SCHEME FOR
SITE SPECIFIC COMPENSATORY AFFORESTATION

OVER

508.496 HA OF NON-FOREST GOVT. LAND IDENTIFIED IN VILLAGE MELKUNDEL

UNDER THUAMUL RAMPUR TAHASIL

IN

KALAHANDI DISTRICT

AGAINST

KURMITAR IRON AND MANGANESE ORE MINING LEASE IN SUNDARGARH DISTRICT, ODISHA

OF

M/s ODISHA MINING CORPORATION LTD.

OMC HOUSE, POST BOX-34, BHUBANESWAR-1

SCHEME FOR SITE SPECIFIC COMPENSATORY AFFORESTATION OVER 508.496 HA OF NON-FOREST GOVT. LAND IDENTIFIED IN VILLAGE MELKUNDEL UNDER THUAMUL RAMPUR TAHASIL IN KALAHANDI DISTRICT AGAINST KURMITAR IRON AND MANGANESE ORE MINING LEASE OF M/s ODISHA MINING CORPORATION LTD.

INTRODUCTION:

Kurmitar Iron and Manganese Ore Mines, over an area of 1212.47 ha was held by OMC Ltd under mining lease with effect from 29.04.1965 for a period of 30 years for extraction of Iron Ore. Application for renewal of Mining Lease after expiry of the lease period has been filed over a reduced area of 651.00 ha, which is of forest category land. The total forest area approved by MoEF, Government of India under Section 2 of the F C Act 1980 vide letter No.8-113/2000-FC dt 10.04.2007 is 133.112 ha. OMC is submitting a revised proposal for diversion of balance forest land over 517.888 ha (651.00 ha – 133.112 ha) including 9.392 ha earmarked for safety zone. Hence the requirement of non-forest Govt. land for compensatory afforestation comes to 508.496 ha (Total Forest Area: 651.00 ha – SZ area: 9.392 ha – Area approved by MoEF, Govt. of India: 133.112 ha). In accordance with the provision of Forest (Conservation) Act 1980, compensatory afforestation scheme over 508.496 ha of non-forest land has to be covered to compensate the loss of forest and environment in general against the forest land proposed to be utilized for non-forestry activity pertaining to Kurmitar Iron and Manganese Ore Mines.

So, the present scheme aim at preparation of site specific compensatory afforestation scheme over 508.496 ha of non-forest land with suitable soil and water conservation measures for regeneration, rehabilitation and restocking of existing forest growth followed by gap plantation with suitable indigenous species to restore the biodiversity. The non-forest land will be rehabilitated through different silvicultural operations and plantations with the active participation and awareness of the local villagers and NGOs through entry point activities and JFM mode.

SELECTION OF SITE:

Non-forest Govt. land to the extent of 508.496 ha in a compact patch was not available in the district of Sundargarh in which the mine is located. Therefore, considering the urgency and request made by OMC equivalent non-forest Govt. land for the purpose of raising compensatory afforestation has been identified in the village Melkundal under Thuamul Rampur R.I. circle of Thuamul Rampur Tahasil in Kalahandi District. The details of plot wise land schedule are furnished below. The site is located on survey of India Topo Sheet No. E 44 E 14 between latitude: 19° 38' 23.0849" - 19° 35' 59.7839" N, longitude: 82°56' 03.7782"- 82°58' 04.4394" E (**Annexure-I**) and at a distance of 12 Km from Tahasil Headquarters. The proposed area is free from encroachment and encumbrances and suitable for plantation is outlined as below. Moreover, the local people most of whom are tribal are very much interested in rehabilitation of the degraded forest to reap the usufructs & to meet their social, cultural and economic needs.

Land schedule of the proposed compensatory afforestation area

Tahasil	Village	Khata No.	Plot No.	Area of the plot (Acr)	Area considered (Acr)	Kissam	Khata No.	Plot No.	Area of the plot (Acr)	Area considered (Acr)	Kissam
THUAMULRAMPUR	MELKUNDAL	155 Abada Ajogya Anabadi	1	49.450	49.45	Dangar	155 Abada Ajogya Anabadi	773	46.25	41.15	Dangar
			673	20.100	20.10	Dangar		774	43.33	43.33	Dangar
			681	9.60	9.60	Dangar		782	63.70	63.70	Dangar
			682	47.08	47.08	Dangar		816	52.83	52.83	Dangar
			684	32.83	32.83	Dangar		27/919	40.00	40.00	Dangar
			685	56.80	56.80	Dangar		27/820	31.40	31.40	Dangar
			686	49.20	49.20	Dangar		27/821	23.65	23.65	Dangar
			687	40.90	40.90	Dangar		26	44.75	44.75	Dangar
			697	7.30	7.30	Dangar		27	40.00	40.00	Dangar
			717	3.12	3.12	Dangar		60	41.63	36.73	Dangar
			722	36.83	36.23	Dangar		77	42.45	37.05	Dangar
			723	30.60	30.60	Dangar		313	22.50	22.50	Dangar
			724	37.50	37.50	Dangar		314	26.00	23.60	Dangar
			725	60.88	57.38	Dangar		356	61.33	57.83	Dangar
			748	4.48	4.48	Dangar		357	19.58	19.00	Dangar
			751	11.10	11.10	Dangar		358	40.53	40.00	Dangar
			752	12.48	12.48	Dangar		408	24.150	23.95	Dangar
			754	41.95	41.95	Dangar		612	14.88	14.00	Dangar
			763	52.13	52.13	Dangar		613	19.60	17.60	Dangar
Total Area: 1302.890 Ac or 521.156 ha Area Considered: 1273.300 Acr or 515.287 ha											

An area of 508.496 ha has been found suitable and is covered under the present scheme. The village map showing the above land details for the proposed compensatory afforestation is enclosed as **Plate No.IX.** The land details jointly verified by Forest and Revenue authorities are enclosed as **Annexure-VII.**

DESCRIPTION OF THE EXISTING VEGITATION:

The site although categorized as non-forest land kissam in revenue record still comprises forest growth crops like Sal, Mahul, Kusum, Kendu, Bela, Kurei, Gambhari, Bamboo, Asana, Sisoo, Amba and Misc. species in pole condition in a degraded state having canopy density 0.1 to 0.4. The floor of the forest is devoid of under growth due to soil erosion, repeated annual fire and "podu cultivation".

SOIL & TOPOGRAPHY:

The topography of the area is mainly hilly with its lower slope fairly gentle in nature. The valleys are narrow. Some portion of the area is completely devoid of any forest growth. The minimum height of the area is 640 m above MSL occurring to NW and maximum height occurs at 990 above MSL, occurring to the NE of of the area. The seasonal streams are dendritic in nature. The overall slope of the ground is towards west direction. The westerly flowing streams drains to Gharia Jor which in turn is a tributary of Hati Nadi flowing towards North. The 1st and 2nd order streams flowing westerly discharges to a perennial stream which joins Gharia Jor. The soil is eroded at the lowest slope of the

mounds with formation of gullies and small ravines. The area is bordered on west by Singari RF and on SW by Gopalpur RF. Melkundel and Pindapadar villages occur to western part of Patch-I. However, good depth of soil (1ft to 2ft) of loam and sandy loam are found in blank areas at patches in the plots and on podu ravaged areas. Podu cultivation is not very conspicuous but remnants are found at places. The effect of past "podu cultivation" is experienced due to presence of even aged crop at places. The drainage is dendritic type due to heavy soil erosion.

RAINFALL & TEMPERATURE:

The annual rainfall varies from 1200 mm to 1500 mm. The maximum rainfall is received during the rainy season from July to September. The average temperature varies from 13.5°C minimum in December to 45° C maximum in May.

OBJECTIVE OF THE SCHEME:

The main objective of the present scheme is to **(i)** restock the degraded non-forest area by taking up plantation, **(ii)** tending the existing degraded crop where ever available with suitable silvicultural practices, **(iii)** clearly demarcating the area with posting up RCC pillars and **(iv)** providing strong barbed wire fencing to dispense with the biotic interferences, **(v)** enforcing protection measures by involving people around under JFM and **(vi)** above all checking soil erosion and run off which will go in combination for enrichment of the vegetation and soil and building up ecosystem. The total 508.496 ha shall be covered under ANR (Gap plantation) mode with 300 plant/ha. Some rocky patches distributed in several locations inside the area of 515.287 ha jointly verified with Revenue authorities are retained as such for smooth management point of view and providing shelter to the wild fauna in the caves, crevices, talus etc.

ITEMS OF WORKS TO BE TAKEN UP:

To achieve the above objectives, the following items of work are mainly prescribed to be taken up with the full involvement and co-operation of local villagers.

1. **Survey and demarcation of Boundary:** The identified non-forest land is very close to the agricultural fields. Hence the boundary should be surveyed clearly by the User Agency with reference to the village maps and demarcated by posting R.C.C. pillars of size 1.25 mtr x 20 cm x 20 cm which shall be embedded at every corner/turning points of boundary line. The RCC pillars shall be embedded 0.625mtr deep in to the ground with a foundation of 50 cm x 40 cm. in C.C. Top of the pillar shall have a slanting cut facing outside the area for numbering the pillars which will be done in the same sequence as done in the map. Numbering should start from North-Western Corner and proceed in a clock wise direction. The distance between the corner points, forward and back ward bearing of each point, its GPS reading and the perimeter of the area to be afforested is given in **Annexure-II**.

2. **Fencing:** To protect the plantation and regeneration cleaning area from grazing and other biotic interferences, fencing shall be taken up around the entire compensatory afforestation site by using 5 stranded barbed wire (with two cross strands in each section) fencing with concrete posts. A model estimate for barbed wire fencing for 1 Km has been provided in **Annexure-III**. In addition

Agave bulbils will be planted at a spacing of 2mt. along the boundary as a permanent feature of boundary.

3. **Assisted Natural Regeneration (ANR) with Gap Plantation:** The identified site is subjected to podu cultivation in patches of one acre to two acre, mostly occurring in moderate hill slopes and plains. Such degraded areas will be covered by ANR practices followed by gap plantation at the rate of 300 saplings per hectare. Out of the total allotted area of 515.287 ha due to technical reasons 508.496 ha shall be covered by ANR with gap planting in a staggered manner without any proper spacing as per site condition. The sites which are almost subjected to Podu Cultivation and occurring in patches. Plantation over the those areas shall be taken up at a spacing of 2.5m x 2.5m taking care of existing forest crops, if any.

Care should be taken to select only indigenous species as far as possible keeping in view of the existing natural vegetation in and around the area and also the climatic and edaphic factors. The choices of species are as follows:

Amla	*Emblica officinalis*
Bamboo kanda	*Bambusa arundinacea*
Karanja	*Pongomia pinnata*
Teak	*Tectona grandis*

Sisoo	*Dalbergia sisoo*
Neem	*Azadirachta indica*
Mahul	*Madhuca indica*
Bahada	*Terminalia belerica*

In the peripheral areas of the site, susceptible to grazing may be planted with non browsable species like teak, karanja etc.

The soil being eroded and lack of humus, it is proposed to take up pitting with a pit size of 30cm x 30cm x 30 cm at a spacing of 2.5 m x 2.5 m during February/March for allowing weathering of the soil. It is advisable to use an "A" frame for alignment of the pitting line along the contour. The planting should be taken up only with two year old seedlings having height more than one meter. The size of P. bags will be 12 inch x 9 inch with desired quantity of input. The seedlings will be graded and sorted at regular intervals to make those healthy and sound and to avoid root coiling.

While taking up the plantation in Podu ravaged areas species like Kusum, Mohul, Amla, Karanj, Neem, Asan, Teak, Jack fruit and specially Mango in more number shall only be planted which will help the tribal of Juang and Bhuyan to collect the NTFP items for their livelihood and socio-economic upliftment.

Staggered trenches of size 2 mt X 50 cm x 50 cm should be dug in between the planting rows at an interval of 2.0 mt along the contour, and the excavated earth are piled on the downhill side to form a bund. The staggered contour bunds should be stabilized with turf if necessary. The staggered contour trenches will not only arrest, soil erosion but also conserve moisture and micronutrient for the planted saplings. It will retard the velocity of runoff and will be helpful in feeding ground water to the plants below it. If necessary, half moon trenches may be created at sloppy terrain for the same purpose on or before 2nd weeding.

3.2 **Development of Nursery:** A good nursery is the pre-requisite for a successful plantation. Therefore, all care should be taken to raise healthy and sound seedling of required sizes before they are put to the plantation site. The site being heavily eroded and subjected to other biotic

interference, it is proposed to raise two year old seedlings for plantation. This should be particularly adopted in case of slow growing species like Mahul, Neem, Amla, Harida, Karanja, etc. In case of species like Sisoo & Gambhar, one year old seedling is good enough for plantation purpose. In case of Bamboo and Teak, pre-sprouted seedling from rhizomes and stumps should be raised for plantation purpose. Accordingly, the nursery programme can be planned out one year in advance. The two year seedling should be raised in poly-bags of 12 inch x 9 inch and one year old seedling can be raised in 10 inch x 6 inch poly bags. All care as per the guideline of the plantation manual should be taken up at all stages of nursery operation so that a good stock of healthy seedling can be raised. 10% extra seedlings should be raised to cover the short fall due to casualty in the nursery stage. In case of all the seedlings, shifting, grading of polythene bags should be done from time to time not to allow the tap roots to strike the ground. Nursery site should be selected, preferably near to the plantation site and in a well drained locality having perennial water sources.

3.3 **Planting:** The best time of planting of the potted seedling is soon after the onset of regular monsoon or after a good shower of rain. Before planting, the pits are to be prepared by putting mixture of half cubic feet, of alluvial soil and farmyard manure. Basal dose of 30 gram of NPK fertilizer and 5 gram of Aldrin dust or phorate pesticide are to be applied to the pits before planting as basal dose. The excavated earth from the pits already weathered and free from stones should be filled in the pits. Before removal of the plants from the Nursery the following precaution should be taken:

(i) Roots escaping from the container should be trimmed.
(ii) Posts containing the plant are watered, if necessary.
(iii)Maximum care should be taken at the time of transportation and handling of seedling so that the ball of earth of the poly pots does not get disturbed and the primary leading shoots are broken. Manual transportation should be given preference.

Planting should be taken up on rainy/cloudy days by adopting all standard techniques of plantation. As far as possible, Bamboo should be put as a fourth plant in the row and planting up other species should be mixed with poly culture design.

Casualty of seedlings occurs due to various causes like heavy rains, drought, fire, grazing etc. But in a well managed plantation, where the planting stock consists of healthy and stout seedlings, say, about 5% may die during the period between planting and 1st weeding. The operation of casualty replacement may be done in combination with weeding. Seedlings to be used for casualty replacement should be earmarked and kept reserved at the time of planting. Only healthy and stout seedlings slightly larger than those planted at the time of operation should be used. This is important because only such seedlings can catch up growth with those that have survived and are growing. Before planting for casualty replacement, the following operations are to be taken up:

(a) The failure pit is to be dug again.
(b) Another dose of fertilizer, and insecticide should be given to the pit.
(c) If the casualties are due to white ant attack, little more quantity of phorate pesticide may be applied to the pit.
(d) If the casualties are due to water logging and wilting, care should be taken to drain out the pits by making small channels to downhill side.

(e) Watering is to be done generally directly after planting, if the planting is done on a dry day.

Casualty replacement can also be taken up in the 2nd year formation and this time should not exceed 20%.

3.4 **Weeding, Manuring & Soil working:** To improve and enhance the growth of plants, it is necessary to see that the plants get as much nutrients as for as possible and that no other wild plants are contesting for space, light and nutrients. Therefore, weeding and soil working must be undertaken in a newly established plantation. Weeding consist of loosening soil around the plant with a hoe or even with a pick-axe and pulling out all unwanted growth along with their roots, rhizomes, stools etc. While doing so, care should be taken to see that the root system of the planted seedling is not damaged. Weeds within a radius of 0.5 meters around the plant should be removed. Under the prevailing conditions, two weeding are considered sufficient, the first to take place a few weeks after the main plantation is over, say, in August and the second weeding in early winter, i.e., in October or November. Strip weeding which involves cutting of weeds flush to the ground may be confined to the place in between the planted lines. The cut material may be placed along the contour between two rows of plantation, which will ultimately help in conservation of soil and moisture. Soil working is equally an important operation and it should be carried out at the time of each weeding. While loosening the soil, it is important to see that the soil is not pulverized but left in clods. This not only helps in improving soil erosion but also helps in moisture conservation by breaking soil capacity.

The best time for application of fertilizer is at the time of soil working and weeding. In organic fertilizer like NPK @ 50gm/plant shall be applied at the time of soil working. Chemical fertilizer should not be placed too close to the plants as it may burn the roots and kill the plants. A small dose of urea @ 20gm/plant may be applied by crow bar hole method before 1st weeding, if possible for root penetration and growth of seedlings.

It is advisable to apply fertilizer on a rainy day soon after the weeding has been completed.

3.5 **Mulching:** Mulching is an operation where cut vegetative materials are placed around planted seedling covering the soil around it. This helps soil climate to considerable extent from desiccation. Mulching affects soil temperature, helps condensation, and prevents soil erosion and loss of soil moisture through evaporation. Further, it is to be carried out at the time of 2nd weeding. Weeds which have not lowered may be pulled out from around the planted seedlings and may be used as mulches around the seedlings.

Pruning of lower branches of the seedlings planted should be done in the third and subsequent years. This operation is beneficial for the following reasons.

(a) They allow the plants to be healthy and stout and have knot free stems.
(b) It reduces fire hazards by lessening the chance of ground fire.
(c) The plants will be straight with clear bole.

The detailed cost estimate of various operations to be taken up in ANR plantation (300 seedlings) mode has been furnished in **Annexure – IV**.

4. **Silvicultural operation through ANR practices**: The natural vegetation existing over 508.496 ha. is in a degraded stage as rooted wastes, bushes and poles will be tended by silvicultural practices viz. coppicing, cleaning, thinning shoot manipulation, singling, climber cutting etc. to enable the degraded vegetation to establish as trees. The permanent small gaps will be restocked by planting indigenous seedlings @ 300/ha according to planting operation narrated above. Considering the site condition germinated seeds of the natural grown trees may be dibbled by minor hoeing without any spacing during 1st week of July. It can also enrich the vegetative cover to some extent. Germinated mango carnal, bamboo rhizome and jackfruit carnal will be more appreciated by the tribal.

5. **Soil Conservation Measures:** The slope of the identified area varies from gentle to moderate slopes and therefore, soil conservation measures are indispensable and are to be appropriately addressed. The following measures are proposed to be taken up inside the plantation area and regeneration cleaning area.

   i) In the slopes, staggered trenches of 2m x 50Cm x 50Cm should be dug in between the planting line along the contours at an interval of 2.0m, and the excavated earth be piled on the downhill side to form a bund. The staggered contour bunds should be stabilized with plantation on it. The staggered contour trenches will act as place of deposit of eroded soil and will check soil erosion. It will retard the velocity of run-off and will be helpful in feeding ground water to the plants planted below it.

   ii) Check dams are proposed to be constructed with dry rubble stone across in small nallahs specially to be given on the upper reaches of the nallahs.

   The detailed cost estimate of soil conservation measures has been furnished in **Annexure–V (A-E)**.

6. **People's Participation:** In the recent times, no scheme shall be effective if the local villagers are not involved in the implementation of the scheme itself. The villagers who are having a right on the NTFP items in the adjoining forest area are to be associated with the implementation of the scheme at all different levels. For that, Van Samrakhyana Samittee (VSS) is proposed to be constituted in all the villages around the compensatory afforestation site. In accordance with the guidelines of the Government of Odisha issued on 3rd July'1993, the villagers are to be motivated and inspired and above all, explained the benefits they will be getting if plantation is protected by them.

   To protect the plantation, extra care shall be taken to develop the living standard of the local tribes who were making the podu cultivation in the proponent compensatory afforestation site. To develop their living standard, through eco development programmes like land development programme of their tenanted area, plantation of fruit bearing trees in their home stead land and farm house, providing them with high breed vegetable seeds and providing goat, sheep and chicks for rearing shall be taken up as a part of income generation programme offer conducting PRA through resourceful agencies. Moreover, their culture and religious sentiments are also be taken care of and to keep them in good humor, incentives on developmental/cultural activities shall be given which will have a long benefit on the success of plantation programme. All forest conservation events shall be celebrated in their village for creating awareness among them for protection of the plantation.

7. **Monitoring & Execution:** Establishment & Infrastructure: The scheme will be executed by the Forest Department and shall be monitored from time to time by responsible officers including DFO. Nursery, plantation journal and other relevant documents shall be maintained as per the provision of the Plantation Manual. A plantation shed with drinking water facilities may be constructed at the site for execution of different works and from future protection point of view.

8. **Total cost of the project:** The total cost of the project will be **Rs 4,49,06,900.00** as detailed in **Annexure-VI**, which will be deposited in an account as per the direction of the DFO in favour of State specific CAMPA.

15/9/14

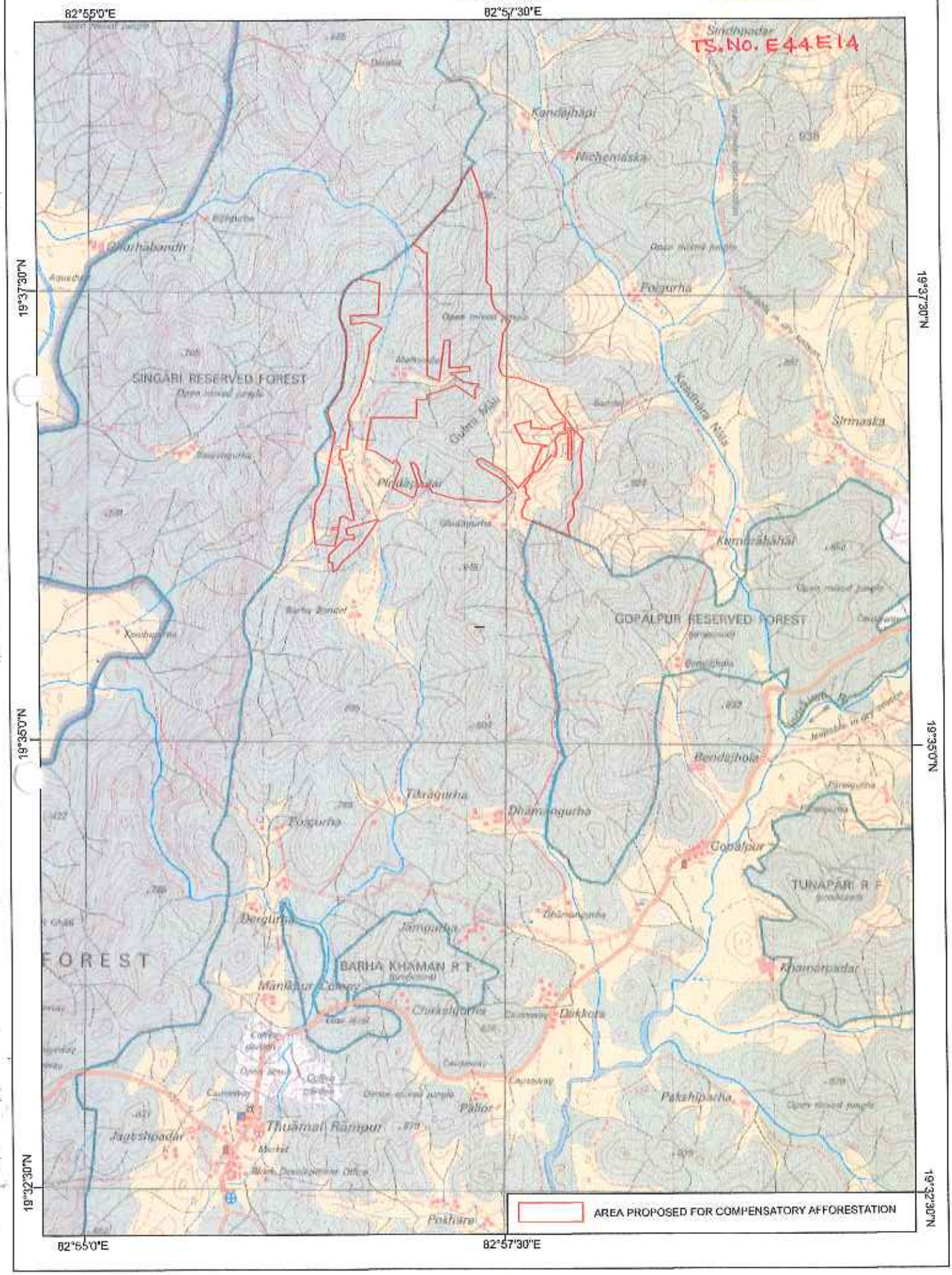
Divisional Forest Officer
Divisional Forest Officer,
Kalahandi (South) Division
Kalahandi South Division

KEYPLAN

SCALE;1:50,000

ANNEXURE - I

TS. No. E44E14



ANNEXURE-II

GPS READING OF THE AREA PROPOSED FOR COMPENSATORY AFFORESTATION

A. PATCH-1

Station		Distance in mtr	Forward Bearing	Backward Bearing	Co-ordinates	
From	To				Longitude	Latitude
1	2	167.106	142°18'50"	322°18'50"	82°57'03.3040"	19°38'23.0849"
2	3	144.999	94°04'48"	274°04'48"	82°57'06.7579"	19°38'18.7470"
3	4	65.199	86°36'10"	266°36'10"	82°57'11.7172"	19°38'18.3577"
4	5	38.574	98°40'39"	278°40'39"	82°57'13.9522"	19°38'18.4591"
5	6	41.584	125°13'00"	305°13'00"	82°57'15.2585"	19°38'18.2556"
6	7	124.883	117°09'52"	297°09'52"	82°57'16.4150"	19°38'17.4633"
7	8	225.729	157°11'49"	337°11'49"	82°57'20.2054"	19°38'15.5680"
8	9	222.925	159°18'21"	339°18'21"	82°57'23.1257"	19°38'08.7696"
9	10	218.444	167°47'14"	347°47'14"	82°57'25.7469"	19°38'01.9596"
10	11	602.323	180°06'03"	0°06'03"	82°57'27.2485"	19°37'55.0005"
11	12	33.709	154°22'32"	334°22'32"	82°57'26.9749"	19°37'35.4168"
12	13	46.851	122°00'42"	302°00'42"	82°57'27.4631"	19°37'34.4231"
13	14	114.865	179°57'53"	359°57'53"	82°57'28.8166"	19°37'33.6008"
14	15	44.912	166°10'13"	346°10'13"	82°57'28.7737"	19°37'29.8660"
15	16	77.04	157°15'54"	337°15'54"	82°57'29.1249"	19°37'28.4440"
16	17	109.92	128°35'33"	308°35'33"	82°57'30.1186"	19°37'26.1226"
17	18	108.264	121°32'34"	301°32'34"	82°57'33.0396"	19°37'23.8611"
18	19	166.302	208°53'07"	28°53'07"	82°57'36.1834"	19°37'21.9852"
19	20	339.606	186°36'03"	6°36'03"	82°57'33.3694"	19°37'17.2807"
20	21	60.313	159°58'51"	339°58'51"	82°57'31.8969"	19°37'06.3264"
21	22	38.096	140°47'42"	320°47'42"	82°57'32.5831"	19°37'04.4762"
22	23	24.574	120°05'43"	300°05'43"	82°57'33.3977"	19°37'03.5073"
23	24	80.59	92°56'24"	272°56'24"	82°57'34.1224"	19°37'03.0987"
24	25	78.927	94°16'54"	274°16'54"	82°57'36.8824"	19°37'02.9343"
25	26	334.865	108°29'30"	288°29'30"	82°57'39.5807"	19°37'02.7133"
26	27	42.721	162°00'09"	342°00'09"	82°57'50.4356"	19°36'59.1412"
27	28	111.344	149°11'11"	329°11'11"	82°57'50.8724"	19°36'57.8152"
28	29	98.968	144°24'35"	324°24'35"	82°57'52.7917"	19°36'54.6846"
29	30	264.294	138°55'00"	318°55'00"	82°57'54.7362"	19°36'52.0463"
30	31	149.552	131°11'20"	311°11'20"	82°58'00.6168"	19°36'45.5039"
31	32	153.401	186°42'09"	6°42'09"	82°58'04.4394"	19°36'42.2595"
32	33	39.275	196°26'07"	16°26'07"	82°58'03.7648"	19°36'37.3126"
33	34	77.361	174°14'53"	354°14'53"	82°58'03.3686"	19°36'36.0920"
34	35	205.082	176°27'40"	356°27'40"	82°58'03.6042"	19°36'33.5864"
35	36	45.175	186°52'52"	6°52'52"	82°58'03.9575"	19°36'26.9263"
36	37	60.894	219°10'28"	39°10'28"	82°58'03.7541"	19°36'25.4701"
37	38	61.708	201°56'32"	21°56'32"	82°58'02.4156"	19°36'23.9496"
38	39	31.234	232°24'07"	52°24'07"	82°58'01.6019"	19°36'22.0972"
39	40	51.357	188°25'47"	8°25'47"	82°58'00.7453"	19°36'21.4868"
40	41	45.279	157°54'55"	337°54'55"	82°58'00.4669"	19°36'19.8379"

Station		Distance in mtr	Forward Bearing	Backward Bearing	Co-ordinates	
From	To				Longitude	Latitude
41	42	68.849	177°46'53"	357°46'53"	82°58'01.0344"	19°36'18.4673"
42	43	83.402	214°31'29"	34°31'29"	82°58'01.0986"	19°36'16.2294"
43	44	26.746	223°46'17"	43°46'17"	82°57'59.4496"	19°36'14.0130"
44	45	53.032	177°59'29"	357°59'29"	82°57'58.8072"	19°36'13.3919"
45	46	60.976	168°43'23"	348°43'23"	82°57'58.8500"	19°36'11.6680"
46	47	66.329	166°00'41"	346°00'41"	82°57'59.2355"	19°36'09.7192"
47	48	16.54	269°20'24"	89°20'24"	82°57'59.7602"	19°36'07.6205"
48	49	37.358	281°33'13"	101°33'13"	82°57'59.1927"	19°36'07.6205"
49	50	538.44	283°51'45"	103°51'45"	82°57'57.9399"	19°36'07.8775"
50	51	65.672	8°39'41"	188°39'41"	82°57'40.0552"	19°36'12.2676"
51	52	13.871	82°47'55"	262°47'55"	82°57'40.4201"	19°36'14.3749"
52	53	103.909	357°21'32"	177°21'32"	82°57'40.8930"	19°36'14.4263"
53	54	32.969	35°13'20"	215°13'20"	82°57'40.7696"	19°36'17.8030"
54	55	94.62	20°18'18"	200°18'18"	82°57'41.4326"	19°36'18.6716"
55	56	27.215	94°20'21"	274°20'21"	82°57'42.5942"	19°36'21.5447"
56	57	22.465	32°29'10"	212°29'10"	82°57'43.5245"	19°36'21.4676"
57	58	72.831	318°57'42"	138°57'42"	82°57'43.9459"	19°36'22.0792"
58	59	50.382	3°15'45"	183°15'45"	82°57'42.3269"	19°36'23.8832"
59	60	35.818	285°13'13"	105°13'13"	82°57'42.4452"	19°36'25.5176"
60	61	49.77	49°11'54"	229°11'54"	82°57'41.2630"	19°36'25.8363"
61	62	125.49	34°13'38"	214°13'38"	82°57'42.5685"	19°36'26.8796"
62	63	41.978	52°44'39"	232°44'39"	82°57'45.0312"	19°36'30.2268"
63	64	12.286	127°23'58"	307°23'58"	82°57'46.1877"	19°36'31.0406"
64	65	74.984	50°26'20"	230°26'20"	82°57'46.5196"	19°36'30.7943"
65	66	16.512	355°00'20"	175°00'20"	82°57'48.5219"	19°36'32.3255"
66	67	102.419	40°15'56"	220°15'56"	82°57'48.4791"	19°36'32.8609"
67	68	53.003	46°13'49"	226°13'49"	82°57'50.7812"	19°36'35.3771"
68	69	38.005	108°33'50"	288°33'50"	82°57'52.1090"	19°36'36.5550"
69	70	40.764	39°56'01"	219°56'01"	82°57'53.3403"	19°36'36.1481"
70	71	22.123	285°46'07"	105°46'07"	82°57'54.2505"	19°36'37.1546"
71	72	41.357	27°13'58"	207°13'58"	82°57'53.5224"	19°36'37.3580"
72	73	84.012	350°21'55"	170°21'55"	82°57'54.1862"	19°36'38.5466"
73	74	36.029	4°18'32"	184°18'32"	82°57'53.7365"	19°36'41.2449"
74	75	53.466	44°44'31"	224°44'31"	82°57'53.8436"	19°36'42.4120"
75	76	47.228	77°15'58"	257°15'58"	82°57'55.1499"	19°36'43.6327"
76	77	61.14	81°17'24"	261°17'24"	82°57'56.7346"	19°36'43.9539"
77	78	146.211	178°58'22"	358°58'22"	82°57'58.8119"	19°36'44.2323"
78	79	135.237	182°38'48"	2°38'48"	82°57'58.8440"	19°36'39.4781"
79	80	42.502	92°26'56"	272°26'56"	82°57'58.5763"	19°36'35.0880"
80	81	135.343	359°04'32"	179°04'32"	82°58'00.0326"	19°36'35.0131"
81	82	112.983	354°44'44"	174°44'44"	82°58'00.0111"	19°36'39.4139"
82	83	92.208	358°45'29"	178°45'29"	82°57'59.7006"	19°36'43.0759"
83	84	84.115	256°40'33"	76°40'33"	82°57'59.6685"	19°36'46.0740"
84	85	68.363	20°11'48"	200°11'48"	82°57'56.8524"	19°36'45.4744"

Station		Distance in mtr	Forward Bearing	Backward Bearing	Co-ordinates	
From	To				Longitude	Latitude
85	86	28.7	298°54'09"	118°54'09"	82°57'57.6876"	19°36'47.5517"
86	87	141.985	248°24'50"	68°24'50"	82°57'56.8310"	19°36'48.0121"
87	88	30.626	179°55'27"	359°55'27"	82°57'52.2803"	19°36'46.3631"
88	89	235.052	271°34'46"	91°34'46"	82°57'52.2696"	19°36'45.3673"
89	90	76.953	0°55'16"	180°55'16"	82°57'44.2102"	19°36'45.6659"
90	91	193.208	255°49'06"	75°49'06"	82°57'44.2830"	19°36'48.1672"
91	92	208.879	149°36'26"	329°36'26"	82°57'37.8370"	19°36'46.6981"
92	93	269.331	95°34'26"	275°34'26"	82°57'41.3919"	19°36'40.8003"
93	94	12.555	158°22'06"	338°22'06"	82°57'50.5790"	19°36'39.8495"
94	95	63.301	268°01'45"	88°01'45"	82°57'50.7332"	19°36'39.4683"
95	96	248.414	204°19'21"	24°19'21"	82°57'48.5617"	19°36'39.4212"
96	97	26.915	144°23'56"	324°23'56"	82°57'44.9618"	19°36'32.0994"
97	98	257.418	223°39'08"	43°39'08"	82°57'45.4908"	19°36'31.3820"
98	99	252.46	315°26'23"	135°26'23"	82°57'39.3207"	19°36'25.3925"
99	100	271.984	297°16'58"	117°16'58"	82°57'33.3137"	19°36'31.3073"
100	101	62.066	239°46'40"	59°46'40"	82°57'25.0689"	19°36'35.4512"
101	102	66.165	144°32'47"	324°32'47"	82°57'23.2165"	19°36'34.4554"
102	103	276.914	117°49'22"	297°49'22"	82°57'24.5121"	19°36'32.6886"
103	104	183.814	136°18'20"	316°18'20"	82°57'32.8640"	19°36'28.3949"
104	105	182.826	233°30'46"	53°30'46"	82°57'37.1684"	19°36'24.0262"
105	106	488.461	273°03'14"	93°03'14"	82°57'32.0823"	19°36'20.5462"
106	107	276.402	282°55'06"	102°55'06"	82°57'15.3571"	19°36'21.5741"
107	108	103.735	327°59'04"	147°59'04"	82°57'06.1379"	19°36'23.6835"
108	109	42.16	178°04'21"	358°04'21"	82°57'04.2855"	19°36'26.5639"
109	110	18.577	311°41'22"	131°41'22"	82°57'04.3176"	19°36'25.1933"
110	111	34.592	262°14'11"	82°14'11"	82°57'03.8465"	19°36'25.6002"
111	112	13.492	320°42'00"	140°42'00"	82°57'02.6686"	19°36'25.4610"
112	113	8.716	36°50'19"	216°50'19"	82°57'02.3795"	19°36'25.8036"
113	114	118.142	335°50'21"	155°50'21"	82°57'02.5615"	19°36'26.0285"
114	115	67.011	355°20'23"	175°20'23"	82°57'00.9447"	19°36'29.5513"
115	116	78.06	318°22'48"	138°22'48"	82°57'00.7841"	19°36'31.7249"
116	117	41.191	269°20'44"	89°20'44"	82°56'59.0280"	19°36'33.6416"
117	118	264.316	158°40'28"	338°40'28"	82°56'57.6146"	19°36'33.6416"
118	119	18.493	244°37'13"	64°37'13"	82°57'00.8162"	19°36'25.6002"
119	120	96.684	196°39'01"	16°39'01"	82°57'00.2398"	19°36'25.3487"
120	121	32.683	245°46'50"	65°46'50"	82°56'59.2530"	19°36'22.3471"
121	122	239.944	293°10'34"	113°10'34"	82°56'58.2251"	19°36'21.9223"
122	123	235.912	22°55'04"	202°55'04"	82°56'50.6938"	19°36'25.0746"
123	124	75.079	326°07'05"	146°07'05"	82°56'53.9309"	19°36'32.1056"
124	125	32.023	273°07'10"	93°07'10"	82°56'52.5192"	19°36'34.1477"
125	126	27.729	201°20'26"	21°20'26"	82°56'51.4228"	19°36'34.2163"
126	127	232.128	300°05'12"	120°05'12"	82°56'51.0664"	19°36'33.3802"
127	128	162.204	281°29'52"	101°29'52"	82°56'44.2204"	19°36'37.2384"
128	129	16.65	358°39'36"	178°39'36"	82°56'38.7793"	19°36'38.3485"

Station		Distance in mtr	Forward Bearing	Backward Bearing	Co-ordinates	
From	To				Longitude	Latitude
129	130	53.573	86°52'02"	266°52'02"	82°56'38.7724"	19°36'38.8899"
130	131	306.552	9°17'18"	189°17'18"	82°56'40.6090"	19°36'38.9653"
131	132	507.959	88°54'06"	268°54'06"	82°56'42.4250"	19°36'48.7837"
132	133	188.524	0°01'41"	180°01'41"	82°56'59.8548"	19°36'48.9118"
133	134	120.742	88°17'41"	268°17'41"	82°56'59.9319"	19°36'55.0415"
134	135	42.255	2°11'21"	182°11'21"	82°57'04.0744"	19°36'55.1134"
135	136	342.674	70°59'03"	250°59'03"	82°57'04.1464"	19°36'56.4857"
136	137	254.668	121°59'24"	301°59'24"	82°57'15.3066"	19°36'59.9955"
137	138	90.248	358°51'16"	178°51'16"	82°57'22.6649"	19°36'55.5283"
138	139	73.027	36°23'27"	216°23'27"	82°57'22.6385"	19°36'58.4627"
139	140	156.199	277°05'50"	97°05'50"	82°57'24.1482"	19°37'00.3580"
140	141	191.406	299°23'09"	119°23'09"	82°57'18.8373"	19°37'01.0432"
141	142	221.522	84°08'27"	264°08'27"	82°57'13.1515"	19°37'04.1592"
142	143	43.931	354°51'43"	174°51'43"	82°57'20.7218"	19°37'04.8123"
143	144	232.824	268°12'32"	88°12'32"	82°57'20.6040"	19°37'06.2364"
144	145	275.412	1°31'32"	181°31'32"	82°57'12.6162"	19°37'06.0865"
145	146	66.65	269°07'03"	89°07'03"	82°57'12.9759"	19°37'15.0355"
146	147	421.101	187°07'07"	7°07'07"	82°57'10.6888"	19°37'15.0269"
147	148	146.449	290°41'45"	110°41'45"	82°57'08.7340"	19°37'01.4600"
148	149	1283.493	359°06'55"	179°06'55"	82°57'04.0535"	19°37'03.1938"
149	150	37.461	258°42'25"	78°42'25"	82°57'03.8774"	19°37'44.9283"
150	151	70.914	314°14'28"	134°14'28"	82°57'02.6139"	19°37'44.7034"
151	152	107.458	291°29'17"	111°29'17"	82°57'00.8900"	19°37'46.3310"
152	153	346.46	260°25'59"	80°25'59"	82°56'57.4743"	19°37'47.6480"
153	154	178.569	27°28'20"	207°28'20"	82°56'45.7281"	19°37'45.9027"
154	155	152.368	30°18'08"	210°18'08"	82°56'48.6170"	19°37'51.0235"
155	156	129.334	21°05'41"	201°05'41"	82°56'51.3067"	19°37'55.2722"
156	157	207.026	53°41'51"	233°41'51"	82°56'52.9514"	19°37'59.1784"
157	158	56.329	18°29'11"	198°29'11"	82°56'58.7249"	19°38'03.1016"
158	159	145.062	24°36'15"	204°36'15"	82°56'59.3588"	19°38'04.8320"
159	160	82.027	14°52'35"	194°52'35"	82°57'01.4832"	19°38'09.0978"
160	161	98.332	351°45'34"	171°45'34"	82°57'02.2370"	19°38'11.6677"
161	162	159.262	15°43'47"	195°43'47"	82°57'01.7916"	19°38'14.8371"
162	1	100.858	358°51'24"	178°51'24"	82°57'03.3335"	19°38'19.8054"
Perimeter:20.84 km						

B. PATCH-2

1	2	376.908	88°09'56"	268°09'56"	82°56'27.5135"	19°36'12.5881"
2	3	10.349	131°16'07"	311°16'07"	82°56'40.4434"	19°36'12.8410"
3	4	265.609	230°42'36"	50°42'36"	82°56'40.7076"	19°36'12.6162"
4	5	127.453	238°40'19"	58°40'19"	82°56'33.5889"	19°36'07.2235"
5	6	243.189	244°20'28"	64°20'28"	82°56'29.8277"	19°36'05.1091"
6	7	52.844	221°45'10"	41°45'10"	82°56'22.2657"	19°36'01.7661"
7	8	59.843	248°11'55"	68°11'55"	82°56'21.0429"	19°36'00.4973"

Station		Distance in mtr	Forward Bearing	Backward Bearing	Co-ordinates	
From	To				Longitude	Latitude
8	9	16.148	268°07'20"	88°07'20"	82°56'19.1280"	19°35'59.7952"
9	10	69.945	9°08'30"	189°08'30"	82°56'18.5740"	19°35'59.7839"
10	11	25.323	10°50'25"	190°50'25"	82°56'18.9822"	19°36'02.0252"
11	12	41.333	288°40'01"	108°40'01"	82°56'19.1553"	19°36'02.8321"
12	13	76.834	19°55'57"	199°55'57"	82°56'17.8169"	19°36'03.2767"
13	14	243.3	61°19'40"	241°19'40"	82°56'18.7438"	19°36'05.6156"
14	15	104.629	107°39'55"	287°39'55"	82°56'26.1133"	19°36'09.3323"
15	16	52.958	17°12'13"	197°12'13"	82°56'29.5214"	19°36'08.2631"
16	17	75.593	281°59'29"	101°59'29"	82°56'30.0786"	19°36'09.9022"
17	1	66.063	358°29'07"	178°29'07"	82°56'27.5477"	19°36'10.4402"
Perimeter: 1.91km						

C. PATCH-3

1	2	60.705	149°33'50"	329°33'50"	82°56'36.8543"	19°37'36.5058"
2	3	60.705	70°10'02"	250°10'02"	82°56'37.8891"	19°37'34.7926"
3	4	56.451	109°26'52"	289°26'52"	82°56'39.7188"	19°37'35.3957"
4	5	244.402	279°00'17"	99°00'17"	82°56'47.5951"	19°37'32.6644"
5	6	316.257	187°45'48"	7°45'48"	82°56'44.7543"	19°37'22.1067"
6	7	316.257	92°35'54"	272°35'54"	82°56'34.0553"	19°37'23.8319"
7	8	92.78	119°10'16"	299°10'16"	82°56'33.5893"	19°37'20.8475"
8	9	182.779	231°17'52"	51°17'52"	82°56'39.8516"	19°37'20.5104"
9	10	181.788	139°18'28"	319°18'28"	82°56'45.2636"	19°37'17.5706"
10	11	217.618	190°18'06"	10°18'06"	82°56'39.3828"	19°37'13.2092"
11	12	96.068	267°09'26"	87°09'26"	82°56'41.5036"	19°37'10.8176"
12	13	281.366	212°35'27"	32°35'27"	82°56'39.6688"	19°37'01.8352"
13	14	20.684	130°09'20"	310°09'20"	82°56'38.9595"	19°37'01.8096"
14	15	196.171	210°12'33"	30°12'33"	82°56'35.2692"	19°36'56.4746"
15	16	37.004	320°15'47"	140°15'47"	82°56'36.2303"	19°36'55.6882"
16	17	372.868	246°54'39"	66°54'39"	82°56'29.6670"	19°36'45.2805"
17	18	4.276	152°24'19"	332°24'19"	82°56'29.5745"	19°36'45.3884"
18	19	18.636	210°37'42"	30°37'42"	82°56'28.9835"	19°36'45.1571"
19	20	19.504	165°41'45"	345°41'45"	82°56'29.2867"	19°36'44.5918"
20	21	53.079	268°21'49"	88°21'49"	82°56'28.3410"	19°36'43.1167"
21	22	135.168	355°22'25"	175°22'25"	82°56'29.4357"	19°36'38.8457"
22	23	202.287	284°11'39"	104°11'39"	82°56'22.4955"	19°36'38.7326"
23	24	66.011	198°14'46"	18°14'46"	82°56'22.4390"	19°36'39.5035"
24	25	66.011	103°35'10"	283°35'10"	82°56'20.2495"	19°36'40.0535"
25	26	107.757	179°31'03"	359°31'03"	82°56'19.0520"	19°36'36.7384"
26	27	28.279	169°19'53"	349°19'53"	82°56'19.9925"	19°36'36.5123"
27	28	101.87	269°20'57"	89°20'57"	82°56'19.9822"	19°36'33.1998"
28	29	95.435	179°20'57"	359°20'57"	82°56'20.5519"	19°36'30.1438"
29	30	13.481	179°20'57"	359°20'57"	82°56'20.0893"	19°36'30.1438"
30	31	138.04	178°48'54"	358°48'54"	82°56'20.0893"	19°36'25.6552"
31	32	101.791	268°15'43"	88°15'43"	82°56'20.0893"	19°36'22.3453"

Station		Distance in mtr	Forward Bearing	Backward Bearing	Co-ordinates	
From	To				Longitude	Latitude
32	33	200.825	310°33'23"	130°33'23"	82°56'20.1536"	19°36'15.8154"
33	34	34.707	254°41'52"	74°41'52"	82°56'18.9629"	19°36'15.7940"
34	35	94.572	201°27'48"	21°27'48"	82°56'16.5215"	19°36'17.8198"
35	36	43.221	273°42'24"	93°42'24"	82°56'15.0867"	19°36'17.4643"
36	37	100.802	179°35'45"	359°35'45"	82°56'13.7847"	19°36'14.4277"
37	38	69.353	89°21'00"	269°21'00"	82°56'11.4119"	19°36'14.5990"
38	39	29.11	205°28'09"	25°28'09"	82°56'11.4076"	19°36'13.6524"
39	40	180.159	284°18'13"	104°18'13"	82°56'13.6947"	19°36'13.6524"
40	41	180.159	285°22'39"	105°22'39"	82°56'10.9733"	19°36'08.3925"
41	42	81.164	4°41'42"	184°41'42"	82°56'08.2827"	19°36'09.0735"
42	43	136.587	30°45'49"	210°45'49"	82°56'03.7782"	19°36'10.2997"
43	44	234.536	22°59'32"	202°59'32"	82°56'04.5278"	19°36'17.8929"
44	45	22.225	15°52'56"	195°52'56"	82°56'04.9252"	19°36'18.5097"
45	46	45.321	17°45'45"	197°45'45"	82°56'05.5489"	19°36'19.8597"
46	47	58.256	43°37'22"	223°37'22"	82°56'06.1176"	19°36'21.6757"
47	48	78.407	45°01'23"	225°01'23"	82°56'06.9674"	19°36'24.0948"
48	49	40.912	33°00'54"	213°00'54"	82°56'07.9474"	19°36'25.0473"
49	50	75.099	44°38'19"	224°38'19"	82°56'09.7908"	19°36'26.7537"
50	51	53.681	22°55'02"	202°55'02"	82°56'10.8118"	19°36'28.2065"
51	52	27.259	24°47'02"	204°47'02"	82°56'11.4766"	19°36'28.8301"
52	53	333.162	18°22'54"	198°22'54"	82°56'16.0474"	19°36'38.7599"
53	54	187.86	341°17'11"	161°17'11"	82°56'18.8160"	19°36'44.2764"
54	55	50.829	350°54'17"	170°54'17"	82°56'19.3848"	19°36'45.8388"
55	56	34.137	350°44'50"	170°44'50"	82°56'19.0216"	19°36'46.8942"
56	57	63.917	23°11'37"	203°11'37"	82°56'18.6995"	19°36'48.9500"
57	58	116.164	68°28'23"	248°28'23"	82°56'18.1033"	19°36'52.6848"
58	59	104.089	68°57'46"	248°57'46"	82°56'18.9599"	19°36'54.5214"
59	60	109.507	54°08'22"	234°08'22"	82°56'22.2972"	19°36'55.7275"
60	61	40.574	39°46'41"	219°46'41"	82°56'25.8196"	19°36'56.9679"
61	62	60.356	37°38'41"	217°38'41"	82°56'26.9572"	19°36'57.7285"
62	63	62.837	18°25'24"	198°25'24"	82°56'28.3003"	19°36'59.2225"
63	64	47.051	21°40'43"	201°40'43"	82°56'29.6366"	19°37'00.8260"
64	65	106.171	18°06'14"	198°06'14"	82°56'30.1643"	19°37'02.2720"
65	66	130.425	13°07'02"	193°07'02"	82°56'31.5486"	19°37'05.4654"
66	67	25.17	350°10'34"	170°10'34"	82°56'32.9877"	19°37'09.4812"
67	68	105.244	351°54'22"	171°54'22"	82°56'33.1932"	19°37'10.2761"
68	69	78.639	3°56'50"	183°56'50"	82°56'32.6176"	19°37'13.6546"
69	70	22.411	334°28'04"	154°28'04"	82°56'32.2681"	19°37'16.1901"
70	71	164.706	355°23'43"	175°23'43"	82°56'32.3298"	19°37'16.9165"
71	72	60.84	16°41'05"	196°41'05"	82°56'29.9518"	19°37'21.7752"
72	73	60.84	26°48'45"	206°48'45"	82°56'29.8079"	19°37'23.7488"
73	74	83.131	37°19'24"	217°19'24"	82°56'31.5554"	19°37'29.0529"
74	75	51.6	36°37'41"	216°37'41"	82°56'32.8712"	19°37'31.4514"
75	76	30.989	34°03'45"	214°03'45"	82°56'33.9608"	19°37'32.7740"

Station		Distance in mtr	Forward Bearing	Backward Bearing	Co-ordinates	
From	To				Longitude	Latitude
76	77	101.818	49°01'51"	229°01'51"	82°56'34.6049"	19°37'33.5758"
77	1	101.818	193°38'57"	13°38'57"	82°56'36.5948"	19°37'36.2972"
Perimeter: 8.00 km						
Total perimeter of the area: 20.84+1.91+8.00 = 30.75 km						
Length of the boundary common with Singari RF: =1410.025 mtr (Patch-1) and 3106.568 mtr (Patch-3) = 4516.59 mtr or 4.517 km						

ANNEXURE – III

ESTIMATE FOR BARBED WIRE FENCING

Estimate for 1 Kilometer		
I	No. of pillars required 500 nos.	
	Cost of 1 pillar	Rs 568.00
	Transportation charges	Rs 244.00
	Cost of base fixing	Rs 244.00
	Cost of fixing barbed wire @ 25.00	Rs 49.00
	Total cost for fixing 1 pillar	Rs 1105.00
	Cost for 500 pillars	**Rs 5,52,500.00**
	Cost of barbed wire (1 Qntls) @ 8000.00. Cost of barbed wire (5+2) strand, 7500 mtrs or 24.75 Qntls @ 0.33kg/rmt.	Rs 1,98,000.00
	Total cost for 1 Km.	**Rs 7,50,500.00**
	Total cost for fencing: Perimeter of the area i.e. 30.75 km - 4.517 km = 26.233 km X Rs 7,50,500.00 (Excluding 1.410 km for Patch-1 and 3.106 km for Patch-3 that bears common with Singari Reserved Forest to the West)	Rs 1,96,87,866.50
	Maintenance 5% of Rs. 9,84,393.32 per annum for 4 year	Rs 39,37,573.30
	Total barbed wire fencing of 26.233 Km	**Rs 2,36,25,439.80**

ANNEXURE-IV

COST ESTIMATE FOR ANR WITH GAP PLANTATION OF 300 SEEDLINGS/HECTARE

1.	Type of the Plantation.	Block Plantation.
2.	No. of seedlings to be planted.	300 Nos. per hectare
3.	Spacing to be adopted.	2.5 m x 2.5 m
4.	Size of pits.	30 cm x 30 cm x 30 cm
5.	Wage rate.	Rs 150.00 per manday.

Sl. No.	Item of Work	Person days	Labour (Rs)	Material (Rs)	Total (Rs)
0th Year (Advanced work) pre-planting operation					
1	Survey, Demarcation and Pillar Posting, GPS Reading with mapping	2	300	0	300
2	Site Preparation	2	300	0	300
3	Silvicultural Operation including clearance of weed, climber cutting, high stump cutting, singling of shoots	5	750	0	750
4	Raising Nursery @ 220 seedling / ha (including 10 %	8	900	300	1200

P5

	Casualty replacement) and watch & ward (Part-1)				
5	Contingency and Unforeseen Expenditure	1	0	150	150
Sub Total		**18**	**2250**	**450**	**2700**
1st Year Planting					
1	Maintenance of Nursery (Balance)	4	600	0	600
2	Pitting 30 cm cube size	7	1050	0	1050
3	Carriage and planting including casualty replacement	4.5	675	0	675
4	Complete weeding, Soil working, manuring	5.5	825	0	825
5	Cost of Vermi compost and insecticide for Plantation	3	0	450	450
6	Cost of Chemical Fertilizer	1	0	150	150
7	Fire line tracing and inspection path	3	450	0	450
8	Silvicultural Operation involving clearance of weeds, cutting of climbers, singling of shoot etc.	15	2250	0	2250
9	Soil conservation measures	20	3000	0	3000
10	Watch & Ward	8	1200	0	1200
11	Contingency and unforeseen expenditure	2	0	300	300
Sub Total		**73**	**10050**	**900**	**10950**
2nd Year Maintenance					
1	Casualty Replacement including cost of seedling, carriage and planting.	2	300	0	300
2	Complete weeding and pruning	2	300	0	300
3	Soil working and manuring	2	300	0	300
4	Cost of fertilizers and Insecticides	1	0	150	150
5	Fire line tracing and inspection path	1	150	0	150
6	Soil conservation measures	8	1200	0	1200
7	Watch & Ward (Whole Year)	8	1200	0	1200
8	Contingency and unforeseen expenditure	1	0	150	150
Sub Total		**25**	**3450**	**300**	**3750**
3rd Year Maintenance					
1	Compete weeding and pruning	1	150	0	150
2	Soil working	1	150	0	150
3	Fire line tracing and inspection path	1	150	0	150
4	Watch & Ward (Whole Year)	8	1200	0	1200
5	Contingency and unforeseen expenditure	0	0	0	0
Sub Total		**11**	**1650**	**0**	**1650**
4th Year Maintenance					
1	Fire line tracing and inspection path	1	150	0	150
2	Watch, Ward & Pruning	2	300	0	300
Sub Total		**3**	**450**	**0**	**450**
5th Year Maintenance					
1	Fire line tracing and inspection path	1	150	0	150
2	Watch, Ward & Pruning	2	300	0	300
Sub Total		**3**	**450**	**0**	**450**
6th Year Maintenance					
1	Fire line tracing and inspection path	1	150	0	150
2	Watch, Ward & Pruning	2	300	0	300
Sub Total		**3**	**450**	**0**	**450**
7th Year Maintenance					
1	Fire line tracing and inspection path	1	150	0	150
2	Watch, Ward & Pruning	2	300	0	300
Sub Total		**3**	**450**	**0**	**450**
8th Year Maintenance					
1	Fire line tracing and inspection path	1	150	0	150
2	Watch, Ward & Pruning	2	300	0	300

Sub Total		**3**	**450**	**0**	**450**
9th Year Maintenance					
1	Fire line tracing and inspection path	1	150	0	150
2	Watch, Ward & Pruning	2	300	0	300
Sub Total		**3**	**450**	**0**	**450**
10th Year Maintenance					
1	Fire line tracing and inspection path	1	150	0	150
2	Watch, Ward & Pruning	2	300	0	300
Sub Total		**3**	**450**	**0**	**450**
Grand Total		**148**	**20550**	**1650**	**22200**

ABSTRACT OF COST OF PLANTATION FOR @ 300 SEEDLINGS PER HECTARE

Year	Person Days	Labour (Rs)	Material (Rs.)	Total Cost (Rs)
0th Year	18	2250	450	2700
1st Year	73	10050	900	10950
2nd Year	25	3450	300	3750
3rd Year	11	1650	0	1650
4th Year	3	450	0	450
5th Year	3	450	0	450
6th Year	3	450	0	450
7th Year	3	450	0	450
8th Year	3	450	0	450
9th Year	3	450	0	450
10th Year	3	450	0	450
TOTAL	**148**	**20550**	**1650**	**22200**

Additional incentive (3%) for VSS/Fr./FG proposed for more than 80% survival and very good growth during 4th year of maintenance as per recommendation of DFO and RCCF.	**666.00**
Additional EPA expenses if implemented through VSS at rate Rs 1200/- in 0th Year, Rs 2400/- in 1st Year, Rs 1800/- in 2nd Year, Rs 600/- per year from 3rd Year to 10th year.	**10200.00**
Total Norm per ha. in non-JFM mode with incentives.	**33066.00**

Cost for 508.496 Ha (ANR) plantation in non-JFM mode x Rs.33066.00 = **Rs 1, 68, 13,928.73**

ANNEXURE- V (A)

Details Estimate of Loose Boulder Structure (S.C.M)

Span-1mtr, Height = 0.6mtr, Slope-U/S: 1:1:5 D/S Slope: 1:2

1	Leaving the unshaped surface of the selected site & layout the structure foundation L.S. 1 MD	@ Rs.152.50 / per MD		Rs.152.50
2	Excavation of foundation in hard soil within initial lead of 50 mtr. including rough dressing and breaking of clods to maximum size 5 cm. to 7 cm laying in layer not exceeding 0.3 in depth to strengthening both side U/S approx. bund of loose boulder structure. Base with apron- 1 x 3.60 x 1.60 x 0.30 Wing wall-4 x 0.50 x 0.30 x 0.30 @ Rs. 5556.00 per 100 cum.	1.728 0.180	1.908	Rs.106.00

3	Rough stone dry packing up to GL Base with apron-1 x 3.60 x 1.60 0.30 Wing wall-4 x 0.50 x 0.30 x 0.30 Above GL Super structure-1 x 1.00 x $\frac{2.60+0.50}{2}$ x 0.60 Wing wall-4 x 0.50 x 0.30 x 0.30 Side wall	1.728 0.180 0.930 0.180	1.908	
i	2 x $\frac{0.3+0.9}{2}$ x 0.3	0.360		
ii	2 x $\frac{0.3+0.9}{2}$ x 1.2 x 0.3	0.432		
iii	2 x 0.5 x 0.9 x 0.3	0.270		
iv	2 x 1.0 x 0.3 x 0.3	0.180	2.316 cum	
			4.26 cum	
	@ Rs. 476.56 per cum			Rs.2,030.14
		Grand Total		**Rs 2288.64**
	Cost of 15 nos of 1 mtr loose boulder structure = Rs 2288.64 X 15 = **Rs 34,329.60**			

ANNEXURE- V (B)

Details Estimate of Loose Boulder Structure (S.C.M)

Span-2mt,Ht.=0.6mt,slope-U/S:1:1:5, D/S Slope: 1:2

1	Leaving the unshaped surface of the selected site & layout the structure foundation L.S. 1 MD	@ Rs.152.50 / per MD		Rs.152.50
2	Excavation of foundation in hard soil within initial lead of 50mtr.including rough dressing and braking of clods to maximum size 5 cm. to 7 cm laying in layer not exceeding 0.3 in depth to strengthening both side U/S approx. bund of loose boulder structure. Base with apron- 1 x 3.70 x 3.00 x 0.30 Wing wall-4 x 0.50 x 0.50 x 0.30 @ Rs. 5510.00 per 100 cum.	3.33 0.30	3.63 cum	Rs.200.00
3	Rough stone dry packing up to GL Base with apron-1 x 3.70 x 3.00 x 0.30 Wing wall-4 x 0.50 x 0.50 x 0.30 Above GL Super structure-1 x 2.00 x $\frac{2.70+0.60}{2}$ x 0.60 Wing wall-4 x 0.50 x 0.50 x 0.50 Side wall	3.33 0.30 1.980 0.50		
	i) 2 x $\frac{0.50+1.10}{2}$ x 0.9 x 0.5	0.72		

	ii) $2 \times \frac{0.5+1.10}{2} \times 1.2 \times 0.5$	0.96		
	iii) $2 \times 0.6 \times 0.6 \times 0.5$	0.36		
	iv) $2 \times 1.0 \times 0.5 \times 0.5$	0.50	8.65 cum	
			4.224 cum	
	@ Rs. 476.18 per cum			Rs.4,119.00
			Grand Total	**Rs 4471.50**
	Cost of 15 nos of 2 mtr loose boulder structure = Rs 4471.50 X 15 = **Rs 67,072.50**			

ANNEXURE- V (C)

Details Estimate of Loose Boulder Structure (S.C.M)

Span-3mtr, Ht.=1.0mtr, slope-U/S:1:1:5, D/S Slope: 1:2:0

1	Leaving the unshaped surface of the selected site & layout the structure foundation L.S. 1 MD	@ Rs.152.50 / per MD		Rs.152.50
2	Excavation of foundation in hard soil within initial lead of 50mtr.including rough dressing and braking of clods to maximum size 5 cm. to 7 cm laying in layer not exceeding 0.3 in depth to strengthening both side U/S approx. bund of loose boulder structure. Base with apron- 1 x 5.10 x 4.00 x 0.30 Wing wall-4 x 0.50 x 0.50 x 0.30 @ Rs.5498.00 per 100 cum.	 6.12 0.30	 6.42 cum @ 54.98 per cum	 Rs.353.00
3	Rough stone dry packing up to GL Base with apron-1 x 5.10 x 4.00 x 0.30 Wing wall-4 x 0.50 x 0.50 0.30 Above GL Super structure-1 x 4.10 x $\frac{2.70+0.60}{2}$ x 1.00 x 3.0 Wing wall-4 x 0.50 x 0.50 x 0.50 Side wall	 6.12 0.30 7.05 0.50		
i	$2 \times \frac{0.50+1.50}{2} \times 1.5 \times 0.5$	1.50		
ii	$2 \times \frac{0.5+1.50}{2} \times 2.0 \times 0.5$	2.00		
iii	2 x 0.6 x 1.0 x 0.5	0.60		
Iv	2 x1.0 x 0.5 x 0.5	0.50		
			18.57 cum	
	@ Rs. 476.38 per cum			Rs.8,847.00
			Grand Total	**Rs 9352.50**
	Cost of 10 nos of 3 mtr loose boulder structure = Rs 9352.50 X 10 = **Rs 93525.00**			

ANNEXURE- V (D)

Details Estimate of Loose Boulder Structure (S.C.M)
Span-4mtr, Ht. =1.3 mtr, slope-U/S: 1:1:5, D/S Slope: 1:2:0

1	Leaving the unshaped surface of the selected site & layout the structure foundation L.S. 1 MD	@ Rs.152.50 / per MD		Rs.152.50
2	Excavation of foundation in hard soil within initial lead of 50mtr.including rough dressing and braking of clods to maximum size 5 cm. to 7 cm laying in layer not exceeding 0.3 in depth to strengthening both side U/S approx. bund of loose boulder structure. Base with apron- 1 x 3.70 x 3.00 x 0.30 Wing wall-4 x 0.50 x 0.50 x 0.30 @ Rs. 5510.00 per 100 cum.	9.225 0.30	9.525	Rs.522.00
3	Rough stone dry packing up to GL Base with apron-1 x 6.15 x 5.00 x 0.30 Wing wall-4 x 0.50 x 0.50 x 0.30 Above GL Super structure-1 x $\frac{5.15+0.60}{2}$ x 1.30 x 4.0 Wing wall-4 x 0.50 x 0.50 x 0.50 Side wall	9.225 0.30 14.95 0.50		
i	2 x $\frac{0.50+1.80}{2}$ x 1.95 x 0.5	2.24		
ii	2 x $\frac{0.5+1.80}{2}$ x 1.95 x 0.5	2.99		
iii	2 x 0.6 x 1.8 x 0.5	1.08		
iv	2 x1.0 x 0.5 x 0.5	0.50		
			31.785	
	@ Rs. 476.45 per cum			Rs.15,144.00
			Grand Total	**Rs.18,818.50**
Cost of 10 nos of 4mtr loose boulder structure = Rs 18818.50 X 10 = **Rs 188185.00**				

ANNEXURE- V (E)

Estimate for digging one no of staggered trench of size 2 mtr x 0.54 mtr x 0.5 mtr Along with Agave Plantation on the dugout soil

i) Earth work in excavation of staggered trench in hard soil including rough dressing and leveling the beds and heaping the dugout soil at the downhill side of the trench and leaving the same too. Size of a trench =2.0 mt x 0.5 mt x 0.5 mt = 0.5 cum @ 246.80 per 2.83 cum	Rs. 43.60

ii) Cost for Agave planting on the dugout soil and its maintenance including weeding. Soil working, manuring, cost of fertilizer etc. for three years. 3 nos. of Agave plants per trench @ Rs.18/- per plants on LS	Rs. 54.00
Total	Rs.97.60 or Rs 98.00 (Rupees Ninety eighty)only
Cost of 20 nos. of staggered trenches covering one ha = 20 x Rs 98.00	Rs.1960.00

ANNEXURE-VI

TOTAL COST OF THE COMPENSATORY AFFORESTATION SCHEME

Sl.No.	Item of Work	Estimated cost in Rs.
1	Barbed wire fencing around non-forest land over 30.75 km (Annexure-III)	**Rs 2,36,25,439.80**
2	ANR (300 Seedlings) plantation over 508.496 ha of non-forest land @ Rs 33,066.00 per hectare (Annexure-IV).	**Rs 1, 68, 13,928.73**
	Sub-total	**Rs 40439368.53**
3	Special soil conservation measures as at **Annexure – V (A-E)** (Rs 34329.60 + Rs 67072.50 + Rs 93525.00 + Rs 188185.00 + Rs.1960.00)	**Rs 3,85,072.10**
	Total	**Rs 4,08,24,440.63**
4	Escalation (10%)	**Rs 40,82,444.06**
	Grand Total	**Rs 4,49,06,884.69** **OR** **Rs 4,49,06,900.00**

(Rupees four crores fortynine lakhs six thousand and nine hundred only)

15/01/14

Divisional Forest Officer
Kalahandi (South) Division.

ANNEXURE-VII

JONT VERIFICATION REPORT OF NON-FOREST GOVERNMENT LAND IN DIFFERENT VILLAGES UNDER THUAMUL RAMPUR TAHASIL OF KALAHANDI DISTIRCT FOR RAISING COMPENSATORY AFFORESTATION(ANR & BLOCK PLANTATION) AGAINST MINING PROJECTS OF M/s O.M.C LTD. LOCATED IN THE DISTRICT OF SUNDARGARH, KEONJHAR AND JAJPUR DISTRICT OF ODISHA

Certified that on joint verifcation of non-frest Government land (Kissam-Dangar) in different villages of Thuamul Rampur Tahasil of Kalahandi distirct, it is found that the schedule wise land mentioned against each village as given under is suitable for ANR and Block Plantation and are free from encroachment and encumbrances.

Name of the mines	Name of the Village	Khata No.	Plot No.	Total area of the plot in Acr	Area recommended for Compensatory Afforestation in Acr	Kissam	Type of plantation in ha	
							Block 1600nosof plants/ha	ANR 300nos. of plants/ha
Daitari	Tebhakalam	79 (Abada Ajogya Anabadi)	1	33.950	33.95	Dangar	Nil	33.95
			2	41.580	41.58	Dangar	Nil	41.58
			19	33.200	33.20	Dangar	Nil	33.20
			20	26.500	26.50	Dangar	Nil	26.50
			21	22.000	22.00	Dangar	Nil	22.00
			34	2.460	2.46	Dangar	Nil	2.46
			41	1.890	1.89	Dangar	Nil	1.89
			42	68.550	68.55	Dangar	Nil	68.55
			46	15.300	15.30	Dangar	Nil	15.30
			47	11.980	11.98	Dangar	Nil	11.98
			48	49.200	49.20	Dangar	Nil	49.20
			65	51.350	51.35	Dangar	Nil	51.35
			67	2.450	2.45	Dangar	Nil	2.45
			82	19.850	19.85	Dangar	Nil	19.85
			83	31.230	31.23	Dangar	Nil	31.23
			105	53.530	53.53	Dangar	Nil	53.53
			146	94.250	94.25	Dangar	Nil	94.25
			199	22.950	18.40	Dangar	Nil	18.40
			200	41.930	41.93	Dangar	Nil	41.93
			201	39.630	38.53	Dangar	Nil	38.53
			367	61.450	54.00	Dangar	Nil	54.00
			373	39.800	37.90	Dangar	Nil	37.90
			374	28.280	24.80	Dangar	Nil	24.80
			447	54.600	54.60	Dangar	Nil	54.60
			448	28.700	28.70	Dangar	Nil	28.70
			451	17.650	17.65	Dangar	Nil	17.65
			452	10.000	10.00	Dangar	Nil	10.00
			453	41.850	41.85	Dangar	Nil	41.85
			454	22.380	22.38	Dangar	Nil	22.38
			455	69.830	69.83	Dangar	Nil	69.83
			456	74.130	74.13	Dangar	Nil	74.13
			457	72.150	72.15	Dangar	Nil	72.15
			458	72.550	72.55	Dangar	Nil	72.55
			461	50.200	49.30	Dangar	Nil	49.30
			498	23.680	23.18	Dangar	Nil	23.18

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Name of the mines	Name of the Village	Khata No.	Plot No.	Total area of the plot in Acr	Area recommended for Compensatory Afforestation in Acr	Kissam	Type of plantation in ha	
							Block 1600nosof plants/ha	ANR 300nos. of plants/ha
Daitari	Tebhakalam	79 (Abada Ajogya Anabadi)	512	8.080	7.68	Dangar	Nil	7.68
			513	28.130	28.13	Dangar	Nil	28.13
			516	35.150	35.15	Dangar	Nil	35.15
			555	63.200	63.20	Dangar	Nil	63.20
			556	92.080	92.08	Dangar	Nil	92.08
			557	75.630	76.63	Dangar	Nil	76.63
			600	16.950	16.95	Dangar	Nil	16.95
			601	32.580	32.58	Dangar	Nil	32.58
			604	33.680	33.60	Dangar	Nil	33.60
			606	48.700	48.70	Dangar	Nil	48.70
			458/607	48.880	28.00	Dangar	Nil	28.00
			Total in Acre	**1814.090**	**1773.850**			**1773.850**
			Total Area in Ha.	**725.636**	**717.853**		Nil	**717.853**
Kurmitar	Melakundel	155 (Abada Ajogya Anabadi)	1	49.450	49.45	Dangar	Nil	49.45
			673	20.100	20.10	Dangar	Nil	20.10
			681	9.600	9.60	Dangar	Nil	9.60
			682	47.080	47.08	Dangar	Nil	47.08
			684	32.830	32.83	Dangar	Nil	32.83
			685	56.800	56.80	Dangar	Nil	56.80
			686	49.200	49.20	Dangar	Nil	49.20
			687	40.900	40.90	Dangar	Nil	40.90
			697	7.300	7.30	Dangar	Nil	7.30
Kurmitar	Melakundel	155 (Abada Ajogya Anabadi)	717	3.120	3.12	Dangar	Nil	3.12
			722	36.830	36.23	Dangar	Nil	36.23
			723	30.600	30.60	Dangar	Nil	30.60
			724	37.500	37.50	Dangar	Nil	37.50
			725	60.880	57.38	Dangar	Nil	57.38
			748	4.480	4.48	Dangar	Nil	4.48
			751	11.100	11.10	Dangar	Nil	11.10
			752	12.480	12.48	Dangar	Nil	12.48
			754	41.950	41.95	Dangar	Nil	41.95
			763	52.130	52.13	Dangar	Nil	52.13
			773	46.250	41.15	Dangar	Nil	41.15
			774	43.330	43.33	Dangar	Nil	43.33
			782	63.700	63.70	Dangar	Nil	63.70
			816	52.830	52.83	Dangar	Nil	52.83
			27/819	40.000	40.00	Dangar	Nil	40.00
			27/820	31.400	31.40	Dangar	Nil	31.40
			27/821	23.650	23.65	Dangar	Nil	23.65
			26	44.750	44.75	Dangar	Nil	44.75

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Name of the mines	Name of the Village	Khata No.	Plot No.	Total area of the plot in Acr	Area recommended for Compensatory Afforestation in Acr	Kissam	Type of plantation in ha	
							Block 1600nosof plants/ha	ANR 300nos. of plants/ha
Kurmitar	Melakundel	155 (Abada Ajogya Anabadi)	27	40.000	40.00	Dangar	Nil	40.00
			60	41.630	36.73	Dangar	Nil	36.73
			77	42.450	37.05	Dangar	Nil	37.05
			313	22.500	22.50	Dangar	Nil	22.50
			314	26.000	23.60	Dangar	Nil	23.60
			356	61.330	57.83	Dangar	Nil	57.83
			357	19.580	19.00	Dangar	Nil	19.00
			358	40.530	40.00	Dangar	Nil	40.00
			408	24.150	23.95	Dangar	Nil	23.95
			612	14.880	14.00	Dangar	Nil	14.00
			613	19.600	17.60	Dangar	Nil	17.60
			Total in Acre	1302.890	1273.300			1273.300
			Total Area in Ha.	521.156	515.287		Nil	515.287
Roida-Sidharnatha	Badabundel	58 (Abada Ajogya Anabadi)	53	35.000	24.00	Dangar		
			62	39.530	39.33	Dangar		
			104	29.830	29.83	Dangar		
			337	16.120	16.12	Dangar		
			349	14.000	14.00	Dangar		
			353	43.280	40.36	Dangar		
			Total area in Acre	177.760	163.640			
			Total Area in Ha.	71.104	66.223		40.000	26.223

Revenue Inspector
Th. Rampur

Forester
Th.Rampur

Th.Rampur Section

Revenue
Th.Rampur

Forest Range Officer
Th.Rampur

FOREST RANGE OFFICER
TH. RAMPUR, SOUTH RANGE.

Tahasildar
Th.Rampur

Divisional Forest Officer
Kalahandi (S) Division
Bhawanipatna

12-11-2013 AM (Pers.)
Asst. MANAGER (PERSONNEL)
O.M.C. LTD. BHAWANIPATNA.