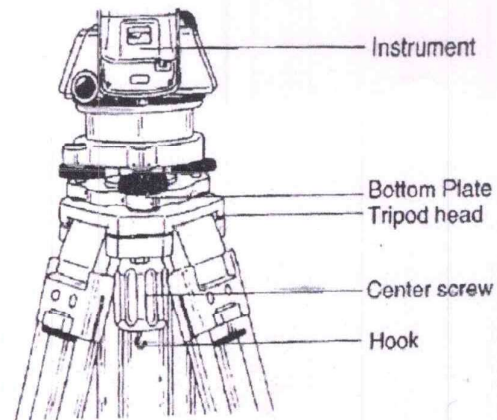
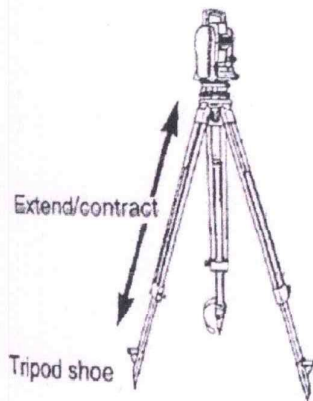


DEDICATED FREIGHT CORPORATION OF INDIA  
LIMITED



PROPOSAL  
FOR  
PREPARATION OF GEO-REFERENCED  
BOUNDARY MAP (IN SHAPE FILE)



*[Signature]*  
12.01.2021

## INDEX

Sl. No.	Description	Page
1	Introduction	3-3
2	Background	3-4
3	Methodology	4-4
4	Survey Instrument	4-6
5	Details of Field Activity	6-6
6	Computation	6-6
7	Documents Submitted	7-7

## TABLES

TABLE NO.	Description	Page
1	List of UTM and Geographical co-ordinates along Forest Land Boundary of Village- ASANBANI, PIPRADIH, CHAUDHURI BANDH, KORADIH, SARIYA KHURD, BARWADIH, KARMA, CHICHAKI, GAREA AND BARKI SARIYA, Dist.- Giridih, Jharkhand.	7-15

  
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**Report on Preparation of Geo-referenced Forest Land Boundary Map (in shape file) for Village- Saryakhurd, District- Giridih, Jharkhand under Hazaribagh East Forest division.**

**1.0 Instruction**

As per MoEF, Govt. of India Circular No 11-9/98-FC dated 8<sup>th</sup> July 2011; we carried out GIS survey of the Forest Land Boundary for upcoming DFCCIL Railway line at Village- Saryakhurd, District- Giridih, Jharkhand under Hazaribagh East Forest division.

**2.0 Background**

Present report is prepared for forest land clearance of for upcoming DFCCIL Railway line at Village- Saryakhurd, District- Giridih, Jharkhand under Hazaribagh East Forest division for submission of Forest Diversion Proposal for consideration of MoEF, Government of India.

To check irrational exploitation of forest and to maintain the ecological balance, Forest (Conservation) Act. 1980 was enacted. Under this act, no forest land can be used for non forest purpose without the prior approval of Central Government. All proposals of diversion of such areas to any non-forest purpose can only be permitted by the Central Government. The procedure for forest clearance envisaged under the Act. mandates a two-stage approval process.

Stage-I: In Principal Approval: Upon a prime facie review, the proposal is either accepted or rejected. If approved, the project authority is required to deposit an amount for compensation of the opportunity cost of the forest (NPV, Compensatory Aforestation, Additional expenses towards mitigating probable environment damage etc.).

Stage-II: Following the deposit of the above mentioned costs, the land is handed over the project authorities provided the hay.

The forest boundaries, in general, are marked on Cadastral (Khasra) Maps. In most cases, the boundaries are demarcated on ground by allotted or Project proponent, in collaboration with the forest officials. At salient point along the boundary is also done.

  
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As per one of the pre-requisite for getting clearance of forest is a geo-reference boundary map in shape file format of the desired forest land.

Present report is prepared for to expedite forest land clearance for upcoming DFCCIL railway line at Village- Sariyakhurd, District- Giridih, Jharkhand under Hazaribagh East Forest division after DGPS survey.


### 3.0 Methodology

Execution of the job was planned on the basis of plans of the area provided by the authority. For the job, DGPS (Different Global Positioning System) survey was found be appropriate for determining geographical co-ordinates of forest boundary.

The Global Positioning System (GPS) is a satellite-based location, timing and navigation system in all weather conditions, anywhere on or near the Earth where there is an unobstructed line of sight to four or more GPS satellites. Presently, 30 orbiting satellites of GPS constellation of USA and 24 GLONASS (Globlnayed Navigatsionnaya Sputnikovaya Sistema or Global Navigation Satellite System) satellites of Russia area operational for the purpose of GPS survey.

### 4.0 DGPS (Survey Instrument)

- 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.
- DGPS improve accuracy significantly 100's of meters to meters to centimeters to millimeters.
- DGPS uses one or several (network) fixed ground-based reference stations (in known locations).

  
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- The base station compares its own known location, to that computed from a GPS receiver.
- 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.

### DGPS Summary

- Term refers to simple C/A code differential.
- Available on GPS receivers from low cost to high cost.
- Produces accuracies from sub-meter to meters.
- 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 observation 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 20cm to sub-centimeters.
- 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).

### 5.0 Details of Field Activity

- a) Reconnaissance survey was done after reaching the site. Officials from Village- Sariyakhurd, District- Giridih, Jharkhand under Hazaribagh East Forest division
- b) The DGPS Survey was carried out in along the Boundary point.

### 6.0 Computation

- a) Data recorded is downloaded from the GPS and processed in computer to get post processed WGS-84 co-ordinates of the surveyed stations. The co-ordinates of boundary Point are then transformed.
- b) The authenticated cadastral plans showing forest and non-forest for the projects authority. These plans are then scanned and geo-referenced with respect to the WGS-84 co-ordinates arrived on the basis of DGPS survey.
- c) The polygons were formed on the basis of geo-referenced maps in Arc-GIS software to get shape file of the forest boundary and plot boundary.
- d) The geodetic/geographical co-ordinates along the forest boundary is tabulated in table-1 with UTM co-ordinates (WGS-84) of the surveyed point of DFCCIL Railway line at Village- Sariyakhurd, District- Giridih, Jharkhand under Hazaribagh East Forest division are tabulated in Table-I.


  
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Table -I


List of Geographical Co-ordinate land for proposed  
village- Sariyakhurd, Dist- Giridih

GPS Coordinates		
Sl. No.	Plot No.- 54	Plot No.- 53
1	24°,12',13.80" 85°,51',17.65"	24°,12',4.27" 85°,51',28.66"
2	24°,12',14.36" 85°,51',17.95"	24°,12',4.93" 85°,51',29.56"
3	24°,12',11.10" 85°,51',21.62"	24°,11',57.57" 85°,51',37.31"
4	24°,12',11.93" 85°,51',22.40"	24°,12',4.24" 85°,51',29.56"
5	24°,12',7.02" 85°,51',27.38"	24°,12',3.74" 85°,51',29.13"
6	24°,12',6.82" 85°,51',27.27"	
7	24°,12',5.05" 85°,51',29.49"	
8	24°,12',4.35" 85°,51',28.51"	

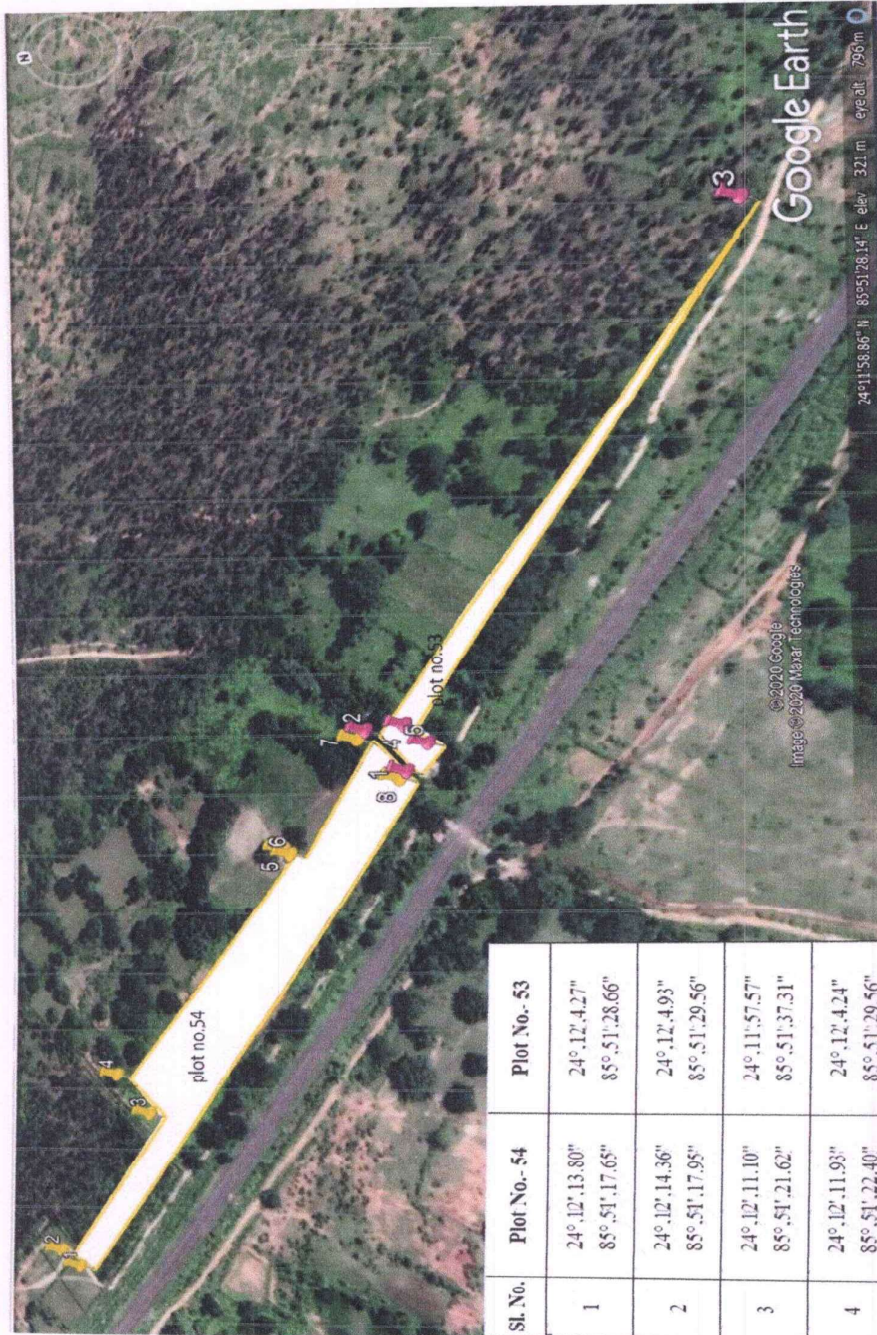
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Sl. No.	Plot No.- 54	Plot No.- 53
1	24° 12' 13.80" 85° 51' 17.65"	24° 12' 4.27" 85° 51' 28.66"
2	24° 12' 14.36" 85° 51' 17.95"	24° 12' 4.93" 85° 51' 29.56"
3	24° 12' 11.10" 85° 51' 21.62"	24° 11' 57.57" 85° 51' 37.31"
4	24° 12' 11.93" 85° 51' 22.40"	24° 12' 4.24" 85° 51' 29.56"
5	24° 12' 7.02" 85° 51' 27.38"	24° 12' 3.74" 85° 51' 29.13"
6	24° 12' 6.82" 85° 51' 27.27"	
7	24° 12' 5.08" 85° 51' 29.49"	
8	24° 12' 4.35" 85° 51' 28.51"	

  
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