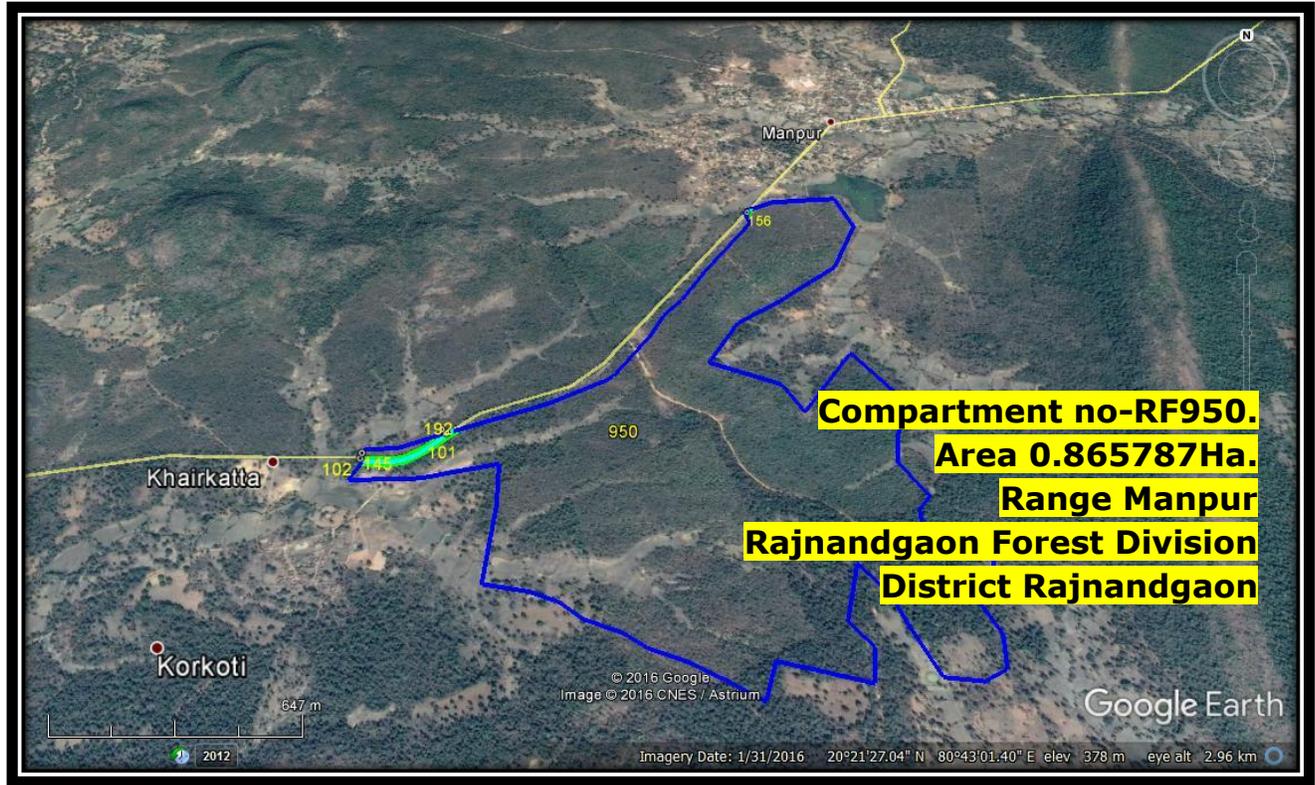
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मानपुर

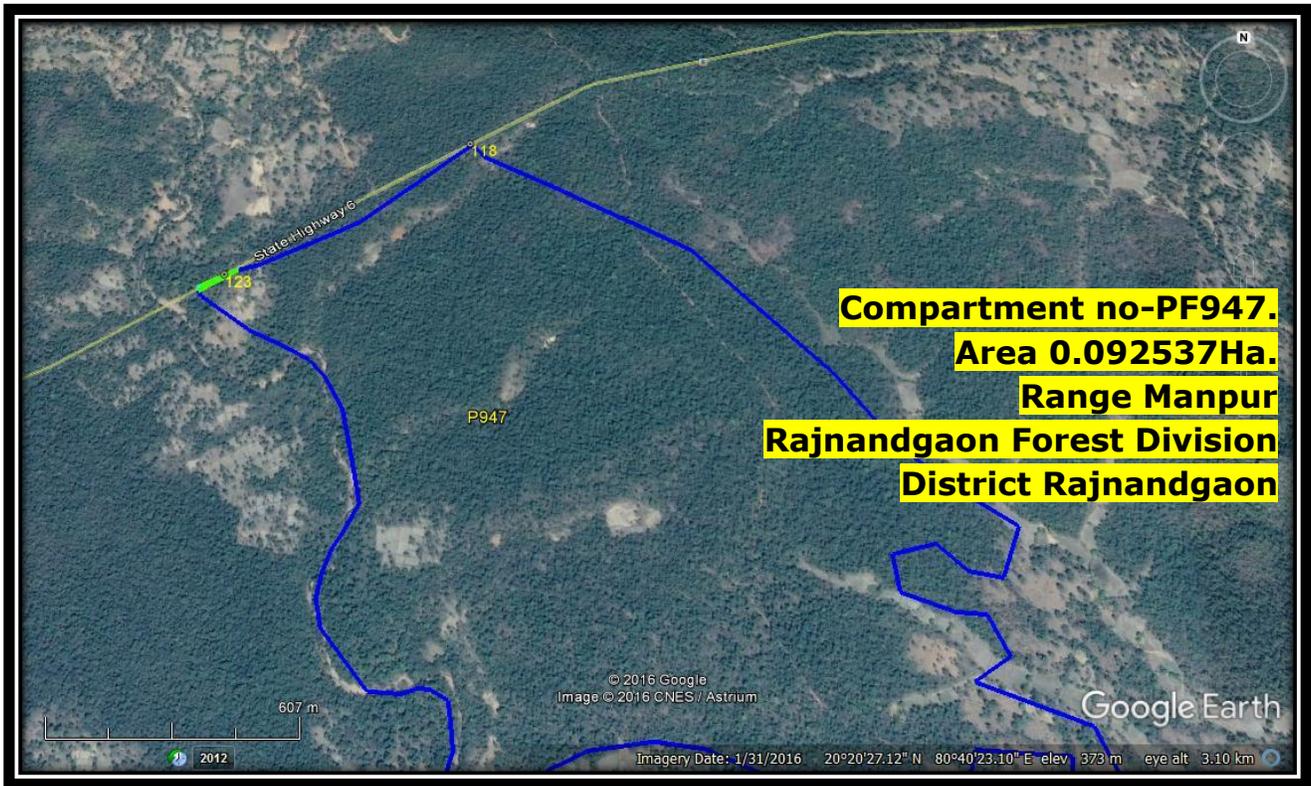
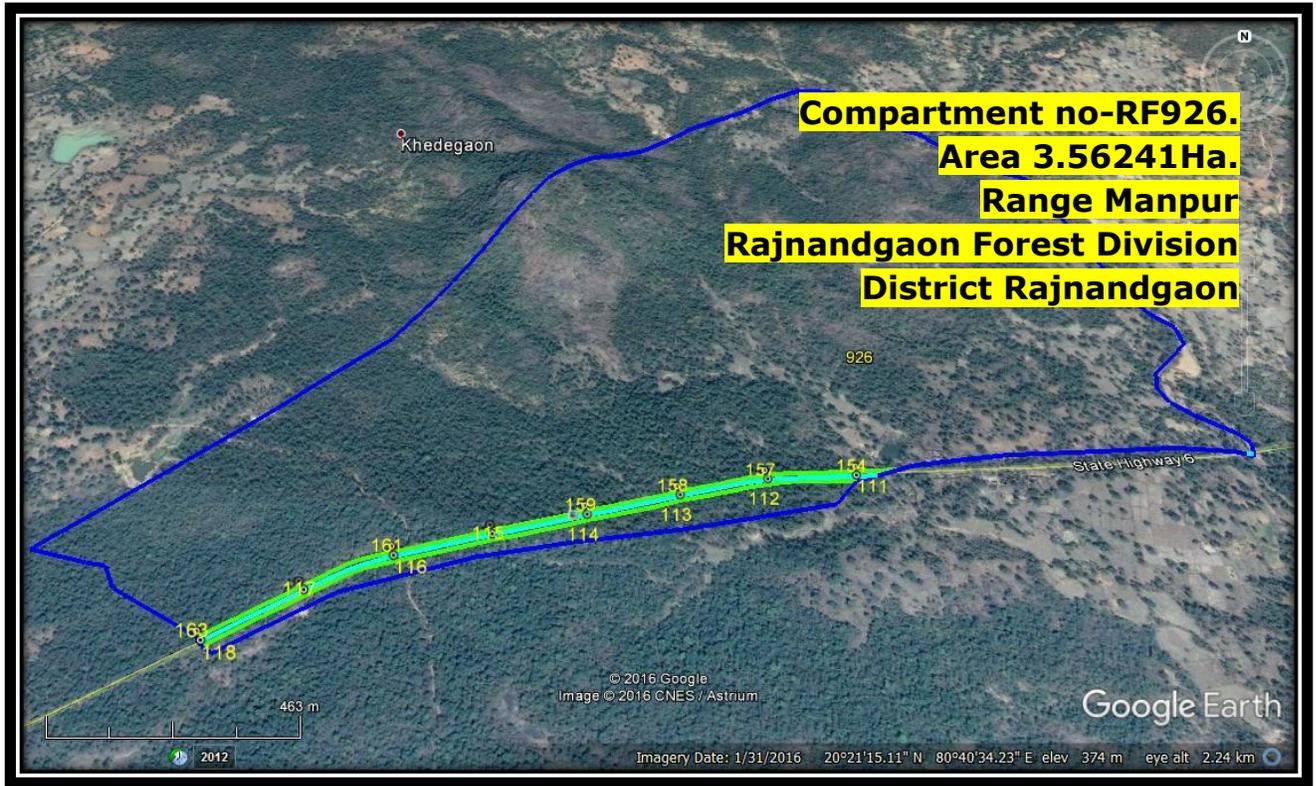
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उत्तर मानपुर

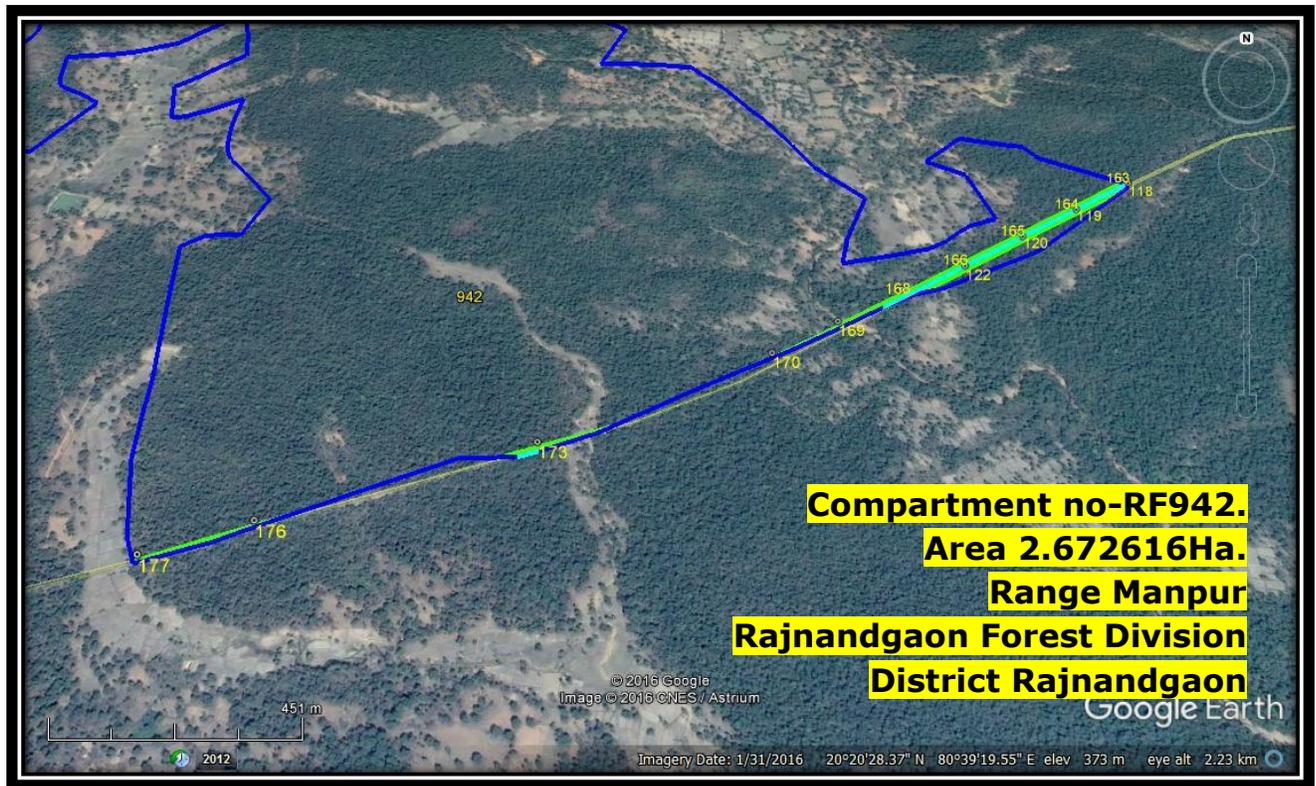
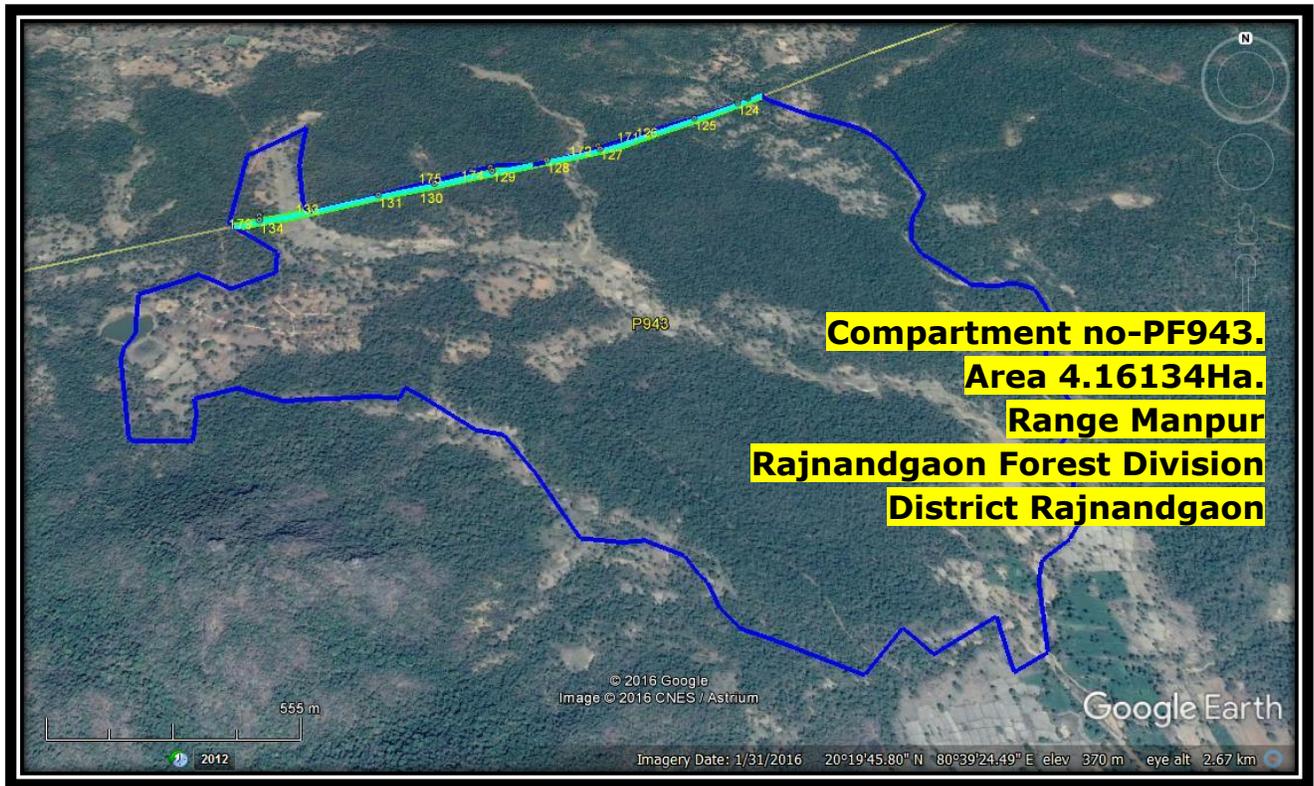


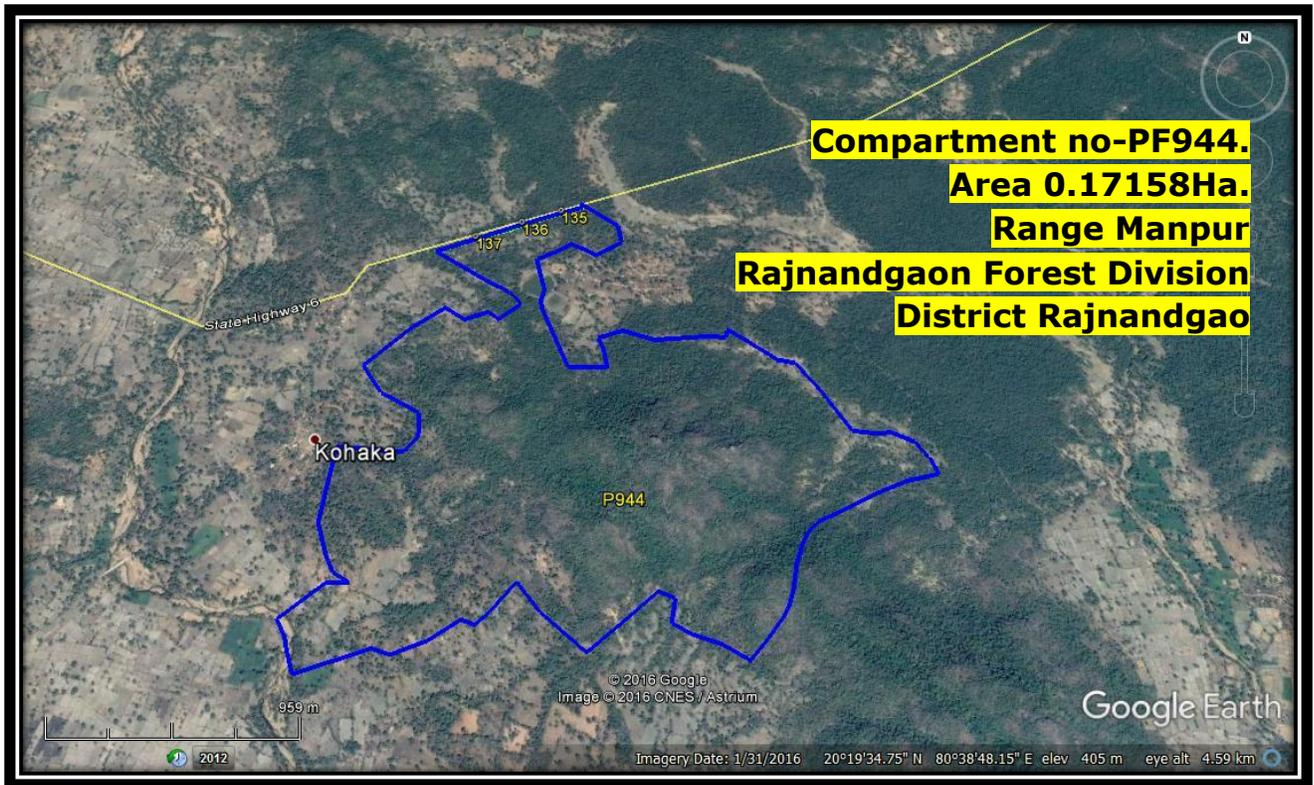
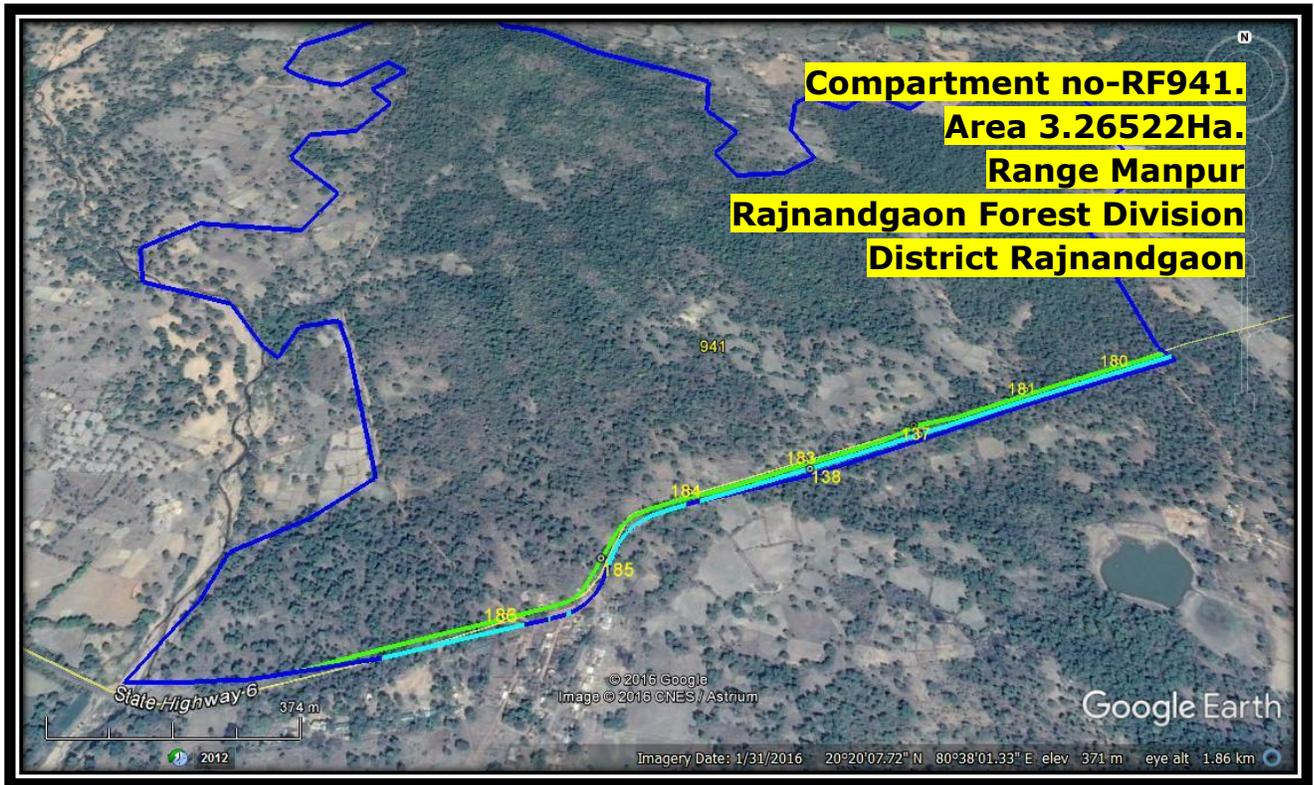


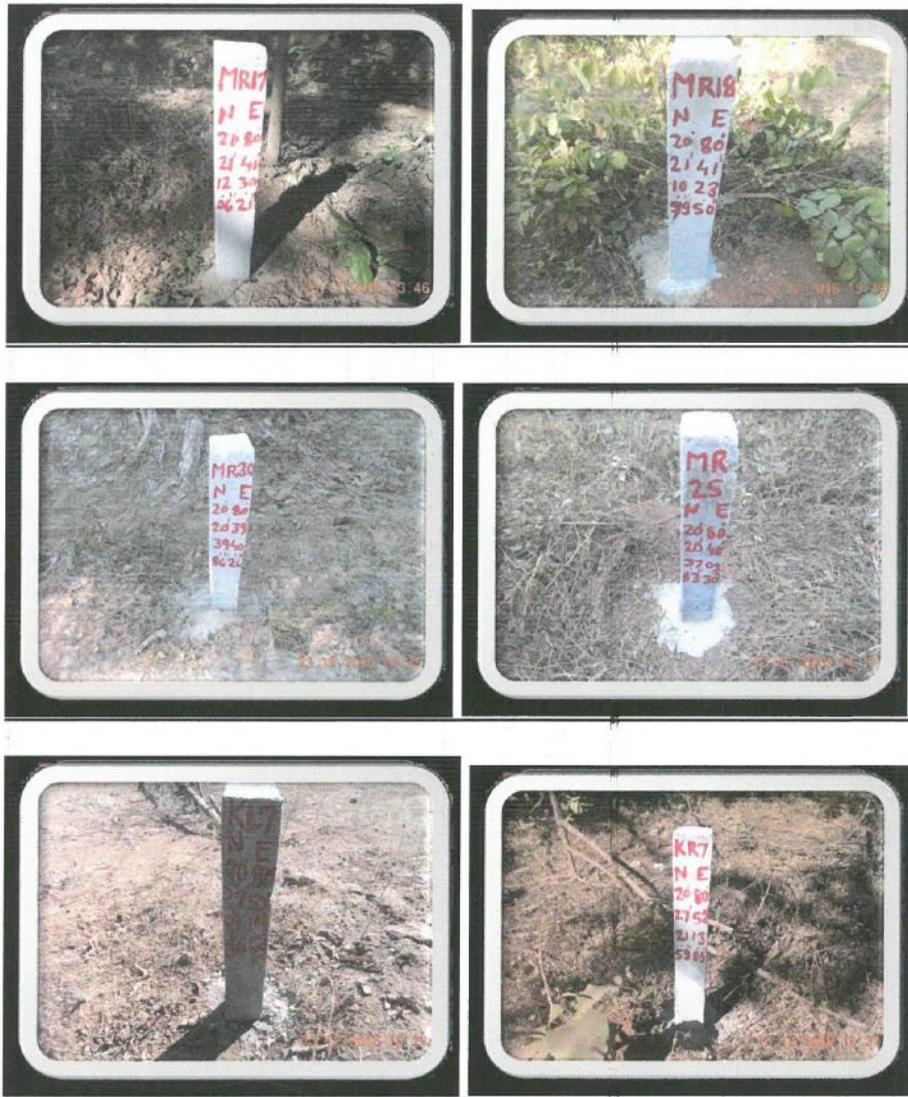












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Executive Engineer
 NH.Dn. 1, PWD, Raipur

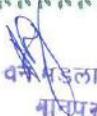



 Dy. Divisional Manager
 Panabaras Project, Dist.
 Rajnandgaon (C.G.)


 Divisional Manager
 Panabaras Project, Dist.
 Rajnandgaon (C.G.)


 पारलक्ष्य निरीक्षक अधिकारी
 डिप्टी मैन


 राजीव प्रो. प्र. अधिकारी
 पानाबरस परियोजना
 पश्चिम भिम्मी


 उप निरीक्षक अधिकारी
 रायपुर


 वन परिक्षेत्र अधिकारी
 उत्तर मानपुर

