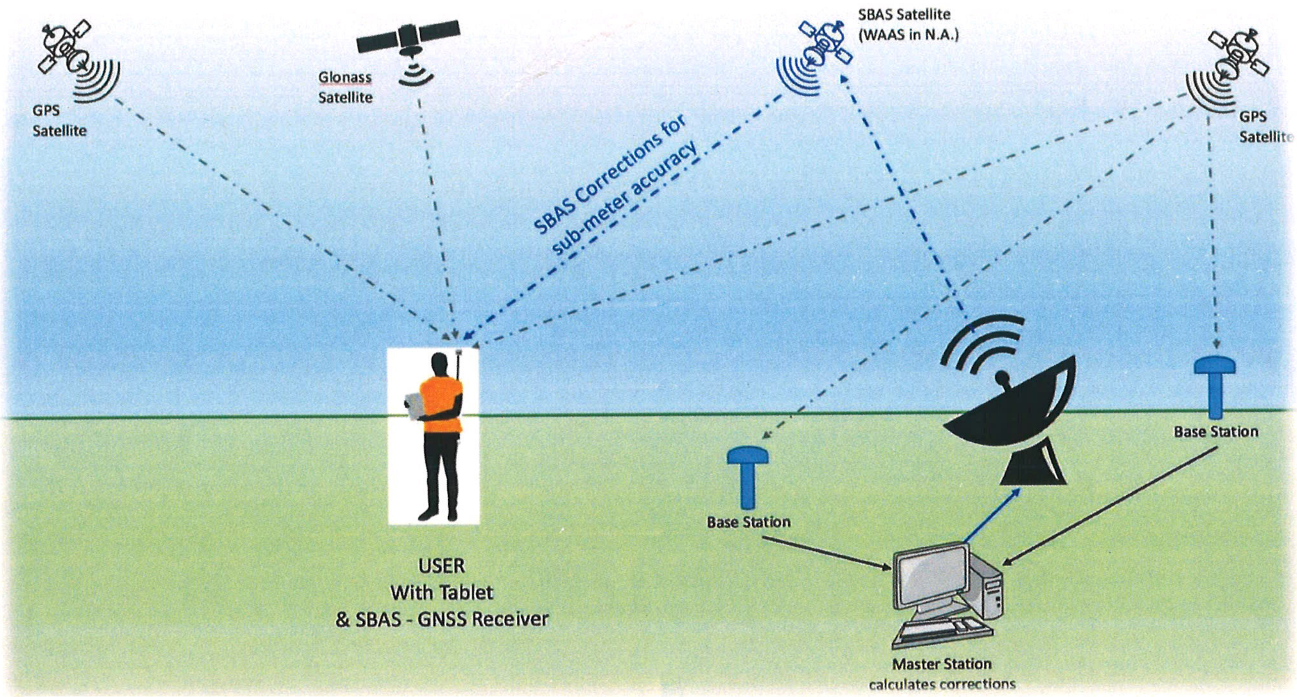
D.G.P.S. SURVEY REPORT FOR

UNDERGROUND WATER PIPE LINE FROM DEWANMUNDA NALA TO B. S. SPONGE PRIVATE LTD. PLANT

FOREST DIVISION RAIGARH
DISTRICT RAIGARH
CHHATTISGARH



For, B. S. Sponge Pvt.Ltd.

Authorised Signatory

Computer Plus Raipur (C.G.)

Submitted To

B.S. Sponge Private Ltd.,
Raigarh, Chhattisgarh.

Report Prepared By

COMPUTER PLUS
Software Development &Consultancy
Devendra Nagar, Raipur, (C.G).

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MAPS ON A3 & A0 PAPER SIZE PRINTOUT

DATA ENCLOSEDIN SOFT COPY

1. ABOUT US

Computer Plus an **ISO 9001:2015 certified** organization working in the field of I.T. Consulting & Software Services. We are registered organization under **Directorate of Geology and Mining, Chhattisgarh**. We are serving since 1998 & head office in Raipur, (C.G.), with core competence in the areas of Integrated Business Solutions with Implementation and Support.

Our Team:

We're justifiably proud of the team we've assembled. Initially numbering just two programmers, **Computer Plus** has grown steadily and now has over 250 staff members. The **Computer Plus** team is made up of highly-qualified, talented and innovative IT and GIS professionals each with their own area of expertise. Their experience spans the full range of custom software development, from small entrepreneurial projects to complex systems for major corporations.

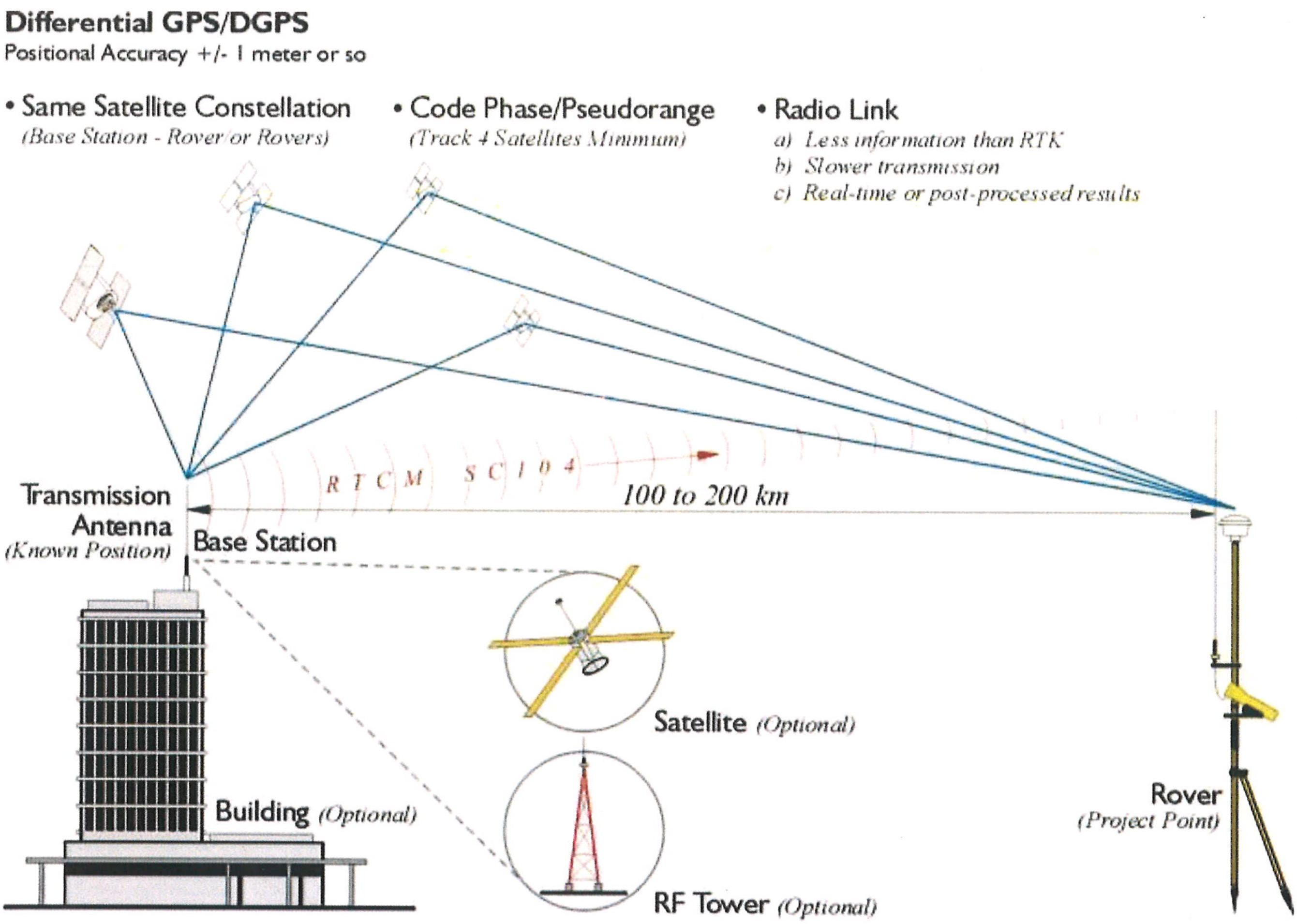
Our Mission:

Computer Plus's mission is to solve challenging technical problems in partnership with our clients.
How we achieve it:

- We understand the business needs of our clients, and how technology can be a tool to make modern businesses more profitable for both private and government sector.
- **Computer Plus** combines technical excellence with great customer service and value for money.
- We value creativity and collaboration; ideas are shared and everybody contributes on an individual basis toward the common goal.

We create new teams for each project, ensuring the best possible combination of skills and experience to meet the client's needs and deliver high quality solutions.

2. INTRODUCTION TO DGPS



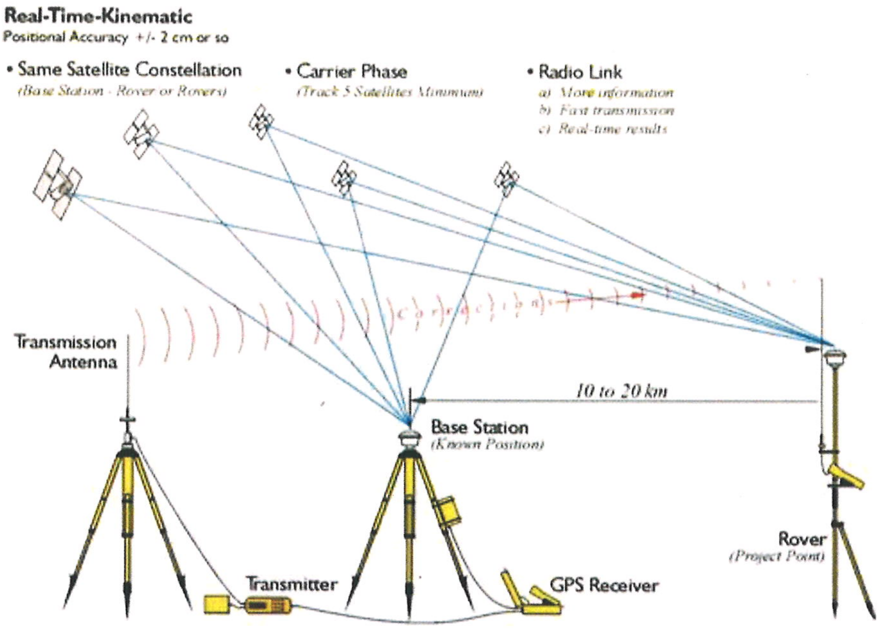
The term DGPS is sometimes used to refer to differential GPS that is based on pseudo ranges, aka code phase. Even though the accuracy of code phase applications was given a boost with the elimination of Selective Availability (SA) in May 2000 consistent accuracy better than the 2-5-meter range still requires reduction of the effect of correlated ephemeris and atmospheric errors by differential corrections. Though the corrections could be applied in post-processing services that supply these corrections, most often operate in real-time. In such an operation pseudo range-based version can offer meter- or even sub meter results.

Usually, pseudo range corrections are broadcast from the base to the rover or rovers for each satellite in the visible constellation. Rovers with an appropriate input/output (I/O) port can receive the correction signal and calculate coordinates. The real-time signal comes to the receiver over a data link. It can originate at a project specific base station or it can come to the user through a service of which there are various categories. Some are open to all users and some are by subscription only. Coverage depends on the spacing of the beacons, aka transmitting base stations, their power, interference, and so forth. Some systems require two-way, some one-way, communication with the base stations. Radio systems, geostationary satellites, low-earth-orbiting.

SURVEY METHOD

1) RTK (Real Time Kinematic)

A. Real-time Kinematic



Most, not all, GPS surveying relies on the idea of differential positioning. The mode of a base or reference receiver at a known location logging data at the same time as a receiver at an unknown location together provide the fundamental information for the determination of accurate coordinates. While this basic approach remains today, the majority of GPS surveying is not done in the static post-processed mode. Post-processing is most often applied to control work. Now, the most commonly used methods utilize receivers on reference stations that provide correction signals to the end user via a data link sometimes over the Internet, radio signal, or cell phone and often in real-time.

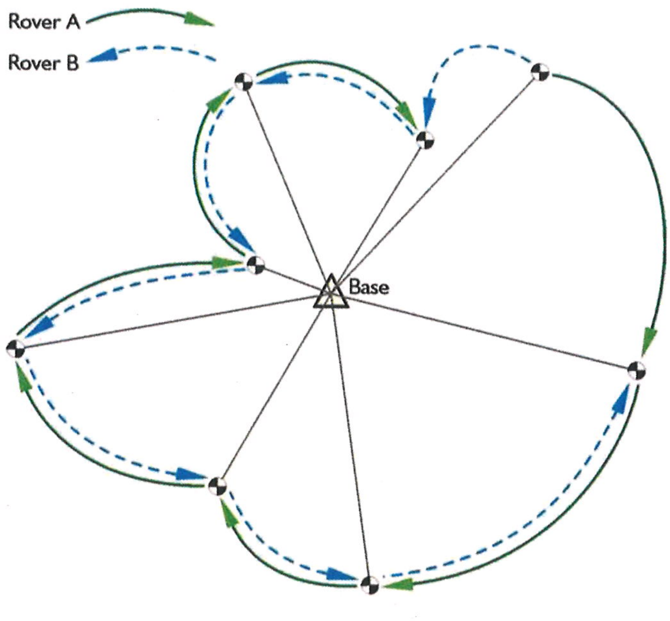
In this category of GPS surveying work there is sometimes a distinction made between code- based and carrier-based solutions. In fact, most systems use a combination of code and carrier measurements so the distinction is more a matter of emphasis rather than an absolute difference. Well that's a bit of discussion about static surveying, but as you know, a good deal of GPS these days is done not static. Much work is now done with DGPS or real-time kinematic, RTK.

Errors in satellite clocks, imperfect orbits, the trip through the layers of the atmosphere, and many other sources contribute inaccuracies to GPS signals by the time they reach a receiver.

These errors are variable, so the best to way to correct them is to monitor them as they happen. A good way to do this is to set up a GPS receiver on a station whose position is known exactly, a base station. This base station receiver's computer can calculate its position from satellite data, compare that position with its actual known position, and find the difference. The resulting error corrections can be communicated from the base to the rover. It works well, but the errors are constantly changing so a base station has to monitor them all the time, at least all the time the rover receiver or receivers are working. While this is happening, the rovers move from place to place collecting the points whose positions you want to know relative to the base station, which is the real objective after all. Then all you have to do is get those base station corrections and the rover's data together somehow. That combination can be done over a data link in real-time, or applied later in post processing.

Real-time positioning is built on the foundation of the idea that, with the important exceptions of multipath and receiver noise, GPS error sources are correlated. In other words, the closer the rover is to the base the more the errors at the ends of the baseline match. The shorter the baseline, the more the errors are correlated. The longer the baseline, the less the errors are correlated.

The base station is at a known point, whether it was on a building permanently or it's a tripod mounted base station. The fact that it is in a known position allows the base station to produce corrections. The constellation is telling the base station that it is in a slightly different place, so corrections can be created to send to the rover at the unknown point. The corrections are applied in real time.



RADIAL GPS

Such real-time surveying is essentially radial. There are advantages to the approach. The advantage is a large number of positions can be established in a short amount of time with little or no planning. The disadvantage is that there is little or no redundancy in positions derived, each of the baselines originates from the same control station. Redundancy can be incorporated, but it requires repetition of the observations so each baseline is determined with more than one GPS constellation. One way to do it is to occupy the project points, the unknown positions, successively with more than one rover. It is best if these successive occupations are separated by at least 4 hours and not more than 8 hours so the satellite constellation can reach a significantly different configuration.

RTK and DGPS are radial. You have a known point in the middle, the base, and then the unknown points around it. This provides little geometric solidity. If there's an error in one of these radial base lines, it would be tough to catch it because there's no real redundancy. The illustration shows a way around this difficulty. There are two receivers, A and B, and it's possible by double occupation, one receiver going one way and the other going the other, by double occupying the unknown points to get some redundancy and some checks against the positions from a base. Another way to do it is to use one receiver. That receiver would occupy each point twice with four to eight hours between the first occupation and the second occupation on the point. Another way is to move the base to another known point. Then if you have vectors from another base into these points, you have a check. This approach allows a solution to be available from two separate control stations. Obviously, this can be done with re-occupation of the project points after one base station has been moved to a new control point, or two base stations can be up and running from the very outset and throughout of the work as would be the case using two CORS stations. It is best if there are both two occupations on each point and each of the two utilize different base stations.

A more convenient but less desirable approach is to do a second occupation almost immediately after the first. The roving receiver's antenna is blocked or tilted until the lock on the satellites is interrupted. It is then re-oriented on the unknown position a second time for the repeat solution. This does offer a second solution, but from virtually the same constellation.

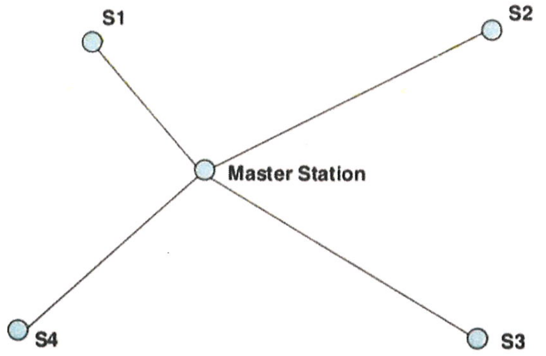
More efficiency can be achieved by adding additional roving receivers. However, as the number of receivers rises, the logistics become more complicated, and a survey plan becomes necessary. Also, project points that are simultaneously near one another but far from the control station should be directly connected with a baseline to maintain the integrity of the survey. Finally, if the base receiver loses lock and it goes unnoticed, it will completely defeat the radial survey for the time it is down.

These are a few possibilities to consider when you are doing a real-time survey.

An advantage to continuously operating reference station network is that since those bases are operating simultaneously and all the time, it's possible to download the positions from more than one base and process your new position based on these continuously operating reference stations and have some redundancy.

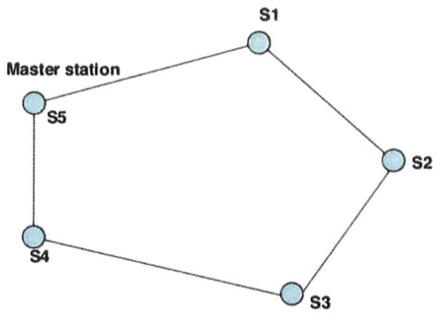
2) STATIC METHOD

I. Rapid Static Method



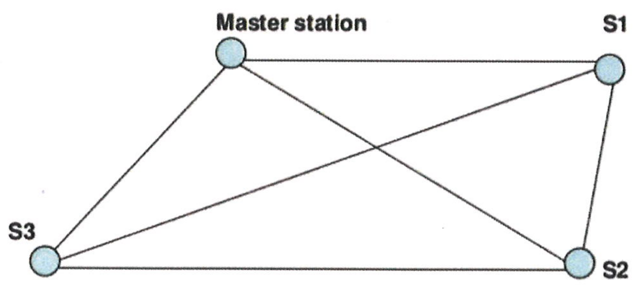
Schematic diagram of Rapid Static Method

II.Traverse Method



Schematic diagram of Traverse method

III. Trilateration Method

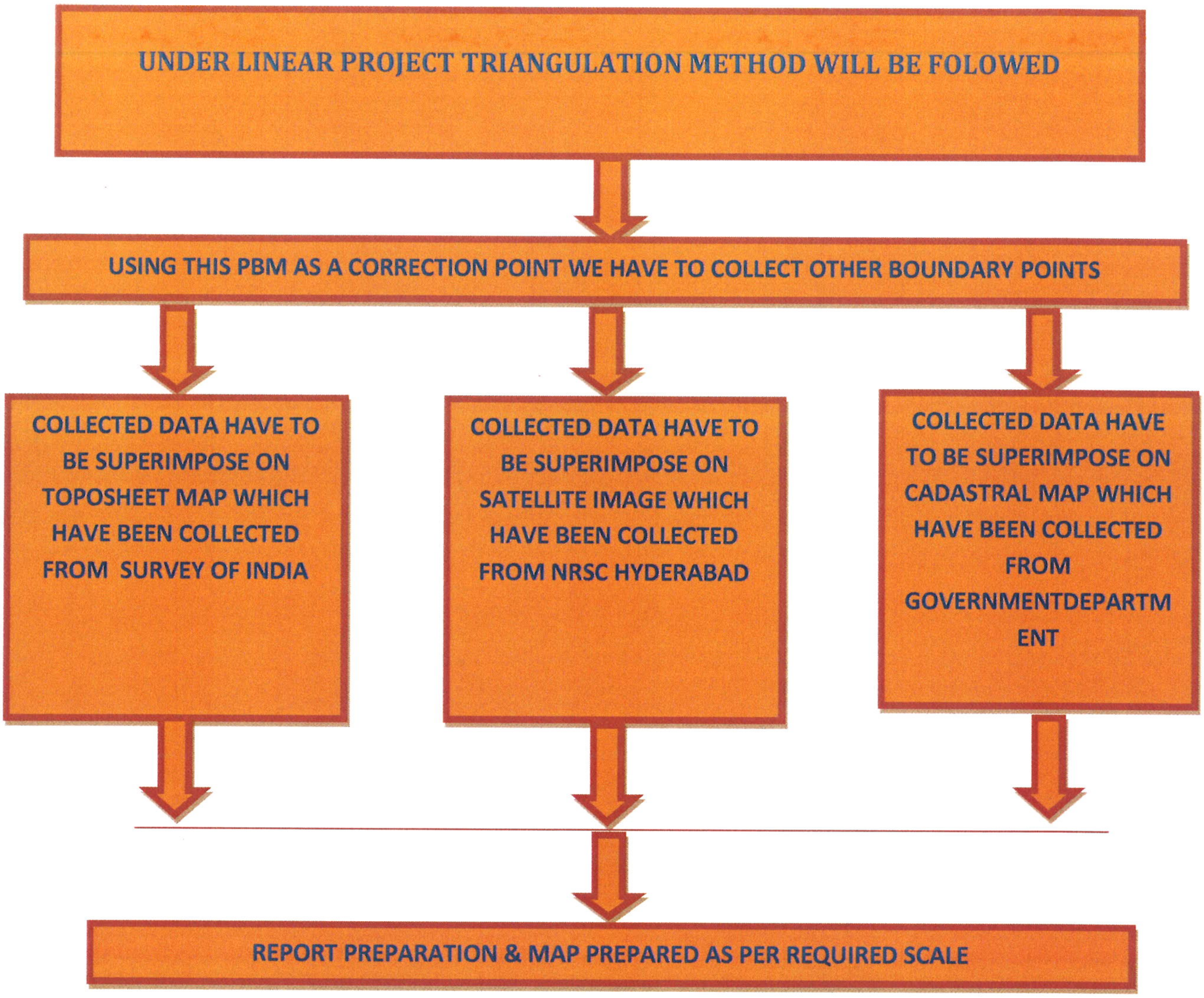


Trilateration method

3. METHODOLOGY USED

Following Methodology have been adopted for DGPS Survey of the proposed site.

SURVEY METHODOLOGY UNDER LINEAR PROJECT



4. DETAILS OF SURVEYED SITE

The surveyed area for **Underground pipe line from Devenmunda Nala to B.S. Sponge Private Ltd. Plant,** which comes under **Block Tamnar, District Raigarh Chhattisgarh**. Raigarh Bus Station longitude latitude is **83°23'39.25"E 21°54'0.62"N.** Survey site is located **20.5 Km** from **Raigarh Bus Station**. Survey site comes under **Forest Division Raigarh, Forest Range Tamnar and Forest Circle Raigarh.**

It is covered in Survey of India Toposheet No.64N8.

Details of area surveyed and land details are given below:

AREA DETAILS & LAND CLASSIFICATION

<table>
<tr><th>Sr.No.</th><th>Forest Division & District</th><th>Range</th><th>Village Name</th><th>Land Type</th><th>Component</th><th>Compartment No.</th><th>AREA (In Hectare)</th></tr>
<tr><td>1</td><td rowspan="3">Raigarh</td><td rowspan="3">Tamnar</td><td rowspan="3">Jamdabri</td><td rowspan="3">Reserve Forest</td><td rowspan="2">Water Pipe Line</td><td>835</td><td>0.025</td></tr>
<tr><td>2</td><td>833</td><td>0.117</td></tr>
<tr><td>3</td><td>Pump House</td><td>833</td><td>0.002</td></tr>
<tr><td colspan="4">TOTAL LENGTH - 942.516 Meter</td><td colspan="3">TOTAL WIDTH - 1.5 Meter</td><td>-</td></tr>
<tr><td colspan="7">TOTAL</td><td>0.144</td></tr>
</table>

For, B. S. Sponge Pvt.Ltd.

Authorised Signatory

Computer Plus Raipur (C.G.)

वन मण्डलाधिकारी
रायगढ़,वनमण्डल

वन परिक्षेत्र अधिकारी
तमनार

5. CONTROL POINTS

Primary Control Point (Fixing of Base Station Point)

Details of primary control points used for fixing of Base Station Point are given below.

Primary Control Point (Fixing of Base Station Point)

Sr. No.	Point ID	Geographical Coordinate		UTM Coordinate	
		Longitude	Latitude	Easting	Northing
1	1	83° 20' 55.797" E	22° 2' 14.923" N	742433.834372	2438840.592149

Surveyed Ground Control Points

Sr. No.	Point ID	Geographical Coordinate		UTM Coordinate	
		Longitude	Latitude	Easting	Northing
1	C01A	83° 20' 56.406" E	22° 2' 16.294" N	742450.666504	2438883.014893
2	L01A	83° 20' 56.390" E	22° 2' 16.312" N	742450.175040	2438883.581429
3	R01A	83° 20' 56.423" E	22° 2' 16.275" N	742451.157967	2438882.448356
4	C01	83° 20' 56.033" E	22° 2' 16.001" N	742440.091108	2438873.840794
5	L01	83° 20' 56.049" E	22° 2' 15.982" N	742440.572143	2438873.265376
6	R01	83° 20' 56.016" E	22° 2' 16.020" N	742439.610073	2438874.416211
7	C02	83° 20' 54.678" E	22° 2' 14.978" N	742401.729932	2438841.771802
8	L02	83° 20' 54.695" E	22° 2' 14.959" N	742402.210967	2438841.196385
9	R02	83° 20' 54.662" E	22° 2' 14.997" N	742401.248897	2438842.347220
10	C03	83° 20' 53.324" E	22° 2' 13.955" N	742363.368757	2438809.702811
11	L03	83° 20' 53.341" E	22° 2' 13.936" N	742363.849791	2438809.127393
12	R03	83° 20' 53.308" E	22° 2' 13.974" N	742362.887722	2438810.278229
13	C04	83° 20' 51.970" E	22° 2' 12.932" N	742325.007581	2438777.633820
14	L04	83° 20' 51.986" E	22° 2' 12.913" N	742325.488616	2438777.058402
15	R04	83° 20' 51.953" E	22° 2' 12.951" N	742324.526546	2438778.209237
16	C05	83° 20' 50.615" E	22° 2' 11.909" N	742286.646405	2438745.564828
17	L05	83° 20' 50.632" E	22° 2' 11.890" N	742287.127440	2438744.989411
18	R05	83° 20' 50.599" E	22° 2' 11.928" N	742286.165371	2438746.140246
19	C06	83° 20' 49.261" E	22° 2' 10.886" N	742248.285230	2438713.495837
20	L06	83° 20' 49.278" E	22° 2' 10.867" N	742248.766265	2438712.920419
21	R06	83° 20' 49.245" E	22° 2' 10.905" N	742247.804195	2438714.071255
22	C07	83° 20' 47.907" E	22° 2' 9.863" N	742209.924054	2438681.426846
23	L07	83° 20' 47.923" E	22° 2' 9.844" N	742210.405089	2438680.851428
24	R07	83° 20' 47.890" E	22° 2' 9.882" N	742209.443019	2438682.002263
25	C08	83° 20' 46.553" E	22° 2' 8.840" N	742171.562879	2438649.357854
26	L08	83° 20' 46.569" E	22° 2' 8.821" N	742172.043914	2438648.782437
27	R08	83° 20' 46.536" E	22° 2' 8.859" N	742171.081844	2438649.933272
28	C09	83° 20' 45.198" E	22° 2' 7.817" N	742133.201703	2438617.288863

Sr. No.	Point ID	Geographical Coordinate		UTM Coordinate	
		Longitude	Latitude	Easting	Northing
29	L09	83° 20' 45.215" E	22° 2' 7.798" N	742133.682738	2438616.713445
30	R09	83° 20' 45.182" E	22° 2' 7.836" N	742132.720668	2438617.864280
31	C10	83° 20' 43.844" E	22° 2' 6.794" N	742094.840528	2438585.219871
32	L10	83° 20' 43.860" E	22° 2' 6.775" N	742095.321562	2438584.644454
33	R10	83° 20' 43.828" E	22° 2' 6.813" N	742094.359493	2438585.795289
34	C11	83° 20' 42.490" E	22° 2' 5.771" N	742056.479352	2438553.150880
35	L11	83° 20' 42.506" E	22° 2' 5.752" N	742056.960387	2438552.575462
36	R11	83° 20' 42.473" E	22° 2' 5.790" N	742055.998317	2438553.726298
37	C12	83° 20' 41.135" E	22° 2' 4.748" N	742018.118176	2438521.081889
38	L12	83° 20' 41.152" E	22° 2' 4.729" N	742018.599211	2438520.506471
39	R12	83° 20' 41.119" E	22° 2' 4.767" N	742017.637141	2438521.657306
40	C13	83° 20' 39.781" E	22° 2' 3.725" N	741979.757001	2438489.012897
41	L13	83° 20' 39.798" E	22° 2' 3.706" N	741980.238036	2438488.437480
42	R13	83° 20' 39.765" E	22° 2' 3.744" N	741979.275966	2438489.588315
43	C14	83° 20' 38.427" E	22° 2' 2.702" N	741941.395825	2438456.943906
44	L14	83° 20' 38.443" E	22° 2' 2.683" N	741941.876860	2438456.368488
45	R14	83° 20' 38.410" E	22° 2' 2.721" N	741940.914790	2438457.519324
46	C15	83° 20' 37.073" E	22° 2' 1.679" N	741903.034650	2438424.874915
47	L15	83° 20' 37.089" E	22° 2' 1.660" N	741903.515684	2438424.299497
48	R15	83° 20' 37.056" E	22° 2' 1.698" N	741902.553615	2438425.450332
49	C16	83° 20' 35.718" E	22° 2' 0.656" N	741864.673474	2438392.805923
50	L16	83° 20' 35.735" E	22° 2' 0.637" N	741865.154509	2438392.230506
51	R16	83° 20' 35.702" E	22° 2' 0.675" N	741864.192439	2438393.381341
52	C17	83° 20' 34.364" E	22° 1' 59.633" N	741826.312298	2438360.736932
53	L17	83° 20' 34.381" E	22° 1' 59.614" N	741826.793333	2438360.161514
54	R17	83° 20' 34.348" E	22° 1' 59.652" N	741825.831264	2438361.312349
55	C18	83° 20' 33.010" E	22° 1' 58.610" N	741787.951123	2438328.667940
56	L18	83° 20' 33.026" E	22° 1' 58.591" N	741788.432158	2438328.092523
57	R18	83° 20' 32.993" E	22° 1' 58.629" N	741787.470088	2438329.243358
58	C19	83° 20' 31.656" E	22° 1' 57.587" N	741749.589947	2438296.598949
59	L19	83° 20' 31.672" E	22° 1' 57.568" N	741750.070982	2438296.023531
60	R19	83° 20' 31.639" E	22° 1' 57.606" N	741749.108912	2438297.174367
61	C20	83° 20' 30.883" E	22° 1' 57.004" N	741727.711872	2438278.309421
62	L20	83° 20' 30.900" E	22° 1' 56.985" N	741728.192907	2438277.734003
63	R20	83° 20' 30.867" E	22° 1' 57.023" N	741727.230837	2438278.884838
64	PHB01	83° 20' 30.927" E	22° 1' 56.953" N	741728.994632	2438276.774974
65	PHB02	83° 20' 30.792" E	22° 1' 56.851" N	741725.158515	2438273.568074
66	PHB03	83° 20' 30.704" E	22° 1' 56.952" N	741722.592995	2438276.636968
67	PHB04	83° 20' 30.839" E	22° 1' 57.054" N	741726.429112	2438279.843868

उपवनमण्डलाधिकारी
धरघोड़ा उपवनमण्डल

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Computer Plus Raipur (C.G.)

वन मण्डलाधिकारी
रायगढ़, वनमण्डल

For, B. S. Sponge Pvt. Ltd.

Authorised Signatory

6. SURVEY DATE

Survey Date	Survey Time	Village
04/12/2021	10 AM To 05.30 PM	Jamdabri

Weather was pleasant with clear sun light. Survey point marking and temporary pillar posting has been done by a team of **Computer Plus.** Comprising of following members:

1. Mr. Sanjay Gardiya
2. Mr. Amit Loha
3. Mr. Krishna Kumar

The team was headed by **Mr. Sanjay Gardiya** and Report is prepared by **Mr. Omshankar**.

➢ **Base Station Photographs**

- **Survey Photograph with Staff**

Thank You!

DGPS SURVEY & REPORT PREPARED BY:

COMPUTER PLUS

Software Development & Consultancy

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