

CHHATTISGARH BHARATNET PHASE-II PROJECT

LIDAR/DGPS SURVEY REPORT FOR MUNGELI FOREST DIVISION FOR DIVERSION OF PROPOSED OFC ROUTES

Forest Division : MUNGELI
Forest Land (RF/PF/OA) : 0.167
Rev. Forest Land : 0.039
Total Proposed Diversion Area : 0.206
Block : LORMI
District : MUNGELI (C.G.)

Applicant -



**Chhattisgarh Infotech Promotion Society (CHiPS)
Raipur (Chhattisgarh)**

Submitted By –



TATA PROJECTS

Tata Projects Limited, Raipur (Chhattisgarh)



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1. Introduction and Background

1.1. Background

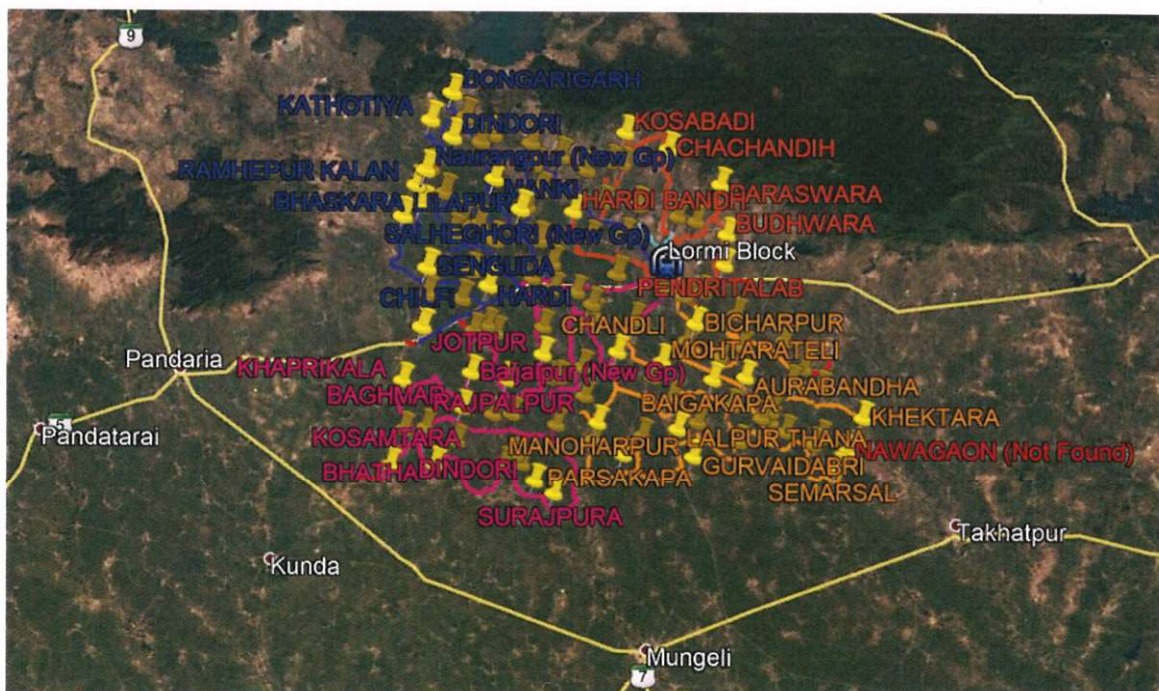
The Government of Chhattisgarh intends to setup an Optical Fibre Cable Network from the Block Head Quarters to Gram Panchayats to provide high speed broadband connectivity by connecting the 85 Blocks, 5987 Gram Panchayats across the State. The proposed network architecture for BharatNet Phase-II project follows ring architecture with Internet Protocol – Multi Protocol Label Switching (IP-MPLS) technology. The network shall be leveraged to deliver scalable bandwidth to households, institutions and enterprises. It is planned to have an IP-MPLS ring at GP level with provisioning of 6 dedicated core of fibre as mandated by Government of India.

The Chhattisgarh Infotech Promotion Society (CHiPS), a Registered Society promoted by the Government of Chhattisgarh, is the nodal agency and prime mover for propelling IT growth and implementation of IT plans in the State.

The Chhattisgarh Infotech Promotion Society (CHiPS) has selected an implementation partner “**Tata Project Limited**” for BharatNet Phase-II Project. The project has been conceived with the ambitious vision of providing connectivity to the yet unreachable blocks in Chhattisgarh and entails massive investment on the infrastructure creation across the state which would serve as the information highway for decades to come.

1.2. Proposed Routes

The proposed routes in Lormi block with in MUNGELI Forest Division.



OFC Cable Proposed Routes in Lormi Block in Mungeli Forest Division.

1.3. Location

The proposed OFC Cable route in Mungeli Forest Division in District: Mungeli). The Proposed OFC route length is approx. 400.514 in Lormi Block. The survey site passes through forest ranges Lormi and Khuriya of Mungeli Forest Division. The OFC Cable route is covered under Survey of India Toposheets 64 F11, 12 15, and 16 on RF 1:50000.

1.4. Objective

As per directives of Ministry of Environment & Forests (MoEF) dated 8th July 2011; all applications for Forest Diversion, under Forest Conservation Act, 1980 must be accompanied with Geo-referenced shape file, showing the boundary of the proposed area (both soft copy and hard copy maps), prepared using LiDAR/Differential GPS (DGPS) and the same should be uploaded to MoEF website along with the online application.

To meet this requirement, **Tata Project Limited** entrusted the DGPS survey work to **Genesys International Corporation Limited, Mumbai** through Mobile LiDAR Technology.

2. Scope of Work

1. Establishment of Ground Control Pointy with 72 Hours observation which covering approx. 15 km radius of the proposed route.
2. DGPS Survey for collection of ground coordinates along the proposed OFC Cable trench at every 200 m interval and/or at every turn/bend along the proposed trench. The DGPS data is collected at forest patches only.
3. Data processing and Interpretation
 - I. Geo-referencing of SOI Toposheet (scale 1:50000).
 - II. Creation of OFC Cable trench boundary vector map using the DGPS Surveyed data
 - III. Computation of Forest area and preparation of Forest Area Statement for proposed diversion. It includes Reserved/Protected Forest/ Orange Area & Revenue Forest Land.
 - IV. Preparation of Geo-referenced map showing proposed OFC Route.
 - V. Superimposition of cable route layer on Geo-referenced SOI Toposheet (scale 1:50000).
 - VI. Preparation of DGPS survey report along with soft copy of maps including shapefile format and kml file.
4. Preparation of Desired report, Geo-referenced maps and Technical compliance in Hard copy and soft copy.

3. Deliverables

The deliverables envisaged for the assignment are described below -

1. Proposed Forest Diversion area statement as per LiDAR / DGPS Survey of proposed OFC route.
2. Geo-referenced map showing proposed OFC route in forest area and superimposed on SOI maps based on LiDAR / DGPS observations – Hard and Soft Copy (Maps in PDF format, SHP and KML formats).
3. LiDAR / DGPS Survey and Mapping Reports containing Ground Control Points report as the primary Control Points.
4. DGPS Survey and mapping report on hard copy and soft copy in CD.

4. Technical Approach

4.1. GCP Establishment for LiDAR (DGPS) Survey:

DGPS Survey with high precision equipment was used in blocks to bring mapping in to a single co-ordinates system. These Ground Control Point (GCPs) were connected to the Mobile LiDAR Mapping for accuracy purpose. The Ground Control Point required for eliminates the traditional mapping. The system can achieve millimeter accuracy of vehicle positioning, 3-D coordinates, and objects measured from the Geo-referenced image sequences. The Ground Control Point with 72 Hours of DGPS observation for Post Processing the GCP data with International GNSS Service (IGS) stations.

4.2. Mobile LiDAR (DGPS) data collection:

DGPS based Mobile LiDAR data was collected along with 360 degree panoramic view of the OFC route corridor (25 meter on each side along the center of the road).



Mobile LiDAR Van

4.3. DRS / GIS Map Creation Using LiDAR data:

All the features along the route are captured using LiDAR data and Panoramic Imagery to create the DRS / GIS Map.



Feature Extraction on LiDAR



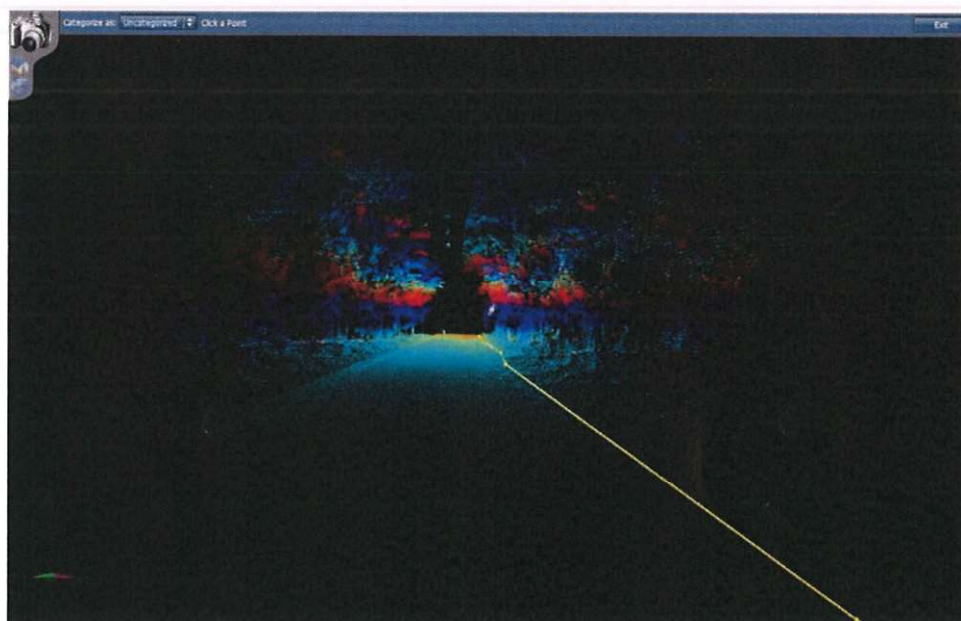
Final DRS / GIS Map

4.4. Demarcation of Proposed OFC on LiDAR data:

Proposed OFC line is demarcated based on the feasibility of trenching to be done on ground by referring the LiDAR data with the panoramic imagery.



Proposed OFC Line on LiDAR Data (with Panoramic Imagery)

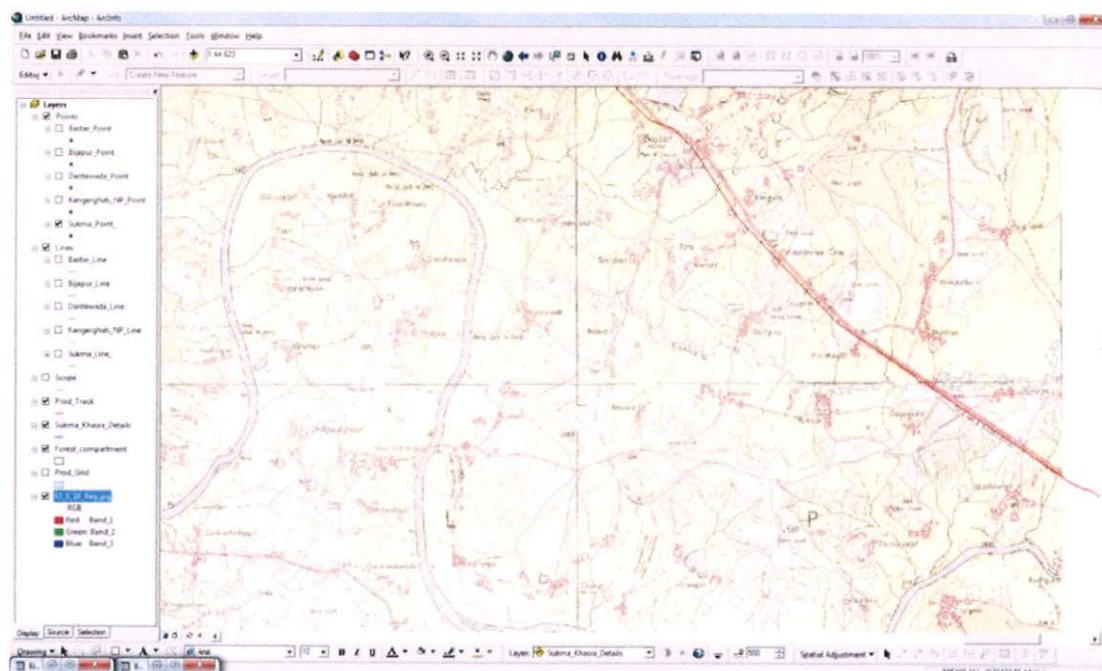


Proposed OFC Line on LiDAR Data only

4.5. Geo-referencing of Maps:

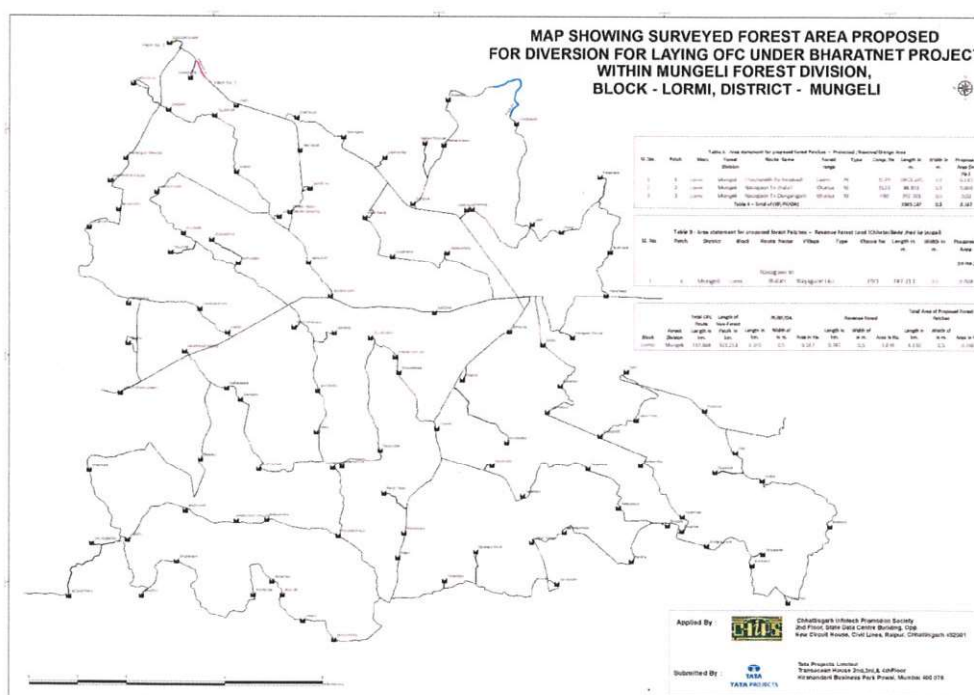
Geo-referencing of Revenue Village Maps and SOI Toposheets are to be done. SOI Toposheets would be geo-referenced based on the coordinates provided on the maps whereas Revenue Village Maps would be

geo-referenced with the help of GCPs collected on field. (at least 5 GCPs for a village having Government Forest Land are to be collected)



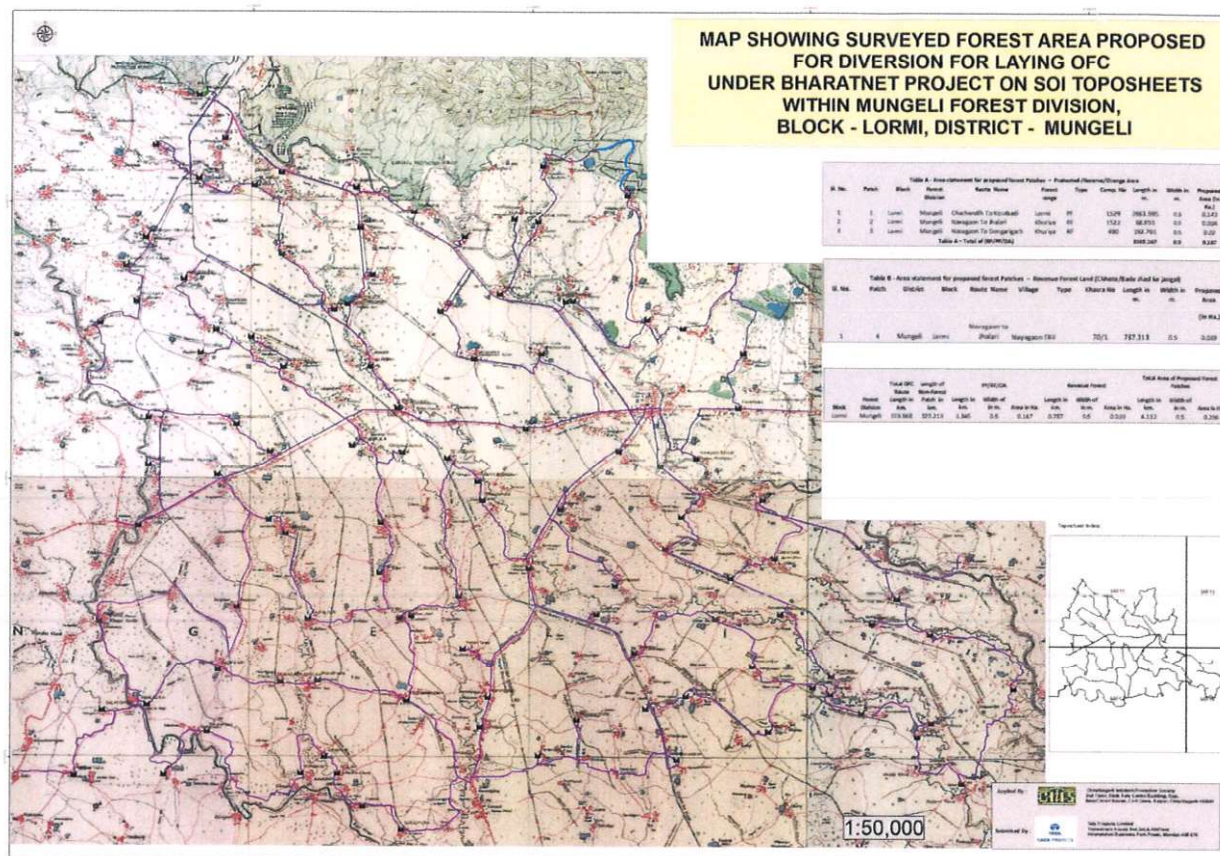
4.6. Creation of Vector Data for Forest Diversion:

Different Layers such as Polygon of Reserved Forest /Protected Forest /Orange Area Patch, Centerline of Proposed OFC Trench, Non-Forest Trench line, Polygons showing Revenue Forest patches etc. are to be created using the Lidar based GDPS Observation, Geo-referenced maps and the information provided by the forest department and Revenue department.



4.7. Generation of Map and Survey Reports for Forest Diversion

A map is created by overlaying the created vector data for the forest patches on the Geo-referenced SOI Toposheets. The reports are generated for DGPS Points (with Lat/long) placed at the regular intervals of 100 m on the proposed OFC route in the forest area. Another report is generated having area calculation for the proposed trench area in different type of Forest Lands. Samples of these are as below.



Geo-referenced Map

Forest Area Statement

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5. DGPS Survey Results

The total OFC route length is approx. 400.514 km covered Lormi of MUNGELI District. Out of this 4.132 km OFC route length is passing through Forest Patches hence the proposed forest area for diversion is 0.206 Ha. Forest Area Statement Report is in Annexure-1, and DGPS coordinates and forest patch boundary coordinates is in Annexure-2. The geo-referenced maps are in Annexure -3.

5.1. Forest Area Statement (Annexure-1)

Block	Forest Division	Total OFC Route Length in km.	Length of Non-Forest Patch in km.	PF/RF/OA			Revenue Forest			Total Area of Proposed Forest Patches		
				Length in km.	Width of in m.	Area in Ha.	Length in km.	Width of in m.	Area in Ha.	Length in km.	Width of in m.	Area in Ha.
Lormi	Mungeli	400.514	396.382	3.345	0.5	0.167	0.787	0.5	0.039	4.132	0.5	0.206

only sign for forest area PF&R.A.P. not for revenue forest

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वन परिक्षेत्र खुड़िया (सिद्धी)

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उपवनमंडल, लोरमी (छ.ग.)

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Table A - Area statement for proposed forest Patches – Protected /Reserve/Orange Area										
Sl. No.	Patch	Block	Forest Division	Route Name	Forest range	Type	Comp. No	Length in m.	Width in m.	Proposed Area {In Ha.}
1	1	Lormi	Mungeli	Chachandih To Kosabadi	Lormi	PF	1529	2863.595	0.5	0.143
2	2	Lormi	Mungeli	Navagaon To Jhalari	Khuriya	RF	1522	88.851	0.5	0.004
3	3	Lormi	Mungeli	Navagaon To Dongarigarh	Khuriya	RF	490	392.701	0.5	0.020
Table A – Total of (RF/PF/OA)								3345.147	0.5	0.167

Table B - Area statement for proposed forest Patches – Revenue Forest Land (Chhote/Bade Jhad ke jangal)										
Sl. No.	Patch	District	Block	Route Name	Village	Type	Khasra No	Length in m.	Width in m.	Proposed Area {In Ha.}
1	4	Mungeli	Lormi	Navagaon to Jhalari	Nayagaon Dayali	BJJ	70/1	787.313	0.5	0.039

only sign for table A.

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वन परिक्षेत्र खुड़िया (छ.ग.)

उपवनमंडलाधिकारी
उपवनमंडल, लोरमी (छ.ग.)

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5.2. DGPS Surveyed coordinates of Forest Patches (Annexure-2)

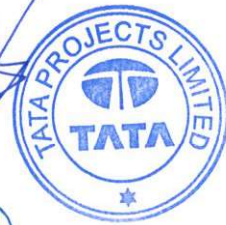
Point	Patch	Longitude in D:M:S	Latitude in D:M:S	Point	Patch	Longitude in D:M:S	Latitude in D:M:S
1	1	81° 41' 12.698" E	22° 20' 57.514" N	36	1	81° 41' 41.794" E	22° 20' 47.064" N
2	1	81° 41' 14.446" E	22° 20' 57.540" N	37	1	81° 41' 41.763" E	22° 20' 45.440" N
3	1	81° 41' 16.192" E	22° 20' 57.600" N	38	1	81° 41' 41.401" E	22° 20' 43.850" N
4	1	81° 41' 17.929" E	22° 20' 57.761" N	39	1	81° 41' 40.930" E	22° 20' 42.284" N
5	1	81° 41' 19.585" E	22° 20' 58.263" N	40	1	81° 41' 40.896" E	22° 20' 40.688" N
6	1	81° 41' 21.198" E	22° 20' 58.888" N	41	1	81° 41' 41.413" E	22° 20' 39.136" N
7	1	81° 41' 22.858" E	22° 20' 59.390" N	42	1	81° 41' 42.008" E	22° 20' 37.607" N
8	1	81° 41' 24.486" E	22° 20' 59.983" N	43	1	81° 41' 42.905" E	22° 20' 36.243" N
9	1	81° 41' 26.129" E	22° 21' 0.534" N	44	1	81° 41' 44.365" E	22° 20' 35.354" N
10	1	81° 41' 27.692" E	22° 21' 1.237" N	45	1	81° 41' 45.816" E	22° 20' 34.456" N
11	1	81° 41' 29.012" E	22° 21' 2.302" N	46	1	81° 41' 45.613" E	22° 20' 33.099" N
12	1	81° 41' 30.376" E	22° 21' 3.319" N	47	1	81° 41' 44.245" E	22° 20' 32.092" N
13	1	81° 41' 31.890" E	22° 21' 4.087" N	48	1	81° 41' 42.826" E	22° 20' 31.151" N
14	1	81° 41' 33.528" E	22° 21' 4.647" N	49	1	81° 41' 41.657" E	22° 20' 29.945" N
15	1	81° 41' 35.235" E	22° 21' 4.915" N	50	1	81° 41' 40.147" E	22° 20' 29.138" N
16	1	81° 41' 36.851" E	22° 21' 5.395" N	51	1	81° 41' 38.847" E	22° 20' 28.161" N
17	1	81° 41' 38.345" E	22° 21' 6.222" N	52	1	81° 41' 37.995" E	22° 20' 26.741" N
18	1	81° 41' 40.038" E	22° 21' 6.618" N	53	1	81° 41' 37.161" E	22° 20' 25.316" N
19	1	81° 41' 41.772" E	22° 21' 6.820" N	54	1	81° 41' 36.665" E	22° 20' 23.757" N
20	1	81° 41' 43.441" E	22° 21' 7.258" N	55	1	81° 41' 36.193" E	22° 20' 22.192" N
21	1	81° 41' 45.158" E	22° 21' 7.355" N	56	1	81° 41' 35.682" E	22° 20' 20.637" N
22	1	81° 41' 46.865" E	22° 21' 7.023" N	57	1	81° 41' 35.117" E	22° 20' 19.099" N
23	1	81° 41' 48.084" E	22° 21' 5.913" N	58	2	81° 34' 55.012" E	22° 21' 3.623" N
24	1	81° 41' 48.728" E	22° 21' 4.403" N	59	2	81° 34' 56.224" E	22° 21' 2.452" N
25	1	81° 41' 49.169" E	22° 21' 2.832" N	60	2	81° 35' 6.204" E	22° 20' 52.860" N
26	1	81° 41' 49.333" E	22° 21' 1.214" N	61	2	81° 35' 5.292" E	22° 20' 53.744" N
27	1	81° 41' 49.257" E	22° 20' 59.607" N	62	3	81° 34' 6.390" E	22° 21' 56.622" N
28	1	81° 41' 48.633" E	22° 20' 58.089" N	63	3	81° 34' 7.922" E	22° 21' 57.406" N
29	1	81° 41' 48.120" E	22° 20' 56.539" N	64	3	81° 34' 9.443" E	22° 21' 58.208" N
30	1	81° 41' 47.237" E	22° 20' 55.136" N	65	3	81° 34' 11.093" E	22° 21' 58.735" N
31	1	81° 41' 46.153" E	22° 20' 53.871" N	66	3	81° 34' 9.599" E	22° 21' 57.922" N
32	1	81° 41' 44.904" E	22° 20' 52.735" N	67	3	81° 34' 8.083" E	22° 21' 57.115" N
33	1	81° 41' 43.837" E	22° 20' 51.448" N	68	3	81° 34' 6.549" E	22° 21' 56.337" N
34	1	81° 41' 42.784" E	22° 20' 50.154" N	69	4	81° 34' 38.054" E	22° 21' 31.014" N
35	1	81° 41' 42.111" E	22° 20' 48.658" N	70	4	81° 34' 38.729" E	22° 21' 29.514" N

Sing for only Patch no (1,2,83) not for Patch no (2)

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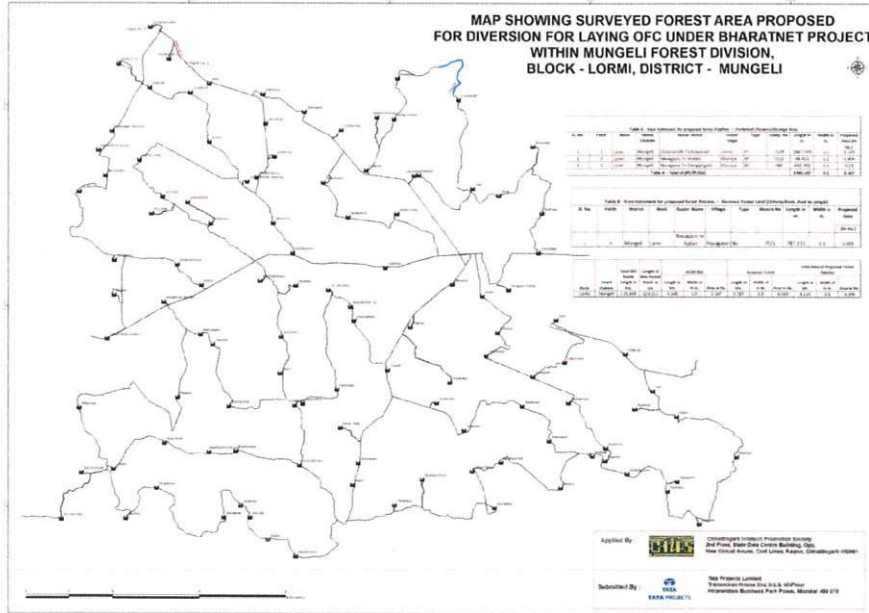
Point	Patch	Longitude in D:M:S	Latitude in D:M:S
71	4	81° 34' 39.410" E	22° 21' 28.017" N
72	4	81° 34' 40.077" E	22° 21' 26.514" N
73	4	81° 34' 40.703" E	22° 21' 24.996" N
74	4	81° 34' 41.393" E	22° 21' 23.502" N
75	4	81° 34' 42.016" E	22° 21' 21.983" N
76	4	81° 34' 42.703" E	22° 21' 20.489" N
77	4	81° 34' 43.409" E	22° 21' 19.001" N
78	4	81° 34' 44.082" E	22° 21' 17.501" N
79	4	81° 34' 44.717" E	22° 21' 15.985" N
80	4	81° 34' 45.386" E	22° 21' 14.484" N
81	4	81° 34' 46.106" E	22° 21' 13.003" N
82	4	81° 34' 46.995" E	22° 21' 11.604" N
83	4	81° 34' 48.065" E	22° 21' 10.319" N



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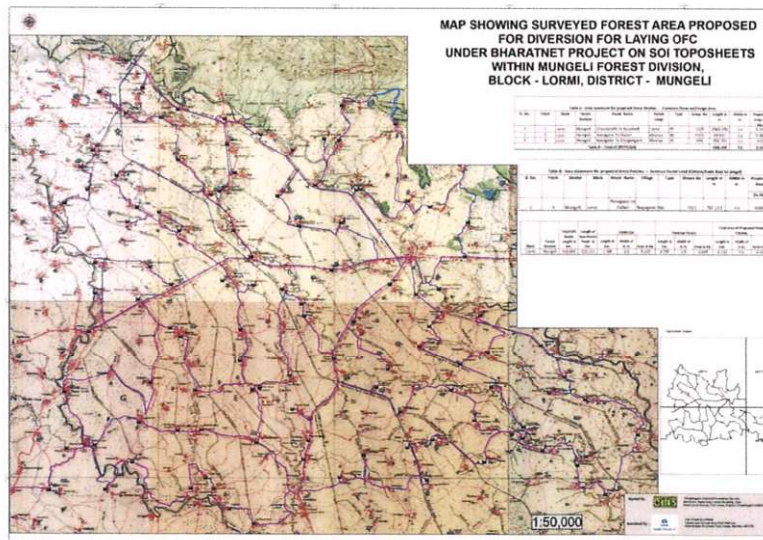
5.3. Geo-Referenced Maps of the Proposed Route (Annexure-3)

5.3.1. Map showing Geo-reference map of proposed OFC Route.



Geo-Referenced Maps of Forest Patched with in Mungeli Forest Division

5.3.2. Map showing Geo-reference map of proposed OFC Route.



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Geo-Referenced Toposheet Map of Forest Patched of Lormi block within Mungeli Forest Division.

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