

## **CHECK LIST SERIAL NUMBER: 18**

### **SCHEME FOR COMPENSATORY AFFORESTATION**

**In lieu of Diversion of 39.599 ha (97.850 Ac) of Forest land in favour of IDCO, Bhubaneswar for Establishment of OIL DEPOT by BPCL, At: Village Arda under Kirmira Tahasil of District Jharsuguda.**

**(Revenue Degraded Forest land selected for Compensatory Afforestation -195.72 Ac (79.20 ha) at village Talmunda under Laikera Tahasil of district Jharsuguda.**

**Block Plantation @ 1600 plant: 20.00 ha  
ANR with planting @ 400 plants: 50.00 ha**

**By Divisional Forest Officer,  
Jharsuguda Division**

# SCHEME FOR COMPENSATORY AFFORESTATION

---

## 1. Introduction:

The Bharat Petroleum Corporation Limited (A Govt. of India PSU), intends to establish an OIL DEPOT through State Nodal Agency for Industrial Development IDCO, Bhubaneswar. Land has been identified at village Arda, Tahasil- Kirmira, District- Jharsuguda, Odisha for the purpose. 39.599 ha of Revenue Forest land has been proposed for diversion u/s 2 of the Forest (Conservation) Act, 1980. The Divisional Forest Officer, Jharsuguda vide his letter No 931/ 4F (Misc) dated 24.02.2020 has requested the Collector, Jharsuguda to provide degraded Revenue Forest Land to an extent of 79.198 ha (39.599 hax2) for compensatory afforestation purpose. (Copy of the letter is at **Annexure-A**). The Collector, Jharsuguda vide his letter noXVIII-C-22/2020/ 8553 / Rev dated 18.06.2020 (Copy enclosed as Annexure-B) has provided 195.72 Ac (79.20 ha) of degraded forest land for compensatory afforestation purpose against diversion of 39.599 ha of Revenue Forest land for the project.

## 2. Details of Non-forest land allotted for Compensatory afforestation:

The Degraded Revenue Forest Land for Compensatory Afforestation purpose is identified at village Talamunda under Laikera Tahasil of district Jharsuguda. The particulars of land identified for Compensatory Afforestation is furnished below.

Tahasil	Village name	Khata No	Plot no	Total area of the Plot in Acre	Area identified for CA in Acre	Kissam of the Land at present
Laikera	Talamunda	323 (rakhit)	2874	25.00	25.00	Gramya jungal
			2875	42.05	42.05	
			2637	38.72	17.95	
			2638	2.03	2.03	
			2782/ 3297	2.70	2.70	
			2843	36.20	33.00	
		325 (AJA)	812	42.80	37.72	Patra Jungal
			2716	25.92	25.92	
			2782	20.72	9.35	
	<b>Total</b>	<b>2 Khata</b>	<b>9 Plot</b>	<b>236.14</b>	<b>195.72 = 79.20 ha</b>	

The District Collector, Jharsuguda has provided the above land for compensatory Afforestation purpose vide letter No noXVIII-C-22/2020/ 8553 / Rev dated 18.06.2020 (Annexure-B)

### 3. Description of Area:

The identified land is under the Jurisdiction of Bagdihi Range of Jharsuguda Division.

The area identified for Compensatory Afforestation is in three patches. Out of three patches two patches have common boundary with **Bhai Bahen Budhikuten Reserved Forest** and the 3<sup>rd</sup> patch is around 200 meters from the 2<sup>nd</sup> patch. The identified land is in compact patches, close to Reserved Forests and suitable for management. The area finds place in Survey of India Topo Sheet No F45M5 (73C/5). The patch wise area is as follows.

Mouza	Patch No.	Khata No.	Plot No.	Area of the Plot in Acre.	Area Earmarked	Kissam
Talamunda						
	Patch - I	325	812	42.80	37.72	Patra Jungle
			2782	20.72	9.35	Patra Jungle
		323	2843	36.20	33.00	Gramya Jungle
			3297	2.70	2.70	Gramya Jungle
	Patch-I (Total)		4 Plot	102.42	82.77 (33.49 ha)	
	Patch - II	325	2716	25.92	25.92	Patra Jungle
		323	2874	25.00	25.00	Gramya Jungle
			2875	42.05	42.05	Gramya Jungle
	Patch-II (Total)		3 plot	92.97	92.97 (37.62 ha)	
	Patch - III	323	2637	38.72	17.95	Gramya Jungle
			2638	2.03	2.03	Gramya Jungle
	Patch-III (Total)		2 plot	40.75	19.98 (8.09ha)	
Total Area (Patch-I,II & III)			9 Plot	236.14	195.72 Acre. ( 79.20 ha)	

**Soil:** The land is having a good soil depth to bear healthy vegetation. Soil is of red alluvial soil with small patches of gravelly soil. The area is well drained.

**Topography:** The area is mostly Plain land. It is situated on the periphery of the Reserved Forest. The hillock in reserved forest is about 200 m above MSL. The runoff from the RF brings top soil and deposited in this area. Patches affected by Rill Erosion noticed. There is a small water body in Patch-III which retains the water coming from the hills of the Reserved Forests.

**Climate:** The area experiences a tropical climate. The average rainfall is 1400mm. summer is from March to June. The South West monsoon brings usual rain and most of the rainfall receives within July to October. Depression in Bay of Bengal brings wide spread rainfall to this region though it is away from the sea. It also experiences heavy rainfall due to depression in Bay of Bengal. The rain fall for last three years is furnished below.

Rainfall data of Laikera Block of Jharsuguda District													
Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Total
2017	2.10	0.00	5.00	0.00	84.50	256.40	584.30	311.90	293.60	116.90	0.00	0.00	1654.70
2018	0.00	0.00	3.20	38.80	158.50	169.90	443.10	423.70	115.90	22.00	0.00	92.70	1467.80
2019	0.00	37.20	10.30	39.30	29.40	224.30	268.90	769.60	359.70	147.10	0.00	0.00	1885.80
Total	2.10	37.20	18.50	78.10	272.40	650.60	1296.30	1505.20	769.20	286.00	0.00	92.70	5008.30
Aver.	0.70	12.40	6.17	26.03	90.80	216.87	432.10	501.73	256.40	95.33	0.00	30.90	1669.43

**Vegetation:** The area is adjacent to Bhai Bahen Budhikuten Reserved Forests. As the area is plain, it bears good Sal poles but under constant biotic pressure. Sal mixed with other miscellaneous associates of dry Sal is observed. In degraded areas, Kendu, Palas, Khair Asan, Dry Jamun, planted Teak, Zyziphus species are seen. The crop is mostly of drier tract. Phoenix, Dhataki (Wodfodia) are seen in open patches. Bamboo is not encountered during field visit.

#### **Biotic interference:**

The area experiences grazing pressure to some extent.

**Villages surrounding the area:** The land is surrounded by village- Talamunda of Jharsuguda district and Chandalimal of Sambalpur District. The population in these villages is as given below.

Demographic Profile of villages surrounding.							
District	Name of village	No_HH	TOT_P	TOT_M	TOT_F	P_SC	P_ST
Jharsuguda	Talamunda	580	2325	1138	1187	449	1206
	Chandalimal	280	1074	530	544	46	206
	Total	860	3399	1668	1731	495	1412
	Percentage			49.07	50.93	14.56	41.54

#### 4. Plantation Model:

The patch wise area available for Block Plantation and ANR@400 plants per ha is as follows.

Patch	Area in Ac	Area in ha	Suitable for Block Plantation in Ha	Suitable for ANR @400 plants / Ha	Periphery in Mts
Patch-I	82.77	33.49	10.00	20.0	3817.50
Patch-II	92.97	37.62	4.00	30.0	3327
Patch-III	19.98	8.09	6.00	0	1267.50
Total	195.72	79.20	20.0	50.0	8412.00

It is proposed to take up in **Block Plantation Mode @1600 plants per hectare and ANR @400 plants per ha model over the area as stated above.** Soil & Moisture Conservation measures as prescribed in the cost norm will be strictly followed. In additional cost for SMC will also be taken up as described under para 5 (f) below. The approved cost norm by PCCF, Odisha updated to wage rate Rs.308.00 will be applicable.

#### 5. Schedule of Plantation Program:

The area is in a single village. Area selected for Block Planting is 20.0 ha and ANR over 50.0 ha. The seedlings that could be planted is 52000 nos seedlings as detailed below.

Sl no	Planting Model	Area in Ha	No of Seedlings per ha	Total Seedlings to be planted
Patch-I	Block Planting	10.0	1600	16000
	ANR	20.0	400	8000
Patch-II	Block Planting	4.0	1600	6400
	ANR	30.0	400	12000
Patch-III	Block Planting	6.0	1600	9600
Total		70.0		52000

As the selected patch is a degraded forest area, Sal is in pole crop / degraded stage after a good fencing, the area will be fully covered with Sal and miscellaneous crop. Planting of 400 plants per ha may not be uniformly possible but can be easily planted up. The selected area is in a village and it is proposed to cover up in a single year which will be most effective and convenient from plantation management point of view.

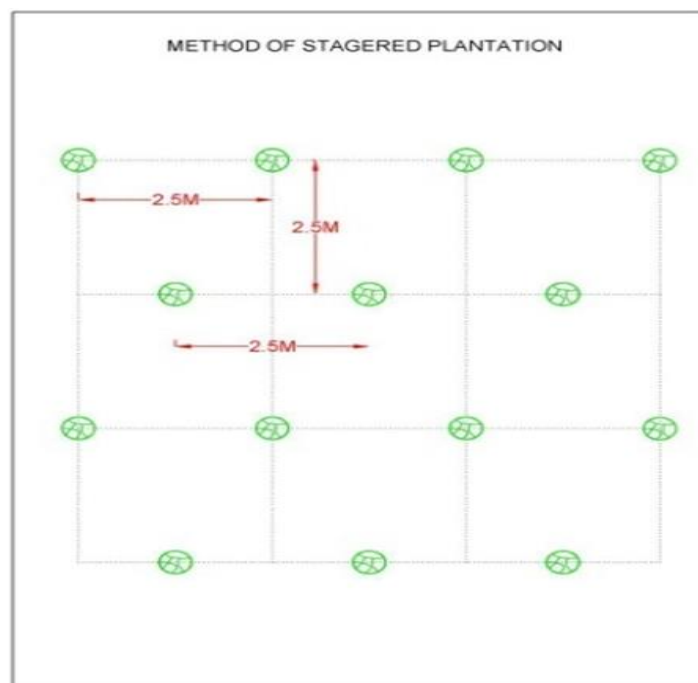
Hence it is proposed to take up the plantation work in a year and subsequent maintenance for 10 years as per approved cost norm. The Soil conservation measures are also proposed to be taken up in the 0<sup>th</sup> Year, 1<sup>st</sup> yr and 2<sup>nd</sup> yr. The Cost norm @Rs.308/- wage rate for Block Plantation (Without Fencing) and ANR @400 plants per ha with 10 years maintenance is at **Annexure-II& III**. Separate Barbed wire fencing is provided to the plantation. The boundary line common with Reserved Forest is not to be fenced in order to maintain continuity with the RF and Wildlife movement. The cost for planting is calculated as a single project than individual patches.

## 6. Technical details:-

- a) **General:** The plantation will be taken up in Block Plantation Mode over 20.0 ha and ANR @400 seedling per ha mode over balance 50.0 ha. The year wise activities to be implemented has been enumerated in the approved Cost norm at **Annexure-II &III**

### For Block Planting @1600 plants per ha

- b) **Spacing:** The plant density proposed for planting is @1600 plants per ha. The spacing is 2.5mX2.5m which is generally adopted in this tract. It is suggested to have the line of planting along the contour and plant to plant in adjacent row is staggered.



This will reduce the runoff and encourage percolation of water and enrichment of vegetation.

**C. Choice of Species:** The suitable species for the site as indicated from the present vegetation are mostly of indigenous species. The Species suggested are

1. *Azadirachta indica* (neema)
2. *Aegle marmelos* (Bela)
3. *Acacia catechu* (Khair)
4. *Bombax ceiba* (Simili)
5. *Cassia fistula* (Sunari)
6. *Dalbergia Sisoo* ( Sisoo)
7. *Dalbergia latifolia* ( Pahadi sisoo)
8. *Gmelina arborea* ( Gambhari )
9. *Mangifera indica* (Aamba)
10. *Phyllanthus emblica* (Anla)
11. *Pongamia pinnata* (karanja)
12. *Syzygium cumini* (Jamun)
13. *Bauhinia vahlii* (Siali)
14. Any other species suggested by VSS.

#### **d) Plantation Method.**

##### **d(i) Survey Demarcation & Pillar Posting:**

The Allotted area has been demarcated, Pillars posted and duly surveyed by DGPS. The coordinated (Latitude / Longitude) of pillars are provided in the DGPS Map attached to this scheme. The area is bounded by

**Latitude:**

**Longitude:**

The area finds place in Survey of India Topo Sheet No F45M6 (73C/5).

The Pillar No / Latitude / Longitude of pillars posted are at Annexure – VII.

#### **d(ii) Alignment, Stacking and Pitting.**

Alignment and stacking will be taken up in the month of January. Pits of size 30 cm x 30 cm x 30cm are to be dugout with a spacing of 2.5mt x 2.5mt @1600 plants per hectare. Alignment will be made along the contour strictly. It is also suggested to have plants staggered within adjacent rows to reduce runoff.

#### **d(iii) Planting**

Plantation will be done after first regular shower of monsoon and to be completed within a week. Basal dose of NPK/DAP fertilizer @50gm per plant to be given. Utmost care is to be taken to apply insecticides @5gm per pit. Casualty replacement is to be taken up during 1<sup>st</sup> year of plantation just after one month of planting. 10% causality replacement is also suggested during 2<sup>nd</sup> Year.

#### **d(iv) Weeding, Soil working and Application of Fertilizer:**

Post planting operation is most vital in success of any planting program. It is proposed to carry out two weeding during first year. Preferable total Weeding along the contour will be taken up. One weeding and soil working has to be done in second year and third year of plantation. Application of 35gms of Urea to be added to the soil per plant at the time of soil working during rains during 1<sup>st</sup>, 2<sup>nd</sup> & 3<sup>rd</sup> year of plantation.

#### **d(v) Application of insecticide:**

To prevent infestation of planted seedlings with diseases due to influx of insects and pests into the area, it is required to apply insecticides like Forate /themet at the time of planting. Foliar spraying of insecticide may be done if badly necessary.

#### **d(vi) Fire line tracing and maintenance:**

Tender seedlings planted are subject to damage by ground fire. It is required to protect the plantation and forest growth from fire hazard by tracing of fire lines. Boundary of the plantation and several internal lines need to be scrapped to a width of 2mtr during February-March. The cut back materials and dry leaves along with fire lines should be separated and dumped in pits outside the plantation area.



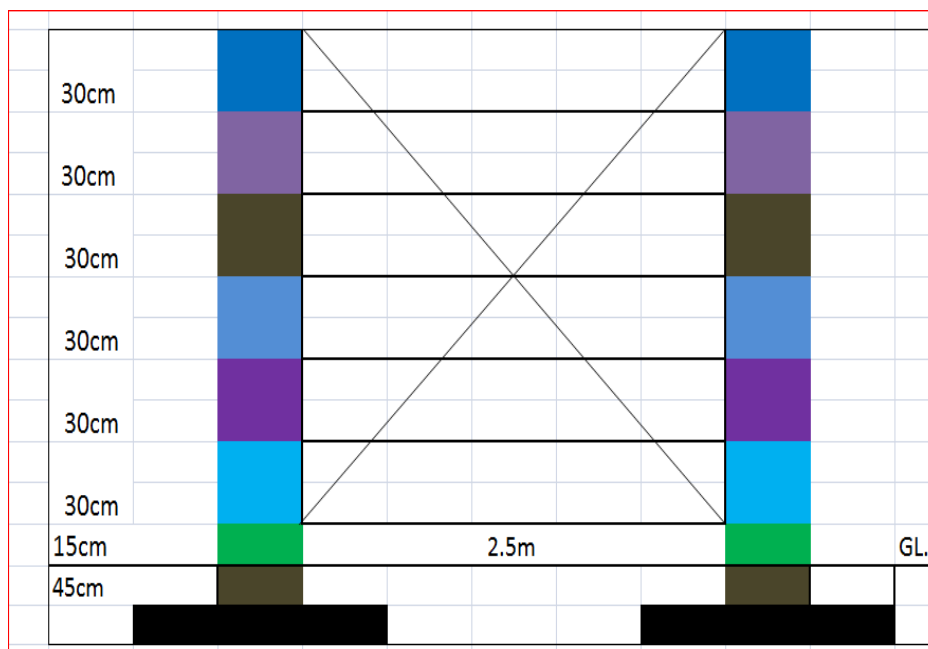
#### **d(vii) Fencing:**

The periphery of the patch selected is 8412 meter. There is a provision of fencing in the cost norm of “Block Plantation” as approved by PCCF, Odisha. It is proposed to provide Barbed Wire fencing instead of Brushwood fencing. Approved cost norm @Rs280/- wage rate is Rs 6, 67, 712/- per RKM. The cost has been enhanced to **Rs 6,86,473.86** due to revision of wages to Rs 308.00 per day.(Revised Cost norm is enclosed as **Annexure-IV**)

#### **Description of Barbed Wire Fencing.**

It is suggested to put T shaped pillars at an interval of 2.5m. The length of such pillar is 2.40 m. (1.95 m above the ground & 0.45m below the ground.) Size:15cmx15cm at bottom and 10cm x10cm at top. The Lower bar of inverted “T” is of 30cm including the width of the pillar. There will be 7 strands of two ply barbed wires and to be placed at a height of 15cm, 45cm, 75cm, 105cm, 135cm, 165cm and 195cm from the ground level. Two strands will be put diagonally (connecting 15cm point to 195 cm point & 195cm point to 15cm point of adjacent pillar).

The total amount for Barbed wire fencing for 8.412 RKM. @ **6,86,473.86** Per RKM comes to Rs.5774618.11/-



#### **d(viii) Watch and Ward:**

Watch and ward is necessary to protect the area from grazing, fire accident and other biotic interference. Necessary provisions have been made in the approved cost norm.

#### **e) Soil and Moisture Conservation Works:**

In order to enhance soil moisture, check run off and arrest carrying of silt in the flow water it is required to have staggered trenches (Size 2m longx0.50 m width X0.5 m Deep ) along the contour. In the cost norm 30 numbers of staggered trenches per hectare has been provided.

#### **For ANR @400 Plants per ha:**

#### **f) silvicultural Cleaning:**

The selected area is having Sal shoots of promising vigour and also some ruminants of old plantation. Only few teak plants are available. It is proposed to take up Silvicultural cleaning over the area. The activities are intended to achieve healthy growth of existing seedlings / saplings / coppice shoots of favoured species. The operation includes

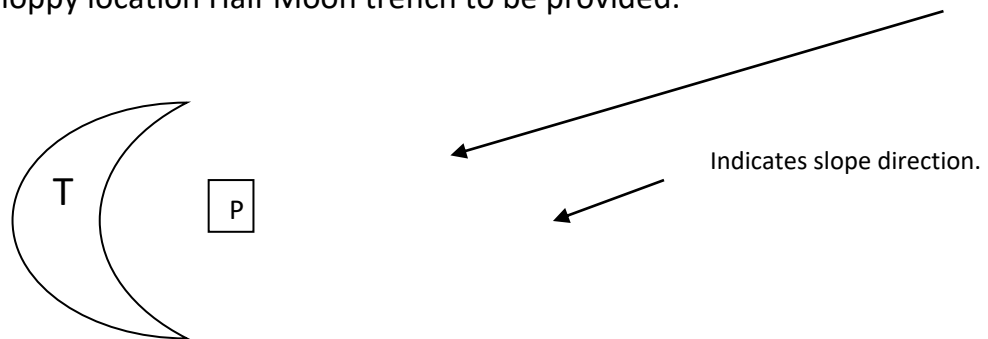
- Cutting back of high stumps with preference to living stumps and having a good coppicing power.

- Cutting of climbers those are of annual nature and uprooting them wherever possible.
- Singling out of multiple coppice shoots and retaining most promising ones.
- Pruning of teal plants available within the area.

The natural seedlings available in the treatment area are to be given appropriate attention to ensure its establishment.

The following measures are prescribed.

- Deep Soil Working around the seedlings at a width of 0.50 m with application of fertilizer.
- Weeds to be removed / uprooted at a radius of 1 meter.
- In case of sloppy location Half Moon trench to be provided.



- T : Half Moon Trench
- P: Plant position.

#### i) Restocking of Area by Planting (Artificial Regeneration) & Post-care operation.

Plantation of indigenous species matching with the local species is required to be planted following the cost norm of Plantations approved by Forest department. The species suggested are Pahadi sisoo (*Dalbergia latifolia*), Khaira (*Senegalia catechu* / *Acacia catechu*), Bela (*Aegle marmelos*), Phasi (*Anogeissus acuminata*), Dhaura (*Anogeissus latifolia*), Asan (*Terminalia tomentosa*), Arjun (*T. arjuna*), Bahada (*T. belerica*), Bandhan (*Ougeinia oojeinensis*), Kuruma (*Adina cardifolia*), Jamu (*Syzygium cumini*) etc.

#### ii) Control of Grazing.

The area is required to be closed to grazing at least for three years. As fencing is provided it will not be a problem to check grazing.

### **iii) Fire Protection Measures.**

The area is to be protected against fire. Fire line is required to be maintained along the periphery and internal lines. Controlled burning of weeds / fallen leafs may be taken up under strict supervision of section forester.

### **iv) Soil & Moisture conservation.**

In the cost norm staggered trenches @ 60 no per ha is provided. This is to be implemented.

All the operations as per cost norm is to be followed.

### **f) Additional Soil & Moisture Conservation work:**

As per the recent guidelines 25% of the Planting cost is to be provided for additional SMC activities. The following activities under Additional Soil & Moisture Conservation are proposed.

- a) Treatment of natural recruits and seedlings (within 1meter height) available within the area. Half moon trench, soil working around the plants at a width of 0.5m radius to be taken up.
- b) Contour bonding along the contour is to be constructed; Size  $(1.5m+1m)/2 \times 1m$  to provide a check to runoff. At least two / three contour bonds parallel to each other is to be constructed as the run off velocity is likely to be high.
- c) Staggered trenches in between contour bonds are suggested which will check the accumulation of runoff and reduce the velocity.
- d) There is one water body which will be maintained to retain water throughout the year to provide water to animals and also help in in-situ Nursery for proposed plantation/ causality replacement.
- e) It is also proposed to have Percolation pits of 1mx1mx1m @ 200 numbers per hectare @64 MD per ha. The cost comes to **Rs 19712.0 per ha**

### **g) Proposed Monitoring Mechanism:**

Implementation of the planting program will be monitored by the DFO, Jharsuguda and RCCF, Sambalpur periodically. As other technical facilities / tools are now available at the hands of supervising authority and KML file along with Coordinates available it can be

easily monitored from Satellite imagery / Google earth maps. Plantation journal is also to be regularly maintained by Field staff.

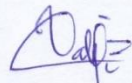
#### 7. Abstract of Cost Estimate:

( Wage Rate 308 per Day)		
Sl No	Description	Amount in Rs
1	Cost of Block Plantation @1600 plants per ha over 20.00 ha @ Rs 138119.94 with 20 years maintenance without provision of fencing.	2762398.80
2	ANR with planting @400 plants per ha @ 59389.26 over 50.00 ha	2969463.00
3	Barbed Wire fencing over 8.412 km with 3 years maintenance @2% of initial cost per RKM @ <b>6,86,473.86</b>	5774618.11
4	In the Scheme Seedling up to 52000.00 seedlings could be planted up against 79200 plants required. The balance seedlings i.e. 27200 seedlings will be planted up as per Working Plan prescription as ANR 400/plant over 68 ha. The Cost per ha @ 59389.26	4038469.68
	Total CA Cost (A)	15544949.59
5	Add. Soil & Moisture Conservation.	
a	Contour Bonding over 8 Km (size: (1.5m+1m)/2 x1m = 1.25 cum per Rmt. @ Rs 198.72 per cum	1987200.00
b	Staggered Trench (2.5 mt. X 0.5 mt. X 0.5 mt.)300 nos per ha. @ 66 MD over 79.20 ha.	1609977.60
c	Cost of Percolation Pit of size 1mtx1mtx1mt)@200 numbers per ha @64 MD per ha over 79.20 ha ( 64*308.0*79 ha)	1557248.00
d	Treatment of Natural seedlings / recruits @ 200 plants per Ha @ 20/- per plant i.e.4000/- per ha over 40.0 ha	160000.00
e	Improvement of existing water body on LS	500000.00
	SMC Cost Total (B)	5814425.60
6	15% of total Plantation Cost towards Entry Point Activities / Incentive to VSS including monitoring & Evaluation.	2331742.43
7	One Watch Tower With facilities of Solar lighting for protection of plantation from growing and FF.	4000000.00
8	Cost of 5 Nos Fire Blower	300000.00
9	Cost of strengthening of Division Office for internal communication system etc. ( One Computer along with scanner cum printer, Colour Xerox Machine and High end configuration laptop)	500000.00
10	Contingency and administrative expenses.	500000.00
	Total	28991117.62
	Add Escalation Cost (20%)	5798223.52
	Grand Total	<b>34789341.14 or 34789341.00</b>

(Rupees Three Crore Forty-Seven Lakhs Eighty-Nine Thousand Three Hundred Forty-One) only

Encl:

1. Toposheet showing area for CA, (Plate-I)
2. Cadastral Map of the CA area. (Plate-II)
3. Annexure- I, II, III, IV, V& VI.

  
Divisional Forests Officer,  
Jharsuguda Forest Division  
Jharsuguda Forest Division

**Full Title of the Project:** Establishment of Oil Depot by BPCL at Village Arda, Jharsuguda through IDCO, Bhubaneswar.

**File No.:**

**Date of Proposal:**

## Annexure-I

Cost Norm For Block plantation (@1600 Plants per Hectare)(Fodder Plantation)						
For ten year maintenance.						
Wage rate- @Rs308.00						
Sl. No	Item of Work	Preferable Period of Execution	Person days	Labour cost @Rs 308.00 per day	Material (Rs)	Total (Rs)
0 <sup>th</sup> Year (Advance Work)						
1	Survey, Demarcation and Pillar Posting,	Nov / Dec	2	616.00	0.00	616.00
2	Site Preparation	Nov / Dec	12	3696.00	0.00	3696.00
3	Alignment & Stacking of pits.	Jan / Feb	2	616.00	0.00	616.00
4	Digging of pits (30cm cube)	Feb / March	40	12320.00	0.00	12320.00
5	Nursery Cost (6 month old seedling) Part@12.43/seedling (Rs8.67in 0th yr +Rs3.76 in 1st year)for 1760seedlings (1600+160)	Jan / March	44	13552.00	2939.00	16491.00
	<b>S.Total</b>		<b>100</b>	<b>30800.00</b>	<b>2939.00</b>	<b>33739.00</b>
6	Monitoring & Supervision charges 5% of the cost					1686.95
	<b>G.Total</b>		<b>100</b>	<b>30800.00</b>	<b>2939.00</b>	<b>35425.95</b>
1 <sup>st</sup> Year / Planting Year						
7	Nursery Cost (6 month old seedling) Balance @3.76 for 1760 seedling	Apr-June	21.5	6622.00	593.00	7215.00
8	Carriage and planting Casualty replacement and application og insecticide, manure etc.	July / Aug	21	6468.00	0.00	6468.00
9	Cost of Insecticide & Fertilizer. (a) NPK @50gm/ plant as basal dose=80kg @Rs24/- per Kg : Rs1920/- (b) Urea 70gm per plantin two subsequent doses@6/- per kgRs672/- (c ) Granullar insecticides (Themet , Forest, etc @5gm/ plant@Rs80/ kg=Rs640/-			0.00	3232.00	3232.00
10	1 <sup>st</sup> Weeding (Complete weeding)	Aug / Sept	7	2156.00	0.00	2156.00
11	Manuring of urea 35gm/ plant	Aug / Sept	5	1540.00	0.00	1540.00
12	2 <sup>nd</sup> Weeding (Complete weeding)	Sept / Oct	5	1540.00	0.00	1540.00
13	Soil Working(50cm Radius around plant) maureing 35g/ plant		7	2156.00	0.00	2156.00
14	Soil conservation measures in the form of Staggered trenches of 2m Lx.5m x0.5m @ 30 no/ ha.	Sept/ Oct.	10	3080.00	0.00	3080.00
15	Fire line tracing & inspection path		3	924.00	0.00	924.00
16	Watch & Ward		7	2156.00	0.00	2156.00
	<b>Sub Total</b>		<b>86.5</b>	<b>26642.00</b>	<b>3825.00</b>	<b>30467.00</b>
17	Monitoring & Supervision charges 5% of the cost					1523.35
	<b>G.Total</b>		<b>86.5</b>	<b>26642.00</b>	<b>3825.00</b>	<b>31990.35</b>

2 <sup>nd</sup> Year Maintenance						
18	Casualty Replacement (10%) with nursery cost	July / Aug	4	1232	1988.80	3220.80
19	weeding ( Complete weeding)		6	1848	0.00	1848.00
20	Cost of Fertilizer @NPK 70g/ plant (Rs24.00 per Kg & inecticides @5g/ plant for 160 plants 800 gm @Rs80/- per Kg			0.00	2752.00	2752.00
21	Soil working 50bm Radius around Plant	Oct / Nov	7	2156.00	0.00	2156.00
22	Application of Fertilizer & insecticides.	Sept/ Oct	4	1232.00	0.00	1232.00
23	Fire line tracing (2m Wide fire line over 400m long)	Feb/ March	3	924.00	0.00	924.00
24	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>39</b>	<b>12012.00</b>	<b>4740.80</b>	<b>16752.8</b>
25	Monitoring & Supervision charges 5% of the cost					837.64
	<b>G.Total</b>		<b>39</b>	<b>12012.00</b>	<b>4740.80</b>	<b>17590.44</b>
3 <sup>rd</sup> Year maintenance						
26	Weeding and application of fertilizer	Aug / Sept	7	2156.00	0.00	2156.00
27	Cost of fertilizer. NPK @50g/ plant @Rs24/- per Kg			0.00	1920.00	1920.00
28	Soil Working(50cm Radius around plant)	Oct / Nov	7	2156.00	0.00	2156.00
29	Fire line tracing (2m Wide fire line over 400m long) & cultural operation	Fec / March	3	924.00	0.00	924.00
30	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>32</b>	<b>9856.00</b>	<b>1920.00</b>	<b>11776.00</b>
31	Monitoring & Supervision charges 5% of the cost					588.80
	<b>G.Total</b>		<b>32</b>	<b>9856.00</b>	<b>1920.00</b>	<b>12364.80</b>
4 <sup>th</sup> Year maintenance						
32	Fire line tracing (2m Wide fire line over 400m long) & cultural operation	Feb / March	3	924.00	0.00	924.00
33	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5544.00</b>
34	Monitoring & Supervision charges 5% of the cost					277.20
	<b>G.Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5821.20</b>
5 <sup>th</sup> Year maintenance						
35	Fire line tracing (2m Wide fire line over 400m long) & cultural operation	Feb / March	3	924.00	0.00	924.00
36	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5544.00</b>
37	Monitoring & Supervision charges 5% of the cost					277.20
	<b>G.Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5821.20</b>



<b>6th Year maintenance</b>						
38	Fire line tracing (2m Wide fire line over 400m long) & cultural operation	Feb / March	3	924.00	0.00	924.00
39	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5544.00</b>
40	Monitoring & Supervision charges 5% of the cost					277.20
	<b>G.Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5821.20</b>
<b>7th Year maintenance</b>						
41	Fire line tracing (2m Wide fire line over 400m long) & cultural operation	Feb / March	3	924.00	0.00	924.00
42	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5544.00</b>
43	Monitoring & Supervision charges 5% of the cost					277.20
	<b>G.Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5821.20</b>
<b>8th Year maintenance</b>						
44	Fire line tracing (2m Wide fire line over 400m long) & cultural operation	Feb / March	3	924.00	0.00	924.00
45	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5544.00</b>
46	Monitoring & Supervision charges 5% of the cost					277.20
	<b>G.Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5821.20</b>
<b>9th Year maintenance</b>						
47	Fire line tracing (2m Wide fire line over 400m long) & cultural operation	Feb / March	3	924.00	0.00	924.00
48	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5544.00</b>
49	Monitoring & Supervision charges 5% of the cost					277.20
	<b>G.Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5821.20</b>
<b>10th Year maintenance</b>						
50	Fire line tracing (2m Wide fire line over 400m long) & cultural operation	Feb / March	3	924.00	0.00	924.00
51	Watch & Ward	April / March	15	4620.00	0.00	4620.00
	<b>Sub Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5544.00</b>
52	Monitoring & Supervision charges 5% of the cost					277.20
	<b>G.Total</b>		<b>18</b>	<b>5544.00</b>	<b>0.00</b>	<b>5821.20</b>
	<b>Grand Total</b>		<b>383.5</b>	<b>118118.00</b>	<b>13424.80</b>	<b>138119.94</b>

<b>ABSTRACT.</b>					
Year	Person days	Labour Component	Material Component	Monitoring & Supervision charge 5% of total cost	Total
0th Yr	100	30800.00	2939.00	1686.95	35425.95
1st yr	86.5	26642.00	3825.00	1523.35	31990.35
2nd Yr	39	12012.00	4740.80	837.64	17590.44
3rd Yr	32	9856.00	1920.00	588.80	12364.80
4th Yr	18	5544.00	0	277.20	5821.20
5th Yr	18	5544.00	0	277.20	5821.20
6th Yr	18	5544.00	0	277.20	5821.20
7th Yr	18	5544.00	0	277.20	5821.20
8th Yr	18	5544.00	0	277.20	5821.20
9th Yr	18	5544.00	0	277.20	5821.20
10th Yr	18	5544.00	0	277.20	5821.20
<b>Total</b>	<b>383.5</b>	118118.00	<b>13424.80</b>	6577.14	<b>138119.94</b>

## Annexure-III

## Cost Norm For ANR (@400 Plants per Hectare)

For ten year maintenance.

Wage rate- @Rs308.00

Sl. No.	Item of Work	Preferable period of Execution	Person days	Labour (Rs)	Material (Rs)	Total (Rs)
<b>0<sup>th</sup> Year</b>						
1	Survey, Demarcation and Pillar Posting, GPS Reading with mapping	Nov/ Dec	2	616.00	0.00	616.00
2	Site Preparation	Nov/ Dec	2	616.00	0.00	616.00
3	Silvicultural Operation including clearance of weed, climber cutting, high stump cutting, singling of shoots etc.	Jan/ Feb	5	1540.00	0.00	1540.00
4	Nursery cost (6 months old seedling ) part @ Rs. 12.43/- seedling (Rs 8.67 in 0th year + Rs 3.76 in 1st year) for 440 seedlings (400+40)	Jan/ March	11	3388	735.00	4123.00
5	Contingency and Unforeseen Expenditure		0	0.00	165.00	165.00
	<b>Sub Total</b>		<b>20</b>	<b>6160.00</b>	<b>900.00</b>	<b>7060.00</b>
6	Monitoring & Supervision charge 5% of the total cost					353.00
	<b>Grand Total</b>		<b>20</b>	<b>6160.00</b>	<b>900.00</b>	<b>7413.00</b>
<b>1<sup>st</sup> Year Planting</b>						
1	Nursery cost (6 months old seedling ) balance part @ Rs 3.76 for 440 seedlings	Apr- Jul	5	1540.00	255.00	1795.00
2	Pitting 30 cm cube size	Feb/ Mar	12	3696.00	0.00	3696.00
3	Carriage and planting including casualty replacement	Jul/ Aug	10	3080.00	0.00	3080.00

4	Complete weeding, Soil working, manuring	Aug /Sep	12	3696.00	0.00	3696
5	Cost of Vermi compost @ 200 gms/plant @ Rs 20/- per Kg = Rs 1600.00 and Granular insecticides 5 gms/plant @ Rs 80/- per Kg = Rs 160.00	Aug /Sep	0	0.00	1760.00	1760.00
6	Cost of Chemical Fertilizer (a) Urea 70 gms/plant in two subsequent doses @ Rs 6/- per Kg = Rs 168.00 (b) NPK 50 gms/plant @ Rs 24/- per Kg = Rs 480.00 as basal dose		0	0.00	648.00	648.00
7	Silvicultural Operation involving clearance of weeds, cutting of climbers, singling of shoot etc.	Sep/Oct	15	4620.00	0.00	4620.00
8	Soil conservation measures (staggered trenches of dimension 2 m x 0.5 m x 0.5 m @ 60 nos per ha) or its equivalent	Sep/Oct	20	6160.00	0.00	6160.00
9	Fire line tracing and inspection path	Feb/ Mar	3	924.00	0.00	924.00
10	Watch & Ward	Aug- Mar	7	2156.00	0.00	2156.00
11	Contingency and unforeseen expenditure		0	0.00	319.00	319.00
	<b>Sub Total</b>		<b>84</b>	<b>25872.00</b>	<b>2982.00</b>	<b>28854.00</b>
12	Monitoring & Supervision charge 5% of the total cost					1442.70
	<b>Grand Total</b>		<b>84</b>	<b>25872.00</b>	<b>2982.00</b>	<b>30296.70</b>
<b>2<sup>nd</sup> Year</b>						
1	Casualty Replacement including cost of seedling, carriage and planting.	Jul/Aug	2	616.00	497.20	1113.20

2	Complete weeding and cultural operations	Sep/Oct	4	1232.00	0.00	1232.00
3	Soil working and manuring	Sep/Oct	4	1232.00	0.00	1232.00
4	Cost of Fertiliser and insecticide (a) Vermi compost @ 200 gms/plant @ Rs 20/- per Kg = Rs 1600.00 (b) Granular insecticides 5 gms/plant for 40 plants 100 gms @ Rs 80/- per Kg = Rs 16.00	Sep/Oct	0	0.00	1616.00	1616.00
5	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
6	Soil conservation measures(Renovation of staggered trenches etc.)	Sep/Oct	8	2464.00	0.00	2464.00
7	Watch & Ward (Whole Year)	Apr-Mar	7	2156.00	0.00	2156.00
8	Contingency and unforeseen expenditure		0	0.00	362.00	362.00
	<b>Sub Total</b>		<b>26</b>	<b>8008.00</b>	<b>2475.20</b>	<b>10483.20</b>
9	Monitoring & Supervision charge 5% of the total cost					524.16
	<b>Grand Total</b>		<b>26</b>	<b>8008.00</b>	<b>2475.20</b>	<b>11007.36</b>
<b>3<sup>rd</sup> Year</b>						
1	Complete weeding and cultural operations	Aug /Sep	2	616.00	0.00	616.00
2	Soil working	Aug /Sep	2	616.00	0.00	616.00
3	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
4	Watch & Ward (Whole Year)	Apr-Mar	7	2156.00	0.00	2156.00
	<b>Sub Total</b>		<b>12</b>	<b>3696.00</b>	<b>0.00</b>	<b>3696.00</b>
5	Monitoring & Supervision charge 5% of the total cost					184.80
	<b>Grand Total</b>		<b>12</b>	<b>3696.00</b>	<b>0.00</b>	<b>3880.80</b>

4 <sup>th</sup> Year						
1	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
2	Watch, Ward & Pruning	Apr-Mar	2	616.00	0.00	616.00
	<b>Sub Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>924.00</b>
3	Monitoring & Supervision charge 5% of the total cost					46.20
	<b>Grand Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>970.20</b>
5 <sup>th</sup> Year						
1	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
2	Watch, Ward & Pruning	Apr-Mar	2	616.00	0.00	616.00
	<b>Sub Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>924.00</b>
3	Monitoring & Supervision charge 5% of the total cost					46.20
	<b>Grand Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>970.20</b>
6 <sup>th</sup> Year						
1	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
2	Watch, Ward & Pruning	Apr-Mar	2	616.00	0.00	616.00
	<b>Sub Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>924.00</b>
3	Monitoring & Supervision charge 5% of the total cost					46.20
	<b>Grand Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>970.20</b>
7 <sup>th</sup> Year						
1	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
2	Watch, Ward & Pruning	Apr-Mar	2	616.00	0.00	616.00
	<b>Sub Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>924.00</b>
3	Monitoring & Supervision charge 5% of the total cost					46.20
	<b>Grand Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>970.20</b>
8 <sup>th</sup> Year						
1	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
2	Watch, Ward & Pruning	Apr-Mar	2	616.00	0.00	616.00
	<b>Sub Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>924.00</b>
3	Monitoring & Supervision charge 5% of the total cost					46.20

	<b>Grand Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>970.20</b>
<b>9<sup>th</sup> Year</b>						
1	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
2	Watch, Ward & Pruning	Apr-Mar	2	616.00	0.00	616.00
	<b>Sub Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>924.00</b>
3	Monitoring & Supervision charge 5% of the total cost					46.20
	<b>Grand Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>970.20</b>
<b>10<sup>th</sup> Year</b>						
1	Fire line tracing and inspection path	Feb/ Mar	1	308.00	0.00	308.00
2	Watch, Ward & Pruning	Apr-Mar	2	616.00	0.00	616.00
	<b>Sub Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>924.00</b>
3	Monitoring & Supervision charge 5% of the total cost					46.20
	<b>Grand Total</b>		<b>3</b>	<b>924.00</b>	<b>0.00</b>	<b>970.20</b>
	<b>Grand Total</b>		<b>163</b>	<b>50204.00</b>	<b>6357.20</b>	<b>59389.26</b>

ABSTRACT.					
Year	Person days	Labour Component	Material Component	Monitoring & Supervision charge 5% of total cost	Total
0th Yr	20	6160.00	900.00	353.00	7413.00
1st yr	84	25872.00	2982.00	1442.70	30296.70
2nd Yr	26	8008.00	2475.20	524.16	11007.36
3rd Yr	12	3696.00	0.00	184.80	3880.80
4th Yr	3	924.00	0.00	46.20	970.20
5th Yr	3	924.00	0.00	46.20	970.20
6th Yr	3	924.00	0.00	46.20	970.20
7th Yr	3	924.00	0.00	46.20	970.20
8th Yr	3	924.00	0.00	46.20	970.20
9th Yr	3	924.00	0.00	46.20	970.20
10th Yr	3	924.00	0.00	46.20	970.20
<b>Total</b>	<b>163</b>	<b>50204.00</b>	<b>6357.20</b>	<b>2828.06</b>	<b>59389.26</b>

**Estimate for BARBED WIRE FENCING**

- 1) 02 PLY barbed wires 5 rmt per kg)  
 7 Straight stand x 1000mt = 7000mt  
 2 diagonal stand =  $2 \times \sqrt{\{(6.5)^2 + (8.2)^2\}} = 2 \times 10.50\text{ft}$   
 = 21.00 ft x 400nos = 8400 ft or = 2560 mt  
 9560mt

Requirement of Barbed wire per km

Cost per k m =  $9560/5 = 1912\text{kg}$  @ Rs 80/kg**Rs 1,52,960.00**

- 2) Construction of RCC Pillar size of length 8ft, Bottom width 6" x 6" ,  
 Top width – 4"x4" Reinforced with 6mm rods with proper curing  
 $\{8 \times (6'' + 4'')/2\} \times (6'' + 4'')/2 = 1.34\text{ft}$  or 0.038 cum

- |      |   |                          |
|------|---|--------------------------|
| i)   | Cost of CC work 1:2:4 0.038cum @5408.17/cum     | = 205.51                 |
| ii)  | Cost of rod including cutting bending & binding |                          |
|      | 0.038 x 0.9 qtl =0.0342qtl @Rs 10966.12/qtl     | = 375.04                 |
| iii) | Contingency (15% ) including                    | = 87.08                  |
|      | curing, stacking ,provision of hooks etc        |                          |
|      |   | <hr/> Rs 667.63 or 668/- |

**Requirement of pillars per kilometer**

Spacing = 2.5m x 2.5mt

Requirement =  $1000\text{mt} / 2.5\text{mt}$  = 400Strut pillar in every 10<sup>th</sup> pillar =  $(400/10) \times 2$  = 80-----  
480 nosCost of pillars per km =  $480 \times 668/-$ **Rs 3,20,640.00**

- 3) Fitting of fixing of RCC pillars in position with hbg metal (4cm) in C.M (1:4:8)

- i) Digging of pits  $1.5' \times 1.5' \times 1.5'$  = 3.375cft/pit  
 For 480 pits  $480 \times 3.375 = 1620\text{ cft}$  or 45.86 cum @13244/100cum = **Rs 6073.70**
- ii) Fixing of pillars with 4cm hbg metals in C.M 1:4:8  
 Pit size  $1.5' \times 1.5' \times 1.5'$  = 3.375cft  
 Deduct 1/3th of butt of pillar i.e  $3.375/3$  = (-) 1.125 cft  
 Total C.C work per pillar -----  
 2.25 cft  
 For 480 pillars =  $480 \times 2.25 = 1080\text{cft}$  or 30.577 cum @ 3743.70/cum **Rs 1,14,471.10**



4) Labour for straightening the barbed wire and fixing & clipping with pillars 70M.D per km @308.00	Rs 21,560.00
5) Carriage of Barbed wire & pillars to work site @ Rs 1000/tl and cost of loading & unloading within 5km distance Approximately 10tld @800/tld	Rs 18000.00
6) Provision of one iron Gate of size (4'x5') on LS	Rs 7500.00
Total =	Rs 641204.80
Labour Cess 1% =	Rs 6412.05
Expenditure per 1km of barbed wire fencing	Rs 6,47,616.85
Or say, Rs 644.68/- or 645/ per meter	

7) Expenditure towards maintenance for 3 years 3 <sup>rd</sup> , 6 <sup>th</sup> & 9 <sup>th</sup> year)	
@ 2% cost per rkm = 3 X 2% of Rs 647616.85	Rs 38857.01
Expenditure per 1km of barbed wire fencing including mentainance	Rs 6,86,473.86

**So expenditure per running for fencing = Rs 686.47/Mt**  
**(Rupees Six Hundred Eighty six and Forty Seven paise) only.**

**Annexure- V**

#### **Estimate for Staggered Trench**

Earth Work in hard Soil of Staggered Trenches of Size 2mt x 0.5 mt x 0.5 mt=0.5 cum.

Male and Female Mulia 43 no @ 308.00 per MD =13244/per cum.

For 100 cum earth work is required =13244/-

For 0.5 cum earth is required = $\frac{13244 \times 0.5}{100}$  =66.22 Or 66/-

**(Rupees Sixty six ) Only**

Analysis of Rate for Earth Work (100Cum) for Rs308.00 Wage Rate.

Sl No	Description	Unit Required	Rate	Amount.
1	Earth Work in hard Soil or gravelly soil within 50m initial lead and 1.5m initial lift including rough dressing and breaking clods to maximum 5cm to 7 cm and laying in layers not exceeding 0.3m in depth and as per the direction of the Engineer –in charge.	Labour Man Mulia 21.5 no	308.00	6622.00
		Woman Mulia 21.5	308.00	6622.00
I	Sub Total(Labour)			13244.00
ii.	Overhead charges @10% of (i)			1324.40
iii.	2% Sundries and T&P etc. on (i)			264.88
	Total Earth Work			14833.28
iv.	Add 20% excess for Foundation / trenches etc			2966.65
2	Compacting of soil on embankment (for 28.31 Cum)			
I	Ramming or Rolling earth work with Light H.R.R in embankment in layers not exceeding 0.30m for 28.31 cum	Labour man mulia 0.75 nos	308.00	231.00
		Woman mulia 0.50 nos	308.00	154.00
	Sub Total			385.00
ii.	Overhead charges @10% of (i)			38.5
iii.	2% Sundries and T&P etc. on (i)			7.70
iv.	Total			531.20
v	Compacting for 100 Cum= 531.20*100/28.31			1876.39
A.	For 1 Cum (Earth Work & Compacting )	= (14833.28+2966.65 +1876.39)/ 100		196.76
	Contractors Profit @7.50%			14.75
	Add 1% labour Cess			1.96
	<b>Total</b>			<b>213.47</b>
	Total after deduction of Contractors profit due to Forest Department work.			<b>198.72</b>

(Rupee One Hundred Ninety Eight and Seventy Two paise only)

DFO, Jharsuguda

*[Signature]*  
 Divisional Forest Officer  
 Jharsuguda Forest Division